Session 1: 8:30-10:15 AM

1.1 The “Race” That Wouldn’t End: Genetics, Population, and Identity

Wenda Bauchspies, Pennsylvania State U and Alondra Nelson, Yale U

Discussant: Wenda Bauchspies, Science, Technology, and Society Program, Pennsylvania State University

Georgia Room

- “Letting the Genie Out of Its Bottle: Contemporary Population Genetics and the New Biological Basis of Race”, Stephanie M. Fullerton, Penn State U

The end of the biological basis of race can be dated to the scientific/political ‘Statement on Race’ commissioned by the United Nations Education, Scientific, and Cultural Organization at the conclusion of WWII (UNESCO 1952). As Haraway (1989: 201-2) has noted, however, the original UNESCO Statement, authored by social scientists, was quickly superceded by a more authoritative
version, composed instead by geneticists and physical anthropologists. Thus, human population geneticists were instrumental in producing the (scientific) knowledge deemed definitive in combating theories of racial inequality and prejudice. It therefore comes as some concern that contemporary investigations of global genetic variation (e.g. Rosenberg et al. 2002) have begun to affirm a portrait of human diversity which emphasizes readily ascertainable inter-continental genetic differences, differences which look for all the world like an objective confirmation of the biological validity of race. The authors of these accounts do not use the term ‘race’ to describe their findings and they are careful to disavow a narrowly typological interpretation of the reported variation. Nevertheless, their results ARE invoked in the defense of the use of race as a biomedical research variable. The reasons underlying this apparent disciplinary shift in emphasis, and its near- and longer-term societal implications, will be discussed.


The idea that race is a social construct is one that has not only become something of an article of faith among sociologists, but which is now often presumed by them to have won over most social and natural scientists. As the American Sociological Association’s 2002 Statement on Race put it, “Respected voices from the fields of human molecular biology and physical anthropology (supported by research from the Human Genome Project) assert that the concept of race has no validity in their respective fields.” In contrast, researchers often assume that the American public maintains traditional, essentialist beliefs concerning the nature of race. As a result, educators since the 1940s have sought to transform lay views of race by exposing the public to what they consider the latest scientific thinking. In the aftermath of World War II and the
concomitant atrocities committed in the name of race science, anthropologists Ashley Montagu and Ruth Benedict wrote monographs challenging longstanding beliefs about race that were to be circulated in public venues from churches to the military units, and the United Nations Educational, Scientific, and Cultural Organization (UNESCO) developed a series of Statements on Race for mass circulation. Contemporary echoes of such public information campaigns can be found in evolutionary biologist Joseph Graves’ call for a new Manhattan Project to inform Americans about prevailing scientific perspectives on race, or the nationwide airing of the public television documentary “Race: The Power of an Illusion.”

In addition to such mass public information initiatives, social and biological scientists who seek to transform American lay understandings of race have also appealed to schools to play a role. In 1967, the authors of UNESCO’s Fourth Statement on Race wrote, “The schools should ensure that their curricula contain scientific understandings about race and human unity, and that invidious distinctions about peoples are not made in texts and classrooms.” Yet today we know little about how American schools met this charge. Although researchers have examined the degree to which curricular materials reflect bias, little attention has been paid to the messages conveyed to students regarding the existence or origins of racial difference.

Using a sample of 80 high-school biology textbooks published in the United States between 1952 and 2002, I chart changes over time in the ways the texts define and illustrate race. I find that although race has become a less prominent subject of American biological pedagogy over time, it has not necessarily lost its status as a tool for understanding human biology. And despite social scientists’ faith in the explanatory power of constructionism to account for the existence of racial categories, consideration of the social nature of race is almost entirely absent from the biology textbooks. Instead, their discussions of race have merely shifted the grounds on which they are based, moving away from the
When the decoding of the human genome was announced at a White House press conference, President Clinton proclaimed that this achievement proved “our common humanity.” Celera Genomics head J. Craig Venter’s comments during the event were more cautious; he remarked that with the genome deciphered, genetics was entering its “interpretation phase.” Venter was most certainly referring to efforts to develop therapies with information gleaned from the human genetic database. Yet, his was also an apt characterization of the disputes that have unfolded in ensuing years about how to best interpret our genetic “common humanity,” in particular, understandings of race/ethnicity. Broadly speaking, the genes and race debate has involved, on the one hand, population geneticists who argue that human beings map onto groupings that approximate long-held conceptions about race and clinical researchers who contend that self-reported racial identity is critical to understanding health and drug response disparities. On the other side, social scientists assert that race is socio-cultural category and not a biological one. In this paper, I examine a third arena in which the association between race and genes is being actively constructed—the use of genetic technologies to trace African American genealogy. Much of African American history was irrevocably lost during the Middle Passage in which between 12 and 40 million Africans were transported to various New World outposts as slave laborers. Many have been unable to reconstruct their family lineages in the dramatic manner depicted in Alex Haley’s Roots. Recently, a spate of commercial services has come along to fill this genealogical lacuna. Using tests which trace maternal and paternal lineage
through mtDNA and Y chromosomes, respectively, these services have harnessed the power of genetics to provide certainty of African ancestral heritage. Similar to population geneticists, these services proceed from the assumption that race can be ascertained from a few group-exclusive genetic markers. Yet, in the vein of the social scientists recent assertions, these services may profoundly transform notions of identity as African Americans are able to forge a sense of connection with particular African cultures. In this paper, I will outline a short history of these services and the technologies on which they rely. Questions include: How is the race and genes debate being played-out outside of scientific communities? How does the authority of DNA provide racial certainty?

1.2 Technology, Place, and Practice: An Ethnographic Perspective

Sub-Panel 1

Mizuko Ito, U of Southern California and Carsten Osterlund, Syracuse U

Discussant: Sharon Traweek, UCLA

Ardmore Room

New communication and information technologies are altering the experience and practice of place. Engineers, anthropologists, architects, and cultural geographers are just beginning to grasp the consequences of proliferating forms of technical mediation. This panel draws on a growing interdisciplinary conversation about cultural geography and globalization in relation to new media technologies, and works to ground this discourse in concrete practice-based ethnographic cases. While there is more and more work that broadly interrogates social and cultural processes related to new media technologies, there is still relatively little work that looks at the details and materialities of how new technologies are embedded in, transform, and reproduce place. The everyday practices that integrate electronic media and new technology with
spatial organizations of social relations receive little attention. The panel addresses this gap in the literature by bringing into dialog interdisciplinary perspectives on place with grounded ethnographic perspectives on everyday uses of new technology and their relation to our spatial practices. This four-part panel draws from a wide range of research grounded in the specificity of ethnographic study and design experimentation with technologies of place-making, both old and new. Cases include electronic document and record systems, mobile work and play practices, networked software design, public transportation, an airline passenger profiling system, automated teller machines, canals in the 1800s, and a newly informatted café, robots, and museum.

- “Design in-between: Exploring Technology Development as Transitional Activity”, Mervi Hasu, U of Helsinki

The subject of this paper is the innovation process and the problem of simultaneous transitional processes in organizations. According to my conceptual analysis of innovation research, the dynamics of the technology/product design and various organizational transitions has not been adequately understood or conceptualized. In addressing this need, I apply and develop the concept of critical transition. Besides maintaining and stabilizing innovation during continuous and complex organizational change, envisioning or imagining new opportunities for innovation within and between various arenas of design is a major challenge for participants involved in complex technological design. In exploring this challenge, I focus on the development and implementation of new products in an international technology company, which is facing significant developmental transition(s) from one phase to another. I will focus on, firstly, the pattern of product design, that is, identification of the historical phases of product design and the specific critical transitional phase of the company. I will explore how this shift from prevailing pattern to the next is emerging in design-related organizational practices, in particular, how it is envisioned through various representations and articulations. Secondly, in the level of local R&D process of
the company, I will explore the shift of a particular new design concept from one project to the next, focusing on the participants envisioned representations of what is being shifted in the process. Thirdly, and most importantly, I will focus on the patterns of participation in design, that is, the shifting positions of participants and the emergence of new professional groups, aiming to explore the imaginaries of the marginal or “invisible” participants in their attempts to partake in design. I will examine and discuss the relationship and encounter between these intra-organizational imaginaries and the “outer-world” signals from the contexts of implementation and use.

• “Imaginaries at Work - Conceptualizing Technology Beyond Individual Projects”, Judith Gregory, U Oslo and Jonna Kangasoja and Sampsa Hyssalo, U of Helsinki

Science and technology studies have an established body of research on the material and social construction of technological projects (e.g. Bijker, Hughes, Pinch 1987; Bijker & Law 1992). Far less considered is the question, how do designers and engineers act in these processes of construction? The question of motives, imaginaries (e.g. Verran 1998) and resources for imagination in design becomes urgent with a recognition that many technical projects are partial instantiations of wider and often more long-term imaginaries, rationales and logics. This paper explores diverse imaginaries in technology design through three case studies. We first examine a Finnish project of creating a district wide ICT infrastructure enabling fiber-to-home services. The project is analysed from the point of view of the longstanding desires regarding the use-value promises embedded in broadband technologies and the particular agendas for the physical and abstract space, i.e. the district, being developed and marketed (Kangasoja 2002). The construction process is conceptualized using the notion of ’ideological
dilemmas’ (Billig 1987). We then move to discuss user-representations involved in building a wrist-held health-monitoring device for the elderly. When analysed, the inscriptions in the device seemed to be more aligned with representations embedded in the multiple professional imaginaries, rather than user representations derived from explicit investigations of use, which accentuates the perseverance of the forces that led the invention process (Hyysalo 2002). Lastly, we focus on resources of imagination in the design of innovation-in-the-making, in the prototyping phase of a large-scale electronic patient record (EPR) system. This draws our attention to the imaginative power needed to pull resources and practices together in a large-scale innovation project. We find central the inter-animation of diverse "incomplete utopian projects" (Gregory 2000) - sustained imaginaries rooted in medical, technical and managerial agendas - that motivated and sustained this ambitious EPR project in the face of increasing difficulties. This allows us to further discuss how imaginaries come to effect a technological project, by elaborating the mechanisms of how imaginaries are mediated to actions in local communities.


Increasingly, mediation is not only an effect of technology use, but a design problem for software engineers as they attempt to fit new systems into the complexly layered universe of existing networked products. During a multi-year ethnography, I studied the development of one such system, specifically intended to mediate between multiple proprietary document management systems, already dis- and re-mediated as "clients" and "servers". In this presentation I pursue the question of how, and for whom, software designers create meaningful, if virtual, places and spaces within, and as part of the design of,
these "between" systems. I argue that system design in such a case can be seen as an extended process of virtual world-making that, for the designers, stands for, and is in a mostly unexamined relation to, the more familiar world of users, interaction, and work.

- “Making Space, Crafting Time: Documents in Laboratory Work”, Kalpana Shankar, U of California-Los Angeles

In a research laboratory, people come and go, but the artifacts and documents that they create stay behind. As a result, records uniquely and specifically define the social, physical, and temporal space that a laboratory occupies. Scientists create laboratory notebooks, annotations of data sets, and other primary documents and artifacts for a number of reasons – to create a form of external memory of their work, for teaching and learning technical skills, and to convince themselves and others of the validity of their research trail. In this paper, I draw upon ethnographic observation and interviews in an experimental physiology laboratory to examine how records and new technologies of recordkeeping in a laboratory blur boundaries, create narratives, and constitute our notions laboratory time and space

1.3 Four Panel Stream: Environmental and Health Social Movements

David Hess, RPI

Sub-Panel 1: Environmental and Health Social Movements I. Reform vs. Radicalism in Environmental Movements

Sherwood Room
This series of panels represents a continuation and expansion of a previous 4S stream of panels on health social movements. Here, the topic is expanded to include environmental social movements and the frequent intersections of environmental and health issues. Although many of the papers focus on social movements, the topic is considered broadly to include research on participation in science and technology policy by citizen groups, civil society organizations, and patient advocacy organizations. Panels are grouped into four subareas: reform vs. radicalism in environmental movements, public participation and expertise in EH (environmental-health) movements, science and expertise in health social movements, and the politics of genetics and difference in EH movements.

- “Conservation vs Conservatism”, Sharon Beder, Wollongong

With the growth of the anti-globalization movement the split in the environmental movement between those groups that confront corporations and those that negotiate and form partnerships with them is becoming more significant. Negotiation as a strategy for change requires a degree of compromise, as well as shared goals and assumptions between the negotiating parties. It is therefore not a strategy which is available to environmentalists who believe that more radical social, political and institutional change is necessary. Activists who draw attention to environmental problems by highlighting corporate misdeeds deliberately seek to damage the good reputation of those companies. Negotiators help to repair the damage and also tend to promote corporate agendas and endorse conservative ideologies through their approach to conservation.

For example, at one level, The Nature Conservancy (TNC) offers corporations valuable PR. In return for corporate support TNC promises corporate donors publicity as corporations which care about the environment. But more than this, TNC’s market-based approach to conservation helps to promote property rights and free enterprise. Rather than lobbying the government to implement
regulations to ensure the environment is protected, or highlighting the activities of those same corporations in degrading the environment, TNC uses the market to purchase the land it wants to protect. Other groups, such as the Environmental Defense Fund, promote market-based solutions to the environment through their advocacy of economic instruments that seek to assign property rights to polluters that they can trade on the market. In each case the environmental policies promoted fit within corporate ideologies, rhetoric and priorities. However, environmentalists on the other side of the divide do not believe this sort of reformism can be effective and in fact are concerned that it does more harm than good by giving the impression that environmental problems are being solved when they are not.

- “Ecological Modernization and the Movement for Global Justice”, Steve Breyman, RPI

This paper explores the extent to which environmentalist participation in the anti-corporate globalization movement can be explained by ecological modernization theory. Are environmental groups at diverse spatial levels--those self-identified with the global justice movement--working to "green" (i.e., reform) the most anti-ecological features of global capitalism? Or are they plotting the wholesale replacement of an inherently unsustainable political economy by an all-around superior alternative? I argue that what may appear to be reform efforts by environmental organizations (to green the WTO or World Bank, for example) are instead better understood as radical political-economic replacement initiatives more satisfactorily explained by social movement theory than by ecological modernization theory.

- “Environmental Social Movements and the Small Business Sector”, David J. Hess, RPI

A comparative analysis is developed for various articulations of social movement values and ecological innovations in the small business sector. “Green
technopole” versus “green localist” strategies of regional development are contrasted, with various subtypes within each. Various types of greening processes in technological systems are mapped onto the emergent types of small-business activity. The paper argues that innovations in the green technopole tend to be incremental, tied to triple helix dynamics, and only weakly related to regional social justice issues, whereas greater opportunities for more profound forms of technological innovation as well as connections with social justice issues emerge in the localist projects. However, localist projects suffer from undercapitalization, marginalization, and treadmill of production dynamics. Relations between the two models are also discussed.

- “Ecological Radicalism in Cinema: The ‘Qatsi’ Trilogy of Godfrey Reggio”, Langdon Winner, RPI

The recent release of “Naqoyqatsi” -- war as a way of life--brings to a conclusion the provocative trilogy of films by Godfrey Reggio, an opus that also includes "Koyaanisqatsi" -- life out of balance -- and "Powaqqatsi" -- sorcerer life. Working in close collaboration with composer Philip Glass for two decades, Reggio has crafted a flow of images without words that jarring tensions between nature and technology, South and North, development and tradition, peace and war. Intended as a complement to social movements seeking alternatives to globalism, consumerism, militarism, and the saturation of the world by toxic artifice, the trilology was produced with some of the sophisticated techniques it criticizes. How succesful are the "Qatsi" movies in depicting our situation and the promise of a different path?

1.4 Regulating Scientific Organisations: A Cross-Section

Filippa Corneliussen, London School of Economics and Political Science and Astrid Epp, Bielefeld U

Fulton Room
This panel examines the regulation of scientific organisations in a number of settings.

Through the presentation of case studies, it considers the regulation of both public and private organisations, and considers research with both civilian and military applications. In addition, the panel considers the regulation of scientific organisations across a number of national settings, more specifically Germany, Norway, and the United States.

The different settings of the case study organisations suggest that they are confronted with disparate legal environments. Public scientific organisations presumably face different societal expectations and demands than private scientific organisations. Scientific organisations that engage in weapons-related research probably perceive themselves under greater political pressure than those doing purely civilian work. Distinct constrains are in all likelihood also experienced by scientific organisations located in different territorially bordered entities.

Different regulatory structures are therefore likely to occur – the emergence, for example, of private governance regimes through contracting, or of public/private governance systems in the form of cooperative administration action. This panel aims to initiate an exploration of these different structures by investigating the interrelations between the various organisations and their respective legal environments.

- “Science vs. Bureaucracy? Safety and Institutional Culture at Los Alamos”, Benjamin Sims, Los Alamos National Laboratory

At Los Alamos National Laboratory (LANL) – a U.S. government nuclear research facility – conflicts between science and bureaucracy have often been cast in terms of conflicting values: many scientists believe that managers and regulators care about enforcing rules to the exclusion of good scientific work,
while those responsible for enforcing the rules see many scientists as valuing scientific productivity above all else, including national security and safety. This story of broad normative conflict between cultures also informs social studies of scientific institutions. This paper is based on an ethnographic study of a plasma research laboratory at LANL where scientists and technicians cared a great deal about safety, frequently prioritizing it over scientific productivity. Safety measures were treated as an integral part of good scientific work practice. Still, the researchers typically set themselves in opposition to institutional safety regulations and personnel, and safety personnel viewed them as having a bad attitude about safety. In this case, I argue that conflict between scientists and bureaucracy arose not because scientists did not value safety, but precisely because the research group had developed a strong safety culture that was tightly integrated into the social life of the group. Outside attempts to impose safety rules were resisted because they directly threatened the social cohesion of the group. This finding suggests that conflicts between science and bureaucracy do not always stem from differing values. Instead, they may result from the different normative roles that concepts like safety and security play within the formal structure of an institution and within a more informally structured scientific work group. This source of this conflict lies not in a broad normative clash between scientific and bureaucratic cultures, but rather in the details of cultural differentiation within a scientific institution.

- “Negotiating Regulatory Compliance”, Filippa Corneliussen, London School of Economics and Political Science

This paper will use a case study of a Norwegian biotech firm to explore the implementation of regulations controlling environmental, health, and safety concerns in private laboratories. It builds on the neoinstitutional conception that organisations adopt their structures and practices, because, to a large extent, these are seen to confer legitimacy on the organisations and to ensure organisational survival. However, multiple environmentally prescribed models
exist, overlap and offer competing, or even conflicting, alternative formulations and prescriptions for organisational forms. This paper will consider how a private laboratory responded to regulatory requirements that conflicted with accepted scientific practices.

I argue that the firm responded to the regulatory requirements by producing Standard Operating Procedures, and that these provided a visible symbol of the firm’s attention to the regulations. The incorporation of the regulatory authority’s prescribed model of behaviour into its formal documents, legitimated the firm’s waste management process. The Standard Operating Procedures were thus to a large extent a symbolic response designed to signal conformity to the externally legitimated requirements. The regulatory authority’s prescribed model conflicted, however, with firm efficiency and production output. The firm, therefore, decoupled its formal waste management procedures from the actual waste treatment routines, in order to maintain both ceremonial conformity and production efficiency.

The firm’s response to the regulatory requirements can not, however, be characterised as purely one of providing visible symbols of compliance, while evading the requirements in practice. The firm’s response to the regulatory requirements was more complex than that. The regulatory requirements imposed on the firm by the regulatory authority conflicted with accepted scientific practices, and I argue that the decoupling of the firm’s formal procedures from its actual routines was not only based on efficiency criteria, but on an interpretation of satisfactory precaution in line with professional belief. The firm negotiated between the two divergent environmentally prescribed models of behaviour to achieve what it considered ‘adequate compliance’.

- “Conflicting Rationalities. Regulating Research Laboratories”, Astrid Epp, Bielefeld U
Private and public research activities are regulated by a plurality of legal acts, rules and guidelines in order to protect against potential environmental and health hazards. These forms of regulation are, however, likely to be met with opposition, as the implementation of environmental protection and occupational safety measures is often perceived as an undesired “bureaucratization of the researchers’ everyday work” (Stratmann/Müller, 1995:2). The scientific rationality characterizing the research field follows its own practices, routines, and rules. Scientific guidelines and their legal counterparts are thus likely to carry different understandings of what constitutes, for instance, a ‘hazard’. Consequently, different understandings of risk and safety are produced and re-produced. These understandings can be used as a basis for interpreting the legal demands and expectations of those to whom they are addressed.

This paper explores different understandings of risk and safety using a case study of a German scientific organization. Starting with an examination of the understanding of the regulatory trigger (what is the problem to which environmental, safety and health regulations propose a solution?), it will address questions that focus on the reconstruction(s) of this problem throughout the administrative and the research units of the organization. Furthermore, consideration will be given to the ways in which these (probably differing) constructions impact on the interpretation and actual adoption of these guidelines.

The paper aims to investigate the interplay between legal and scientific regulation, as well as the processes by which different understandings of ‘risk’ and ‘safety’ compete with one another in order to become the dominant understanding. Consequently, the lines of conflict between different rationalities – such as the legal and the scientific rationality – can be reconstructed.

• “Marking the Boundaries of Science: Differential Responses to Legal Regulation of Laboratory Science”, Susan Silbey, M.I.T.
This paper describes the implementation of a consent order between the EPA and a research university to create a system for managing environmental, health and safety hazards in research laboratories. This engagement between the EPA and the University is not about historic events or spectacular failures; rather, it is about the everyday, commonplace practices of ordinary people working to make things better in small, often unnoticed ways. At the same time, however, the consent order seeks to reconstruct the everyday routines and unremarked rituals of scientific practice, remaking them into the elements of a new form of sociality. If successful, this consent order will bring the audit culture into the heart of modern science. By assigning the responsibility to the University for designing, implementing and most importantly auditing its own protocols for environmental safety, the consent order threatens not only the conventionally routinized lab practices but also long cherished forms of collegial governance.

Auditing has become the mechanism of choice for assuring moral responsibility by joining economic efficiency to good practice in the widest array of fields: publicly held corporations, international environmental liability, bioprospecting and the ethical protection of indigenous rights, "everywhere [that] transparency of operation is endorsed as the outward sign of integrity." Although by themselves audit practices often seem mundane, inevitable parts of a bureaucratic process, I argue that they signal in scientific communities, an historic change. Although rituals of verification are at the heart of modern science, those characteristic processes of verification have been conducted by and for scientists, internal to the processes of making scientific knowledge rather than a ceremony mandated from outside and by an audience for whom truth claims are constitutively irrelevant.

If this consent decree and the effort to create an environmental health and safety management system for the University's laboratories is trouble for science, it is not quite experienced or responded to in the same way for all scientists. This paper describes the variable responses of biologists and chemists to the
developing safety regime. I offer an explanation of the differential responses in terms of the histories, organization, and epistemologies of the two disciplines.

1.5 The Challenge of Free and Open Source Software for Information Society

Jussi Silvonen, U of Joensuu and Jochen Gläser, Australian National U

Highlands Room

Free and Open Source Software (FOSS) is a phenomenon that manifests a basic tension of information society, a tension between free sharing of information and its proprietary control. New technologies are offering new communicative possibilities for the distribution of information. At the same time, the commodification of knowledge creates new limitations for this distribution.

FOSS is regarded as a new paradigmatic mode of operation in information technology and economy. Among the main features of this mode are the following: 1) open development model represents a novel, potentially more effective way to develop computer programs, 2) Various forms of virtual and real communities have been formed in the process of FOSS development, like kernel developer community, commercial and volunteer distribution developer communities, and local Linux user groups, 3) This programming practice is based on a new social idea of computer programs (free software), 4) These ideas are regulated by new kind of licenses (GNU General Public License), which challenge and transforms the traditional forms of intellectual property rights, 5) The open development model is also a promise of a change in the developer end-user relation, implicating an active role for the end-user in the development of products, and 6) A new mode of service economy has emerged based on open development model and FOSS communities.

These aspects together make FOSS a special interesting case for social sciences and technology studies as well. The papers in the session will deal
Theoretically and through case studies various aspects of FOSS characterized above.

- “The Role of the End-User Groups in the Diffusion of Linux”, Jussi Silvonen, U of Joensuu

Linux is a socio-technical innovation, which combines a special social idea of computer operating systems (free software) with a special form of programming (open development model). Linux, like the Internet and other new IC-technologies are examples of free sharing of code and information. This sharing requires new forms of collaboration that in some sense are contradicting the tendency of commodification of all information.

Linux can be seen also as an example of the transformation of the developer end-user relation. A new kind of interactive global community of developers and end-users has emerged. The end-users are supposed to be an essential resource for the development and diffusion of the program. Little is known, however, how this “community” actually works, who the participants are, and what the actual role of end-users is in the diffusion of the operating system.

Communities – real and virtual – are essential resources for the development of Linux. Besides the kernel and another developer communities, there are local end-user groups as well. Their role inside the Linux community and in the diffusion of Linux will be examined by analyzing one local user group.

The total number of Linux User Groups in the world was 493 in May 2002. Without these locally based, voluntary end-user groups the diffusion of Linux would probably not have been possible. The practices of a local Linux user community (Finnish Linux User Group) will be analyzed. Different practices of this group will be examined as well as the group’s relations to other Linux
communities (local and global). The identity of the group and its participants and their understanding about the role and nature of free software in market economy reality will be analyzed.

- “From Public Domain to Open Source Licensing: A Historical View of the Regulation of Free Software”, Juha Siltala, U of Helsinki

The original, academic diffusion of computer code has radically changed with the introduction of proprietary software during the 1970’s and 1980’s, and with the commodification of PC hardware in the 90’s. The modern public domain is a commons, parts of which can be enclosed in a Lockean manner, by changing it, by adding value to it by means of work. Well-known examples of the enclosure of the so-called digital commons are the Unix proprietors and Microsoft. Licensing proprietary software is a relatively simple matter: either you write new code, or take and improve some code from the public domain, then close the resulting source code and distribute the program in a binary form, with a more or less restrictive license agreement.

Developers of explicitly free software have, on the other hand, faced a continuous challenge in finding ways to keep their code freely distributable, and various free software licenses have evolved in accordance to the constantly changing demands of the technological and commercial environment. At first, simple free licenses such as the well-known University licenses by the MIT and Berkeley, were issued in order to protect the developers from being sued and to ensure recognition of their authorship by copyrighting the software and by adding non-warranty clauses. Later, Copyleft style licenses such as the GNU General Public License (most notably the license of Linux) were written to ensure the continuing freedom of the code.
After the commercial success of certain free software products, such as Linux and Apache, more complex licenses were needed to safeguard interests of commercial software development houses, which were trying to simultaneously gain the full benefits of open source development models; one paradigmatic example is the license of the Mozilla Web browser based on the source code of the Navigator suite of Netscape.

In this paper, a historical overview of the development of licensing free software will be given, and several distinct generations of free licenses will be recognized. Paradigmatic cases of licensing will be examined briefly, and an explanation of the circumstances and motivations behind each shift to new licensing styles will be attempted. The paper will present each identified generation of licensing styles as partial solutions to a fundamental contradiction between the need to protect authorship and the drive to gain benefits from an open development model.

- “Linux Developers and Their Culture of Reworking”, Matt Ratto, NIWI-KNAW

In this paper I claim that the Linux kernel development effort is demonstrative of a novel relationship between technology production and use made possible by a set of practices, tools, and values which serve to constitute a shared culture. This culture, which I term a 'culture of reworking' has much in common with what Victor and Boynton have referred to as 'co-configuration' (Victor & Boyton, 1998) a practice in which the producer and the customer are partners in an ongoing and never-ending reconfiguration of the product. In addition, the product itself, is “learning and customer-intelligent” and thus also participates in this process.

I argue that the result of the Linux kernel developers' culture of reworking is an object that is inseparable from the knowledge context of its development; inseparable, that is, without its transformation into a 'black box'. I hope to make three insights clear. First, that cultures of reworking develop around and result in
epistemic objects that are explicitly linked to the cultural ground of their ongoing transformations. Second, that the communicative means by which these transformations take place are more than just descriptions of this work – they are constitutive of both the culture and the object. And third, that the results of this work are epistemic objects that require expert users – experts in this sense referring to the social as well as the technical knowledge required to use them. I claim that a 'culture of reworking' is not uni-directional; just as co-configuration entails a dynamic and ever-changing object of work, the structure of the organizations involved and the relationship between the organization, the individual, and the product are equally dynamic.

- “Open Source Software is Produced in the Same Way as Scientific Knowledge”, Jochen Gläser, Australian National U

Several attempts have been made to describe the mode of production underlying the Open Source Software Movement. Emphasizing the differences between Open Source software production and market economies, it is usually proposed that the former is characterised by a unique mode of production and exchange, which has been described e.g. as a 'bazaar' or a 'gift economy'. The aim of this paper is to demonstrate that the way in which open source software is produced is not unique. Open software production applies exactly the same mechanism as scientific communities. I will characterise this production mechanism as a producing community and compare producing communities to the three other mechanisms that are discussed in the literature, namely market, organisation and network.

Both scientific communities and open software communities are collective producers whose members' actions are coordinated by a shared subject matter. The subject matter is knowledge – a body of scientific knowledge in science, and a list of source code in the case of open source software production. The coordination of individual producers' actions is achieved by a practice of
decentralized coordination. Individual producers interpret the communal subject matter and use it as a source of problems as well as means for solving these problems. Contributions to the common subject matter are offered by means of publication. In open source software production, a 'publication format' similar to that of the sciences has emerged, and the activity distribution among contributors is similar to that of the sciences. It follows Lotka's law.

Producing communities differ from markets in that they apply knowledge as a coordination device and accept only new and therefore idiosyncratic contributions, while markets use an abstract coordination device (the price) and accept contributions which are equal to others or previous ones. Producing communities are different from organisations and networks, which are closed productions systems that operate with a fixed number of known producers and rest on an ex-ante division of labour.

The comparison of the four production mechanisms shows that producing communities are a highly efficient system of production when the uncertainty about the nature of the problems and ways to solve them is high. Quality control can be achieved only by subjecting the contribution to a multitude of different uses, contributions are idiosyncratic, only few contributions

- “The Varieties of Linux Communities”, Jussi Silvonen and Reijo Miettinen, U of Helsinki

The concept of "Linux community" is commonly used by free or open source software (FOSS) developers and users. Communities are self evidently essential for all development projects, which are not directly based on economic markets. From the analytical point of view, it is obvious that the talk about one Linux community hides more than it opens. Instead of one community there is a complicated network of different communities, with different identities and
functions. We suggest that to have an accurate conception of limits and nature of Linux communities, they must be analyzed historically as an evolving web of institutions, networks and technologies. In this paper, we ask the actual role of different communities in the development and diffusion of Linux.

We will analyze the emergence, development and expansion of Linux communities. We suggest that communities can be separated by identifying their object and specific contribution to the development and diffusion of Linux. In addition we analyze whether an to what extend each of these communities adapts to demands market economy.

There are different opinions about the meaning of 'freedom' for software development inside the Linux community. According to Stallman "proprietary software is a problem - a social and ethical problem - and replacing it with free software is the solution." Eric Raymond's approach is more pragmatic: "In fact, I think Linus's cleverest and most consequential hack was his invention of the Linux development model." These are not only differences in opinions but illustrate the fact that Linux communities have somehow adapt to the logic of market economy, which is not based on the idea of free distribution of software or any other goods. This basic tension between freedom and markets is one criterion we follow in our description of communities.

Every Linux community is constituted on the basis of shared object, which gives the meaning for the community. Linux kernel community is organized around the kernel development. In the transition from kernel development to the end-user arenas, new functions, objects and communities arise. The ways in which communities organize themselves will also change, as well the degree of adaptation to demands of market economy.

1.6 Building and Sustainability

Piedmont Room
Buildings are very important to human welfare as well as to sustainability. We live and work in buildings, and a lot of resources are spent on their design, construction, and maintenance. Thus, it is important to achieve a better understanding of buildings as socio-technical entities as well as shaping processes related to the building industry and building technologies.

These shaping processes are quite complex, in their origin as well as in the way they are performed. In this paper, our focal point is public policy in the area of sustainable energy. The Norwegian government has in the past three decades tried various strategies to make the building industry interested in designing buildings that are more energy efficient, but with modest results. While the first efforts tried to address technological issues directly through investments and subsidies related to particular technologies, like heat pumps, policy has increasingly been grounded in market liberalism and the economists’ belief in “cost-efficient instruments”. These efforts to provide ‘action at a distance’ call for a critical examination.

Our research shows that the building industry has been quite resistant to ideas about sustainability and energy conservation. The introduction of new energy technologies, new energy carriers and sustainable design have been shown to be much more difficult than assumed, due to an underestimation of the need to cope with cultural, political and industrial challenges within the industry. The research has also faulted the traditional idea about energy use as an issue of effective use of macro-political measures to influence micro behaviour. Instead, it can be shown that to facilitate sustainable energy consumption, an explicit focus on meso and micro relationships is needed. Thus, we need to understand the institutional arrangements and actors’ strategies that decisively influence design, development, implementation and use of energy technologies.
In this paper, we particularly want to highlight the problem of what we see as a peculiar low ambition regime in designing building and how this regime is characterised by a kind of lock-in between socio-cultural conditions, traditional technologies and particular micro-economic conditions. This implies an analysis of forces of stability versus forces of change, the translation problem from visions of sustainability to concrete political and technological actions, and the potential for appropriation of new system elements like new renewable energy sources and energy carriers. The paper addresses the problem of establishing efficient support system for the development and implementation of new sustainable energy technologies in the building trade. This problem may be seen as a traditional issue of providing an efficient innovation policy related to a specific area.

The analysis will draw on a series of case studies related to sustainable architecture, HVAC engineers, heatpumps, implementation of new heating systems in buildings, and users of office buildings as well as an analysis of Norwegian energy policies.

- “Inter-disciplinarity and The Sustainable City: Moving Beyond Science, Technology or Society”, Robert Evans, Cardiff U and Simon Marvin, U of Salford

Is inter-disciplinary research possible? Over the past decade UK research councils, the Engineering and Physical Sciences Research Council (EPSRC), the Natural Environment Research Council (NERC) and the Economic and Social Research Council (ESRC), have collectively put over £30 million into a key site for inter-disciplinary research – the ‘sustainable city’. This paper examines the way the Research Councils framed the problem of the sustainable city and, in so doing, put inter-disciplinarity into practice. In each case, the Councils recognised that the problems of the sustainable city transcended disciplinary boundaries but the collective outcome of their research has remained resolutely disciplinary in
focus, an outcome that has been particularly frustrating for policy-makers and other potential users.

This tension between recognising the complexity of the research problem and formulating realistic research questions is most apparent in the research programmes through which Research Council mapped the original interdisciplinary problem on to the more narrow set of disciplinary paradigms that they represent. Thus EPSRC see the ‘sustainable city’ mainly in terms of technological systems and fixes; NERC see it in terms of the flows and stocks of natural resources; ESRC sees it a distinctive form of social organisation. Unfortunately, in setting the problem up in this way, what was originally a complex combination of science AND technology AND society has been reduced to science OR technology OR society. In other words, to the extent that interdisciplinary research occurred, then it was within research councils not between research councils.

The critical question is whether or not this outcome could or should have been avoided. Moving between scientific disciplines, particularly non-cognate ones, raises problems of incommensurability of both language and purpose, as STS fieldworkers know only too well. Yet inter-disciplinarity requires this and more. The perspectives are supposed to add up the single, integrated view that policy-makers and other users want. Given what we now know about the risk and uncertainty within even the narrow boundaries of disciplinary science, this paper argues that seeking certainty in inter-disciplinarity is to search for the Holy Grail. Policy-makers and others will need to find other ways to act.

This research, based on fieldwork, interviews, and archival data from the activities involved in passing alternative building codes for straw bale building in four US states (Arizona, New Mexico, Texas and California) engages the discussion of how ecological concerns can be integrated into sociological theory. A number of those engaged in what is beginning to be termed "sociology of ecology" recycle 19th century "classic" authors of the field, searching for ways to include the physical world. A more fruitful approach, undertaken here, combines Yearly's problematization of ecological issues and actor network theory. Yearly argues ecological issues are not physical givens but social constructions. This concept combined with actor network theory allows the physical world to be theorized as an actant in the social construction of ecological concerns and the multiple interpretations of what is sustainable existence, a move that reformulates the physical/social distinction. The focus here is boundary work in the negotiations between grass roots and professional advocates of green building, on the one hand, with representatives of the Home Builders Association lobby and building code officials on the other. Particularly important are individuals and organizations that facilitate translation in these domains. Examination of such negotiations has the potential to reveal ways in which future policy might address ecological concerns by revealing details of the social fabric that constitute them, resist them, and potentially might translate between oppositional groups in practice.


The modern cityscape - buildings, streets, bridges and even the nature in the form of parks? is entirely designed. Within the Finnish polity the authority over the use of land (irrespective of its owner) is monopolized by the city council. The city decides what and how much can be built within its territory. This authority is exercised through the city-planning apparatus. The urban sociologists have studied the city planning process extensively, but the actual construction process
has been left with amazingly little attention. After all, it is only through construction projects undertaken primarily by private companies that reproduce not only the cityscape but also the material contexts of everyday life in organizations inhabiting buildings.

I conceptualize building design as a historically unfolding process of negotiation between different interests and variably interpreted conditions. To be sure, it is not merely economic calculation, aesthetic experience and practical usability that shape buildings, but much more varied and complex interests than ceremonial jargon of businessmen, architects and other established players in the construction process. Explicating the variety of different interests involved in the design of buildings is not only necessary precondition for politically critical reflection, but, more practically, it may shed light into issues such as why much hyped ideas of participatory design and co-configuration have been scarcely adopted in the construction industry.

By conducting participant observation, interviews and reading documents from a large-scale governmental construction project I am working to understand why the building takes a particular form. My study is a part of three-years research project Proactive Design funded by The National Technology Agency of Finland (TEKES) and it will lead to a Masters thesis for The Department of Sociology in the University of Helsinki.

1.7 Shifting Paradigms in Science and Science Studies

Morningside Room

- “Paradigms” and “Normality” as Perspectives on Science and Philosophy: The Case of Nineteenth Century Associationism”, Thomas W. Staley, Virginia Tech
Thomas Kuhn’s notions of “paradigms” and “normal science” have, of course, been hugely influential in social studies of scientific activity. They have also, unsurprisingly, been assimilated into broader discussions of social organization, becoming part of a general vocabulary for describing the evolution of human institutions. However, it is important to keep in mind the technical meanings of Kuhn’s terminology when making such extensions. For instance, some authors (Rorty [1979], Heelan [1983], Wood [1995]) have redeployed Kuhn’s terms to examine what they refer to as “normal philosophy.” The idea of philosophy – as well as sciences - operating within paradigms is, on the surface, attractive. But “paradigm” has a dual meaning, which Kuhn himself captured as “disciplinary matrix” and “exemplar.” Given this inherent dichotomy, it is less clear whether philosophy is the sort of endeavor that can be effectively described by means of paradigms, in the strict Kuhnian sense.

Consider the case of Associationism in Britain in the first half of the nineteenth century: Standard histories of social science often treat work within this school of thought as part of a “preparadigmatic” stage in the development of psychology. However, by self-identification and professional status, such influential Associationist figures as Dugald Stewart and Alexander Bain were – strictly speaking – philosophers. Furthermore, their work occupied a space within a well-defined disciplinary structure that might (or might not) be best described as “normal philosophy.” This paper will consider such work from two perspectives – as scientific and as philosophical – to examine the range of applicability of a Kuhnian analysis. It will emerge that the apparent historical significance of Associationism is significantly affected by whether we consider it as preparadigmatic science, as normal philosophy, or as both at the same time. This underlines the importance of viewing the analytical framework as a contributing part of the historical narrative.

- “Paradigm Shifts and New Worldviews: Kuhn, Laudan and Discovery in Molecular Biology”, Priya Venkatesan, U of California-San Diego
A study of specific discoveries in the history of the science of molecular biology reveals a certain dialectical relationship between the emergence of new scientific ideas and methods and the concept of scientific revolution as developed by Thomas Kuhn and Larry Laudan. Both are considered important historians and sociologists of science and scientific history who introduced the notions of paradigm shift and new worldview, respectively. I would like to address how discovery in molecular biology relates to scientific revolution and elaborate on crucial questions as to how and why the science of molecular biology and molecular genetics undergoes paradigm shifts and/or encompasses new worldviews.

In my paper for the Society for Social Studies of Science Conference, I would like to pose an alternate set of ideas concerning paradigms, normal science, research traditions and scientific revolution on the basis of the unique and inherently distinctive development of molecular biology and genetics; for, a new set of conceptual tools concerning scientific progress are required for an adequate understanding of how biological processes were elucidated under the scientific auspices of the central dogma of the genetic code. I would like to concentrate on a limited study of three aspects in genetics: the study of chromosome structure, dynamics and function, reverse transcriptases, and the discovery of RNA catalysts. In attempting to analyze the key moments of discovery in these processes, I hope to distinguish between Kuhnian and Laudanian notions of science and how molecular biology configures into them and attempt to put forth a set of ideas that may not necessarily conflate the two but provide further insight into their treatises on the nature of scientific revolution of which Kuhn and Laudan discuss at length.

- “The Social Transaction of Scientific Explanations”, Michael Ben-Chaim, Harvard U
The paper presents an outline of a novel theoretical approach to the sociological study of scientific practice. Social studies are commonly predicated on the assumption that the aim of science is knowledge. The assumption has often led to the polarization of the social and cognitive aspects of scientific practice. Traditionally, philosophy of science highlighted cognitive considerations in the production of knowledge. These are understated by social studies, which draw attention to social considerations. An alternative view of the relation between the cognitive and the social follows a sociological definition of explanation as a social transaction in which the means to satisfy the desire to understand are exchanged in return for an implicit or explicit acknowledgement of intellectual authority.

Two implications follow from this sociological definition of scientific explanations: First, we ought to consider scientific work as being guided by the scientists' overall interest in bringing cognitive values and social values to reinforce one another. Second, assuming that the values and interests that are embodied in any specific transaction are not immutable, we ought to examine how they become the subject of reappraisal and change. These implications provide the framework for applying the sociological concept of social institutions to the study of the cognitive tools and social devices that scientists employ to regulate the construction and transaction of explanations.

The paper comprises a detailed examination of the theoretical aspects of the image of science as explanation and compares them with those associated with the image of science as knowledge. The historical, cultural and ideological origins of the two images are examined. Examples from the history of modern experimental natural sciences provide, in addition, empirical sources for illustrating aspects of continuity and change in the institutional structure of the social transaction of scientific explanations.

- “Toward an Non-Essentialist Conception of Science”, Mark Erickson, U of Brighton
Science is at the centre of much of our lives in our society. Science is also a problem, and problematic, in a technoscientific society. It generates controversy, is seen by significant portions of society as potentially threatening, and contributes to social divisions.

Why is this? Contemporary philosophy of science, science and technology studies, and sociology of science and scientific knowledge all examine the workings of science and offer descriptions of how science is constructed in scientific workplaces, or how scientific knowledge emerges across time. These are admirable, useful approaches but in such studies we rapidly lose sight of wider contexts that science is located within. Further, even when such wider contexts are identified – e.g. locating scientific endeavour in the context of economic realities – these are often treated, as science is itself in these approaches, as being isolated and unitary. From these perspectives science is seen as an object with an essence.

This paper attempts a different mode of explanation for science. Drawing on the later philosophy of Wittgenstein, and the work of Fleck, I propose that we see science as being a complex, confused and disordered ‘family resemblance’ concept. As we begin to do this we will see that the meaning, and thus the structure, of science will shift according to which context we are located within. Science may in specific locations such as a laboratory have a specific and unitary meaning, but this meaning is inappropriate in other contexts. From this perspective (an anti-essentialist perspective) science becomes an object that has many facets, all interconnected, all impinging to some extent on each other. As we look at science in different contexts we see a different facet, and a different meaning coming to the fore: the science of the laboratory is not the science of the sci-fi movie which is not the science of the classroom or the production process in a factory. Thus our investigations of science need to be carried out in multiple locations.
Drawing on data collected from professional scientists, a cultural studies framework and material collected from a range of cultural sources this paper proposes a strategy for making sense of science such that we enable the full complexity of science, and the importance of this complexity, to emerge. Without this our studies of science will remain partial, and our explanation of science in contemporary society will remain incomplete.

1.8 Contested Illness

Crown Room

- “The Un/Intended Consequences of Dyscalculia”, Tamar Posner, U of California – Berkeley

In this paper I will discuss the ways in which current technoscientific changes influence cultural beliefs and practices about mathematical capabilities. Specifically, I will look how medicalization and geneticization processes have affected the classification of children as mathematically learning disabled, enabling the emergence of the classification of dyscalculia.

Dyscalculia is a diagnosis for people with limited calculation abilities. Prior to the past decade, difficulties in mathematical calculation were mainly attributed to poor study habits, lack of motivation, untrained teachers, uninspiring curriculum, and lower intelligence. The emergence of dyscalculia helps to pathologize mathematical difficulties and presents an alternative explanation. Dyscalculia is seen as a learning disability and is often associated with genetic and neurological/chemical disorders. Although the causes for this “condition” are unclear, genetic determination and medical explanations are becoming more popularized, thus reducing the burden of poor calculation abilities to “biological” attributes rather than socialization and individual behavior.
I will examine the social and technical infrastructure that has enabled dyscalculia to become a durable classification in various systems, from legal courts to educational policy making. Furthermore, I will explore the ways in which this classification is more widely used and accepted in some countries (e.g. U.K. Israel) while other places (including the USA) are in earlier stages of establishing its legitimacy.

I argue that educators, psychologists, policy makers, medical professionals, or the pharmaceutical industry have not randomly constructed the naturalized ‘normal’ and ‘abnormal’ standards of mathematical development and performance purely for their own self-interest. Rather, the medicalization and geneticization of mathematical capabilities - and in particular the construction of dyscalculia - depends on a variety of pre-existing cultural assumptions and values about normative development, intelligence, critical and mathematical thinking, and success.


In this paper, I will examine how obstetricians used advances in medical technology and scientific understanding of fetal development to perform the boundary-work necessary to legitimate their claims to expert knowledge and skills in managing the fetus’s health.

Following less than a year after Roe vs. Wade, in 1974, the American Board of Obstetricians and Gynecologists accredited the subspecialty of Maternal–Fetal Medicine (MFM). The medical community’s official recognition of the “fetal doctor’s” claims to specialized, expert knowledge came at a time of unique opportunity for obstetricians – both socially and professionally - to claim the fetus (rather than just the pregnant woman) as their patient.
The 1960s was a long decade of discovery for researchers interested in fetal development and health: In 1955, researchers discovered that a fetus’s sex could be determined by analyzing the fetal cells collected by amniocentesis, and by the late 1960s, obstetricians were using amniocentesis to identify Down’s syndrome fetuses and fetuses carrying certain inborn errors of metabolism. In the same decade, fetuses received their first therapies: In 1963, the first fetal blood transfusions for fetuses afflicted with Rhesus disease were performed. And despite being illegal, “therapeutic abortions” were being performed by licensed obstetricians on fetuses diagnosed with congenital defects.

The Sixties was also a period in which the fetus emerged into the media spotlight. In the first years of the decade, Americans were awakened to the potential hazards that the fetal environment, and by extension, maternal behavior, posed to the developing fetus. Reports of the thalidomide babies hit the headlines in 1961, followed a few years later by reports of babies born with profound disabilities after their mothers were exposed to rubella while pregnant.

In the context of the cultural visibility of the fetus, the scientific and technological advances that made fetal diagnosis and therapy possible, and the social demand from expectant couples to implement fetal therapy where possible, the “fetuses’ physicians” were able to exploit the burgeoning market for fetal care. Indeed, these physicians delineated “high-risk” pregnancies – where the fetus carried a congenital defect or the pregnancy was complicated due to maternal factors – from all other, “low-risk” pregnancies. The fetal physicians asserted authority over general obstetricians to manage high-risk pregnancies, claiming specialized knowledge of fetal development and the technological skills necessary to bring a complicated pregnancy to term. Through this boundary-work, Maternal-Fetal Medicine specialists secured the autonomy (from the natural childbirth movement and midwives, in particular) of obstetricians in the management of pregnancy.
Chronic Lyme disease or post-Lyme disease syndrome refer to a cluster of chronic symptoms that remain after standard antibiotic therapy. Some patients claim that after standard antibiotic treatment for acute Lyme disease their symptoms disappear only to return weeks, months, or even years later. For others, initial treatment with antibiotics does not even relieve their acute symptoms. Most Lyme disease researchers and clinicians believe that the majority of these patients do not have Lyme disease and long-term antibiotics will not help them. But many sufferers claim that long-term antibiotics is the only treatment that helps them feel better, raising questions about whether physicians should comply with their requests. The debate over the diagnosis and treatment of chronic Lyme disease is not only between patients and physicians, but also between physicians themselves. Many physicians do not believe that chronic Lyme disease exists or that antibiotics will help cure it, but there are also physicians who treat sufferers with long-term antibiotics. This debate also takes place outside the academic arena. Patients have staged numerous protests, sent death threats to leading researchers, and motivated Congressional legislation. Debates over the diagnosis and treatment of chronic Lyme disease illustrate some of the issues of what counts as good medicine and the role of patients’ decisions in the face of chronic disease and medical uncertainty. Using the case of chronic Lyme disease, I first argue that good medicine must be defined in both scientific and social terms; this helps us understand the dynamics of conflict between patients, clinicians, and researchers. Second, I argue that the role of patient activism in medicine must be taken seriously, especially in the face of medical uncertainty. Finally, I argue that although medical uncertainty is a scientific question, it must be understood in a broader social context. The desires of patients to accept risks associated with uncertain treatments should be recognized.
In the last two decades, the public and the professional interest in autism have grown enormously. From a relatively obscure disease category, autism and related disorders have become an object of growing research interest and practical concern in a variety of professional fields. Despite extensive research, diagnosis and classification of autistic disorders have remained contentious. To date there is no generally accepted theory of autism or agreement on its causation. Whereas psychologists, psychiatrists and medical researchers agree that abnormalities in communication and social interaction, and stereotyped patterns of behavior are key manifestations of the disorder, they continue to debate the underlying mechanisms. Similarly agreement on the neurological nature of the disease has not resulted in a shared understanding of its biological causes.

At the same time, despite the increased familiarity of the disorder, diagnosing children with autism continues to pose great practical difficulties. Often the symptoms remain unrecognized and parents are referred from one specialist to another. Moreover, both the practical and the theoretical difficulties in diagnosing and classifying autism, are complicated by the fact that autism is considered to be a developmental disorder with varying characteristics at different ages, that the symptoms vary in severity and have a range of manifestations, that autism often occurs in conjunction with other disorders and that the intellectual abilities of the affected children differ greatly. In the face of these difficulties which affect both research and care, much effort has been devoted to standardizing the diagnostic criteria and, at the same time, adjusting the diagnostic tools to the practices of various professional groups involved in the care and education of children with of changing understanding of the disorder and the various professional practices involving special needs. The potential users of such diagnostic tools include not only epidemiologists who need to assess the
prevalence of the disorder but also general practitioners or teachers who are confronted with worried parents and specialists establishing the appropriate plan of action for a particular child.

In this paper we examine the development of the various diagnostic tools in the context children suspected of autism, focusing on the tensions between standardization and differentiation.

- “The Trial of “Shaken Baby Syndrome”, Stefan Timmermans, Brandeis U/Harvard School of Public Health

While social theorists have singled out the rise of experts as one of the landmarks of late modern societies, few researchers have investigated how experts validate medical knowledge in court trials. Medical sociologists have long been interested in the ways contested illnesses have gained legitimacy in the medical field. But their analysis has been largely limited to the advocacy struggles of patients to have their conditions recognized as “real” medical phenomena. Recently, some scholars of science and technology have begun to look at how scientific findings are presented in legal settings, analyzing the preconceived notions of science embedded in jurisdictional decisions and the adversarial court process.

“Shaken baby syndrome” has gained legitimacy as a distinct medical condition and has been used to prosecute defendants in criminal homicide trials. Shaken baby syndrome was first described in 1974 by a pediatric radiologist and is a term used to describe the constellation of signs and symptoms resulting from violent shaking, or shaking and impacting, of the head of an infant or small child. While internal trauma is necessary to make the diagnosis, external evidence of trauma does not need to be present.
The recent history of shaken baby syndrome has been marred by many unknowns and controversies, prompting some legal analysts to write off the condition as a “crime du jour”. While the concept of shaken baby syndrome has received some legal standing, influencing prosecution and defense strategies in court, in other jurisdictions the controversies surrounding the syndrome have been used to raise “reasonable doubt”.

These controversies will likely be revisited in an adversarial court hearing. The outcome of the evaluation of scientific evidence and expert testimony greatly helps decide whether a defendant will be tried for homicide or whether the case will be dismissed. From all shaken baby syndrome trials, the landmark case has been the trial of the nanny Louise Woodward who was tried for killing eight month old Matthew Eappen. The prosecution charged that Woodward shook the baby to death while the defense argued that the injuries were due to the rebleed of a previous brain injury. Because of the high visibility of the trial in the US and the UK, the Woodward case provides an important legal precedent to establish the scientific validity of shaken baby syndrome. This paper analyzes how shaken baby syndrome was conceptualized in the Woodward trial.

1.9 Technologies of Finance

Caitlin Zaloom, New York U

Discussant: Karin Knorr Cetina

Athens Room

- “Trapped in the Pits”, Caitlin Zaloom, New York U

In contemporary capitalism, technologies constitute the material base for financial knowledge and work, inscribe and link communities of calculative actors and challenge the organizational forms of economic exchange. The Social Studies of Finance is emerging to examine the technological production of
economic forms. This panel will present approaches to the social studies of finance at the intersection of history, anthropology, and sociology. From the role of the telegraph in constituting economic spaces, and the use of mathematical risk assessments as communicative tools, and the challenge of new technologies for financial organizations. The panel will conclude with an assessment of the promise and limitations of science and technology studies techniques in this new area.

This paper examines a critical moment of technological conflict for the Chicago Board of Trade (CBOT)-- the year 1998 when futures exchanges around the world were leaving behind their trading pits in favor of new, electronic technologies of exchange. Drawing on ethnographic fieldwork at the CBOT, This paper analyses a moment of technological problematization in global finance when the efficacy of traditional open-outcry methods began to come into question under the pressure of new technological expectations, a crisis that challenged Chicago’s central place in the global financial system and that played out on the trading floors and administrative hallways of the city’s largest financial exchange. The Chicago Board of Trade, birthplace of the contemporary open-outcry pit, would not give up their traditional methods easily. Digging beyond the obvious issues of obsolescence, the questions arise: What makes pit traders' particular set of skills susceptible to the technological transformation of the futures industry? How did the CBOT become so wedded to one technology? And how have these vulnerabilities and allegiances shaped the organization’s responses to the appearance of digital of markets? The paper examines the ways the CBOT’s particular relationship to its trading population and its central technology shapes the way it chooses to integrate and stand apart from the evolving digitized norms of global financial dealing.

Arbitrage is a key process in the practice of financial markets and in their theoretical depiction: it allows markets to be posited as efficient without all investors being assumed to be rational. This article explores the sociology of arbitrage by means of an examination of the arbitrageurs, Long-Term Capital Management (LTCM). LTCM’s 1998 crisis is analyzed using both qualitative, interview-based data and quantitative examination of price movements. It is suggested that the roots of the crisis lay in an unstable pattern of imitation that had developed in the markets within which LTCM operated. As the resultant “superportfolio” began to unravel, arbitrageurs other than LTCM fled the market, even as arbitrage opportunities became more attractive, causing huge price movements against LTCM. Three features of the sociology of arbitrage are discussed: its conduct by people often personally known to each other; the possibility and consequences of imitation; and the limits on the capacity of arbitrage to close price discrepancies. It is suggested that by 1998 imitative arbitrage formed a “global microstructure” in the sense of Knorr Cetina and Bruegger.

- “Risk Communities: The Financial Services Authority (FSA) and Risk-Based Regulation in Financial Markets”, Yuval Millo, London School of Economics and Political Science

1.10 Norms, Resources, and Practices in the New Knowledge Economy

Daniel Lee Kleinman and Steven P. Vallas, U of Wisconsin – Madison
This paper seeks to contribute simultaneously to debates about the nature of the new knowledge economy and to arguments in science studies about the most appropriate theoretical lens through which to view contemporary technoscience. Through an analysis of the "asymmetrical convergence" of high technology industry and academia, we extend neo-institutionalist theory and challenge certain strains of 'constructivism' in science studies.

Drawing on interviews with scientists, administrators, and technicians (N=85) in two centers of research in biotechnology--the Silicon Valley area in California and the Route 128 Region adjoining Boston--we examine the commingling of industrial and academic normative codes and practices in the work situations of both university and industrial scientists. Specifically, our data focus on the organizational pressures that research personnel experience, the social relations established among researchers themselves, and the tacit rules governing the flow of information among scientists. We find that organizational contradiction is increasingly the norm within our sample's laboratories, as conflicting organizational logics have emerged within previously distinct and homogenous institutional domains.

Approaches in science studies that focus solely on processes of construction tend to overlook the presence of externally-induced contradictions that impinge on laboratory life, and which generate ongoing debates among actors about the rules that govern the production of scientific knowledge. By contrast, how academic and industrial organizations cope with the presence of such conflicting organizational logics constitutes an important issue for neo-institutionalist theory and research on the emerging knowledge economy.
In the past two decades, federal promotion of universities’ commercial involvement and industrial firms’ increased reliance on academic science have created growing similarities between the activities of firms and universities. As the lines between university and commercial science become blurrier in the new economy, science careers also take on a composite character. Increasingly, academic scientists are patenting and industrial scientists are publishing, particularly in the life sciences. Past work has investigated the extent to which scientific dissemination across sectors has changed, but has paid little attention to the under-representation of women in positions of power in science organizations. While women have traditionally published and patented less than their male counterparts in the sciences, it remains unclear how recent modifications in scientific practice have affected this long-established inequality. In addition, little is known about the influence of firm-level characteristics on gender differences in productivity. We investigate whether the durable gender inequality in science careers is affected by the changing boundaries between university and firm, and whether this results in: 1) an increasing divide between male and female scientists, in which men continue to publish but also patent to a greater extent than women in academe, and men continue to patent but also publish more than women in industry; or 2) a lack of gender difference in patenting and publishing when controlling for scientists’ educational background and experience and for firm-level characteristics; or 3) female scientists more ably transgressing traditional boundaries between the academy and industry, by proportionally publishing more in industry, and patenting more in academe. Our quantitative data on life science PhDs is a unique combination of archival data from the NIH, firm-level data on biotech firms, and patent data from the USPTO.
Using data on the patenting activity and career characteristics of a sample of life scientists, this research quantifies and compares gender differences in productivity across small biotechnology firms, large pharmaceutical companies, and academic life science departments. Results highlight the importance of looking beyond the academic sector and publishing activity alone to examine gender disparities in scientific research. Assessing the effects of organizational context on multiple forms of productivity is of great importance as scholars begin to sort out the contemporary pushes, pulls, and constraints operating on female scientists in an era where commercial and academic science are closely linked. The results of this study will have implications for scholarship on stratification in science and the changing institutions of science/technology, as well as for managers and policy-makers interested in promoting equity as part of the new economy.

- “Administrative Academic Capitalism and the New Economy”, Sheila Slaughter, U of Arizona

The literature that treats entrepreneurial universities and intellectual property focuses almost exclusively on faculty activity. The part played by university presidents in the development of an academic capitalist regime has not been extensively treated. Yet colleges and universities could not engage in academic capitalism without the involvement of university presidents, so we decided to explore how they contribute to market behaviors.

We make the case that academic capitalism offers a theoretical explanation for the change from a (putative) public good knowledge regime to a new one, which we call an academic capitalist knowledge/learning regime. The academic capitalist regime is created by the interstitial emergence of complex new networks of actors within colleges and universities, who enter into alliances with groups outside the university, create new organizations, reshape old ones and
redefine the purposes of the university so they articulate more closely with the new/knowledge/information economy.

We analyze Internet2 as an instructive instance of administrative academic capitalism. The Internet2 organization includes presidents from most research universities in the United States, letting us see not just one or two presidents involved in the academic capitalism knowledge/learning, but a large number. The purpose of the organization is to span the boundary between non-profit and for-profit sectors, creating commercial opportunity for both sectors, allowing us to observe administrators pursuit of market opportunities.

We find that presidents are networked in intermediating organizations such as Internet2, in which they engage in forward planning in research, deployment and testing infrastructures, as well as products, processes and services for the knowledge economy. Through Internet2, presidents engage in public purposes - research and education - at the same time they participate in commercial endeavors from which both universities and corporations benefit. The boundary between public and private shifts. Universities no longer deal with the private sector markets through procurement relations, but through intermediating organizations in which corporations and universities share in profits. Ironically, they may not share market risks fully because government support of university research and infrastructure development subsidizes both universities and corporations.

- “Beyond the Digital Divide: How Technology and the Knowledge Economy Systematically Disadvantage Some”, Barry Bozeman, Georgia Tech

Access to scientific knowledge and technological tools enhances social capital, but such access is highly unequal. The knowledge economy changes the rules of access. While there is widespread awareness of the inequities in the distribution of S&T benefits, there is no theory about why this occurs and little research documenting the skewness of distributions.
The purpose of this research is to develop a conceptual model of factors affecting the distributional impacts of S&T, with particular focus on the context of the evolving knowledge economy. The focus is on factors internal to science and technology knowledge production processes rather than the social factors that mitigate distributional impacts (e.g., income inequities; lack of universal health care). The model developed in this paper is anchored in case illustrations pertaining to the knowledge economy, including the development and use of the Internet.

The preliminary model hypothesizes that the social distribution and quality of outcomes are in part determined by characteristics of technology, especially whether the technology is primarily an “enabling technology” or “hedonic technology,” where the first serves instrumental values and the second consumption values. Just as important as the value type for S&T outcomes is whether the S&T has as its primary effect a physical experience for the individual or a social experience. If the outcome is related to senses (e.g. music) or modification of physical processes (e.g. diet, reproduction), then it is a “physical impact technology.” If the outcome affects the individual’s social relations, social position, or social network ties, the outcome is a “social impact of technology.” Taking these two dimensions together (physical-social and enabling-hedonic) we can consider (archetype) combinations. S&T outcomes cases are developed to illustrate the model and develop hypotheses.

COFFEE BREAK

Session 2: 10:30-12:15

2.1 Science Studies World-Effects: Rethinking the Transnational and the Postcolonial
In 2001 the city of Sao Paulo set up an “Electronic Government Coordinating Agency” with the “main goal of carrying out its Digital Inclusion Plan.” This plan’s goal was double. First, a definition of one standard kind of design of sites and one concept of navigation in the internet was to be established “so that government information and services can be accessed through standard easy interactive procedures”. Second, the plan included an “e-citizenship (e-cidadania) program” which aimed to set up “telecenters” – places with computers for free access to the internet – spread specially in the poor neighborhoods in the periphery of the city.

According to the city government “the computer may be an efficient instrument of access to education, professional qualification, culture and exercise of citizenship … the [Digital Inclusion] Plan is a way to give incentives to citizen’s
participation in government decisions, to increase transparency of public management, and to fight social exclusion in the city.”


Is the research process similar in the developed and developing worlds? This paper seeks to address one particular aspect of this broad theoretical issue by focusing on collaboration in three developing areas. We examine two basic questions about collaborative research. These questions derive from concerns that are widespread in the literature, but our approach is based specifically on analyses by Bozeman and Lee (2003) and Walsh and Mahoney (2003). First, is collaboration associated with productivity? Second, do new information and communication technologies reduce the problems associated with scientific collaboration? We do not attempt any direct replication of these studies, owing to differences in the population of scientists from which samples were drawn, methods of study, and survey instruments. However, our analysis shows that collaboration is not related to productivity for all contexts and sectors, and suggests the costs of collaboration may sometimes outweigh the benefits.

2.2 Technology, Place, and Practice: An Ethnographic Perspective

Sub-Panel 2 - Engineering Spatial Practice

Mizuko Ito, U of Southern California and Carsten Osterlund, Syracuse U

Discussant: Michael Curry

Ardmore Room
• “Electronic Records, Hospital Design, and Medical Rounds: My Place or Yours”, Carsten Osterlund, Syracuse U

Computers and electronic record systems have proliferated in hospitals and clinics over the past three decades. Medical informatics researchers and consultants work on large-scale global record systems hoping to facilitate the effortless communication and easy coordination of classification schemas across locations. Hospital architects strive for the paperless infirmary. Nevertheless, most healthcare settings harbor a patchwork of information systems most of which do not communicate with one another. Paper is everywhere and the global electronic record system is nowhere to be found. Often a doctor or nurse will document the same patient’s history in three, four, or five different information systems. In the process they carefully craft unique forms and records -- each serving as a work itinerary and map for a specific constituency of hospital employees. Medical documents are used to place and “re-place” interactions. Doctors' and nurses' daily work involves walking, not so much from patient to patient, as from information system to information system. As they negotiate the physical layout of the infirmary they combine documents and in the process create new work maps and itineraries. The daily rounds become a “re-placing” of interactions into the hospital layout. Drawing from multi-sited fieldwork in healthcare settings and interviews with hospital architects, medical informatics researchers, doctors, nurses, secretaries, and administrators, this paper analyzes the clashing notions of place and space embedded in hospital design, electronic records, and doctors' and nurses' daily work.

• “Robot-Human Interaction: Reinventing Humanism and Culture through Technology”, Joan H. Fujimura, U of Wisconsin - Madison

This paper explores the reinvention of culture through technology. The case considered here is the humanistic robot. While humanoid robots have
attracted much attention elsewhere, they have especially been recently the rage in Japan. But my interest here is the human-machine interaction focus of its designers. Soccer playing robots match "wits" with other robot "wits" in RoboCup tournaments which act as field test sites for interactional engagements between different artificial intelligent (AI) models as designed by different laboratories. In contrast, humanoid robots tend to focus on human-machine interactions. Even SONY's robotic dog AIBO and her robotic pet successors are meant to elicit emotions in humans. (Her very name indicates this.) The Kitano Laboratory's PINO is also designed to elicit human emotion. It is a 70 centimeter humanoid robot that is unstable on its feet, fragile, and imperfect. It is represented as "childlike," like the puppy AIBO that can "learn" and "develop." PINO is not a robust, functional, super house cleaning robot. These robots are meant to have human frailties, to be fallible. Its designer Tatusya Matsui argues that PINO and its cohort are meant to take us back to innocence, to an appreciation of life. We take care of the robot as we take care of flowers, of a child. It is the interaction with humans that help develop the robot's AI and that help develop the human's humanism. The robots are the laboratories for developing artificially intelligent machines, but they are also objects that interact with humans.

I am interested in the desires and fantasies that humanistic robots represent. How are robots being used to reinvent culture? What are the humanistic concerns that designers intend and humans respond to? Why and how is technology a means by which and the site/place where culture gets made today?

In the case of Japan, postcolonial theory theorizes that Nihonjin ron was a discursive attempt by Japanese intellectuals to deal with incursions on identity and culture. Technologically reinvented culture is something
different, a way to create culture, create feelings, create sensitivities. I propose that some technologists are creating objects that can reinvent humanity and culture. It is also a designed humanism that is place-based differently than was Nihonjin ron. Humanistic robots appeal more broadly (although probably primarily to industrialized nations), and digital artists elsewhere are also using robots to track human-machine interaction. I examine this human-robot-place interaction in this paper.

- “Feral Robotic Dogs: STS in Engineering Design Education”, Natalie Jeremijenko, Yale

No Abstract

2.3 Four Panel Stream: Environmental and Health Social Movements

David Hess, RPI

Sub-Panel 2: Environmental and Health Social Movements II: Public Participation and Expertise in EH Movements

Sherwood Room

- “Activist-Experts as Catalysts in Environmental/Health Social Movements: The Case of Louisiana’s Cancer Alley”, Barbara Allen, Virginia Tech

How does a social movement begin? How does a community complaint grow from a local concern to a state or national agenda item leading to action and change? Using several examples from Cancer Alley, I conclude that expert-activists can be primary catalysts in both the formation of social movements and in the expansion of those movements out of the local realm. First is the early work of the state attorney general's environmental liaison, Willie Fontenot. His
early fieldwork taught people how to understand and talk about the pollution around them. He also prepared "how to" flyers about both organizing and legal remedies. Scientists Florence Robinson and Wilma Subra also taught citizens how to speak about their environmental and health problems. They also instructed the citizens in rudimentary scientific methodology that led to early popular epidemiological studies in the region. Pharmacist Kay Gaudet used her knowledge and community alliances to assemble enough voices to force a state-funded study of miscarriages in this region. And lastly, as a counter-point, I analyze the medical surveillance work of Patricia Williams. Williams' work, high-caliber laboratory science, looks at the cellular level for damage from toxic pollutants and holds promise for proving causation. But her concern to be seen as unbiased and not part of any movement has resulted in her work having less impact than it would otherwise. I conclude that expert-activists allying directly with social movements have a much greater impact on outcomes than disinterested science on the sidelines in the case of Cancer Alley.

- "Are Scientists Irrational? Citizens and Experts in Environmental Risk Assessment", Frank Fischer, Rutgers

This presentation examines the tensions between citizens and experts in the assessment of environmental and technological risks from an epistemological perspective. Much of the discussion of this topic has focused on the "irrationality" of the citizen, in particular the citizen's inability to understand or accept scientific findings and its implications for rational policymaking. Through a comparison of the formal logic of science and the informal ordinary language logic of argumentation, this analysis turns the issue around and questions the rationality of the scientist in decisions pertaining to public policy. In the process, the presentation will show that ordinary citizens rationally focus on important questions that scientific experts ignore or neglect. Epistemologically demonstrating the scientist's need to integrate the citizen's perspective, the paper concludes with an approach for bringing them together.
Over the last two decades, Southern Europe has been witnessing important conflicts on the environment. Issues such as the water and forest policy, the estuaries and coastal defence, the treatment of hazardous wastes, and the construction of dams and bridges have been the centre of important political struggles. Portugal is not an exception to this situation. Particularly in the last ten years, environmental conflicts have gained great relevance.

The most relevant and sound conflict in Portugal, as probably at an European scale, was the one that ended with the triumph of the social movement that stopped the construction of an important dam due to the finding of open air Palaeolithic rock art. The protection of this cultural heritage implied the defence of the environmental patrimony and the dismantling of the dam. Between 1994 and 1997, the struggle to save the rock art of Foz Côa embodied profound political consequences in Portugal and led UNESCO to declare that this finding was part of humanity's world patrimony. This is practically the only case in the world in which a big economic project that was fully in progress was forced to see beyond the cost-benefit rationale in favour of cultural and environmental protection. Why did the political action of social movements achieve such an intensity and success in this case? What does this case reveal from the relations between science and politics? To answer these questions is the aim of this talk.

The potential of Internet-based public participation in environmental regulatory rulemaking is examined through content analyses of public comments submitted in two United States Department of Agriculture (USDA) rulemaking processes: the National Organic Program’s organic standard and the Forest Service's
Roadless Area Conservation ruling. In each case, public comment was accepted electronically, either via an Internet-based form or e-mail, as well as through traditional methods (e.g., letters and public hearings). Case narratives of the initial proposed rules, content analysis of public comments, and interviews with policy staffers at three national environmental organizations are used to describe electronic public participation’s impact on social movement organization mobilization strategies. Drawing on the ecological-symbolic perspective, it is argued that the Internet may have the potential to overcome some of the obstacles of traditional forms of public participation in environmental decision-making, but that it currently provides an arena for playing out the same conflicts that appear in conventional public participation methods, such as conflicts over trust of federal agencies, the use of science, and the role of public values. Consequently, the strategies employed by social movement organizations in this new environment of electronic participation are not substantially changed. The implications for this are discussed.

•  “Organizing Scientist Environmental Justice Activism”, Scott Frickel, Tulane U

This paper examines the problem of scientist environmental activism as it shapes social and institutional change in the health sciences and environmental justice communities. Following Peter Evans' (1996) work on "state-society synergy," this paper argues that environmental knowledge and politics are mediated by and co-constructed through organizational networks that link specialized research groups, professional organizations, and environmental/citizens groups. These collective structures are important sites for examining the opportunities and constraints to scientist environmental activism and for identifying the various forms that those politics take as collective responses to the degradation of ecosystems and human communities. These arguments are illustrated through an analysis of the relationships among organizational and professional actors
engaged in ongoing environmental justice conflicts in Southern Louisiana's "cancer alley."

2.4 STS, Ethics and Technology

Jameson M. Wetmore, U of Virginia

Fulton Room

- “Building Systems of Responsibility”, Jameson M. Wetmore, U of Virginia

A number of scholars in technology studies, including Thomas Hughes, Bruno Latour, and Wiebe Bijker, have done much to explicate the ways in which material artifacts are not built in a vacuum, but rather as an integral part of a much broader system of people, institutions, uses, practices, meanings, and other artifacts. In this talk I will use examples from the history of automobile safety to argue that the integration of new restraint technologies into society is intimately linked to the creation, allocation, and reallocation of responsibilities. Technological systems designed to solve various problems each involve a plan for who and what should be responsible for each aspect of the system. Compelling all of the actors involved to carry out the tasks allocated to them under a particular strategy is of vital importance to ensure stability in the resulting socio-technical system and in order to attain the goals of the system builders. When there is no agreement as to what the responsibilities of the various components involved should be, the individuals, organizations, devices, and government agencies that system builders seek to mobilize act independently of the strategy and do not form a coherent whole. But when agreements are reached, the resulting bonds of responsibility are a significant part of the glue that holds a system together and integrates it into the wider social sphere. To ensure the continuation of this stability, these distributions of responsibility, along with
the socio-technical system itself, are constantly being renegotiated and adapted in order to address new problems, concerns, and situations.


Why/how are technology and ethics connected? A better understanding of this connection will allow us to see ethical issues in technology. This paper synthesizes insights from the social studies of technology and from applied and practical ethics. Two ideas about the technology-ethics connection are explored. First, STS theory suggests that technology should be understood to be not just material objects but material objects together with systems of knowledge, social institutions, social practices, and human relationships. While ethicists have primarily seen the locus of ethics as being in social institutions, social arrangements, and social relationships, the STS account suggests that technologies are an appropriate focus for ethics and that technologies might be characterized as moral/immoral. Second, some STS scholars argue that material objects (artifacts) carry values in their design. This suggests the possibility of thinking of artifacts as carrying moral values. A torture machine would seem to be a good example of such an artifact, but the challenge is to consider the possibility of more mundane artifacts carrying moral values. These two themes are explored in attempt to understand the connections between ethics and technology.

- “A Kantian Critique of Technology”, Thomas M. Powers, U of Virginia

An important theme in philosophical ethics is respect for persons. Kant’s ethical theory is often the starting point for work in this area, primarily because his Categorical Imperative offers a principle-based reason for treating persons with respect. The second formulation of the Categorical Imperative tells us that we ought to treat or regard persons as ends-in-themselves, and never use them as mere means to some end. Philosophers mostly agree that Kant’s view gives a
plausible account of respect for persons because it explains the moral status of persons as ends-in themselves, and it tells us in general terms what that status demands in the behavior of other persons. While Kant’s view is a good starting point, it notoriously fails to address the morality of effects on humans which do not come directly from human agency. Specifically, it fails to assess the morality of technological effects on persons.

I will broaden Kant’s ethical theory by exploring three questions. 1) Do some technologies help persons treat other persons as mere means, in effect aiding them in some special way to violate the Categorical Imperative? 2) Do some technologies themselves treat persons as mere means? 3) Has technology become an end-in-itself, usurping or undermining the status of the person as an end-in-herself?

- “Creating a Moral Buffer in the Design of Weapon Control Computer Interfaces”, Mary Cummings, U of Virginia

With the tremendous leaps in computer technology in the past ten years, significant improvements in computer interfaces now provide greater computing accessibility to a diverse population, and indeed, an intense focus in all areas of human-computer interaction has been to make human-computer interfaces more “user-friendly.” While in general most individuals would agree that making computer technology accessible to more people in a friendly and easy-to-use format is more equitable and indicative of a socially progressive trend, the ubiquitous move to make human-computer interface environments more user-friendly can actually lead to new ethical dilemmas that did not previously exist with older technologies. For example, when designing human-computer interfaces that control weapons in real time, the concept of user-friendly can be a dual-edged sword. The ability for weapon controllers to easily interact with a computer and to ensure commands are both well understood and easily executed provide obvious strategic and safety advantages. However, it is
possible that designing “friendly” interfaces for the sole purpose of destruction and death can afford a moral buffer that diminishes controllers’ sense of responsibility and autonomy, which could allow people to make decisions more quickly and without proper consideration of all the consequences. This paper will examine the ethical and social issues surrounding the design of human-computer interfaces for weapon control systems, and also discuss why it is crucial that the designing engineer understand the social and ethical implications of both critical design elements as well as decision biases that are introduced through both cognitive and social sources.


Is it GM food, plastics, designer babies, nuclear energy, xenotransplantation or internet: technological innovation provokes extreme and opposite public reactions. In a stringent historical pattern, the same technology that is welcomed as a source of welfare and prosperity, is reviled by others as an attack on nature and human dignity.

Increasingly, applied philosophers have dedicated themselves to analyzing and evaluating technology debates. However, their research often goes without answering and even without questioning the roots of the sketched pattern. Instead, they show a tendency to repeat the polarized pattern in academic disguise, instead of indicating new directions. Thus, current technology ethics appears not to be equipped for theorizing public discomfort and euphoria.

For a better understanding of the mechanism at work in actual controversies, I made a detour to the cultural anthropology of Mary Douglas on premodern ideas on purity and danger. Departing from anthropological observations, I have developed a so-called monster-theory. A monster is an ambiguous phenomenon,
which fits into two or more cultural categories that were considered to be mutually excluding. It gives rise to feelings of fear and abhorrence or of fascination and reverence, or of both. Indeed, new technologies often appear not to fit in our standard categories. Transgressions of cultural categories are almost regular in medical technology and biotechnology: life and death, human genes and animal genes, machine and organism, nature and culture are continuously mixed up.

In general, technological innovation is a rich source of new phenomena, which have to be appropriated in order to make them fit in our lives and practices. New technology has to fit in diverse existing orders; social orders, technical orders, organizational orders etcetera. During the appropriation process both technology and existing social and technical orders have to be mutually adapted. However, new technology has to be attuned to the cultural, symbolical order too. This symbolical aspect of technological domestication, as well as the crucial impact of cultural transgressions on our emotions and moral intuitions, is often overlooked by technology ethics and by Science and Technology Studies (STS).

Thus, monster theory offers a consistent explanation for public reactions to new technology. At the same time it opens up several strategies to deal with the force of symbolical images.

2.5 The Problems - and Promise - of Participatory Research Strategies

Virginia Eubanks, RPI

Highlands Room


My research focuses on the impacts of globalization--as both a concept and a material force--on public policy making in Kentucky. Articulations of
‘globalization’ and the ‘new economy’ are central in the making of numerous policy decisions that affect political climate, citizens’ rights and interests, and the overall economic situation of the state. As such, substantive public participation in debates about Kentucky’s economic future is paramount. While economic change is a reality, the strategies taken for coping with and shaping economic change are not inevitable or predetermined. The strategies taken by public officials in particular regions depend on many factors, including economic structure, regional demographics, geographical considerations, political climate, and pressure from business, labor, feminist, environmentalist, anti-racist, and other interest groups. My project is focused on the interactions between these various players, and the various forms of ‘public participation’ they embody.

This panel asks, "What makes the difference between animated participation and the incorporation and appropriation of local resources for social experimentation?" My project addresses this question on two interrelated fronts. First, as a researcher I must continually adjust my research design so that it evolves as a product of ‘animated participation’ between myself and my so-called ‘informants.’ Second, it is a question citizen/ community groups with whom I am working must continually ask of their public representatives and civic leaders: How can we promote strong public participation in policy making that moves beyond the extraction of citizens’ labor and resources for public relations campaigns? This paper will explore those questions as they have emerged during my own preliminary work on the project, and will consider some of the key tensions surrounding participatory research and participatory democracy that are embodied in these debates.

- "Warming the Chilly Climate: Participatory Research on Faculty Development at Georgia Tech", Carol Colaterlla, Georgia Institute of Technology

Warming the Chilly Climate" argues that participatory research within university settings offers the welcome prospect of changing environments for women
students and faculty, especially for women in scientific and technical disciplines. As a feminist teaching in a technological university, I helped to develop a women studies curriculum in science and technology studies; a research center on gender, science, and technology; and an undergraduate learning and living community focusing on improving the representation of women studying and practicing in science, mathematics, engineering, and other technical disciplines. I am currently working with faculty groups coordinated by the provost to improve current evaluation practices of faculty research, teaching, and service and to produce an instrument to enhance faculty understanding of bias in evaluation processes.

In response to the panel’s organizing question "What makes the difference between animated participation and the incorporation and appropriation of local resources for social experimentation?,” I will describe two specific projects I am involved with on the Georgia Tech campus: developing a learning community for women students and researching promotion and tenure issues so as decrease gender, ethnic, race, and disciplinary bias. Drawing examples from The Center for the Study of Women, Science, and Technology (WST); The Women, Science, and Technology Learning Community (WST Lrn C); Georgia Tech’s ADVANCE research in institutional transformation; and the Promotion and Tenure ADVANCE committee (PTAC), the paper argues that participatory research must include all stakeholders and must directly influence practices and policies to be significant.

- “Together (With the Computer): Participatory Action Research and Technology Education”, Virginia Eubanks, RPI

Economically disenfranchised people in the United States find themselves in ambivalent and contradictory relationships to contemporary technological and economic change--though many believe that “computers are the future,” that
technology skills are something they should and must have, they are also aware that they disproportionately bear the negative effects of high-tech development. In this context, is all of the faith that governmental agencies and community activists have placed in the democratic potential of information technology just magical thinking? “Together (With the Computer)” explores how the emancipatory methods of adult popular education can challenge traditional models of passive technological ‘transfer’ and develops a method of IT education in the service of social justice called, after Paolo Freire, “popular technology.”

This paper draws on two years of research collaboratively developing popular technology programs at the Troy-Cohoes YWCA in Troy, NY, a diverse community of resourceful women committed to both the ‘politics of survival’ and the ‘politics of social change.’ These programs combine popular education, participatory action research, and participatory design approaches to build social and technological infrastructure, mobilize direct action organizing, educate ourselves and other members of the community, and produce policy interventions. In the process, these projects contribute to better understandings of the relationship between information technology and poverty in the contemporary U.S., broaden disciplinary and practical understandings of local and strategic expertise, and help develop best-practice models of community-based university research.

- “The Scale-Politics of Resistance to Welfare Reform”, Kate Boyer, RPI

In recent years, social welfare policy has become a site of debate about where governmental responsibility ends, and that of private citizens begins. In the United States, the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (the welfare reform act) has led to broad-scale changes in the degree and kind of social services provided by the State. These include: the imposition of life-time limits on assistance, full-family sanctions, benefits conditioned on work, and a shift in the responsibility to provide services away from public
institutions, and toward private organizations. Taken together, welfare reform has made the responsibility of securing the opportunities and resources necessary to find work and supporting one’s self and one’s family a personal one.

Welfare reform has been achieved through the spatio-juridical rescaling of social policy down from the federal, to the state and sometimes local level (devolution). However, federal to state policy transfer is not the only scalar operation at work in welfare reform. Welfare reform operates at the level of the body through tight behavioral discipline (including the punishment of procreation), while the effects of welfare reform are spatially concentrated in particular neighborhoods, cities and regions. Finally, the ideological engine driving welfare reform is not unique to the United States, but rather part of a more extensive neoliberal policy offensive that is international in scale. Welfare reform thus functions as an inter-scalar mechanism connecting low-income women and their children to globalized policies and practices aimed at diminishing the scope and potency of the social safety net.

As welfare reform has re-scaled, so have the means of resisting it. In this paper I examine the “scale politics” of resistance to welfare reform. Through an analysis of a range of different strategies for challenges to welfare reform, from legal advocacy to the tactics employed by grass-roots organizations, I argue that forms of resistance to welfare reform echo the inter-scalar nature of the policy itself, and further suggest that this policy change can be seen to have created new scales of resistance.

2.6 Nanopast and Nanofuture: Putting Nanoscience into Narrative Representations

Christopher P. Toumey, U of South Carolina

Piedmont Room
Nanoscience and nanotechnology are old enough, and important enough, to have acquired their own collection of histories, tales, legends, myths and anecdotes. These and other representations in narrative form are a way of arranging people and values in a kind of moral order: we make sense of a new reality like nanoscience by putting it into stories about the past, present and future. Those stories, and the ways we tell them, then enable us to tell ourselves that one scientist is better than another; or that one thing is the most important thing about this science, and other things are less important; or that some features are good, while other features are evil; and so on. Furthermore, these narrative representations compete with one another for credibility and historical authenticity. It matters very much which stories become more influential, and which less influential, and why. In this session, five scholars in the humanities observe narrative representations which put nanoscience and nanotechnology into past, present and future, and then critically examine those narratives.

- “On the Mythology of Nanotechnology”, Davis Baird, U of South Carolina

The National Nanotechnology Initiative [NNI], signed into law by President Clinton in 2000, provided considerable funding for work at the nanoscale, with significant increases through the first decade of this century. The initiative comes with its own founding myth. In a now widely-quoted speech from 1959, “Plenty of Room at the Bottom,” Richard Feynman prophesied nanotechnology. He foretold our ability to see and manipulate matter on an atomic scale, suggesting that we might store and manipulate information on this scale: “For each bit I allow 100 atoms. And it turns out that all of the information that man has carefully accumulated in all the books in the world can be written in this form in a cube of material two-hundredths of an inch wide – which is the barest piece of dust that can be made out by the human eye. So there is plenty of room at the bottom! Don’t tell me about microfilm!” He imagined surgeons we would swallow, little nanomachines that, as in The Incredible Voyage, would travel the body’s highways, fixing things as necessary, but without nanoshrunken human pilots. The
major innovation that Feynman suggested was necessary to make this possible was the development of an electron microscope 100 times more powerful than those available in 1959. According to nanotechnology’s founding myth, Binnig and Rohrer provided Feynman’s dream microscope with their invention of the scanning tunneling microscope in 1981. By 1986 E. Drexler, in Engines of Creation, filled out Feynman’s fantasies for the possibilities opened up by the atomic level manufacturing. By 1990 scientists had demonstrated the ability to see and manipulate individual atoms, most strikingly with Eigler and Schweizer’s “IBM” composed of 35 individually placed xenon atoms. Then with more work and a lot of politics, we later have the NNI. In my paper I examine this founding myth, “the standard story.” While not exactly inaccurate, its primary function is mythological, not historical. The standard story tells us what is fundamental and perhaps revolutionary about nanotechnology. It is a story about the origins of a new age where human need and perhaps human want are conquered through our ability to see and, most significantly, to manipulate – touch – matter with atomic – nanoscale – precision.

- “Programmers as the Invisible Technicians of Nanotechnology”, Ann Johnson, Fordham U

No Abstract

- “Multidisciplinarity, Interdisciplinarity, and Patterns of Collaborations in Nanoscale Research”, Joachim Schummer, U of South Carolina

Nanoscale research attracts a large variety of science and engineering disciplines, which is encouraged by technological visions, promises of new discoveries, and huge government funding. Such a melting pot of various disciplines promises to be a great opportunity for innovative research through synergetic effects, if researchers from different disciplines find new ways to
cooperate with each other. It has already been suggested that nanoscale research is a paradigm of what Gibbons et al. call the “New Production of Knowledge.” Even more, visionaries and policy makers see nanoscale research as the driving force for a future convergence of nono-, bio-, and info-, and cognitive science, which would restructure the entire landscape of scientific and engineering disciplines, including the humanities and social sciences. This paper tries to understand the multi- and inter-disciplinary structure and dynamics of nanoscale research by referring to scientometric data instead of visions. First, a survey of the worldwide multidisciplinary landscape of nanoscience and nanotechnology quantifies the scientific and engineering disciplines involved. Secondly, a distinction between multidisciplinarity and interdisciplinarity defines quantitative indices for both, and then compares nanoscale research with that of chemistry. I argue that, while the multidisciplinarity of nanoscale research is indeed impressive, the interdisciplinarity is not. By looking closely at patterns of interdisciplinary collaborations, I ask if the disciplinary dynamics in nanoscale research run towards disciplinary integration or disintegration.

• “From Theory to Databases: The Interaction Between the Scanning Tunneling Microscope and Physical Theory 1984-1988”, Arne Hessenbruch, MIT

In the early days of the STM, there was much resistance to the claim that the instrument yielded atomic resolution and thus, in current parlance, gave us access to the nanoworld. The development of a quantum-mechanics-based theory of the tunneling effect helped to get the new tool accepted. But prior knowledge of the theory of the surfaces under investigation also played a role. My microstudy is used to ask whether a general shift in cognitive status is taking place from theory to databases.

• “Anticipating Reactions to Nanoscience”, Chris Toumey, U of South Carolina

While a great deal of information regarding nanoscience is publicly available, discussion of this research is so far limited to certain specialized or sophisticated
circles: scientists, engineers, and investors, plus distinctive subcultures of nanophiles and nanophobes. Substantive media accounts appear mostly in relatively elite sources like the N.Y. Times and Scientific American. Nevertheless, we can confidently anticipate that public controversies about nanoscience will arise in the near future. If we think of the current situation as the lull before the storm, we now have the luxury to speculate on the forms and the dynamics of future public controversies about nanoscience. This paper raises two issues about how to anticipate such controversies. First, how valuable are general lessons and statements about public scientific controversies? Do we have reliable models which accurately predict public reactions to new scientific developments, or should we turn instead to limited analogies with specific episodes of public reactions? Secondly, if a public controversy is an interaction between a given science and a given set of cultural values, which is likely to be more influential? Does the science determine the controversy such that the science makes certain values relevant and others irrelevant, or, do the pre-existing values set the terms of the debate, so that they neutralize the scientific content? I explore these two issues with the help of examples from other recent public scientific controversies.

2.7 Science and Movements for Precaution

Karen Hoffman, U of California – Santa Cruz

Morningside Room


From greenhouse gases to persistent organic pollutants, genetically modified organisms, space shuttles, and beyond, advocacy for public policies that take precaution (that err on the safe side in situations of uncertainty), has been building and gaining visibility in recent years. But public actors have been fighting
for precaution for decades and precaution has been written into a number of risk-regulating laws since at least the early 1970s. What got in the way of actualizing this principle?

In the case of toxic water pollutants in the United States, Congress mandated the Environmental Protection Agency to create health-based limits with “an ample margin of safety” and prohibit “toxic pollution in toxic amounts” in the Clean Water Act Amendments of 1972. EPA was required to give more weight to health and ecological concerns than to costs and availability of technology and, in fact, was not required to consider the latter. When there was evidence but not proof of carcinogenicity, EPA was to err on the side of precaution. Yet, more than thirty years later, industries continue to produce water pollutants that in tiny doses cause cancer and other diseases and that bioaccumulate in the food chain. Regulatory agencies continue to allow this pollution. Critics advocate precaution anew.

A crucial question finding the way forward in movements for precaution is, what got in the way? A common answer is that EPA did not have good enough science to set and defend precautionary toxics limits. But what knowledge was available and what was not? Was lacking science a legitimate obstacle? How did EPA evolve a protocol that requires exact proof of things that cannot be proved? What got in the way of taking precaution with substances known to be highly toxic by working with the science that was already done or readily do-able? Examining the history of putting the Clean Water Act into practice, I give an account of how EPA’s approach to precaution got constituted as unworkable and was abandoned, and how approaches that do not meet the requirement for precaution got constituted as acceptable. I also envision democratic and scientific approaches that taking precaution with toxics after the fact of their dispersal in the environment and the economy calls for.
Since the early 1990s, U.S. breast cancer activists have worked to raise awareness about suspected environmental causes of breast cancer, especially those that are believed to cause the disease by disrupting the endocrine system. More recently, they have argued that measures to prevent exposure to these chemicals need to be taken now. This call for action, however, has not been based on scientific proof that these toxins cause the disease in humans, which is the type of proof currently necessary for regulatory action. Instead, they have been based on the precautionary principle, an alternative approach to environmental health policy gaining momentum nationwide that stresses the importance of taking action despite scientific uncertainty if there is reason to believe that harm exists. Moreover, by emphasizing plausibility rather than proof, this principle reconfigures not only how much evidence is necessary for action, but also what kinds of evidence matter.

In this paper, I discuss how the precautionary principle has enabled breast cancer activists to create “disease kinships” between breast cancer and other human-and non-human disorders linked to endocrine disrupters. In addition to providing activists with insight into the limitations of existing environmental breast cancer research, these kinships have enabled them to create new “cultural ecologies of risk.” These ecologies not only shape how activists understand the causes of breast cancer in relation to the local/global environments in which they live, but also make evidence on these other disorders relevant to their breast cancer prevention efforts.
While planning researchers have underscored the communicative advantages of participating in a small-group collaborative process (Innes 1994; Forester 1996), many science studies scholars have shown that reaching consensus is challenging when a group of scientists are assigned a common task, but approach the task from fundamentally different perspectives (Jasanoff 1990; Wynne 1996). My paper examines a case where scientific collaboration collapsed, ending efforts to identify a species preserve for a regional habitat conservation plan (HCP). HCPs lay out the terms under which private landholders are allowed to kill endangered animals or eliminate a portion of their habitat, which is otherwise forbidden under the Federal Endangered Species Act. I focus on the moment when the crisis erupted, ending the civility and sense of common purpose among scientific advisory committee members commissioned by each plan's stakeholders to reach consensus on the habitat preserve design of the HCP. I parse the differences among members of the two technical teams among fundamental technical issues, including data standards, validation techniques, disciplinary vs. "precautionary" validation standards, and appropriate temporal and spatial scales of analysis. I then explore what lay behind these differences. While members of the committees prefer simple explanations of incompetence and negotiation in bad faith (by the other side, not themselves!), I trace their differences to the ways in which their claims circulated through different institutional cultures that involved regulatory agencies, universities, private consulting firms, and environmental organizations. The different avenues in which their claims circulated informed the different conceptions that scientific advisory committee members had about the way the HCP should proceed and what kind of science was required. I connect the collapse of the scientific advisory committee to scientists' inability to understand the legitimacy and importance of other knowledge practices, a condition that anthropologist Helen Verran (1994) has called 'epistemological arteriosclerosis', or 'hardening of the categories'. I conclude by suggesting ways to detect the warning signs of this
potentially fatal condition and administer the proper therapy in order to guide
scientists through collaborative negotiations.

- “The March of Cancer,' A Chronogeography of Cutting Cures for Breast
  Tumors. 1870-1920”, Sotiría Theoháris, U of California - San Francisco

No Abstract

2.8 Information Technologies and Health Care

Crown Room

- “Configuring Patient Identities on Health Web Sites”, Nelly Oudshoorn, U of
  Twente

Internet has become an increasingly important technology in the dissemination
and use of health information. As in other medical discourses, discourses on
Internet and health are dominated by the rhetoric of empowerment of patients.
This discourse shows a proliferation of patient identities that challenge the earlier
representations of patients as passive recipients of health care. Inspired by
Giddens' notion of the reflexive consumer(Giddens 1991), sociologists have
introduced new conceptualizations of patient identities, including the reflexive
patient, the informed patient, the health care consumer (Eysenbach 2000), the
net-empowered medical end-user (Ferguson 2002), and the on-line self-helpers
(Ferguson 1997) to capture the changing relationships between patients and
doctors in the "information age health care system" (Eysenbach 2000).

Although discourses on Internet and patients thus celebrate the agency of users,
there are as yet rather few empirical studies to support this optimistic view.
Recent studies have described the constraints on the emergence of the informed
patient identity within patient as well as medical practitioners communities
This paper focuses on another important location to understand the co-construction of technologies and patient identities: the design of health web sites by patient organizations. How do they configure the users of their web sites? Which identities dominate their design practice? To what extent do their practices contribute to the informed patient discourse and enable patients to act as reflexive health consumers? And last but not least: which expertise is prioritized in patient organizations web sites: expert knowledge or experience based/patient knowledge? Based on a case study of 4 Dutch patient organizations, the paper shows the organizational constraints on the design of health web sites to support the empowerment of patients, particularly within patient organizations initiated and run by professionals.

• “Do Not Nurses Need an Electronic Patient Record? Various Orientations Towards New Information Technology”, Gro Underland, NTNU

In recent years, electronic patient records (EPR) have been implemented at Norwegian hospitals. This is a new tool for documentation, classification, and for improved clinical decision-making. The aim is among other things that the EPR shall rationalise medical work and increase the security of patient treatment by better access to medical information.

This paper is based on an extensive observation study at a Norwegian hospital. Interviews and video-recording have also been used. The aim was to observe how the various groups of health personnel adapted the EPR and how they used it for documentation, mediation of medical knowledge for clinical decisions in their daily work.

This study shows that, health personnel do not exploit the inherent potential of the EPR. Different professional groups use the EPR in extremely various ways. Some are very little interested in how the EPR can contribute in supporting their
work in everyday practice. This implicates that it is not just to implement new technology in an organisation; it is crucial to get the different professions to cooperate, contribute and to understand its advantages. A hospital ward has rules, routines and practices, which are produced and reproduced through practices and negotiations. New technology will feed into this process and will result in new and reinforced negotiations and produce new structures. An important question is; why are some health professions negative before they have even tried the new technology. This study elaborates on these comprehensions, negotiations and lack of use in detail and examines in particular why some health professions are negative even before they have tried the new technology.


This paper will address a little-known chapter in the history of the Cold War. It will focus on the efforts by some of the key technoscientific institutions of the period to demonstrate how the products of their knowledge and technology could be applied to the problems of human health and welfare in the United States. I will examine a demonstration project led by NASA which sought to show how the agency was especially suited to addressing the problems of access to health care for disenfranchised populations—in particular Native Americans.

From 1974 until 1976, NASA, the Tohono O’odham nation of Southern Arizona (then known as Papago), Lockheed Martin, and the Indian Health Services collaborated in a pioneering effort to develop an experimental medical delivery system that could link together patient and health care provider instantaneously irrespective of either parties spatial location. The project was known as STARPAHC, or Space Technology Applied to Advanced Rural Papago Health Care. Promoters at NASA believed that they would simultaneously provide a solution to the earth bound problems of rural populations seeking access to
urban and regionally-based medical centers and the space-bound challenges of providing medical care to orbiting space stations, manned interplanetary probes or even a moon base without doctors aboard. Through an analysis of various public relations media produced by the space agency, I will show how this project was used to publicize and promote the idea that NASA was applying space technology to improving the health care delivery systems for disenfranchised populations such as Native Americans.

Although NASA represented the Tohono O’odham reservation as a stand in for “remoteness” and “outer space”, I will show how O’odham people involved in tribal government viewed STARPAHC as an opportunity to involve greater numbers of their people in health and welfare programs. The project brought considerable national media attention to the tribe and its leadership, which soon became an emblem of the social progress being made by American Indians during the 1970s. Tribal leaders capitalized upon the opportunities that the project offered. In this sense, they were entrepreneurs of their remoteness; turning what might be viewed as a “lack” into a set of opportunities and assets for advancing the political goals of self-determination.

- “Building a Health ‘Infostructure’ in Canada: Towards the Promised Land?”, Patrick Feng, Simon Fraser U

As is the case in many countries, health care reform is a perennial issue in Canadian politics. In recent years, a number of major documents have been produced on how Canada’s health care system might be renewed. A common thread across all of these studies is the centrality of information technology and, in particular, the importance of developing health information standards. Increasingly, information technologies and information standards are framed as the key to delivering better health care. As just one example, electronic health records are given a prominent role in the 2002 Romanow report, with the assumption that provinces across Canada will soon adopt common standards for
the collection, use, and dissemination of health data. And yet, the development of such standards will largely take place outside of government, in the realm of industry consortia and international standards organizations.

This paper examines the interplay between government, industry, and non-governmental standards organizations in the building of a Canadian health “infostructure.” I begin with a review of some of the institutional players in the Canadian health care scene, concentrating on the federal and provincial levels. I then analyze the different visions put forward by various health organizations such as the Canadian Institutes for Health Information and Canada Health Infoway—both of which operate at arms length from government. Next, I situate the development of Canadian health information standards in light of global trends in standardization. Finally, I argue that the growing importance of—and push for—health information standards illustrates how control over critical decisions about the design of health technologies is shifting from traditional public bodies (i.e., government) to non-governmental and industry-sponsored organizations. This trend is indicative of the growing importance of “non-traditional” governance structures in the science and technology policy arena, and suggests that traditional bodies are playing an increasingly marginalized role in the design of technoscience.

- “Once Circuits Could be Sick: Rediscovering the Uncanny Machine, and Understanding the New Corporate”, Nate Greenslit, MIT

Alongside of the changing information-gathering requirements of the medical industry, mood charts and rating scales have emerged as new forms of expressing, articulating and identifying the symptoms of depression and anxiety. These new techniques of self-management have been developed in tandem with psychiatric diagnostic systems that privilege reliability over validity, and have become a key part of how pharmaceutical companies communicate with doctors and patients about their products. Similarly, alongside of these shifts in the
conceptual and practical relationships between pharmaceuticals and mental illness, insurance companies are beginning to track prescription records rather than medical records to collect health information and to generate new algorithms to decide issues of reimbursement.

This presentation will look back on Warren McCulloch's cybernetic ideas about machines and human psychiatric illness as way to think critically about how these medical information-gathering systems work, and as means to ask some new questions about mental health in the U.S. as a complex product of the quickly evolving relationships between science, medicine, and business.

2.9 Theorizing STS—Networks, Boundaries, Embodiments

Athens Room

- "Simulation and Embodiment", Don Ihde, SUNY

Human embodiment plays both explicit and implicit roles in simulation. In this paper I examine three trajectories which show this relationship (a) simulation technologies which follow added sensory dimensions; (b) simulation technologies which incorporate differing perspectives [POVs]; and (c) visualization technologies which entail hermeneutic components. I demonstrate the role of embodiment through each trajectory and then show patterns which emerge therefrom.

- "Machines, Memory and Intelligence: Three Computer Models of Mind", Peter Asaro, U of Illinois – Urbana-Champaign

This essay examines the origins of computational models of mind in the 1940's. In particular, it compares the theory and embodiment of three different models of mind and intelligence which were produced in that period by three of the most
significant figures in the development of such models. The first of these is the mathematician John von Neumann, his design of the Institute for Advanced Study machine, and his drive to build computational simulations of the mind. The second is the mathematician Alan Turing, his Automatic Computing Engine and his drive to discover the fundamental algorithmic processes underlying human intelligence. Third is the psychiatrist W. Ross Ashby, his Homeostat and his drive to recreate the fundamental processes of life and intelligence in a machine. Each of these computer designers intended to exhibit a specific theory of how a scientific understanding of the mind might be approached. Moreover, competing theories of mind and brain influenced the architectural design of their machines. In particular, the essay examines how psychological aspects of memory influenced machine design. It also considers competing theories of intelligence promoted by Turing and Ashby and exhibited in their machines and discussed in their correspondence. The paper concludes that a social and historical understanding of the debates about Artificial Intelligence beginning in the 1950’s, and whether or not “machines can think” must consider the significant difference in the way this concept was constructed in these three specific cases.

• “Culture, Network, and Cosmogram: Putting a Post-Cultural Lid on ANT”,
  John Tresch, Northwestern U

The concept of "culture" has been sharply criticized in anthropology and in science studies for its implication of a bounded, monolithic, ahistorical, uniform, and idealistic entity. Bruno Latour has offered instead the study of "networks" of humans and nonhumans as a more open-ended, pluralistic, textured, and material portrayal of human knowledge and activity. For the "depth", "meaning", and "holism" of "culture", Latour has proposed a "flat society" of overlapping, distributed, particularistic, and multi-centered networks. This paper addresses two main difficulties with ANT. Networks have a tendency to recruit new actors and cross borders in a process of seemingly unstoppable expansion and translation. Yet borders between nations and between "cultural fields" persist.
How do we know where one network ends and another begins? Secondly, the injunctions to "follow the actors" and "use actor’s categories" lead to an internal contradiction. While taking the terms and judgements of actors seriously is preferable to the reductive critiques of classic sociology, psychology, or biology, how are we to deal with the appearance in practice of categories which ANT has itself effectively banned? How do we reckon with actors who insist on using terms of explanation like "culture" ("Japanese Science", "French DNA", "American work ethic"), or even "Science" with a capital 'S'---a set of timeless, abstract, universal, rational procedures? Do such methodologically unacceptable generalizations and abstractions suddenly become acceptable when actors show them to have a function in practice? This paper argues that we should examine the role played by "cosmograms"--- concrete representations of the entirety of relations among humans and nature, and the divisions among cultural fields, whether these take the form of artistic representations, narratives, explicit cultural maps, scientific trees of knowledge, or even ritual enactments of cosmic order---as a way of recapturing the generality and holism of "culture", without leaving the realm of material traces, discrete events, and observable phenomena. As an example I consider the case of Alexander von Humboldt, who pioneered the modern scientific network. Humboldt saw it as his task to make visible the articulations and interconnections among the sciences and society and to provide a clear moral sense of the place of humans within the Cosmos. His example offers useful suggestions for contemporary, "post-cultural" STS.

- “On The Notion Of Boundary”, Imes Chiu, Cornell U

Numerous science and technology studies employ the notion of boundary in their theoretical construction. The popularity of boundary-related concepts in science studies literature spun a plethora of definitions. Mapmaking, cartography and other boundary-related terminologies appear in such diverse semantics, it can be confounding to a novice student speaking the language of the field. What exactly is ‘boundary-speak’?
Some studies emphasize the demarcating properties of ‘boundary-speak’ in distinguishing concepts while others portray its unifying characteristics among diverse social groups. Despite changes in the theoretical approaches of understanding science over the years, ‘boundary-speak’ persists in theoretical analysis. This paper strives to make sense of the range of meanings employed in ‘boundary-speak’ as well as explore the appeal of this terminology. The methodology involves analyzing quotations from actual semantic use of selected science studies texts. While the study limits itself to a representative sample, the semantic analysis takes into account the contextual meanings of the terms based on the dominant themes of the literature.

- “The Ontology of Network Mechanisms”, Kai Eriksson, U of Helsinki

Network relations have become an inherent part of the research object studied by economics and management research. Once having been intertwined with the more general social scientific and political discourse, they have formed a theoretical foundation for the network metaphor’s becoming embedded into the social realm. This is why the discourse about networking can be conceived of as part of the discussion that extends beyond that of any special sciences. It is possible to say, therefore, that formal network relations are defined largely by two distinct ways. They can be based either on contract (a mutually binding legal frame) or integration (a shared horizon or culture). Contract can be considered as a relationship in which the functions and parties involved have been predetermined, before the commencing of the action in question. The network relation here is subjected to the existing objectives of the parties. Contract is thus a tool for governing the relationship, being organized in relation to the articulated objectivities. In integration, however, the emphasis is on the action in itself. It can be thought of as a relationship in which the functions or even the parties involved are not clearly specified. Although integration is also about articulating and
governing common goals, these goals are immanent to the action which, for its part, finds its expression in the network relations. Thus, whereas contract refers to some foundation external to the action in question, in integration the relationship is governed only through the techniques and practices emerging from the action itself.

It is commonly thought that the previous distinction of network relations between contract and integration is feasible from the point of view of network actors only. If one considers the network as such – as a whole – that constitutes always already the precondition for individual actors and actions, one has to think about network as ontological question. For in the same way as we need a conception of the wholeness of a language as the precondition for individual expressions, we need a conception of the wholeness of a network in which different relationships take place. But the ontology of network (as the whole in and through which network relationships become designable) is not articulated independent of the relations and conceptions. What I will try to show is how this ontology of network is construed though the very historical movement of this networking itself.

2.10 Public Databases in an Age of Uncertainty

Barbara S. Poore, U.S. Geological Survey

Savannah Room


In the mid 1990's, federal agencies cooperated in a joint project, the National Spatial Data Infrastructure (NSDI), to make geographic information publicly accessible on the Internet. The NSDI supported the Clinton administration’s promise to use the Internet to reinvent government. The NSDI was sold as a package of standards and basic data sets that would cover the nation and serve
as a framework for state and local government information. The benefits of the
NSDI were cast in terms of citizen access to government, saving money by
avoiding wasteful duplication of data sets, stimulating economic growth, and
protecting the environment. This vision culminated in Vice President Gore’s
Digital Earth in which a schoolgirl could point at a virtual globe and call up
scientific and cultural information for any place on earth. NSDI marketing
materials proclaimed a bottom-up process of data sharing among many
organizations, however, in reality the conception was rooted in a hierarchical
view of organizations centered on the federal agencies that were the primary
repositories for data they validated and served up.

In the post 9-11 climate, the NSDI has been repositioned as a provider of data for
homeland security. New technologies have turned geographic information into
geographic intelligence, embedded like the journalists of the Iraq war into smart
bombs, hand-carried GPS receivers as part of a soldier’s equipment, and satellite
images of Baghdad in ruin on every blogger’s website. At the same time, the very
web services that allowed the Pentagon to wage a networked military campaign
have made it possible for someone to recover a map to your house simply by
typing your phone number into Google. The implications of this paradoxical
evolution towards increasing security and at the same time increasing
fragmentation are discussed with respect to privacy and accessibility.

- “Freedom and Openness in Bioinformatics Networks”, Anne Gatensby,
  Concordia U

In the emerging global markets of bioinformatics, based on the merging of
computer technologies with molecular techniques, tensions have developed
between those who wish to preserve public access to genomic databases as a
social benefit and those who view them as a source of profit. Central to these
debates are negotiations over what constitutes privacy, property, ethical practice,
public interest, and the boundaries between human and non-human bodies. In
some contexts, privacy and property debates tend to adopt individualistic and legalistic frameworks that try to balance the rights of individuals to maintain confidentiality over personal information with the desires of private institutions to exercise proprietary control over biological data. In others, concerns over changing cultural and social patterns of meaning and practice take precedence. What they tend to have in common is a focus on human rather than animal or plant genetics, as for example with the cases of the Human Genome Project and the Icelandic Health Sector Database. As a consequence, ethical and social discourses of privacy and property tend to pit the interests of affected laypersons against the imperatives of commercial bioinformatics firms that seek to control information for the purposes of accumulation. While such emphases have been crucial to the development of critical analyses of these human-centred genetic commodification projects, they also have had the effect of overshadowing debates that have developed within the field of bioinformatics that position those who promote free and open access to the proportionally more numerous plant and animal databases that exist against those that argue for proprietary rights for private-sector owners. In this paper, I focus on how the recent emergence of a number of non-profit organizations in the bioinformatics community, modeled on the open source software movement, operates to open up debates over individual privacy, intellectual property, and ethical conduct to the multiple ways that material and social relations are reconstructed in and between lay, scientific and corporate communities.

• “Government Access to Health Information - Ethics and Equity”, Jacque-Lynne Schulman, Virginia Tech

The phrase endocrine disruptor and environmental estrogens have become synonymous with a new research initiative that is investigating the effects of hormonally active xenobiotics on biological systems. A generation ago, scientists learned that some industrial and agricultural chemicals showed estrogen-like
activities. Ten years ago, a new term, endocrine disruptor, entered the vocabulary of science and biomedicine.

Different areas of science have specific areas of research and use specific tools and instruments. Reflections on scientific methodology in the fields will also help clarify whether endocrine disruptors symbolize a new etiology of chemically induced disease or represent variations of traditional chemical toxicology. (Krimsky, 2001). The environmental endocrine hypothesis posits that a diverse group of chemicals in the human and animal environment mimics or blocks normal hormonal function. The effects within the endocrine include altering many control mechanisms of physiology. These agents are mainly synthetic organic chemicals. They have been found to have association with several dozen human and animal disorders, specifically those involving the reproduction, development, and the immune system as well as cognitive and behavioral disorders, and neoplasms.

A preliminary study was made of the involvement by different disciplines in a developing area of inquiry. Specially, the patterns of authorship and institutional affiliation as well as well of publication were examined in the area of research on environmental hormones ad endocrine disruption. The following variable are analyzed: terminal degree of authors (PhD, MD, MPH), etc.); degree field of authors (physiology, endocrinology, toxicology, etc.); departmental affiliation; geographic location; geography and journal characteristics (national or regional differences).

- “Biodiversity Data Perversity: Understanding Barriers to Sharing Data across Epistemic Communities”, Nancy Van House, U of California – Berkeley

Biodiversity research requires the convergence and integration of data from many sources, disciplines, places, and time periods. The ideal, in a world of networked information, is freely shared data and cross-disciplinary collaboration.
Sharing heterogeneous datasets raises serious challenges of content and representation, which the biodiversity research community are addressing.

However, the idealized view of scientific cooperation is, of course, just that: idealized. Biodiversity research reveals many of the barriers to cooperation in a networked world. Among them are differences among disciplines and epistemic communities; organizational tensions and rivalries; and questions of power, including control over the data and the decision-making about it. Areas of contention include, not only metadata and database standards, but also who is to have access to the data; who is allowed to contribute; who makes the decisions; and who bears the costs.

This paper will address the interactions among three types of barriers to networked information and distributed work, and explicate them in the arena of biodiversity data sharing. The first is differences among epistemic communities -- not only among scientific disciplines, but between so-called “professionals” and “amateurs,” who are a potentially rich but controversial source of fine-grained data from the field. Second are tensions and rivalries among institutions with different mandates, including research, policy-making, and on-the-ground preservation of biodiversity.

Finally, there is the question of resources. Biodiversity data gains value to the extent to which it crosses organizational, spatial, disciplinary, and institutional boundaries. Research – and data – that are the responsibility of many easily become the responsibility of no one. Value added for people outside the institution is often lauded as a good idea, but unfunded.

This paper will use Karen Knorr Cetina’s idea of epistemic cultures and epistemic machineries, as well as other analytical lenses, to understand these processes and to ask what are the possibilities for collaborative, distributed work in biodiversity informatics.
LUNCH

Students of 4S: Lunch Meeting  12:15-1:30

Georgia Room

Launching Your Career

Session 3:  1:30-3:15 PM

3.1 Populations, Race, and the New Genetics

Michael Fortun, RPI

Discussant:  Evelynn Hammonds, Harvard U

Georgia Room

•  “Purity and Danger: Genes and Disease on the US/Mexico Border”, Michael J. Montoya, Stanford U and U of Wisconsin

This paper examines the ways knowledge produced with ethnically labeled DNA simultaneously exploits and constructs difference. Using ethnographic details from a genetic sampling operation along the US/Mexico border illustrates how Mexicana/o ethnicity is conscripted as raw material for a chronic disease research enterprise. It will be argued that the human specificity configured for genetic epidemiology of type 2 diabetes is consistent with the decades long effort to create stratified corporate-state subjects of Mexicanas/os.
A drug called BiDil is poised to become the first drug ever approved by the Food and Drug Administration (FDA) to treat heart failure in African Americans—and only African Americans. On March 8, 2001, NitroMed, a privately held biotech firm in Massachusetts, issued a press release triumphantly announcing the receipt of a letter from the FDA—describing the regulatory status and ultimate approvability of BiDil®, pending the successful completion of a confirmatory trial of the drug in African Americans with heart failure. The trial, known as A-HeFT—the African American Heart Failure Trial—is currently underway and is expected to be completed sometime late in 2003.

Underlying the drive to develop and market this “ethnic” drug is a patent, issued in October, 2002, with the title “Methods of treating and preventing congestive heart failure with hydralazine compounds and isosorbide dinitrate or isosorbide mononitrate.” Hydralazine and isosorbide dinitrate are generic compounds that have been used independently for the treatment of a variety of heart conditions for decades. The patent covers a particular use of those compounds in tandem, and goes on to specify that the present invention provides methods for treating and preventing mortality associated with heart failure in an African American patients. A search of the U.S. PTO database for similar race-specific claims in a patent revealed this to be the only patent for such a race-specific drug treatment.

Patent law is supposed to promote the invention of new and useful products. This paper argues that in the case of BiDil, patent law did not spur the invention of a new drug, but rather the reinvention of an existing therapy as ethnic. In so doing it both racializes the space of intellectual property transforming it into a terrain for the renaturalization of race as some sort of “objective” biological category and commodifies race as good to be patented as subjected to the dictates of market forces.
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This paper analyzes an ensemble of nascent ethical practices that are emerging at sites where the investigations into the genetics of complex behaviors, such as smoking, intersect with controversies about racial and other means of categorizing study populations. These nascent ethical practices are meant to inculcate a particular relationship between the researcher and a complex, volatile set of data and research practices. These practices can be considered a guide to the “care of the data,” in a manner similar to what Foucault named the “care of the self” in regard to practices that the ethical subjects of sexuality in an earlier time used to shape themselves and their behavior. Based on interviews with geneticists and analysis of the “methodological” literature in behavioral genetics, the paper analyzes the different ways in which scientists comport themselves toward the uncertainties, complexities, and multiplicities of behavioral genetics data, research practices, and meaning-generating devices. In particular, the paper addresses the ethical force experienced by researchers in a time of microsatellite DNA markers, haplotype maps, and burgeoning databases of population differences, which together pose questions of whether race, ethnicity, or some other practiced category can confer meaning upon how neuroreceptors may be prone to differential habituation among populations of diverse yet groupable individuals.

3.2 Technology, Place, and Practice: An Ethnographic Perspective

Sub-Panel 3 – Mobile and Networked Work

Mizuko Ito, U of Southern California and Carsten Osterlund, Syracuse U

Discussant: Ken Anderson

Ardmore Room
To take seriously the geographical nature of technology we need to think not only how technologies are used in particular places, but how those places are connected together. Yet, in turn, understanding these connections need to take seriously the specificities of particular places. Flows do not eliminate the specificities of particular places and practices, what is involved in experiencing and using space. This paper uses three different examples of technology and space to explore these geographical aspects of technology, and how spatial configurations change and are changed by technology. The first example we discuss is a new mixed reality museum visiting system. This system allowed museum visitors to "co-visit" with online museum visitors. In use this system created a new type of space - a "hybrid space", a space which mixed both online and physical objects, online and physical spatial relations. The second example discussed is the advent of canals in 1800s America and, in particular, the effects this introduction had on the production of food. This historical example shows how a "macro" change in the flows of food depended upon two "micro" changes - a transport revolution, but also a change in practice in the form of the standardisation of crops and weights. Lastly, we look at the changing practices of mobile workers, and how their work changes places and creates new spatial connections through the use of technology. Together these three examples provide a start to thinking about how technology can change our experiences of and use of space.

The paper explores the intricate interrelation between space, place and technology in recent forms of office work. Based on fieldwork in a mobile and non-territorial office, the paper examines how power differences play out in a
technologically saturated multi-setting workplace. These new office designs bring together a variety of places and spaces with an intricate system of mobile technologies to reshape the social organization of the office. Appropriating these techno-spatial places, office workers reconfigure the status hierarchy and redistribute privileges associated with older forms of office organization. As a result, new forms of mobile privacy are open to those with privileged access to mobile technologies, and status in the new office gets expressed through mobility and technology as well. Thus, in a culture of mobile territory it is a multiplicity of physical, technological and hybrid places and spaces that shape the social organization and power formations of work.

• “Machines as a Social System: Reorganization of Space and Control”, Yasuko Kawatoko, Daito Bunka U and Naoki Ueno, Musashi Institute of Technology

Machines can be regarded as social systems rather than physical systems. Copiers are no exception, particularly as they are often leased products with accompanying repair and maintenance services. Without these services, copiers would not be able to act as stable products in the market as they are relatively unstable machines. Due to industry competition, development and design divisions prioritize the creation of advanced technologies rather than creating stable machines. In short, the commodification of copiers relies on the social integration of technology development and service arrangements. In this context, service technicians' social organization and teamwork artifacts are well developed. One of these artifacts is a mobile self-dispatch system with which service technicians monitor a list of customers' request to repair machines in their service area. Through the analysis of service technicians' activities and interviews, we describe how various artifacts are placed in multiple ways in the service space, and various norms and controls are embedded in those artifacts in
order to maintain and manage copiers as a social system. For example, the mobile self-dispatch system are deeply held indicators and controls regarding what service technicians should pay attention to and how they should work. Thus, we also describe artifacts as reified indication systems achieved through everyday practice.

3.3 Four Panel Stream: Environmental and Health Social Movements

David Hess, RPI

Sub-Panel 3: Environmental and Health Social Movements III. Science and Expertise in Health Social Movements

Sherwood Room

“Health Social Movements and Contested Illnesses”, Phil Brown, Brian Mayer, Rachel Morello-Frosch, Rebecca Gasior, Sabrina McCormick, Brown U and Stephen Zavestoski, U of San Francisco

Social movements have organized around many health-related issues, playing a major role in expanding access to health services, implementing new and more humane treatments, discovering and redefining diseases, increasing lay involvement in science, and pressing for overall social change. Health social movements address (a) access to, or provision, of health care services; (b) disease, illness experience, disability and contested illness; and/or (c) health inequality and inequity based on race, ethnicity, gender, class and/or sexuality. We focus on a subset of these movements, “embodied health movements.” These differ from other health social movements, and from most other social movements, by possessing the combination of three features: 1) they introduce the biological body to social movements, especially with regard to the embodied experience of people with the disease, 2) they typically include challenges to existing medical/scientific knowledge and practice, and 3) they often involve
activists collaborating with scientists and health professionals in pursuing treatment, prevention, research, and expanded funding. We develop a conceptual framework for understanding embodied health movements, and provide examples of some of these movements. We also lay out a set of research directions to further this approach.

- “Regenerating Movements: Embryonic Stem Cells, Social Movements, and the Politics of Potentiality”, Chris Ganchoff, U of California-San Francisco

Human embryonic stem cell (ESC) technologies are being heralded by many both inside and outside of biomedical institutions as revolutionary breakthroughs for the amelioration of a variety of pathologies. While stem cell-based therapeutics are still in an early phase of development, their creation from ESC precursors has provoked tremendous controversy.

ESCs are human biological objects; however, they also take other forms. They are also political objects, subject to intense scrutiny and regulation; religious objects, endowed with metaphysical qualities and bioethical quandaries; and legal objects, delimited and defined in the domains of patent and other types of law, among other forms. This article will compare framings of ESC technologies in five different forms of social movements: a Parkinson’s disease (PD) patient advocacy organization; a “science movement” organized around creating public support of ESC technologies; an anti-ESC research pro-life group; a biotechnology/pharmaceutical industry organization; and a patent law organization. While the ESC debates map, albeit unevenly, onto earlier arguments over abortion and fetal tissue research, there are also significant differences. These five positions in the field allow us to do comparative work regarding how social movements operate with both shared and contested images, silenced and articulated discourses and images of ESC research.
This paper will work on both analytical and theoretical levels. Analytically, I will examine one aspect of the politics of life: the maneuvers of different social movements around ESC research. However, I will depart from traditional social movement analysis and concentrate on how these five groups are part of a larger field of biotechnology. Using insights from health social movements (HSMs) and social worlds perspectives, and empirical data, I will examine how they simultaneously co-produce the field within which they are enmeshed. In other words, rather than focusing on the cognitive elements of social movement actors, or the strategic choices of organizations and groups, I seek to highlight the ways in which the different sides contest and contribute to potentiality. Within the field of biotechnology, it is not so much what science can tell us about the nature of ESCs, but rather the effects produced by the very creation of possible positions to be taken in the debate over what constitutes "life itself."

- “Chemicals, Cancer and Prevention: The Synergy of Synthetic Social Movements”,

Maren Klawiter, Georgia Institute of Technology

The feminist cancer movement was born in the San Francisco Bay Area in the late 1980s and early 1990s. Although from the very beginning, feminist cancer organizations in the San Francisco Bay Area framed cancer as an environmental issue, until the middle of the decade, feminist cancer activism concerning the environment took the shape of public education through speeches, organizational newsletters and, at least in the case of the Women’s Cancer Resource Center, through the way in which they trained and educated new groups of volunteers. Until the mid-1990s, however, feminist cancer and environmental justice organizations moved within separate and largely non-overlapping political fields. Beginning in the fall of 1994, however, that all began to change. A new group, the Toxic Links Coalition, synthesized feminist cancer and environmental activism. That synthesis created a synergistic reaction that resulted in new
campaigns, organizations, and coalitions. It also infused pre-existing projects and organizations with new energy and broadened their networks. It was when the feminist cancer movement hooked into the energy, experience, networks, resources, and organizing acumen of the local environmental justice movement, however, that new ideas, campaigns, and coalitions around the issues of cancer and the environment really came to life and began to achieve real political impact.

- “Alternative Futures: Antismoking Campaigns and Revising Late Twentieth-Century Modernity”, Roddey Reid, U of California-San Diego

This paper examines how anti-smoking movements, especially in the US (California), offer up a revisionist history of twentieth century modernity as a deeply flawed period tied to the economic and political cultures of industrial-based economies wracked by the Cold War, illiberal practices of government, and casual disregard for the health of citizens.

3.4 Mediators and Mediation

Joshua Greenberg, Cornell U

Sub-Panel 1: Mediation in a Consumption Context

Fulton Room

- “Mediating the Signs of a « Natural » Body: Technology, Commodification and Embodied Consciousness”, Gwen Bingle, Munich Centre for the History of Science and Technology

The wellness and health market in Germany currently boasts a 16 billion Euros turnover and seems to bask in the promise of a radiant future. The two last
decades have been paving the way for this development by gradually affixing the fitness and wellness labels on an ever increasing range of technologies from food to movement, cosmetics and alternative health practices. But how can one satisfactorily account for such a dramatic focus on the body and its everyday needs? In this paper I want to argue that if the contents of these technologies are not necessarily revolutionary, they nevertheless point to a significant shift in the mediation of what it means to care for the body -whether in terms of ideological discourse, concrete marketing strategies, actors as well as loci.

Ideological discourse is increasingly dominated by the negotiation of a new body project, where the relationship between nature and technology is redefined. In this context, “embodied consciousness” provides the linchpin to reunite potentially contradictory and programmatic buzzwords such as holistic experience, pleasure, harmony and relaxation on the one hand, and longevity, performance, immunity and personal preventive action on the other.

'Discriminative trivialisation' is the first marketing strategy I will introduce and can be defined as a symbolic dialogue between producers and users revealing the interplay between natural and technical expertise, as it is encoded in the design and packaging of a technology. ‘Creolisation’, as another distinctive strategy, refers to the way in which products and processes are holistically marketed in interactive commodity networks. Finally, both the actors and the loci of this mediation also undergo a form of hybridisation in terms of their functions, as for example illustrated by GPs -and by extension their practices- who no longer solely function as “body mechanics” but increasingly address lifestyle and psycho-spiritual issues.

- “Gendered Icons in the Mediation of Mobile Consumption”, Heike Weber, Munich Centre for the History of Science and Technology

Focusing on the mediation context of portable electronics, this paper shows how the portable radio became an indispensable, often wearable companion of Mrs.
and Mr. Everybody during the 1950s and was finally used both during work and leisure, as well as in the private and public spheres. Because of their ubiquitous functioning and closeness to the body, 20th century portables called for a renegotiation of the concepts of space, body and public behavior. For the radio, three lead-icons predominately figured in these negotiation processes: the "progressive" male tinkerer, the "passive" female mass consumer and the "subversive" (primarily male) teenage rowdy.<caron>Theoretically, the paper argues for a wide understanding of "mediation" and conceptualises it as the "negotiation of user designs" in which various actors in the continuum between producers and users take part -sometimes even without being aware of it. The term "user designs" (as developed by my colleague and I), serves to encompass prospective and actual user images, meanings and practices of a technology, from production to consumption. The three lead-user categories mentioned can thus be said to each represent certain "user designs" which later portables in their design, marketing and consumption draw upon. In his self-made portable radios, the tinkerer promoted miniaturisation and wearability, and therefore, the icon of the tinkerer represented technical playfulness and extreme experiences - a semiotic dimension which would be increasingly exploited by espionage narratives such as James Bond. Advertising in the 50s however used another icon, that of an attractive woman listening to the radio in a public leisure setting. Besides providing an erotic signal and representing the simplicity of the radio's handling, this image also served to newly define the public sphere as an appropriate place for informal, hence also rather private pleasure and relaxation. Later, around 1960, teenage users challenged the established norms of public radio listening, and their novel user designs generated the boom of the -by then-mass-produced pocket receiver.

- "Retailers, Distributors, and Enthusiasts: Mediating Home Video", Joshua Greenberg, Cornell U
In its first sixty years, the US motion picture industry developed a clearly defined structure, incorporating specific technical artifacts and social practices into a system stretching from cameras to distribution networks to theater projectors, from Hollywood studios to audiences around the world. In the late 1970’s and early 1980’s, however, a parallel sociotechnical system of movie distribution and viewing emerged around the videocassette recorder (VCR) and other video technologies, and within ten years the video market was more important to a film’s financial success than its theatrical release. During the early days of the American home video market, established corporations were in perpetually playing catch-up with the small business owners and enthusiasts who mediated access to the new technology for home users, and who essentially built new institutions and practices from the ground up. These “Mom and Pop” video retailers and “videophile” enthusiasts, often characterized as isolated homesteaders on the wild frontier of home video, created and facilitated a new distribution network that served as a consumption junction of users, movie studios, and manufacturers in which the groundwork was laid for much of our current understanding of entertainment and media technologies. Thus, new knowledge about the nature of movies and their status with regard to the new video technologies flowed not from producers to consumers (or vice versa), but rather from the consumption junction outward, from the mediators to those whom they brought together.

- ‘Multiple Mediation: Commodity Traders, Knowledge Brokers, and Truth Makers”, Hamid Ekbia, U of Redlands

Recent studies of the financial markets by sociologists have shown the constitutively social structure of the markets as well as their deeply political and cultural character. Most of these studies have focused on the relationships among “professional” players such as traders and entrepreneurs. An equally interesting phenomenon, however, is the relationship between creators/ producers and users/consumers — a relationship that has become
increasingly complex because of its highly mediated character. One example of such relationship is manifested in the role of companies such as Enron in energy, broadband, and even home video markets. A close study of Enron reveals the multiple mediatory roles that it played, not only as a trading company, but also as a knowledge broker that heavily contributed to the formation of political agenda, public opinion, and the broad cultural milieu of the 1990’s. It also reveals that Enron did not play these roles in isolation, but as part of a complex web of social networks that included, among others, Wall Street analysts, auditing firms, business media, and academic press. These actors, who played a substantial role as the producers of “truth”, also had a crucial mediatory role between Enron and its consumers and stockholders. This paper explores the multiple mediation roles of companies like Enron and the social networks that supported it.

3.5 Theorizing Scientific Knowledge in Democratic Politics

Erik Freeman and Justus Lentsch, U of Bielefeld

Highlands Room

- “Science and Public Reason”, Erik Freeman, Bielefeld U

Public reason specifies the kind of reason appropriate to deliberation in public forums, in which the competing and often incompatible views common to a pluralist constitutional regime are considered on the basis of whether or not their advocates could reasonably expect others to accept them as reasonable. Accounts of public reason often run into difficulty when they are challenged by comprehensively religious, moral, or philosophical doctrines. Science has typically been included among such forms of nonpublic reason, even as society increasingly turns to scientific expertise to settle some of its most central conflicts. The problems posed by expert cultures for democracy have been
widely noted, but the distinctive problems scientific reason creates when admitted as a normative frame for political argumentation are less commonly discussed. In this paper I shall consider some reasons for and especially against viewing science as a comprehensive doctrine. In particular, I will argue that the great extent to which science and technology imbue the basic institutions of modern societies compels us to regard some parts of scientific knowledge as latent in the public political domain. It follows that a conception of public reason starting from intuitive cultural ideas cannot treat science as traditionally comprehensive. Understanding science as a type of quasi-public knowledge, at least in its less controversial aspects, suggests a broader notion of public reason more responsive to the kinds of evidence with which policymakers and other political actors are confronted. This foregrounds an explicit concern with the deep relationship between political practice and social belief, and so provides a seriously realistic starting point for normative political theory.


Does deliberative democracy serve truth? Building on an ongoing study of the different forms of parliamentary advice to the German "Bundestag" (Weingart, Brown, Lentsch) funded by the German Parliament's office of Technology Assessment (TAB), I first ask how public knowledge is produced. Second, I examine how the increasing reliance on scientific expert advice in the production of public knowledge affects the epistemics of public deliberation.

The increasing reliance on scientific expertise for political decision making is often regarded as incompatible with some of the basic epistemic presuppositions of liberal democracy: First, it violates the conditions of equality presupposed by democratic deliberation. Second, expert deliberations do not necessarily "track" the reasoning people would undertake if they had actually considered the matter
for themselves, i.e. are not publicly representative. In consequence, political decisions based on scientific expert advice often lack public legitimation. Epistemologically, this amounts to questions of knowledge production, representation, assessment and dissemination as they arise in the political arena.

To make science more responsive to public interest, Philip Kitcher suggests an ideal procedure of enlightened democratic deliberation for the agenda-setting of scientific research. He proposes a procedure for "well-ordered science" where ideal deliberators debate with experts thereby turning their initial personal preferences into "tutored preferences". In this way Kitcher wants to align the patterns of scientific discourse and political deliberation.

Contrary to Kitcher, I argue not to focus primarily on the relationship between truth-seeking and the demands of the political process: Mechanisms of public and institutional accountability and extended peer review recently called for by the European Commission (2001) can be described not only as mechanisms for public and political control over the production and dissemination of scientific knowledge, but as principles bridging between the domains of scientific and public knowledge.

I undertake an epistemological investigation of how the mutual interaction between scientific expertise, the different modes of representation involved, decision-makers and the public is constitutive for the production of public knowledge. Finally, it is elucidated to what extent this might be understood as an instance of public reason.


In February 2002 president George W. Bush authorized the construction of a nuclear waste storage facility beneath Yucca Mountain in Nevada. The twenty
year long controversy, which has not yet ended, is one of the best examples of the extent to which science, technology, and politics are intertwined. This paper analyzes this case from the viewpoint of the philosophy of technology, focusing on the relationship between modern technology and democracy.

First, after a brief survey on the nuclear waste problem in general, I will show that this issue reveals crucial characteristics of modern technology and is directly relevant to contested issues in philosophy of technology -- such as the "essence" of technology, modern and traditional technology, the idea of progress, the social construction of technology, and the relationship between technology and democracy. In every respect the nuclear waste problem represents important features of modern technology.

Next, I will attempt to apply recent theories of democratizing technology to the Yucca Mountain example, and compare the hypothetical result with the actual case. This will show that a number of democratic principles cannot be fulfilled because of certain technological aspects of the case. In passing I will also show that, both in theory and in practice, it is wrong to assume that the scientific attitude will eventually lead to democratic decisions.

Third, based on these observations, I will develop the thesis that the fundamental issue raised by the Yucca Mountain case is not simply how one can have a better scientific and democratic decision procedure for modern technology, but rather whether one can make such a decision at all. I will claim that the Yucca Mountain case shows that the ideal of democracy that we take for granted has become obsolete in modern technological society.

Finally, I will argue that, from the perspective of the philosophy of technology, the Yucca Mountain case challenges the tacit optimism that is often hidden in STS. Acknowledging the limits of democratic management of technological problems does not necessarily lead to giving up efforts to improve the situation. Instead of the implicit optimism or positive attitude with respect to technology apparent in
much of technology studies and philosophy of technology influenced by the “empirical turn,” a much humbler attitude, such as the "active pessimism" proposed by J. Ellul, might be the correct stance, both empirically and morally.

• “The Promise of Public Space and the Blurred Boundary Between Science and Politics”, Ari Tarkiainen

The starting point of this paper is the reflexive question why theory elaboration from “social” to “politics” among STS-theorists has not been either popular and why many scholar thinks it is difficult. The social and communitarian epistemologists within and outside the STS/SKS-community have tried to do their best to fill that theoretical gap by focusing their theoretical gaze on epistemic arenas, beliefs and claims and their justification within scientific communities. Also Bruno Latour and his associates have suggested that we must do two things. We have to open black boxes having a label “scientific fact” and we have to abandon Kantian subject/object – opposition and produce totally new vocabularies to investigate science and its cultural, historical and social tradition.

My another question is – is it enough? Namely, if we are critical and honest STS-theoretical toolbox provides very simple politics-conceptions and its approach to homo politicus is somewhat ambivalent. Their interest has traditionally been on “social” “cultural” and “historical” within science and not so much on “political”. Their basic argument has been; science and its objectivity are bounded, situated, contextual, construed and relative. However, new conceptual elaborations within STS-community like actor/network or some other similar attempts like triple helix or mode 2 are too translucent and non-analytic to capture the complexity of political transformation involved and embedded in science. Science as a political regime is clearly not a Machiavellian monarchy.

The recent heat debate on biotechnology and democracy is an example of that impotence. The very strong coercion to highlight public opinion and democracy in that context is interesting. It clearly alludes and assumes the idea of public space
as an ultimate genesis to legitimate the research and the potential of political power it conceals. It also manifests the mythic and symbolic capacity of public space. But what is public space in science and technology policy? Who needs it? Who is defending it and why?

The conclusion is that we have to start our analysis by asking why most of STS-scholars take the political issue for granted and are not willing to include it to their analyses. We need innovative and argumentative theoretical tools for that politically oriented analysis. One theoretical candidate available is the concept of public space. Without politics we do not have any science, do we?

3.6 The Columbia Disaster: A Workshop

Christopher Kirchhoff and Dwayne Day, Columbia Accident Investigation Board

Piedmont Room

Commentators

Sheila Jasanoff, Harvard U

Brian Wynne, Lancaster U

3.7 Mathematics as Social Critique

Jean-François Blanchette and Ron Eglash, RPI

Morningside Room

“The Co-construction of Math and Culture: Opportunities in Computational Media”, Ron Eglash, RPI

STS needs to shift from its focus on social construction of technoscience to portraits of co-construction between the social and technical. Ethnomathematics
provides one location for such research; ie how the social distinctions of “primitive” and “civilized” have been created through attributions of mathematical absence and presence; simultaneous with how mathematical distinctions such as Galton’s statistics and Boole’s logic have been socially created. In the present and future, we can then ask how to move from this covert co-construction to more explicit and democratic re-construction. Merging ethnomathematics with computational media—a hybrid that has been referred to as both “ethnocomputing” and “computational ethnography”—offers new potential for both the dangers of deleterious appropriation and the hopeful promise of democratic resistance and reconfiguration.

- “Ethnography of Number”, Helen Verran, Uof Melbourne
  No Abstract

- “Sexuality, Cultural Experiences and the Production of Mathematics”, Meredith Wells, RPI
  No Abstract

3.8 Engineering Identities

Crown Room

- “Engineering as Cultural Project: Nation, Progress, and the Problem of Professional Identity”, Gary Downey, Virginia Tech

The problem of professional identity involves responding affirmatively to codes of meaning that live at different scales. Codes living at larger scales can more difficult to intervene in and change than codes living at smaller scales. Like other knowledge workers, engineers ‘code-switch’ between codes of meaning that
originate both inside and outside of engineering. An example of the latter includes dominant national images of what counts as progress in everyday society. Although the unique trajectories of individual lives make contingency and difference a default theoretical expectation, engineers ignore such dominant images at their peril. In responding affirmatively to the problem of professional identity, ‘successful’ engineers tend to produce patterned outcomes in what counts as engineers and engineering knowledge. In this sense, engineering functions as a ‘cultural project,’ both responding and contributing to cultural codes of meaning. Also, calling attention to the problem of professional identity provides a way of accounting for national patterns in the meanings of engineers and engineering knowledge without an essentialist appeal to shared culture, character, or style. The paper highlights examples of engineers in France, Germany, United Kingdom, and United States.

• “I Hear Voices”. Moral Narratives of Gender and Computer Science in Norway and Malaysia’, Vivian A. Lagesen, Norwegian U of Science and Technology

How come female students so frequently give normative accounts of why they study computer science? How come moral statements often are invoked in statements about gender and ICT? This paper explores these questions by interpreting students and other people’s utterances in a Bakhtinian way. Bakhtin’s view on language might serve as tool to improve the understanding of the way that different informants in different settings produce utterances and narratives about gender. Language is for Bakhtin not a neutral linguistic resource, but is already ‘overpopulated’ with other people’s voices, and the social practices and contexts they invoke. When we use language, therefore, we struggle to produce our own meaning out of the myriad connotations and associations of the words we use. However, Bakhtin distinguishes between more
or less authoritative voices; for instance, the voices of authoritative others are often particularly evident in children’s speech.

To talk about gender and ICT, one needs to be able to draw upon a linguistic resource or repertoire that makes utterances and/or narratives about gender and ICT available. The availability of such repertoire could be considered partly as an individual achievement (learning), partly as a collective product of for example gender ideologies. Thus, to compare a society where state feminism makes utterances about gender and ICT readily available to other countries with different gender ideologies could form an interesting SIGIS achievement, also because it shows the way national gender ideologies may influence the performance of inclusion initiatives.

The paper is based on an analysis of an extensive advertising campaign in Norway aimed to recruit more women to computer science, in addition to interviews with computer science students in Norway and Malaysia. It argues that there exist several “voices” about gender and computer science, which the students draw upon in their accounts of their relationship to computer science. These “voices” are complex and situated in various spaces. It seems as if there are global “voices” as well as national “voices” in the repertoire on which the students draw. This may help us to understand why Malaysian women more frequently choose to study computer science than Norwegian women, as well as helping us to characterise the moral regimes that influence these choices.

- “Cultivating Young Researchers and Winning the Nobel Prize”, William Bradley, Ryukoku U

The Japanese government and media were elated last year when two researchers were awarded Nobel Prizes, one in physics and the other in chemistry. Tanaka Koichi, who at age 43 won one quarter of the prize in chemistry, was the youngest laureate in that field since 1967. He also was the
only laureate in the 102 year history of the prize who has graduated with only a B.A. degree.

Further enhancing his popular image was an appearance the following day in front of TV cameras, unshaven and in his work overalls (he is employed by Shimadzu Corporation in Kyoto), and his modesty in downplaying his achievement. In the following months, he has taken up several guest lectureships at universities in the Kansai area in order to help cultivate the desire and attitude in young students to conduct quality research.

In this paper, I use the example of Professor Tanaka to illustrate the manner in which the Ministry of Education (Monbukagakushou or MOE) in Japan has been attempting to promote science education. Two years ago, the MOE set a target of attaining 30 Nobel Prizes in the next 50 years. As one example of practical measures, so-called ‘super-science’ high schools have been designated across the country in an attempt to identify and nurture talented future scientists.

A characteristic feature of a national policy for the promotion of science is the emphasis on the distinctiveness of Japanese research and is illustrated both in MOE policy and some of the comments made in interviews by Professor Tanaka, quoted as stressing the Japanese penchant to avoid wasting precious resources. While such a national science policy is neither unique nor new in Japan, the current presupposed crisis in math and science basic skills among Japanese youth is used as a rallying point for renewed attention on science education not only for the best and brightest but also for the majority of Japanese youth.

- “Permeable Definitions of Information Technology Professional”, Monica Gaughan, Branco Ponomario and Craig Boardman, Georgia Institute of Technology
A recent NSF funding initiative seeks to understand why women and racial and ethnic minorities are underrepresented in information technology careers. An interesting discovery among researchers investigating the phenomenon is the lack of a coherent definition of what, exactly, an information technology professional is. In this analysis, we ask a sample (n=600) of graduates from a technology-intensive University (graduating cohorts 1994-1997) to describe their career development strategies with respect to information technology. We ask participants to respond to several definitions of information technology after asking them to define the term in an unstructured format. The results will enable us to understand the relationship between closed-ended response patterns, and open-ended, unstructured definitions. Furthermore, we will investigate how definitions may vary according to gender, racial, and career trajectory characteristics. If definitions vary by these salient characteristics, it may point to ways in which policy makers can develop ways to attract a more diverse pool to information technology careers.

3.9 Environmental Representations Environmental Representations

Gwen Ottinger, U of California – Berkeley

Sub-Panel 1

Athens Room

- "Searching for the Nawhal: Making Chemistry Green through Metrics", Alastair Iles, U of California at Berkeley

Since the 1990s, green chemistry has emerged as a field where scientists in industry, government, and academia work towards reducing the environmental impacts of the chemical industry. The US Environmental Protection Agency defines green chemistry as "the design of processes and products that reduce or eliminate the use of hazardous substances." Nonetheless, it remains unclear
whether or not chemistry can be "green" or "sustainable". Changing a reaction sequence or substituting a chemical for another could increase energy use or introduce a different toxic chemical.

As a consequence, industry, regulators, and scientists -- but not yet citizens or environmental groups -- are starting to develop metrics to help assure that chemistry is turning green. Lifecycle analysis, mass balances, the E-factor, atom efficiency, mass intensity, toxicity, and structure-activity relationships are among the concepts and methods that are proliferating in the scientific and engineering literature. These are new, nascent ways of representing the environmental effects embedded within chemicals and products.

The choice and use of green chemistry metrics will be politically important and will help shape the policies and decisions of many actors. In this presentation, I discuss recent developments in metrics in the US and the European Union, who is engaged, and the processes by which scientists, companies, and governments are trying to establish the authority of their favored metrics. I also explore how metric esign, audiences, and industry decision-making are shaping each other. For example, proponents need to convince corporate managers and fellow chemists that green chemistry is technically better and more economical than existing chemistry. Metrics are being developed as persuasive instruments. As another example, the US EPA is developing a green chemistry expert system that defines greenness as toxicity reductions, which sends a signal to industry to focus on some activities rather than others. Finally, I discuss the challenges and possibilities that environmental groups face in trying to make green chemistry metrics accessible and useable to citizens and NGOs.

- “What it Means to Be Green: The Conceptual and Network Roots of Environmental Performance Representation”, Charles David White, U of California-Berkeley
In the face of continued environmental problems in traditionally targeted media and the perceived limitations of central planning, the dominance of direct regulation in environmental protection policy is waning. In its place, actors at the frontier of environmental innovation are focusing instead on more collaborative and market-driven approaches to industrial transformation. These alternative institutional arrangements create new challenges for industrial environmental management: in the absence of central arbitration and boundary drawing by state mandates, organizations must decide how broadly to bound and represent their “environmental performance,” both internally and externally.

Drawing from research on three information technology companies, in this presentation I explore how these organizations grapple to define and manage their “environmental performance.” Contrary to the characterization of environmental management as simply a response to external pressure, I take the view that environmental management is an active venue of environmental politics – a place where companies attempt to stave off further regulation, to capture green market share, or to satisfy powerful environmental advocates in their environment. Thus, measuring and communicating environmental performance about unregulated or “beyond compliance” environmental concerns becomes a matter of ongoing negotiation. Looking at the panoply of interactions within and across these case organizations, my work focuses on explaining the tools, processes, and communities shaping organizations’ conceptions of their environmental performance. Using these findings, I then explain how these representations affect the environmental matters incorporated into a corporate environmental management agenda.

- “Network Ecologies: Building Environmental Regimes in the U.S.-Mexico Borderlands”, Steven Jackson, U of California-San Diego

This paper reports on research-in-progress concerning efforts to build regimes of environmental representation and governance in the U.S.-Mexico borderlands.
While a long-standing feature of U.S.-Mexico relations (seen most dramatically in
the decades-old problem of binational water management), the scale, scope and
pace of these efforts have expanded in the 1990s. The paper looks in particular
at regimes of environmental management built around an emerging synthesis of
computer-based geographic information, database and networked
communication technologies. Since the mid-1990s these have played an
increasingly central role in mediating flows of knowledge and control among
scientists, policy-makers and variety of border publics. Collectively, such
representational regimes provide the frequently overlooked infrastructure that
alternately supports and constrains a variety of ways of knowing and acting on
border environments. Focusing in particular on the western (California/Baja
California) border region, this paper will examine two specific bits of such
infrastructural work: the effort to construct shared environmental and quality-of-
life indicators as a baseline for environmental monitoring and binational
governance; and the several attempts in recent years to construct an 'integrated
regional canvas' through the coordination of spatial data from both sides of the
border.

• “Boot-strapping Representational Infrastructures Within a Habitat
Conservation Plan”, Bruce Goldstein, U of California – Berkeley

I examine a collaborative effort to identify a multispecies preserve for a regional
habitat conservation plan (HCP), focusing on the cognitive function of the half-
formed elements of a digital landscape representation contained within a
geographic information system (GIS). Bowker and Star (1999) suggest that
complex classification systems like a GIS serve as "representational
infrastructures", the most complex and fully differentiated of boundary objects
(Star and Griesemer 1989). Representational infrastructures are tricked out with
features that allow them to sustain constructive relations between social
communities separated in institutional space and time. Bowker and Star’s reconstructions are analogous to the way that evolutionary biologists analyze form to understand function, reading the marvelous adaptations of species in terms of the way they help the species to function effectively in its environment. However, as evolutionary biologists themselves have pointed out (Gould and Lewontin 1979), this method of analysis is akin to Rudyard Kipling’s "Just So" stories (1902), missing the way that the origins of certain features may be vestigial of a species evolutionary heritage (such as a human appendix), or fleetingly functional during the ontogeny of the individual. Similarly, analysis of the functional characteristics of a classification system could miss the way that features of a representational infrastructures are transiently functional during creation, assisting in the complex cognitive work required to being the system into being. These cooperative dynamics are difficult to examine because group deliberations are often lost from view, unrecorded in official documents and unavailable in retrospective interviews. My paper takes advantage of a rare opportunity to observe representational infrastructures "in the making" by examining an instance in which a group of conservation scientists boot-straps a classification system into being through imaginative manipulation of its partly-formed elements. This instance of representational autochthony (self-creation) expands on the concept of the "material model" (Griesemer 1991) developed to understand how skill, inference, and memory are socially organized and distributed.

3.10 The New Political Sociology of Science

Kelly Moore, Brooklyn College and Scott Frickel, Tulane U

Savannah Room

- “Categorical Alignment and Intermediary Standardization: Institutionalizing the New Politics of Difference”, Steven Epstein, U of California-San Diego
In this presentation I seek to distill theoretical conclusions from an ongoing research project studying the politics of inclusion and the management of difference in U.S. biomedical research. In recent years, agencies of the Department of Health and Human Services, including the NIH and the FDA, have instituted a new "policy paradigm" mandating the inclusion of women, racial and ethnic minorities, children, and the elderly as subjects of clinical research and pharmaceutical drug development. I link this identity-based redefinition of biomedical knowledge production to two abstract processes: the "categorical alignment" by which everyday political categories of identity, biomedical categories of human difference, and bureaucratic categories of state administration are made to coincide; and "intermediary standardization," in which a universalistic conception of the "standard human" is replaced with a new regime of standards articulated at the level of the social group. I argue that these abstract processes were fueled, in this case, by two concrete political projects: the construction of diverse coalitions that traversed recognized boundaries between state, science, and society; and the deployment of collective action frames that tied citizenship claims to assertions about biological differences between social groups. In developing these arguments, I suggest the utility of combining analytical approaches from science studies and political sociology.


This paper explores tacit theories of nature, representation and voice embedded in current efforts to bring diverse populations into human genetic variation research. In particular, it critically examines efforts of leaders of the proposed Human Genome Diversity Project to create a democratic and anti-racist project through the inclusion of members of indigenous populations and "major ethnic groups" in the design and conduct of research. The paper demonstrates that this approach drew upon a political strategy of inclusion that failed to recognize the
tacit constructions of science, race and democracy embedded within it, and the fundamental questions about the order of nature and society at stake. For example, the attempt to include “African Americans” and “Native Americans” in the planning and implementation of the Diversity Project raised complicated political questions about the identity and voice of these groups that could not be disconnected from vexed scientific questions about the status of these groups as biological entities whose genetic diversity should be sampled. Far from stabilizing the Project, this so-called “Affirmative Action” policy sidestepped important questions about the constitution of power and nature in a manner that merely introduced new points of debate. The case demonstrates that efforts to “democratize” studies of human genetic variation will require the simultaneous negotiation of fundamental questions about the order of nature and society.

- “Incentive to Change or Rational Myth?: New U.S. Policies Tying Funding to Research Ethics”, Laurel Smith-Doerr, Boston U

Policymakers concur that recent developments in the life sciences are surrounded by thorny ethical and social issues. Research scientists, not just clinicians, need to consider the social implications of their work. To gauge whether these dimensions of research have been incorporated into the professional socialization of life scientists, this paper focuses on doctoral programs. The departmental politics of designing a graduate curriculum can be shaped by national level policies when research funding is attached to new requirements. This model of policymaking assumes rational action on the part of scientists—if funding is affected, they will have incentives to take the social and ethical implications of their research seriously. Is there evidence of this outcome, or is a rational myth instituted instead? If departments structure their programs to appear as if they are following the federal guidelines to be eligible for funding but the efforts are pro forma rather than real change, a rational myth may be
emerging. In 2000, the NIH enacted a policy requiring all grant recipients to be certified as passing a course of study in research ethics. The new requirement, however, seems to lack depth as it could be met by clicking through a website with multiple-choice questions on the treatment of human subjects. The effect of new NIH and NSF research ethics policies on graduate programs, at least initially, appears modest. A random sample of 50 Molecular Biology and Biochemistry Ph.D. programs collected in 2001 revealed that two-thirds of the programs had no visible course offerings or information on the ethical and social implications of biological research. A comparison in 2003 will show whether any change in the visibility of ethics in these programs has yet occurred. Interviews with life scientists provide data to assess the extent to which the ethical and social aspects of science are discussed informally rather than being a part of the formal, visible curriculum. Additionally, the interviews investigate whether scientists express an adverse reaction against government funding agencies “legislating” a focus on research ethics. The results of this study have implications for understanding political and organizational institutions of science, and the effectiveness of federal policies in altering university programs.

- “Walking the Line: Science and Environmental Politics in Agriculture”, Christopher Henke, Colgate U

Social theorists have increasingly become interested in the relations between modernity and the environment, especially the problem of reconciling an industrial-consumerist society with the kind of environmental impacts caused by this way of organizing our lives. Is it possible to continue down our current path and yet still make significant changes in how we relate to the environment? Obviously, science and technology play an important part in the answer to this question, given that we often depend on these institutions to both promote the growth of industrial modernity as well as clean up after its messes. Theorists
hold mixed views, however, on the potential role of science and technology in a transition to a more environmentally sustainable modernity—ranging from the cynical views expressed in Ulrich Beck’s “risk society” thesis to the more optimistic perspective taken by ecological modernization theorists.

And yet, despite these divergent perspectives on the ability of science and technology to address environmental problems, there has been very little empirical research on the role of experts in environmental conflicts. How do scientists really deal with environmental problems? My aim in this paper is to investigate the role of scientists in environmental conflicts, drawing on my research with a group of agricultural scientists and their attempts to improve the environmental sustainability of farming practices in California. I describe scientific work on applied environmental problems as a process of simultaneously accounting for an established social order of practice and culture, while, at the same time, pushing for social change within that same system. I call this balance between order and change “walking the line” of environmental politics, and the key problem I address here is: how can scientists promote environmental change among industrialists without unduly threatening their established systems of practice?

The paper provides extensive analysis of my fieldwork and interview data collected with agricultural scientists and their grower clientele. I examine in depth two specific cases of environmental problems related to agriculture (groundwater pollution and pesticide runoff) that highlight both the compromises and promises of scientists' interactions with industry on environmental problems.

COFFEE BREAK

Session 4: 3:45-5:30 PM
Scholarship and activism over the last twenty years has shown that mitigating environmental conflicts and providing sustainable livelihoods necessarily involves the building of participatory, democratic and accountable development institutions. While this notion of "alternative development" is well grounded in empirical evidence from non-governmental and academic circles, the actual implementation of change rests on the ability of state science and technology experts to re-envision development.

The papers from this panel address how historical and contemporary science and technology policies provide different articulations of effective and accountable governance in the context of agricultural development. The panel also addresses the interactions between citizens, non-state organizations and government experts that enable shifts toward more democratic institutions. Using complimentary case studies from industrialized and developing countries, the papers address these questions across scales. Put together the papers discuss the potentialities for alternative development paradigms to influence state science and technology planning as both a theoretical and practical endeavor.

- "Renewable Energy and Rural Development: Questions of Scale and Governance in India and America", Benjamin Weil, U of California-Santa Cruz

Farming has a tendency to be all things to all people. Farming is food production, landscape management, environmental stewardship, keeper of a rural aesthetic and cultural values, and, increasingly, farms are expected to be
the site of energy production. The future of renewable energy production is inevitably tied up with rural land management; it remains to be seen whether this necessarily means farming. The recent rapid take-off of the wind power industry leaves very much in question what character renewable energy production in the rural landscape will take. Will it replicate the exploitative labor relations, increasing centralization and assimilation by industry of elements of production, and destruction of environmental quality typified by industrial agriculture? Will it, on the other hand, be a vehicle for the repopulation of rural areas, reconnecting consumers with the social and ecological circumstances of production, development of rural communities? How will the conflicts over rural traditional aesthetics, open space natural values, and the unavoidable environmental impacts of energy production and distribution be resolved – through democratic consensus politics or through the imposition of ‘solutions’ by industrial capital?

This paper explores the implications for rural development of renewable energy enterprises and projects through a set of cases from North America and India. The cases, ranging from large wind farms in Iowa and Maharashtra to a community biogas project in Pune and a dairy/electricity generation enterprise in Minnesota allow analysis across institutional contexts and across scales. Environmental Governance is model of democratic control that requires accountability, transparency, and an attempt to minimize environmental impacts. But in the case of energy development, even the simplest biogas fermenters or shared photovoltaic array and battery charging station requires manufactured high technology, technology transfer, and financing. Thus even the local control and small scale usually implied by Environmental Governance models is implicated in a grand web of national policy, international lending and development institutions, foreign governments and multinational corporations.

- “Sweet Solutions to Drought and Famine in India”, Roopali Phadke, U of California, Santa Cruz
Irrigation development in India has been promoted in drought prone regions as a form of insurance against drought and famine. In water scarce regions of central and south India, early 20th century irrigation development helped establish sugarcane as the crop of choice despite its intensive water needs. Extensive farming of sugarcane continues today. While the ecological result has been excessive soil salinity, water logging and ground water depletion, the social ramifications of these cropping choices have been to resign a majority of rural residents in sugar producing regions to poverty and disenfranchisement from the techno-political decisions that impact their livelihoods.

By examining the ideological values that underpin irrigation engineering in the 19th and 20th centuries in colonial and post-colonial India, this paper reconstructs why sugarcane cultivation was a promising solution to drought. Furthermore, the presentation links STS concerns for traditional knowledge, accountable expertise and democratic decision-making with the agricultural development crises that have plagued India. Fast-forwarding to contemporary technology politics, this paper analyzes why and how social movements are struggling to reconfigure cropping patterns toward models of more equitable and decentralized water distribution and management.

- “Risk, Governance and Agricultural Biotechnologies: Anti-Science Zealotry or Techno-Fundamentalism?”, Dustin Mulvaney, U of California – Santa Cruz

A preliminary inquiry into the discursive realms of risk and governance regarding agricultural biotechnologies (ABTs) finds the discourses firmly situated in opposing epistemic camps. International policy debates over multilateral trade and environmental agreements are mediated by differing interpretations of the role for science in the evaluation of social and ecological risks. Further, these claims purport that the outcome of these governance challenges presage both the well-being of peoples in developing countries and the vulnerability of regional
economies, intimately tying normative considerations to the rubric of technological change.

Central to this discussion is how certain risks and modes of governance are reduced to scientific truths and how these facts are produced and contested. Proponents of ABTs suggest that the ecological and social risks are far less significant than the benefits. They repackage a risk homily that emphasizes the risks of impeding technological advances. They tout the benefits to developing countries of products derived from intellectual property rights concessions to “humanitarian” projects such as golden rice. This bimodality of profit and nonprofit ABTs confounds popular social movement rhetoric as it has a tendency to neutralize the causal-structure-of-poverty discourse, turning a social problem into a technical one. Likewise, it defuses the “content of research” discourse on university-life science industry alliances.

The analytical challenge of this paper is to set out a framework for uncovering the epistemic commitments of the actors in the ABT debate as it pertains to how food security and risk is perceived and obfuscated across the North-South divide. It asserts that how these discourses on risk and governance change across scale poses significant obstacles to the elaboration of viable alternatives creating a relational disjuncture between the material and discursive, and obscuring the meaning of democratic and appropriate technologies. ABTs are not inherently a panacea nor are they depraved. However, the content and context of ABT research and deployment does matter both ecologically and socially. Participation in these decisions by the affected is a governance imperative. Continuing along the technological trajectory without consideration of oversights of a generation of agricultural revolutionaries does not bode well for the agricultural landscape, those who inhabit it, or those who will share its bounty.
Trying to design a mathematical model for improving poor Brazilian communities self-management and sustainability in food production led to a classical problem in Operations Research. Soon after World War II, the US Armed Forces hired several Mathematicians to propose a diary diet which could be used by the troops. The diet should be optimized so as to have the minimum cost and also the minimum nutritious requirements. From this point on, it was formulated the “Stigler’s diet problem”, the first to use the simplex method to solve a linear programming problem. The problem consisted in determining which amount among 77 different kinds of food should be taken so as to have the required nutritious food as well as a lower cost.

Despite Stigler himself did not accept the resulting tasteless diet – “no one recommends these diets to anyone, let alone everyone” (Stigler, 1945) – his formulation was transformed into a classic problem related to human diets and also applied to other areas like low prices to animal food as well as the definition of mixtures of fertilizers.

The present paper focuses on some aspects of the construction of “Stigler’s diet problem”. Firstly, the original problem of the diet is pointed out as well as its goals and initial results. Then, it is sketched some elements for the history of the creation of Operations Research as a distinct discipline, specially by following two researchers of “Stigler’s problem” along their interactions with the war industry, its politics and discourses. Moreover, it is considered the “Stigler’s problem” prominence to the construction of computers. Finally, the paper tries to develop some of the (dis)connections between the “canonical” and the present Brazilian problems.
4.2 Technology, Place, and Practice: An Ethnographic Perspective

Sub-Panel 4

Mizuko Ito, U of Southern California and Carsten Osterlund, Syracuse U

Discussant: Ken Anderson

Ardmore Room

New communication and information technologies are altering the experience and practice of place. Engineers, anthropologists, architects, and cultural geographers are just beginning to grasp the consequences of proliferating forms of technical mediation. This panel draws on a growing interdisciplinary conversation about cultural geography and globalization in relation to new media technologies, and works to ground this discourse in concrete practice-based ethnographic cases. While there is more and more work that broadly interrogates social and cultural processes related to new media technologies, there is still relatively little work that looks at the details and materialities of how new technologies are embedded in, transform, and reproduce place. The everyday practices that integrate electronic media and new technology with spatial organizations of social relations receive little attention. The panel addresses this gap in the literature by bringing into dialog interdisciplinary perspectives on place with grounded ethnographic perspectives on everyday uses of new technology and their relation to our spatial practices. This four-part panel draws from a wide range of research grounded in the specificity of ethnographic study and design experimentation with technologies of place-making, both old and new. Cases include electronic document and record systems, mobile work and play practices, networked software design, public transportation, an airline passenger profiling system, automated teller machines, canals in the 1800s, and a newly informatted café, robots, and museum.
“Reimagining the Trusted Traveler”, Michael Curry, U of California-Los Angeles

From Aristotle’s need to understand whether a person on the deck of a moving ship can be said to be standing still to the continuing suspicion of Roma and Jews, there is in Western society a recurrent concern about how to make sense of the mobile individual, the individual who lacks the marks of identity provided by the cues of home and place. Over the course of the last forty years one group of mobile individuals--the airline traveler--has been of special concern, and recent events have seemed to render this concern all the more urgent.

Over that period the matter has always been viewed as one of who belongs in a particular place, in this case, of who belongs on a passenger aircraft. And the question has been operationalized through the creation of a passenger profile, one that appeals to a set of narratives within the limits of which that belonging is defined. This operationalization has until recently relied in part upon the visual, upon whether a person looks as though she or he belongs there, though over the years it was augmented by a small but changing list of criteria thought to indicate that the intention of the person in question was not simply to travel to the ticked destination.

But the newest profiling system, the CAPPS (Computer Assisted Passenger Profiling System) II, abandons the visual. Relying upon substantially larger sets of data, potentially including information about one’s neighbors, current and previous, both on the ground and on other flights, and using sophisticated analytical techniques based upon neural networks, it claims the ability without the necessity of face-to-face contact to create for each individual a set of potential narratives, and from them to derive a numerical index of his or her riskiness. Yet the new system is emerging alongside other new airline-based programs that create registers of “trusted travelers,” and promise to excuse them from the rigors of the CAPPS system. And perhaps ironically, those systems are not
information-based; rather, they share with the singularly successful security program developed by El Al Airlines a reliance on face-to-face interaction, a belief that under interrogation a person sitting in a chair will reveal whether he belongs on the aircraft, or not.

- “Route 73: a Bus Journey Through Digital Media”, Nina Wakeford, U of Surrey
- In a project seeking to look at the nature of ubiquitous computing and the consumption of place, a team of researchers at the University of Surrey has been using bus route 73 as a way of sampling the city of London. From the tourist centre of Victoria Station to the more deprived outer areas of the city, this bus route provides a way of talking about practices of mobility, technology and the narration of place. Technosocial practices include web logging, wireless networking via i-point kiosks, visits to cybercafes, and the use of location-based community web boards. Additionally young people riding the bus are intensive users of mobile phones, both with voice and text. Some bus riders avoid other forms of transport so they can engage in communication on the move. This paper argues that urban places are increasingly read through the capability to undertake technosocial practices, and that the boundaries between places shift in this process.

- “Technosocial Situations: Emergent Structurings of Mobile Email Use”, Mizuko Ito, U of Southern California and Daisuke Okabe, Yokohama National U

The case of heavy mobile email users in urban Japan provides a window into the new kinds of “technosocial situations,” or technologically-enabled settings for social action, enabled by mobile media. This paper reports on an ethnographic study of mobile phone users in the greater Tokyo area, where users were asked
to record every instance of mobile communications for a period of two days. Based on these diaries and follow-up interviews, the study identifies new social practices in mobile email communication, and how they are constituting technosocial situations that alter definitions of co-presence and the experience of urban space. The central argument is that the mobile phone participates in the construction of social order as much as it participates in its destabilization. The paper presents three technosocial situations enabled by mobile email: mobile text chat, ambient virtual co-presence, and the augmented flesh meet.

4.3 Four Panel Stream: Environmental and Health Social Movements

David Hess, RPI

Sub-Panel 4: Environmental and Health Social Movements IV. The Politics of Genetics and Difference in EH Social Movements

Sherwood Room

- “Protecting Our Life, Lineage, and Sustenance”: Indigenous Women’s Challenges to Biocolonialism”, Giovanna Di Chiro, Mount Holyoke College

This paper focuses on the human rights and environmental justice work of Native American women activists organizing against the spread of “biocolonialism” and the impact of new genetic technologies on the lives of indigenous peoples worldwide. Based on interviews with women activists from the organization, Indigenous Peoples Council on Biocolonialism (IPCB), this paper examines these activists’ struggles with what they refer to as the “new wave of colonialism,” which threatens their health, their agricultural and intellectual property rights, and their ancestral/cultural values. This “new wave,” they argue, is forged through the contemporary alliances between transnational colonial regimes and high tech science. Debra Harry, the executive director of
the IPCB, argues that “in former times our ancestors fought their battles on land and in courtrooms…today, some of the battles have moved to scientific laboratories and patent offices.” As in other strands of the environmental justice movement, women are at the forefront of the global indigenous peoples movement for genetic justice and are confronting the incursion of genetic science and technology into their lives. I argue that these Native women activists are new “technoscientific actors” who challenge the global reach of genetic technological “advances” and argue for democratic participation in the directions of science and technology.


From 1999-2000, Hungarian politicians, environmentalists, and agricultural lobbyists weighed the pros and cons of allowing genetically modified organisms (GMO) to enter Hungary. Environmentalists initially feared that as a post-socialist country seeking foreign investment, Hungary would become prey to multinational corporations seeking an “emerging market” with a lax regulatory environment. The terms of the debate were reframed when Hungarian expatriate geneticist Arpád Pusztai reported misgivings about the health risks associated with genetically modified foods and when a number of European Union member states banned the imports of GMO foods. The Hungarian public, previously agnostic on the subject of GMOs, suddenly was engrossed in a debate that drew upon two key symbols of contemporary Hungarian national identity: the figure of the scientist and that of the industrious peasant producing wholesome food. This paper examines how environmentalists reframed the GMO issue and successfully formed new political alliances

- “Apples as Aliens: The Politics of Native Plant Reintroduction”, Kelly Moore, Brooklyn College
In cities across the U.S., immigrant groups are protesting city, state, and federal projects to eliminate "alien" plants and replace them with "native" species on public lands. The language that scientists use to describe alien plants parallels that used by anti-immigrant organizations and politicians: Aliens reproduce more quickly than do natives, are aggressive, destroy the harmony of the ecosystem, and spread diseases. In many lay-expert interactions in sociotechnical debates, scientific claims are marshaled by participants to buttress political claims. In the debates over alien plants/people, immigrant groups have also used to scientists to support their claim that the qualities used to describe alien plants are politically derived, not given in nature. In doing so, they are rejecting the idea that the debate is a scientific one at all, asserting that they have as much authority, if not more, than scientists do to make claims about value of reintroducing "native" species. At the same time, they continue to rely on scientists to make the case that the debate is properly political, not scientific. Using the case of recent debates over the elimination of "alien" species in Golden Gate Park, San Francisco, I examine new lay strategies for challenging scientific claims. These strategies, I argue, have important lessons for understanding how the intersection of cultural understandings and political structures in the U.S. has changed over the past thirty years.

“Where Environmental Genomics and Environmental Justice Meet: Concerning the Subject(s) of Toxicogenomics”, Sara Shostak, U of California-San Francisco

This paper examines the multiple perspectives of environmental justice activists on the reconfiguration of “the subject” of toxicological science, as wrought by the emerging discipline of toxicogenomics. My analysis begins with a description of the new tools, research practices, and forms of knowledge that are being created in toxicogenomic research. I demonstrate that as it stabilizes an intersection between the “going concerns” of genomics and toxicology, toxicogenomics is instantiating new definitions of genetic and environmental “risks.” In so doing,
toxicogenomics replaces the “standard human body” of traditional toxicologic knowledge production with a conceptualization of the body that is marked by difference. These differences include “individual” and “subpopulation” genetic variations that may confer resistance and/or susceptibility to environmental exposures and new measures of unique chemical mixtures within the bodies of particular individuals. As toxicogenomics is promoted by scientists and administrators as a new form of biomedical knowledge and as a resource for environmental health risk assessment and regulation, it is of increasing interest to environmental justice groups. In the second half of this paper, I map the varying positions that environmental justice activists have taken in response to toxicogenomics. I argue that these positions must be understood simultaneously as responses to histories of environmental and scientific racism(s), as critiques of technoscience and the risk assessment paradigm, and as expressions of the desire of activists for better means of “making hazards visible,” protecting human health, and achieving environmental justice.

4.4 Mediators and Mediation

Joshua Greenberg, Cornell U

Sub-Panel 2: Mediation in an Institutional Context

Fulton Room


Since 1985, atomic force microscopy (AFM) has gone from an unproven, esoteric laboratory technique to an indispensable and ubiquitous tool of industry and research. Much of the basis for that success was constructed in the late ‘80s, when the few academic research groups that specialized in AFM developed
methods for improving its resolution and reliability, and pioneered its use in a variety of fields. A natural outgrowth of their work was the spawning of several start-ups that sought to manufacture and sell AFMs and related instruments. With commercialization, AFM spread rapidly to the data storage and semiconductor industries, materials science, biophysics, mineralogy, surface science, and other fields. Commercialization has heralded enormous transformations in the probe microscopy community, and in the ways experimental roles are constructed by probe microscopists. In particular, commercialization has brought problems and opportunities to those microscopists who would otherwise have built (and did build) their own instruments. This paper explores the tactics of such researchers; I especially focus on the roles microscope-building academic groups have taken on as mediators between microscope manufacturers and users of commercial instruments.

- "Users' Identities in the Political Economies of International Earth Observation Projects", Dan Plafcan, Cornell U

This paper will examine how and with what implications international science teams for two environmental remote-sensing systems identified and represented users. I will argue that constructs of different types of users which science teams deployed to mediate between users and government agencies became central to the political economies of the earth observation systems. That is, these constructs of users helped answer how, where, at what cost, and in what form data from remote-sensing instruments would circulate in data processing and distribution systems. Owing to these stakes, these constructs were remarkably instable throughout the development and operation of these remote-sensing systems.

Using the mediation of users as a comparative analytical lens, this paper will outline a few aspects of the planned and realized political economies of the two
remote-sensing systems throughout their development. The first aspect that this paper will describe is the how science teams in the United States and Japan became groups that could mediate between users and governmental organizations. Then, I will explain how and why constructs of users became the categories in which the joint teams packaged other values and problems, especially for such issues as instrument scheduling and data acquisition. Finally, I will illustrate how these categories were stable for some activities (e.g., algorithm development) and yet unstable for other activities (e.g., users' production of knowledge about the earth). In sum, the international science teams constructed, deployed, and mediated users' identities in the political economies of international earth observation projects, but the teams could not determine how practices of knowledge creation refashioned the political economies from which users' identities derived their utility.

- "Renorming Academic Science?: University Patenting in the Inter-War Period", Grischa Metlay, U of California-San Diego

Sociological accounts of the modern research university often characterize the current predicament by invoking some notion of “renormalization.” Building on Merton’s (1942) picture of the normative structure of science, these accounts argue that increasing university-industry ties have, roughly since the 1970’s, reconfigured the norms of science by altering the reward structure of academic research, giving rise to a new type of science that is qualitatively different than the science found in previous eras. After positing this radical transformation, such accounts seek to elicit the ways in which scientists comprehend and cope with their new institutional environment. This talk re-assesses the assumption of renormalization by examining the relation between American universities and intellectual property in the inter-war period. The first part examines three institutional solutions to the problem of intellectual property and the rationales that motivated decisions to create novel organizational appendages dedicated to technology transfer. The second part deals with the discourse concerned with
contemporaneous attitudes towards academic patenting in relation to the profession and progression of science, the institutional imperative of the university and the public good. Particular attention is paid to medical patents, as they were (and continue to be) seen as the most lucrative and potentially problematic type of intellectual property originating in university research. Both the creation of organizations devoted to managing university-owned intellectual property and the overwhelmingly positive attitudes taken towards academic patenting suggest that conceptions of renormalization that posit a radical discontinuity between pre and post-World War II academic science are misguided. The positive analysis catalogs the ways in which scientists conceived of intellectual property in the inter-war period; it chronicles the benefits and problems they anticipated and the (institutional) solutions they offered to maximize the public utility of the university while safeguarding the practice and progress of scientific research.

- “Knowledge Brokers: Communication Between Scientific and Entertainment Cultures”, David Kirby, Cornell U

Filmmakers and television producers’ desire for “scientific realism” in fictional media texts has turned science consulting into a flourishing business with numerous companies devoted to providing scientific advice for texts. Some of these companies consist of individuals working as scientific/entertainment intermediaries (“knowledge brokers”) who mediate between the scientific community and the entertainment industry in the construction of science-based fictional texts. Generally, knowledge brokers are individuals with some scientific training who also have extensive experience working in the entertainment world. The broker’s scientific background helps them to approach and converse with scientists in order to gather information, which they then transform into manageable units tailored to the dramatic needs of the filmmakers. Donna Cline, for example, is typical among knowledge brokers. She earned a Masters degree in biomedical illustration and then moved to Hollywood where she worked as a
storyboard artist and designer before consulting on several fictional films including Forever Young (1992), Outbreak (1995), The Relic (1997), and Deep Blue Sea (1999). Outbreak’s filmmakers understood the desirability of her diverse career background to help construct science in their film stating in their production notes that Cline “was well-suited for her role of unifying the scientific and dramatic requirements of the film.”

A knowledge broker’s ability to unify scientific and dramatic elements depends on their capacity to mediate between the needs of two communities that may have radically different goals with regards to fictionalized science. In essence, these differences derive from the fact that entertainment producers and scientists not only represent two distinct communities, but two different cultures with different sets of cultural assumptions and cultural practices. In this paper I use an analytical framework drawn from knowledge management and intercultural communication theories to elaborate on the role that knowledge brokers play in negotiating information transfer between cultures. I argue that while most work on intercultural communication focuses on cultural adaptation (i.e. Anxiety/Uncertainty Management Theory), knowledge brokers allow two distinct cultures to successfully communicate without the need for either to culturally adapt to the other.

4.5 Negotiating the Public Good in Information, Energy, and Transportation Infrastructures

Dean Nieusma and Jason Patton, RPI

Highlands Room

The three papers on this panel develop the relationship between infrastructure and the public good through examinations of information technology in Finland, renewable energy in Sri Lanka, and multimodal transportation in the United States. The contributors characterize this relationship by examining how
disparate values are held together in shared technological forms. As a form of standardization, infrastructures bind people together as functional wholes that encompass differences and multiple localities. In the design of infrastructure, multiple publics negotiate value and technology in shaping and contesting the public good.

Using the design of infrastructure as a lens on social, political, and environmental negotiations, the contributors focus on the relationship between disparate values and shared technological forms. What kind of objects are these infrastructures that necessarily mix perspectives, values, and logics?

- “Colliding Logics Embedded in the Emerging ICT Infrastructure”, Jonna Kangasoja, U of Helsinki

Jonna Kangasoja examines a Finnish public-private partnership constructing a district-wide ICT infrastructure with fiber-to-home services. In the context of larger transformations to the Nordic welfare state, she investigates local-level negotiations over the double nature of information and information infrastructures—as commodity and public good—in an urban regeneration project. Dean Nieusma traces the emergence in Sri Lanka of dendro technology, a renewable energy based on the conversion of wood fuel to electricity. He argues that the creation of such an infrastructure depends upon addressing multiple public goods and diverse interests that interconnect local, national, and global formulations of development. Jason Patton considers contemporary U.S. urban transportation change through negotiations over infrastructure for multiple transportation modes. Drawing a parallel to multiculturalism and biodiversity, he develops the concept of multimodality to explore how the built environment is being re-imagined through the value of diversity.

- “Development Interventions: Electrification alternatives and empowerment in rural Sri Lanka”, Dean Nieusma, RPI
This paper looks at the advocacy and lobbying activities of renewable energy technology experts in Sri Lanka, where over 40% of the population lives without grid electricity. In this context, energy experts widely agree that electrification is a prerequisite for development; however, they also increasingly recognize that electrification alone is not sufficient to stimulate sustained, self-directed development activity, especially in rural settings. They see electrification situated in a field of interlocking development requirements, extending beyond improved material living conditions to include capacity building, creation of income generation opportunities, and environmental stewardship as well as supra-local requirements. With this understanding, a small group of energy experts are working to link a range of social development activities to a promising electrification technology called “dendro.” Derived from the Greek word for tree, dendro technologies burn fuel wood under carefully controlled conditions. By restricting oxygen availability, the process creates “producer gas” that can be directly burned in an internal combustion engine, which, when connected to a generator, creates electricity. To create sufficient support for rural electrification projects using dendro technology, advocates have designed multi-layered socio-technical systems that address multiple public goods of diverse local, national, and international development interests: Poor rural farmers are to receive training and stable income; Sri Lanka’s electrification system is to be stabilized using indigenous resources; and the global environment is to be protected by offsetting carbon emissions. Working with the goal of shifting resources to Sri Lanka’s marginalized rural poor, dendro advocates work both up and down local-global development hierarchies. I will show how, by linking dendro technologies to multiple “public goods” spanning from local to global, dendro advocates attempt to appropriate dominant development logics—such as those espoused by the World Bank—in order to create opportunities for alternative social practice in local contexts. This work is based on participant-observation in Sri Lanka during 2001-2002.
“Emergent Multimodality: The Automobile, Diversity, and Contemporary Urban Transportation Change”, Jason W. Patton, RPI

Through the 1990s, a transportation reform movement coalesced in the United States that questioned the centrality of the automobile in federal transportation policy. The focus of this movement was the relationship between transportation and land use that underlies a host of environmental and social problems. This movement is reshaping the debate on urban transportation and the design of the built environment in U.S. cities. In particular, design for pedestrians, bicyclists, and transit riders has received significant attention under the rubric of multimodal transportation. To understand this shift, I characterize "multimodality" as an emergent concept, a manner of formulating social possibilities that contrasts with the uniformity of automobility. The concept is part of a growing discourse on transportation choices, options, and alternatives that responds to the predominance of automobile-centered design. I use the term automobility to denote how American life, and its status as modern, was re-imagined and re-built around the opportunities and constraints of the private motor vehicle. The term connotes the cohesiveness and pervasiveness of a form of life that depends upon this particular technology and an infrastructure tailored to its needs. Whereas automobility suggests that the car can be most things to most people, multimodality suggests transportation infrastructures and practices that embody social diversity by designing for multiple transportation modes. Through negotiations over urban transportation, I use the concept of multimodality to examine the predicament of living amidst social diversity in a shared built environment. This conceptual shift is coincident with the rise of multiculturalism in public debates and with the growing importance of biodiversity in environmental arenas. The common theme to multiculturalism, biodiversity, and multimodality is the emphasis on diversity as a value for addressing contemporary and complex ills. Through this examination of infrastructure, I explore the salience of diversity to the design of transportation technologies and the built environment.
Transportation and energy infrastructure (T&EI) accounts for the bulk of global environmental concerns. A comparative study of the T&EI sectors of the EU Vs. the US is presented. While the EU has greatly stimulated both R&D and construction of new mass-transportation and alternative-energy infrastructures, the US remains locked into a mid-20th-century oil- and automobile-centered model, adamantly resisting any paradigmatic modernization of its T&EI. Results of the quantitative/factual EU-US comparative study are examined in light of the surrounding geopolitical and historical realities, wherein:

(i) Geopolitically, US enforcement of plentiful-and-cheap oil and natural gas via influence over the four Middle East `oil-price swing states" is both consistent with the older US domestic T&EI, and economically constrains EU ability to adopt relatively more expensive alternative T&EI. This constraint tends to subordinate the EU to US-controlled carbon-based energy;

(ii) Historically, there is a striking parallel between the present EU-US divergence in T&EI policies and the stubborn resistance put up by US manufacturing in the late-1970's-early-1980's to adopting new Japanese and northern European e-technology and methods. This US resistance to technological change was prelude to the collapse of the US Ford/Taylor hierarchical edifice, and proliferation of its `rust-belt'. The present US intransigence Vs. relative EU enthusiasm for T&EI `modernization', has many of the hallmarks of this previous `technical-culture clash.'
No Abstract

- "Does Faith in Goddesses Lakshmi and Saraswati Make Scientific Culture in India Different?", Amit Prasad, U of Illinois at Urbana-Champaign

The phrase "scientific culture" has been commonly used in history and philosophy of science to signify a universal culture of science, which is argued to be comprised of certain social and cognitive traits of individuals and societies. In this paper I argue that the debates around “scientific culture” have been constrained within Eurocentric constructions of science and scientific practice. Even when critiques of such constructions have been put forth the epistemic unity and universality of science, which provided coherence to the notion of a universal scientific culture, are not challenged. On the other hand, some recent studies have emphasized cultural relativism of science(s), in which modern western science becomes one of the many sciences. Such a position, however, fails to account for the structures of power and violence within which scientific practices are conducted, that is of paramount concern to postcolonial science studies. In this paper I have analyzed certain aspects of scientific practice in India through observations and interviews of scientists working in the Nuclear Magnetic Resonance (NMR) and Magnetic Resonance Imaging (MRI) laboratories. I wish to argue that if we see certain common elements in scientific practices in India we cannot attribute it to some enduring cognitive or social aspects of Indian society. Moreover, we cannot also argue that such practices are because of absence of a “scientific community,” whose members share “scientific values”. Empirical studies of scientific knowledge and practice, since the 1970s, have consistently shown that scientific practice is contingent and there is no intrinsic unity or universality of scientific knowledge or culture. In this paper, I show, how particular practices of NMR and MRI scientists in India, with regard to collaboration and patenting, make perfect sense if they are seen in
relation to the institutional practices within which they are being conducted at present.

- “Identity Work, Epistemic Politics, and Velvet Revolutions: On a New Kind of Lab Study”, Park Doing, Cornell U

This paper proposes a new kind of laboratory study in STS that engages issues of hierarchy, labor, and control to explain scientific change. Drawing on ethnographic research from a synchrotron radiation laboratory, the paper argues for a way to relate issues of epistemology with issues of authority and control in this laboratory setting. In doing so, the paper introduces the concepts of ‘identity work’, ‘velvet revolutions’, and ‘epistemic politics’. ‘Identity work’ refers to the ways that identities are performatively related to models. ‘Epistemic politics’ refers to the negotiations and agonizations over who has what kind of access to different epistemic realms at the lab enable technical claims and how these claims are, in turn, used to challenge and fortify agreements over control and authority at the lab. ‘Velvet revolutions’ refers to the recursive relationship between wider cultural trends, in this case the rise of biology in synchrotron science, and the changing epistemic politics of laboratory practice, signifies that scientific change was not, in this case, accompanied by upheaval and tumult, and highlights the fact that scientific change is political change.

- “Negotiation and Consolidation of Scientific Knowledge”, Paolo Volonté, U Cattolica di Milano

I will present the results of a research in the field of the Sociology of Scientific Knowledge. A group of experimental physicists in the field of High Energy Physics was studied through an ethnographic method, in order to achieve a better understanding of the social dynamics leading to the production of scientific knowledge. The research, that lasted one year, was carried out in the Physics National Laboratories of Frascati (Italy). Publications with the results are forthcoming.
My talk will concern what Latour and Woolgar (1979) call the cycle of credit. I would like to show how such a cycle, which rules the scientists' behaviour in everyday laboratory life as well as in the production of official science texts, is held by two different powers: On the one hand, the force of negotiation of meaning, that is at home in every circumstance of social life; on the other hand, the force of institutionalisation, that aims at interrupting the universal process of negotiation to consolidate the meanings. As I will argue, the observation of a team of scientists can show how the different social positions in the cycle of credit couples with different attitudes in the decision to be taken about the submission of a paper for the publication.

4.7 Steps Toward a Platform for the Mapping of Scientific Controversies on the Web – Workshop

Latour Bruno, Ecole des Mines

Morningside Room

4.8 The Making of Language and Metaphor in Technoscientific Discourse

Tarleton Gillespie, Cornell U

Crown Room

- “Representing Forensic Technique as (Legally Credible) Science: Fingerprinting and the Daubert ‘Factors’”, Michael E. Lynch, Cornell U

Carmichael ruling suggested that trial judges should apply the Daubert ‘factors’ when considering the admissibility of expert evidence, regardless of whether the evidence is grounded in ‘experience’ or ‘science’. As Simon Cole and Jennifer Mnookin have noted, the Daubert and Kumho rulings, together with the widespread acceptance in the legal system of DNA testing as the gold standard of forensic science, has cast a shadow on older methods of forensic comparison: handwriting, fingerprinting, bite mark analysis, shoe print analysis, etc. The admissibility of such techniques has been challenged in a number of recent cases. Predictably, proponents of such techniques have put forward publicity and testimony that emphasizes their accordance with the Daubert ‘factors’. In other words, they have rhetorically upgraded the scientific status – ‘scientific’ in the specific sense recognized in the US court system – of the techniques. This presentation is part of a collaborative project with Simon Cole, and examines the testimony of an expert witness in a 2002 admissibility hearing (Colorado v. Hood). The analysis of this testimony focuses upon the rhetorical strategies through which the proponent of fingerprint examination portrays that technique’s accordance with the version of ‘science’ articulated by the Daubert ruling. This rhetorical phenomenon is an instance of how an institutionalized conception of ‘science’ becomes reflexively embedded in consequential practices that serve to perpetuate that institution.

- “Playing the Professional Dozens: The Uses of Extremity in Accounts of Multiple Personality”, Malcolm Ashmore, Loughborough U

The discourse of multiplicity - the talk and texts surrounding and constituting MPD (Multiple Personality Disorder), its more recent official replacement DID (Dissociative Identity Disorder) and its most recent competitor ?Empowered Multiplicity? ? features the frequent occurrence of extreme formulations. For example, both the numbers of reported cases of ?people with multiplicity? over
the last thirty years, and the numbers of reported ?alters? (separate ?alternative personalities?) said to exist ?in and as? each of these cases, have exhibited such rapid growth as to constitute, to some commentators, an epidemic. In this paper, I look closely at some of the most extreme of these numerical accounts, including the career of the most extreme and most notorious claim for a very large number of alters (10,000) yet made. I suggest that such claims are the result of an internal professional dynamic akin to games of competitive excess such as ?the dozens?. My overall aim is to understand how this dynamic impacts on the contemporary phenomenon of multiplicity, especially in relation to its positioning in the raging Recovered Memory/False Memory controversy.

• “Metaphors as Tools of Communication? The Case of Frankenfoods on the Web”, lina Hellsten, U of Amsterdam

Metaphors play an important role in the public representations of techno-scientific issues. Biotechnology, for instance is constantly discussed in terms of revealing ?the alphabet, the secrets of life?, but also as ?scientists playing God? and ?creating Frankenstein?s monsters?. These metaphors are widely used in the mass media but also in the relevant sciences, politics, economics, administration, and in everyday conversations. Metaphors provide a common point of departure for these different discourses.

The metaphor of ?Frankenfood?, for example, was widely circulated in the debates on agricultural biotechnology from the 1990s onwards. It gained wide popularity at least partly because of the active campaigns of local environmental NGOs on their global web-pages. The metaphor was then taken in use in the mass media, in popular scientific and scientific articles as well as in various more informal discussion groups in the Internet. The metaphor of Frankenfood seemed to offer ?common ground? for these different domains to discuss genetically manipulated (GM) foods.
In this paper, I suggest that metaphors may be taken as mechanisms of translation between the different domains and their respective discourses. To analyse the argument that metaphors function as tools of cross-discoursive communication, I map the uses of the metaphor of ?Frankenfood? in the various domains on the Web in 1992-2002.

- “Metaphor as Method: Can the Development of Networked Technologies be Understood Using Metaphor Analysis?”, Matt Ratto and Anne Beaulieu, KNAW-Netherlands Royal Academy of Arts and Science

This paper presents the methodological approach to the study of scientific databases on the Internet. Contemporary scientific databases are created within dynamic and heterogeneous networks of actors, institutions and technologies. Within these networks, databases are conceptualised by using various metaphors, such as data as ?a resource to be mined?. The aim of this project is to study the complex interactions within networks, by analysing their communication. In this communication, metaphors play a crucial role. By making a comparison with a known entity, each metaphor focuses on a particular aspect of a complex issue, thereby shaping how it is understood. This function makes metaphors important tools of communication, both within specific social domains (among researchers), and in the communication between domains (between the public and policy-makers). The metaphors imply not only a definition of the database (databank, community repository, digital workbench, etc), but also of its governance (?community?, ?federated?) and of its purpose (data-mining, virtual experiments).

Since metaphors are also carriers of knowledge in society and in scientific contexts (Maasen and Weingart, 2000), two functions of metaphors are used in our project. First, metaphors facilitate cross-domain communications (Bono, 1990; Maasen & Weingart, 1995, 2000). Second, metaphors orient users (whether as institutions, groups or individuals) to particular possibilities for action
with technologies (Wyatt, 2001; Van Lente, 2001). They shape expectations of databases, they structure the involvement of actors, and orient users to what databases are for.

In this paper, we explore the possibility of extending the use of metaphors. We formulate a way of using metaphors as a new kind of early indicator, to contribute to the complex process of evaluating and steering emerging knowledge infrastructures within heterogeneous networks. In a second instance, we report on how metaphors can help map out the space staked out by databases in the knowledge society, and the role different networks play in the process of database creation and use.

- “Writing Atoms/Atomic Writing: Rhetorics of Nanotechnology”, Valerie Hanson, Pennsylvania State U

In an image of 35 xenon atoms arranged to form the letters I, B and M published in Nature (April 5, 1990), D.M. Eigler and E.K. Schweizer demonstrated a new ability of the scanning tunneling microscope, precise manipulation of individual atoms. One major effect of this ability was to spur the nascent field of nanotechnology. The image appeared in television and newspaper accounts of the discovery and since then has been included in nanotechnology histories as well as arguments about the possible doom or salvation nanotechnology may spark. How and what this image communicates through its deployment of the rhetorical trope of writing through an image becomes crucial for understanding the discursive and non-discursive formations of nanotechnology and its productions. This talk will use Latour’s conception of networks to consider nanotechnology’s use of the common trope of writing and will explore this trope’s effects on the production of scientific knowledge. In addition, following Hayles’ emphasis in Writing Machines on the material, media-specific qualities of inscriptions and inscription practices, the speaker will examine how Eigler and Schweizer’s image exceeds this trope’s more conventional uses because of its
appearance in image form as well as the characteristics particular to the image’s production processes, particularly the non-optical process by which it is created, its informatic nature and the interaction STM users engage in as they manipulate atoms. The speaker will discuss how the trope of writing reinforces the material nature of writing and also the atoms which compose it as well as participates in the arguments about nature, visibility, and value of scientific knowledge that occur within this new field. Finally, the speaker will consider how this image and the rhetorics in which it participates affect constructions of scientific knowledge, particularly the atom, as well as nanotechnology.

4.9 Environmental Representations

Gwen Ottinger, U of California – Berkeley

Sub-Panel 2

Athens Room


Energy Guide labels have been a key element of U.S. government policy to reduce energy consumption of major appliances since they were first mandated on new refrigerators in 1980. These labels position the appliance in question on a scale of similarly configured models, bounded by the most and least energy efficient product of comparable size and features. Regulators believed providing such information would improve decision making by appliance buyers who previously lacked reliable information about appliance energy use. Two aspects of these labels merit our attention. First, energy efficiency labels affixed to major appliances cast the realm of domestic energy consumption as a technical matter, to which experts speak through standardized test procedures, rather than as a complex and highly variable mix of use patterns, ambient conditions and product
specifications. This also focuses attention on those groups and individuals who might buy new appliances and assigns them greater responsibility in reducing energy consumption. Second, while intended as aids to consumer decision-making at the time of purchase, the labels do not supply information necessary for a consumer to identify and thus purchase the most efficient model indicated on the label—instead suggesting merely that an otherwise unidentified model with a corresponding energy rating exists.

The nature and selection of the information included on the Energy Guide label suggests its purpose is not so much to provide specific information about more and less responsible products as the state endorsing the purchase of labeled products generally as economically and environmentally responsible. Such labels ascribe environmental beneficence to the product itself (at the point of purchase), privilege the private sector's right to continue marketing its diverse product lines over the consumer's interest in comparing environmentally significant product characteristics, and increase reliance on expert judgment on matters of energy consumption. This paper examines how consumers use these labels, what meanings they supply, and how they have contributed to shifting the responsibility for conserving energy in households among individual users of energy, the state, and the private sector.

- “Representing Toxicity: An Analysis of How Environmental Activist Websites Construct the Activist”, Wyatt Galusky, Virginia Tech

Like many activist groups, environmental groups have gone online in attempts to increase the visibility of their cause and to empower supporters (or would-be supporters) through the means of political intervention. The case of anti-toxics activism represents a particularly interesting case, in that much of the information useful to the cause is already digitized in the form of the Environmental Protection Agency's Toxics Release Inventory (TRI). What environmentalists have sought to do is present that information in a context of political activism
rather than personal avoidance. Under the guise of empowerment, environmental groups have designed websites intent on generating useful information and means of intervention for concerned citizens. In this paper, I look at the interlinking of three websites - the TRI (www.epa.gov/tri/), the Right-to-Know network (www.rtk.net), and Environmental Defense's Scorecard (www.scorecard.org), as they relate to toxic emissions. I explore these web interfaces as technologies of identity - specifically environmental anti-toxics activist identity. That is, these websites frame and constitute environmental anti-toxics activism by being situating within an historical narrative, (re)presenting information as valuable for certain ends, and providing means of intervention intent on altering the future. For the purposes of the present analysis, I will focus on the ways in which the sites (particularly scorecard.org) both target and alter their intended audience - by making the information valuable to (potential) activists and defining what it means to be an activist. Borrowing from theories of hypertext, along with the work of Bruno Latour, Karin Knorr-Cetina, and Andrew Feenberg, among others, I develop the concept of technologies of identity and argue that this analytical tool allows insight into how representations of environmental problems and (implicit or explicit) means of intervention do the dual work of creating the issue and the audience.

- “Representative Data”: Strategies for Measuring Air Quality in Norco, LA”, Gwen Ottinger, U of California-Berkeley

In Louisiana’s “Industrial Corridor,” a.k.a. “Cancer Alley,” the question of whether the petrochemical industry has deleterious effects on environmental quality is hotly debated, with data being offered in support of both points of view. In one fenceline community, the industry has used agency-prescribed air monitoring methods to produce data that they argue is representative of the average air quality in Norco. Their close conformity to government standards allows the
industry to claim both that they are not in violation of any of the state's ambient air standards and that the overall air quality is on par with other urban areas in the U.S. In the same community, residents have used low-cost sampling devices known as “buckets” to collect information about air quality during periods of particularly noticeable industrial releases to the air. Though dismissed by the industry as not broadly representative of environmental conditions, I will argue that bucket data is meant to represent residents’ experience of living next to a petrochemical facility. Understanding bucket monitoring as providing an alternative representation highlights the degree to which standards designed to guarantee “representative data” predetermine what is to be represented. I will show that competing representations have divergent political implications, as well: while bucket samples showing high levels of toxics can be used to support collective action against the industry by residents who claim the industry is doing them harm, official accounts that that represent broad air quality trends are offered as a way to inform residents’ choices—assumed to be individual and unfettered—about where to live.


In many countries, the compensation of damages to nature and the landscape has become an important means of environmental planning. Whereas traditional nature conservation has aimed at preserving outstanding natural spaces by turning them into nature reserves, compensation aims at the active development or creation of new habitats and ecosystems to remedy the degradation of others. This paper is a historical-sociological case study of nature compensation in urban land-use planning in Germany. It traces the history of the so-called “encroachment regulation” that was introduced into German law in 1976, which calls for compulsory compensation measures for a broad variety of land-use changes. As it will be shown, the application of this regulation involved highly controversial processes of negotiation, in which new modes of producing
knowledge, practices of landscape engineering, and, legal procedures were inextricably interwoven. Such controversies emerged both with respect to the assessment and evaluation of harmful environmental impacts, as well as to what kind of compensation is considered necessary. In the paper, it will also be argued, that conflicts on nature compensation reveal a fundamental paradox of the underlying construction of nature. On the one hand, the category of nature signifies an ontological realm that is separate from human activity. On the other, in compensation measures, nature becomes increasingly technologized and dependent on deliberate political decision-making.


In the late 19th century the seemingly endless global expansion literally came to a close. Coping with notions of living within taut natural limits became a central question of the 20th century. The notions of scarce spatial "resources" reached their peak in the 1960s and 1970s, when warnings of economic "limits to growth" combined with rising "pressures" to the environment, represented in the famous image of "spaceship earth". Yet, this image signified not only the threat to natural habitat, but also illustrated the expectations for science and technology to provide the "blueprint for survival". The picture promoted the vision of the environment as a closed, complex, and self-contained entity. "Spaceship earth" went into coalition with "system earth".

The paper presents one aspect from this history of "globalizing the environment" in the late 20th century: It discusses the interdependencies of the finiteness of traditional expandable space and the anticipated possibilities of modern functional spaces taking the example of the term and concept of the "biosphere". Starting from the concept of biosphere as the whole of the living world elaborated
by Eduard Sueß and Vladimir I. Vernadski around the turn of the 20th century, the paper explores the combination of conservation and eco-systems calculus in the history of the biosphere. It will focus on the one hand on the UNESCO "Man and the Biosphere" program of the 1970s which attempted to preserve the biosphere as a global natural resource, and on the other hand on approaches from environmental sciences which conceptualized the biosphere as a system, as a defined, efficient, and sustainable metabolism of energy, information and material flows. The paper concludes with the example of the "Biosphere II" project of the late 1980s illustrating how the systemic "black box" biosphere merged with a veritable "spaceship" biosphere in the attempt to construct a high tech surrogate planet.

4.10 Risk, Safety, and Institutional Power Structures

Jessie Saul, Cornell U; Shobita Parthasarathy, Northwestern U

Savannah Room

Risk studies abound in the field of S&TS. They cover a wide span of scholarship, from examining the perception of risk in the public domain, to critical analysis of scientific quantifications of risk. This panel proposes several papers that examine the relationship between definitions of risk (or dangerous objects) and the institutional power structures within which those definitions arise. It also proposes to look at the consequences of relationships between institutional power and risk, whether it results in regulations on a national level, information distributed in the public domain, or future uses of a technology. The panelists will answer questions such as: how do power structures influence the kinds of questions that can be asked about risk? How do institutional relationships help shape which concerns can be addressed in discussions of risk and which cannot? And finally, how can the field of Science & Technology Studies add to the already-existing scholarship on risk in this regard? The panelists will address
the topical areas of blood safety regulation, the development of the MRI technology, and the administration of the soviet civilian nuclear industry.

• “Blood Ties: Risks, Relationships, and Regulations for Blood Safety at the NIH”, Jessie Saul, National Institute of Health

Blood supply safety in the United States is regulated by the Food and Drug Administration (FDA). Yet the historical and geographic ties between the Department of Transfusion Medicine (DTM) at the National Institutes of Health (NIH) and the Center for Biologics Education and Research (CBER) of the FDA provide an illustrative example of how institutional relationships can often play a role in understandings of, and responses to, risk. This paper examines the historical and current day interactions between NIH and FDA scientists with respect to blood safety in the context of making blood safer for recipients, and of making the workplace safer for handlers of blood. Through its examination of three primary threats to blood safety (hepatitis, HIV, and West Nile Virus), this paper shows how definitions of dangerous objects have varied over time, and how the organizational and geographic proximity of blood researchers at the NIH and FDA have shaped the practical and political responses of scientists and regulators alike, where the boundaries of expertise and authority overlap sufficiently. This work is based on my research at the National Institutes of Health, interviews with scientists, laboratory technologists, and regulators at both the NIH and FDA, and archival research.

• “Defining Dangerousness: Magnetic Resonance Imaging and Risk”, Kelly Joyce, College of William and Mary

This paper explores the link between definitions of risk and access to institutional power. Using Magnetic Resonance Imaging [MRI] as a case study, this work positions risk as situated knowledge that reflects and recreates social
relations and inequalities. Two sites in which the rhetoric of risk is negotiated are
discussed. The first involves the language used to discuss the patient’s
experience and safety, while the second explores the perceptions of and debates
about the dangerousness of the work environment. This review will demonstrate
how different groups—patients, technologists, physicians, and administrators—
vary in regards to perceptions of risk. In addition, an examination of policies
regulating these two arenas shows that access to power and one’s social
position shape institutional definitions of safety. This analysis also shows the
importance of questioning official interpretations of risk, demonstrating that they
often do not take workers or patients’ views into account. Fieldwork at three
imaging sites, in-depth interviews with 48 physicians and technologists, and
review of existing studies that evaluate the safety of MRI technology provide the
material for this study.

- “Reactors, Risks, and Responsibilities: Managing the Civilian Nuclear
  Industry in the USSR”, Sonja Schmid, Cornell U

In my paper I examine how the concepts of "safety" and "reliability of operation"
have been defined in the context of Soviet nuclear power plants and how these
concepts were tied to institutional structures within the command-administrative
economy of the 1960s-1980s. In particular, I focus on the relationship between
reactor designers and power plant operators: Who had the authority to decide
what constituted a risk, which risk was considered acceptable, and who was to
know about a particular risk?

In my ongoing dissertation research in Russia, I use a wide range of archival
documents as well as published material, and interviews conducted with both
designers and operators of nuclear reactors.
While the legitimacy to define danger and safety, and structures of responsibilities within the Soviet nuclear industry remained mostly implicit prior to the Chernobyl accident and the collapse of the Soviet Union, the archival documents and the interviews indicate that these institutional structures were nevertheless clear to the immediate participants, if to various degrees. Although the structures that shaped the nuclear industry’s conceptions of risk and safety were made more explicit since the early 1990s, they did not substantially change. I discuss the implications this has for (new?) definitions of "nuclear risk."

• “Negotiating Risks of Automobility”, Jane Summerton, TEMA

This paper explores the contesting claims of different groups of actors in a recent debate in Sweden over the environmental risks of automobility. Specifically, the paper will focus on a controversy over emissions of carbon dioxide (CO2) from an increasingly popular type of car, namely cars with diesel motors. This issue is politically important due to the institutional power structures in which the debate is embedded, reflecting high stakes for automobile manufacturers, regulators, environmental groups and other powerful interest groups in Sweden and continental Europe. The paper will explore the intertwining of texts, procedures, technical tests, negotiations and politics in the interactions among actors as they put forth claims about risks, enroll allies and invoke uncertainties to support their position. Specifically, the paper will analyze the discursive strategies that actors use to advance their own claims, contest/destabilize the claims of others and reach provisional stability of “facts”. As a site of conflicting commitments and interpretations, the debate shows the ways in which technology, politics and constructions of risk are inseparable in struggles over the future of the car.
“Globalization is Bad (and Good) for Your Health”, Nicholas King, U of California – San Francisco

No Abstract

FRIDAY, OCTOBER 17, 2003

Session 5: 8:30-10:15 AM

5.1 Biosciences and the Politics of Race

Pauline Kusiak

Georgia Room

“Race and the Breeding World View in America During the Revolution”, Brad D. Hume, U of Dayton

Numerous scholars have examined the origins of race. Some suggest that “science” influenced the development of race while others argue that it emerged out of the economic and legal power relations of the slave societies of the Atlantic World. None of the existing scholarship examines folk beliefs about heredity, hybridity, and animal husbandry and what “scientists” drew from those beliefs and customs in their debates about the two leading theories of generation – preformation and epigenesis. The preformation hypothesis, which, in its extreme form, suggested that every human (and every human variation) existed in the ovaries of Eve, suited a society in which social place and order were the central tenets. Epigeneticists could explain variation as a product of a variety of influences as the individual developed out of a mass of “fluids.” Supporters of both hypotheses had to contend with supposed evidence that variation (in
humans and animals) might be spurred by environmental factors and that characters acquired during an individual’s lifetime might be passed on to descendants. I call this mix of local lore and theories of heredity the breeding mentality because of important distinctions between it and the racial theories of the nineteenth century. In this paper I argue that the first attempt to formalize race and establish the study of it as a philosophical domain was the result of natural philosophers combining of folk beliefs and empirical evidence about heredity and the improvement or degeneration in populations in the “New World.” Natural philosophers were thus asserting their expertise over knowledges from many social locations without clearly defined disciplinary boundaries. Many supporters of the revolution debated the importance of hereditary endowment and used the theories to establish limits upon women and African Americans while simultaneously arguing against existing social ranks. Some savants and revolutionaries even argued that it would be possible, in the words of Benjamin Rush, to breed a population of virtuous “republican machines.”

“Free Floating Fetuses and the Stories They Tell of Race”, Wairimu N. Njambi, Florida Atlantic U

In contemporary medical discourse on pregnancy, as well as in abortion debates, “fetuses” are frequently depicted as separable and separate from women’s bodies – as “free floating.” This paper discusses the implications of representations of these “free floating fetuses,” especially regarding discussions of race. By now, new reproductive technologies have greatly changed the way we understand the relationships among pregnancies, women’s bodies, and fetuses. More than ever, a woman in a state of pregnancy in the U.S. can expect to be scrutinized through various visualizing techniques that monitor, measure, control, regulate, maintain and fragment her “body.” Such visualizing techniques, as some feminists have pointed out, reduces a woman to an objectified pregnant
body that can easily be rendered separable from the “entity” growing inside her while also generally endorsing and authorizing the naturalizing power of technoscience in the management of pregnancy. I am interested in this separation that allows what is variously conceptualized as a free-agent “fetus,” “baby,” “embryo,” and even “child” to “speak” on its own behalf. Questions that have not been adequately addressed in science studies include, what role does the history of racial politics play in this separation? What differences are there between women’s bodies and pregnancies or are they all treated the same? Is this separation only emerging now as a result of the new visualizing technologies as some critics have argued? Through an analysis of images of fetuses in public spaces, i.e. in bus terminals, public restrooms, billboards, magazines, and in television news, I argue that not only are images of fetuses represented as free floating, unattached, autonomous, and vulnerably alone and in need of rescue, but are also represented as white. I am particularly interested in the stories of race that these fetuses tell in a society where black women are sterilized at higher rates than others, and historically, one in which black women and their “fetuses” have routinely been viewed as separable and separate for various political and economic reasons.

- “The New “Yellow Peril”?: Mapping the World of SARS”, Mei Zhan, U of California-Irvine

At the beginning of April, an emergent virulent epidemic rapidly eclipsed allegations of biological weapons in Iraq to become the latest protagonist in Euro-American media coverage on global biothreats. As laboratory research stripped down amorphous clinical cases to produce the viral profile that would singularly define the disease of SARS, a global search to pinpoint the geographic and bodily origin of the epidemic is also underway: “Asia,” “China” and “Hong Kong” have emerged as Destination-Origin. Even though SARS has so far remained a “phantom menace” in most parts of the world including Asia, barriers are quickly erected along national lines to contain the epidemic: business trips to China and
Hong Kong are canceled, visas are denied, and even the women’s World Cup soccer is being moved from China to a “safe” country — either the United States or Australia. Asia and Asian bodies have become identical as global biothreat itself.

In this paper, I examine particular projects and processes of knowledge production in the transnational circulation of “SARS” — or rather, the germs, bodies, labs, hospitals, speculations, rumors, fears and accusations that make up the SARS epidemic. In particular, I am interested in the ways in which racialized visions and practices of what makes up the world have enabled and privileged certain kinds of traveling and knowing, while disabling others. In recent years, celebratory accounts of transnationalism and globalization in and outside of academia have envisioned a kind of globality that promises to transcend race, nation, religion, and other boundaries of differences. The current epidemic of SARS, however, highlights the ways in which discourses of differences — especially racial discourses—are reproduced through transnational and global processes, and, through these processes, continue to shape our ways of knowing.

The paper is divided into two parts. First, I argue that, while difficult to isolate and identify in the clinic-lab nexus and thus remaining a “bad” disease for bioscience, SARS has been defined authoritatively through “cultural” terms—that Asian/Chinese lifestyle is used as the explanation for the emergence and spread of this particular infectious disease. Second, I juxtapose Toronto and Beijing, and how they — one a self-proclaimed non-Asian city and the other one unambiguously Asian — reacted to, and negotiated with, inspections and travel restrictions imposed by the WHO.

- “Flight Patterns: Locating SARS and Other Airborne Matters”, Tim Choy, U of California – Santa Cruz and Ohio State U
In the spring of 2003, concerns about SARS vaulted Hong Kong into the international limelight. Televisual and newspaper images depicted mask-wearing citizens, politicians, patients, and doctors, while air travelers associated with Hong Kong and China came under suspicion in North America and Europe of carrying the coronavirus transnationally. This paper approaches the politics of transnational threat and global biological flow from the vantage point of Hong Kong and the Hong Kong diaspora. I suggest that in the anxieties, knowledge-sharing practices, and preventative techniques engendered by SARS are articulated longstanding and novel preoccupations with air, disease, difference, movement, and economy. Engagements with amorphous danger and with the relative porosity of geo-political borders have undergirded the production of Hong Kong as a locality and as an entrepot within variously imagined globalities. While locating the transnational threat of SARS in a story of biological and airborne concerns in and about Hong Kong, I signal the importance of placing histories of regional and racial alterity at the heart of the study of transnational science.

5.2 Media Meets Technology: Thinking Through Media Technology Studies

Pablo J. Boczkowski, MIT and Fred Turner, Stanford U

Sub-Panel 1- Production

Ardmore Room

- “News Worlds: Rethinking the Dynamics of News Production”, Pablo J. Boczkowski, MIT

In 1964, at the dawn of social studies of news production, Gieber published his classic article “News is what newspapers men make it.” Gieber’s apt title captured the insight that the news, rather than being a transparent expression of social events, is, at least partially, what results from the work of reporters and editors. For the past four decades, research in this tradition of inquiry has shed
light on the interpersonal, institutional, and political factors that shape this work. Despite this valuable contribution, the role of technology has been mostly overlooked by this research. In my forthcoming book about the emergence of online newspapers, I provide an alternative account of newsroom dynamics by focusing on the material culture of news production. This examination of reporters’ and editors’ technical practices and considerations shows that in the online environment a greater variety of groups of actors appear to be involved in, and have a more direct impact on, the production process than what is typically accounted for in studies of print and broadcast newsrooms. The news is created in a relational network composed by editorial, systems, design, marketing, and advertising personnel as well as people outside the formal boundaries of the media organization such as users and sources. Media technologies permeate this relational network: actors use artifacts variously, as communication devices that enable their interactions, as information gathering and processing tools, and as the media embodiments of the news. Inspired by Becker’s seminal study of “art worlds” as the materially grounded and culturally heterogeneous spaces of art work, in this presentation I will outline a research agenda about news making anchored in the notion of “news worlds,” the technology-intensive and socially diverse loci of information creation in old and new media.


In 2002, on the even of a federally-mandate switchover to digital television, the US Department of Education allocated $5.75 million for new closed-captioning training programs at some 14 technical schools around the nation – programs to train workers to use stenographic skills and equipment, such as those employed by professional court reporters, to create, on-the-fly, a text version of the audio track of a live TV broadcast, which can then be encoded into a hidden signal sent to home televisions across the country. A recent advertisement from one of these
technical schools claimed “there are 200 closed-captioners nationwide today,” that “demand is expected to grow to 2,000 by 2006,” and that graduates of the new program (shown as women in the commercial) stood to make “from $35,000 to $100,000” per year while they “work from home.” But why fund training in captioning? And why at these sites? What does captioning matter, anyway?

This “work in progress” paper will outline a nascent multidisciplinary (historical, geographical, and ethnographic) study of closed-captioning technology and labor – a socio-technical process of information production which involves both government standard-setting and government subsidy, both non-profit organizations and for-profit businesses, both advanced information technologies and turn-of-the-century keyboard designs, both hearing and hearing-impaired consumers, and both high- and low-wage labor.

- “Databases as Communicative Devices and Communicable Diseases”, Geoffrey Bowker, U of California-San Diego

There are many dreams now of a universal database. It is hoped that - unlike the universal library of the encyclopedists or the electron-mechanical universal hypertext library of Paul Otlet in the 1890s or H.G. Wells’ World Brain – this universal, random accessible memory for our species will be sufficiently flexible and ‘smart’ that it will transcend its medium and grow into the dawn of a new form of historical and scientific conciousness. In this presentation, I argue that on the ground in the sciences, the vast impulse to database presupposes a universal language for communication between disciplines posited on a variety of Comtean positivist hierarchy of the sciences. I argue that looking at databases as communication devices we can get access to some of the political and organizational work that gets done in the process of creating interoperable databases.

- “A Prehistory of Media Technology Studies”, Leah Lievrouw, U of California-Los Angeles
STS has been one of the most fruitful influences on new media research and scholarship. For example, the critique of technological determinism, an emphasis on socio-technical networks, and a focus on the reinvention of new technologies in practice are STS concepts that are taken for granted in new media research, and in fact help distinguish the area from more traditional mass media research.

Yet to date, relatively few communication researchers are familiar with the principles and literature of STS, and only a small minority of STS scholars have chosen to study media technologies. This paper presents several concepts from STS that have been particularly influential in new media research, along with a brief historical sketch of the gradual diffusion of STS ideas in media studies. Suggestions are made for a future research agenda that incorporates insights from both fields.

5.3 Augmented Bodies

Lucy Suchman, Lancaster U and Ana Viseu, U of Toronto

Sub-Panel 1: Biomedical Augmentations

Sherwood Room

Across diverse realms of social and material practice, the aspirations of technoscience are sited in relation to the body. Mundane and spectacular projects, inspired by dreams of transcendence, performance, connection, mobility, extraordinariness and normativity, all take the body as their starting place and their point of return. This session explores recent developments in the configuration of augmented bodies, considered through empirical cases and theoretical reflections. Among the questions that we hope to raise are the following:

Do projects of augmentation necessarily presuppose a 'natural' body?
What is the relationship of bodies to persons?

What (new) kinds of subjects, objects and entities are configured?

What (new) capacities for action are implied?

What desires and fantasies are in evidence?

Our aim for the session is to juxtapose a wide variety of forms of augmentation and domains of action, in order to generate a critical discussion of the ways in which bodily augmentations, their subjects and objects are figured.

- “A Genealogy of the Phantom: From Mind to Brain”, Cassandra S. Crawford, U of California – San Francisco

I begin with an exploration of the symbolic and institutional shifts relevant to phantom classification. As O'Connor (2000) argues, with the modernization of dismemberment, through improved prosthetic technologies, part-ialized bodies have come to symbolize techno-induced liberty. The age of the machine initiated the meaningful reclamation of part-less bodies and relegated phantoms to the realm the psychology as a type of psychotic baggage. Today’s phantoms have been medicalized, situated predominantly under the purview of neuroscience and prosthetic science. Phantoms now reside in the tissues of the brain, not in the recesses of the mind. Reframed as enormously useful to the amputee, the phantom’s practical status has elevated significantly from its prior equitability with baggage to that of badge; a marker of potential and of achievement.

I turn next to the implications these of shifts. Phantom relocation from psyches to brains and from psychology to neuroscience has meant that causal explanations have moved from the periphery of bodies to more central explanations rooted in cortical reorganization and plasticity. Work interested in the processes of neuronal arborization or unmasking has coincided with the unveiling of the potential of prosthetics and rehabilitation to limit and even reverse cortical
reorganization. Because phantoms exist only through reorganization, neuro-scientific interest and prosthetic advancements have meant a correlative reduction in prevalence, and the potentials of reorganization, if harnessed, could imply the elimination of phantoms. In other words, I am speculating about the possibility of phantom extinction.

I then follow phantoms into conflict with the augmented-body. As these bodies are increasingly embedded in a prosthetic scientific arena where innovations extend beyond replacement, they become pioneers. No longer permanently fractured (O'Connor 2000), no longer productively, aesthetically, and morally bankrupt, the amputee is in a quite unique position relative to techno-human hybridization, the commodification of parts, risk pervasive environments, and body projects. As all bodies are coordinated with the technological to extend potential, to extend beauty, to extend health and as flamingo knees, cheetah legs or third arms are sampled by the part-ialized, is/has the body-as-partial being/been commuted by the amplified-body, able to attenuate the limits of biological givens?

• “Reconfiguring Anaesthetised Bodies: the Making of Silences, Voices and Resistance”, Dawn Goodwin, Lancaster U

In the process of anaesthesia the patient is rendered unconscious and often paralysed to allow optimal conditions for surgery. This necessitates a reconfiguration of bodily boundaries and a redistribution of bodily functions, different methods of communicating must be developed, requiring altogether different tools of speech. The patient is reliant in many ways on the close relationship that is forged with the anaesthetic machine, indeed, the patient is technologically extended and augmented. In a very practical and material sense the patient becomes a hybrid, a mix of organic and technological components, in other words, a cyborg. Poovey (1987) has suggested that historically, anaesthesia silenced patients creating an "unresisting body" that offers no
impediment to the doctor’s interpretation. Drawing on ethnographic data I argue that these boundary transgressions give the anaesthetised patient a voice, they are the means through which an unconscious patient can speak. Such boundary reconfigurations provide the conditions for resistance, in that the union of patient and machine creates new communicative resources with which the patient-cyborg can resist other articulations of the situation.

“Making Cyborg Kin”, Kyra Landzelius, Gothenburg U

Across the expert and exclusive corridors of biomedicine, the aspirations of neonatology are sited in relation to the precocious body of the preterm infant as an object/subject of scientific inquiry and mastery, of prosthetic mediation and simulation. Neonatal medicine’s spectacular project is inspired by technologically-augmented dreams of transcendence of the extra-ordinary - which/who arrives in the form of a baby born before its time and out of place, an immature human marked by illness and the shadow of death, (re)naturalized and gestated anew in the body of the incubator machine whose surrogate laborings bring ‘preemie’ to maturity. Neonatology thus takes the contingent, still-fetalized yet newborn body as the starting place for therapeutic intervention and experimentations in artifice. It delivers - as the point of return - ‘life’ itself: in the body of the patient, healed and made whole. Through such technoscientific performances, the preterm baby is not just introduced, but verily re-produced, invented into being as a contemporary, cyborg category of person.

Across trans-local exchanges of sociality in cyberspace, the aspirations of online communities for ‘parents of preemies’ are, responsively, sited in relation to these cyborg beings as the subject/object for alternative community-building. Cybernursery homepages linked via ‘the Preemie Webring’ are (like all neighborhood schemes) mundane projects in socialization, made spectacular by computer-mediated dreams to domesticate the extra-ordinary - via collective endeavors to normalize/naturalize the other/not-other hybrid. Parents of
Preemies websites take the coterminous infant/incubator body as the figurative starting point to perform cyber kinship and embody a virtual community, itself brought into existence through human-machine connectivity. Here, online representational strategies graphically and discursively turn and return upon hyper-circulated images of the preterm baby’s techno-engineered body, which is displayed, narrated, re-calibrated and ultimately initiated into an unabashedly cyborgized personhood. This paper explores these processes/performances of intersubjectivity, embodiment, identity and community. In so doing, it juxtaposes the biotechno-augmentation of preemie bodies in the domain of medical action with the info-techno-embodiment of cyber-community re-actions that work to make cyborg kin.

- “Technologies of the Heart: Experience and Internal Defibrillators”, Anne Pollock, MIT

People’s experiences with internal cardioverter defibrillators provide a provocative site for analysis. These devices, similar in function to external paddle defibrillators so iconic in television representations of medical emergencies, are implanted into people with certain types of heart conditions to monitor dangerous arrhythmias and automatically shock the heart into regular rhythm. The stories people tell of their experiences are not, for the most part, about the challenged boundaries of the body or the blurring of human and machine, but about life change, the impact of trauma, and increased awareness of death. An emerging theme is the inadequacy of a concept of choice for these involuntary cyborgs, when failure to choose the technology or a decision to have it turned off is understood as tantamount to suicide. Internal defibrillators do in some sense “save lives.” Yet the lives saved are not the same as those that preceded the technology’s presence in the body. How do these traumatic biotechnological interventions, working within the body, reorder the lives they seek to prolong? How do they reorder the deaths they both attempt to postpone and inadvertently foreground? I argue that these technologies pose a challenge to traditionally
rendered experiences of life and death, as well as to cyborg theories that take account only of body technologies as enhancements of life, leaving out of the scope of analysis those that prolong life at significant cost.

5.4 “Social Studies of Models and Simulations”: Models and Simulations as Mediators in Scientific Practice

Catherine Hasse, U of Copenhagen, Erika Mattila, U of Helsinki and Martina Merz, EPF Lausanne

Discussant: Aant Elzinga

Sub-Panel 1

Fulton Room

We are interested in a particular perspective on scientific practice: Science engages in the construction and application of theories and models. Their interdependencies are heterogeneous and specific to particular situations that define them. Theories and models are research tools that make predictions possible, that supply orientation when searching for solutions to practical and technological tasks and problems. In the discussion of the functions and roles of models, it has been proposed that models in general, or a specific class of them, might be characterized as "mediating models". Mediating models help to construct a connection between “theory” and the “world” – a world of data, technological development, political measures or other. We are specifically interested in looking at how models are used in various situations and contexts in natural sciences, in design, decision making and planning. The study of the relationship between theory, models and corresponding practices must obviously be based on an analysis of such relationships in different disciplines and social settings. This is one of the aims of the session. What arrays of models and tools are needed to accomplish connections between “theory” and “data”? What are
these connections? And how do the elements work together? It is well known that computers supply a powerful tool for simulation and modelling. How then are models transformed into computer-based instruments, into application-oriented software programs? What kind of additional tools are needed for using the models in their work of transforming practices? What kind of social organization, negotiation, planning is needed to work with the models? How do the models facilitate learning in interdisciplinary or other collaboration? And under what circumstances can they act as "boundary objects", enabling negotiation and joint action, while actors remain attached to different interests, viewpoints and interpretations in relation to the model?

- "Modeling and Simulating the Brain", Andrea Loettgers, ETHZ

To get an understanding of how the human brain works creates one of the most challenging enterprises in science. What is the role of models and computer simulations in this enterprise? How are they connected to theory, empirical knowledge and the world? And what is the relation between models and computer simulations?

To examine these questions from the great amount of models and computer simulations which deal with different properties and functions of the brain one model, the so-called Hopfield model, is chosen. In this model the property to complete information from an incomplete input, which is called associative memory is modeled by drawing an analogy to disordered magnetic systems, so called spin-glass systems. When Hopfield did introduce his model in 1982 theoretical physicists working on spin-glass systems became interested in this model and a complex development started in this field. With the guidance of the following questions a closer look will be put on the scientific practice of modeling and simulating connected to this development in theoretical physics: How is empirical knowledge coming from neurophysiology combined with theories, methods and techniques coming from statistical mechanics in the Hopfield
model? Why and how became theoretical physicists interested in this model? How did the Hopfield model develop in the field of theoretical physics? How the model and the computer simulations did change their function during this process and how are they interconnected? How were the computer simulations restricted by the development of computer technologies? How are the Hopfield model and the computer simulations are connected to the brain? What did physicists contribute to the big question of how the human brain works by their investigations?

• “Nature and Construction of Interdisciplinary Tailor-Made Models in Biostatistics”, Erika Mattila, U of Helsinki

Researchers refer to the statistical and epidemiological models as Tailor-Made Models. They construct these models to describe, for example, the transmission of a bacterial agent in a population. Tailor-Made Models have several functions in interdisciplinary research collaboration. They function as “the means of communication”, they form a “common playground” for the researchers coming from different disciplines, and they also contain the exact description of the phenomena for they allow the researchers to use mathematical formulae. With the knowledge produced by these models, researchers aim at predicting, evaluating and explaining the behavior of bacterial agents in populations, and applying the knowledge to the planning of nationwide vaccination programs.

Functions of models and their roles in research have brought new insight for studying scientific practices (e.g. Morgan and Morrison 1999, Sismondo 1999). How do the Tailor-Made Models sustain and mediate the interdisciplinary collaboration? I will study this by analyzing the construction of Tailor Made Models in the project INFEMAT during 1993-2003 and focusing especially on the construction of the shared research object and the simultaneous formation interdisciplinary expertise within the project. The shared object of activity has dual nature as being both epistemic research object and application object.
(Miettinen 1998). I use concepts from both cultural-historical activity theory and from the studies on scientific practices (e.g. Pickering 1992) as the analytical tools for my study. The data consists of interviews, field notes from the group meetings of the project and documents and scientific publications from the project. I will elaborate the functions of Tailor Made Models in relation to the formation and spread of interdisciplinary expertise through the modeling practice.

- “Configuring Scientists: The Case of Computer Simulation in Particle Physics”, Martina Merz, EPF Lausanne

The paper links up the topic of simulation practice with questions of nonhuman agency and configuration. In the recent debate on nonhuman agency, human and nonhuman have been contrasted (or equated) often in such a way that the heterogeneity and polymorphism of either side disappeared from view. The proposed paper tries to avoid such generalization in addressing specific, locally and temporally situated subject-object relations. The focus is on different instances of computer simulation practice in particle physics, based on detailed empirical investigation at CERN, the European Laboratory for Particle Physics near Geneva. The topic of agency is reframed by considering how subjects (different sub-communities of particle physicists) and objects (different types of simulation software) configure one another. For the notion of configuration the paper draws upon two bodies of work: Firstly, a theoretical notion of the laboratory that associates the success of today’s sciences with a reconfiguration of the natural and social order considered constitutive of the laboratory (cf. Knorr Cetina). Secondly, the observation that computers or information technologies configure or reconfigure the users in the sense of enabling or constraining their actions (cf. Woolgar, Mackay et al.). The paper will investigate different dimensions of the objects’ capacity to configure subjects. It will discuss (a) configuration as regulation of forms of access, (b) configuration by means of resistance and deprivation of control, (c) configuration of the social by way of
mediation. Finally, the paper will examine which of the discussed configuration forms are specific to simulation.

- “Cultural-Historical Learning Processes in Physicists’ Modelling Activities”, Cathrine Hasse, Danish U of Education

Models in physics can often be defined as simplified representations of moving objects on a smaller or larger scale than real life. They are built on knowledge, but also generate knowledge and act simultaneously as models of/models for. The aim of this paper is to scrutinize the cultural-historical learning processes behind the creation of simulations based on a particular model in a particle physics project, Atlas, being carried out at CERN in Geneva. Many hundred physicists are collaborating to build simulations of particles colliding in a Large Hadron Collider. Most of them have been working with the theoretical and technical aspects of the experiment for many years. When the experiment starts running in 2007 the results from the simulations will be compared to what the real collision of particles reveals. The information about these collisions is based on a model showing how particles move and change when they collide. The processes cannot be directly observed because the building bricks of atoms are too small. The physicists see these processes through a model build up over many years of research in the international community and to some extent the model act as a mediating tool levelling out cultural-historical differences in the international group of physicists. Through an analysis of fieldwork material, obtained through a study following different groups of physicists in the Atlas-project, it is argued that, even so, in the process of learning from the model - in the negotiation of simulations building on the model - social and cultural differences appear.

5.5 IT and Education
How are computers and the Internet changing the ways that we teach and learn? In this double session, we apply concepts from STS to the intersection of information technology (IT) and education. As the social relevance of IT continues to increase, its impact on education is expanding tremendously: it is an era of wired classrooms, digital libraries, simulated laboratories, and virtual field trips. The participants in this session explore issues such as the design and use of new educational information technologies; the mutual construction of IT and education; and power imbalances related to IT and education.

- “Standardizing Marketable Information and Learning Through the U.S. Educational System”, Rachel Dowty, RPI

This paper describes how standardized testing and institutional accountability in the American educational system help educational product marketing strategies shape definitions of information and learning. Randall Collins approached American schools as a “unified hierarchy” that grows vertically and acts as a cultural market wherein cultures can be transformed into abstract credentials. When combined with Mary Douglas’ definition of an institution as a legitimized social grouping that reproduces itself through information classification similarities, standardized testing becomes not only a culprit of education mismeasurement, but also the provider of a mismeasured basis for “educational” software and hardware. Standardized testing, which facilitates comparison and competition among students, teachers, institutions, districts, and states, determines ratings and, under some circumstances, funding. In 1987, Dr. John J. Cannell set out to find out how 100% of U.S. states that year reported that their students scored "above average" on standardized tests. He discovered that the
standardized test scores of one group are not compared with current scores from other groups, but with scores from the original test group. Schools also kept scores artificially high by ordering old tests, which were better articulated with the present curriculum. Accountability mandates pressured education officials at all levels to use such ploys to insure acceptable results on standardized tests. These same pressures are exploited by the makers of educational products. Products are marketed as easy ways to translate educational initiatives such as “child-centered” learning and “hands-on” learning into higher test scores. Despite continued calls for testing reform by teachers nationwide, federal testing policies continue to intensify. This intensification of testing is accompanied by an increase in software and hardware products marketed as “educational.” Questions and concerns for future trends in standardization of marketable information in learning environments will be outlined.


The Digital Water Education Library (DWEL: http://dwel.dlese.org) is a two year NSF funded digital library project. DWEL seeks to provide an online catalogue record of 500 Web-based resources considered exemplary for teaching about water in primary and secondary school classrooms. DWEL’s design process is user-centred, with volunteer school teachers selecting, describing, and cataloguing the resources that will eventually form the collection. Ongoing research into DWEL’s design process suggests the existence of two alternate views and definitions of ‘digital library’ amongst DWEL’s members: one view, held by project managers, emphasises information science aspects of the library such as cataloguing and metadata; while a second view, held by the volunteer teacher cataloguers, emphasises the use of resources in classroom situations and teaching practice. These alternate definitions have been identified through a range of qualitative methods, including participant observation, textual analysis of project documents, and computerised latent semantic analysis of transcripts of
the recorded speech of project members. The implications of the presence of these two alternate views in DWEL's design process will be discussed, as will the ways in which the project's design is being changed to accommodate and mediate them.


No Abstract

5.6 Information Technologies and Democracy

Piedmont Room

- “Online Video Games as Aredntian and Democratic Worlds”, Jessi Hafer, U of Wisconsin – Milwaukee

The public sphere, so important to theorists like Hannah Arendt, seems to be slipping away from us. Technologies make it increasingly unnecessary to be with fellow citizens. Indoor plumbing removed the need to visit the community wells. People make rushed visits to corporate-owned supermarket chains to buy their groceries instead of gathering at community markets. Catalogs and internet shopping replace trips to small shops. Cars are so widely accessible that public transportation is not desirable to many. Cell phones allow one to talk to people without being in their company wherever they are, removing the advantages of purposely and frequently gathering with friends or getting to know the surrounding strangers. Some college classes are moved from the classroom to online forums. These are just a few examples of many technological advances that are convenient at the level of the individual yet are in some way detrimental to communities, in many instances both for the environment of the community and for the community of people. A result is a withering public sphere.
To understand the concept of a public sphere, it helps to also understand things that are not of the public sphere. Hannah Arendt shows a differentiation between the public and private spheres and the characteristics of each, but she also shows that one realm cannot exist without the other. One wonders, then, what effect a withering public sphere can have on private spheres. Arendt sets up a dichotomy of ideas in her works that is not immediately obvious. Arendt’s work is laden with moments of profound insight, but a reader must trudge through what feels to be a stream of consciousness to arrive at them. The ideas encountered may be difficult to separate and sort, yet each adds to the strength of Arendt’s political philosophy. The primary work considered here is Arendt’s The Human Condition, and thoughts from Origins of Totalitarianism and On Violence will be included as well. Within these works she seems to be developing two different groups of ideas, ideas that form a web with two distinct sides, yet the two sides remain strongly intertwined. Some of Arendt’s ideas that will be discussed are Earth, world, society, household, politics, private sphere, public sphere, and government. Arendt’s writings appeared before the diffusion of the internet, yet her ideas create an interesting framework for evaluating the internet just as the internet creates an interesting forum for evaluating Arendt’s works. Like the Arendtian dichotomy, the separate phenomena are in some way conceptually strengthened by each other.

Though it is not equally accessible to all, the internet is available in public libraries, many public schools, cyber-cafes, and in many American homes. Available on the internet are educational resources, commerce, links to government agencies, newspapers from all over the world, and communication with others via email and chat rooms. There are highly democratic aspects to each of these. Internet commerce allows smaller companies to compete with larger ones while making products more universally available to internet users, online news sources cultivate an informed citizenry, email and chat allows for debate, government agency sites bring the workings of politics to citizens,
personal websites give users the opportunity to share their voices, and educational sources allow people to readily inform themselves.

Of course, there are counterarguments to these supposed advantages. Internet commerce has made the internet as a whole increasingly commercial, which makes useful information more difficult to filter while, in some cases, invading the privacy of users. Online news sources bring valuable information to readers, but these readers would likely seek the information in other sources if it was not available online. Likewise with educational sources, but in the case of educational sites, sometimes students may miss out on details and experiences that come from information searches that are more involved than those that take place on the internet. Personal web pages require knowledge and funds to maintain. Government agencies may put themselves in the public eye with web sites, but politicians cannot keep up with email traffic from constituents or with the bureaucratic augmentation that comes with the need to regulate a relatively new and still developing entity. Email and chat may allow people to more readily communicate, but email and chat rooms are often forums for like-minded people rather than a place for challenging ideas through debate. Methods of online communication have changed the presentation of personal identities and the fervor of the advancement of ideas in ways that, in the interest of the intended focus of this paper, will not be developed here.

But perhaps most glaring, possibilities for democracy do not guarantee that democracy will be embraced. Though the internet has been exulted as a great democratic medium, clearly there are reasons to approach this exultation with caution. The internet can offer citizens a means for keeping informed, for participating in debate, and for simply receiving and contributing to the marketplace of ideas. Simultaneously, though, the internet offers users a diversion from politics by making available another form of entertainment. Perhaps users are spending more time shopping and playing internet games and less time keeping themselves in top condition for robust democracy.
It is not necessarily bad that improving democracy is not the top priority for most internet users all the time. True democracy cannot be forced upon a group. For a group to be truly democratic, democracy has to be desired, set up, and executed by all group members and not by an outside force. The internet can be set up to be advantageous to democracy, but democracy by its very nature cannot be guaranteed without the will of the users. Entertainment may dominate, but that's not necessarily bad. Perhaps too often entertainment is dismissed as having little value beyond diversion, yet all information we consume, regardless of medium and content, in some way becomes part of us. We may learn any of number of things from the entertainment that surrounds us. Perhaps a medium of entertainment can teach us democracy, but, as hinted above, it cannot be designed in such a way to force democracy.

Internet video games may actually be an ideal forum for democracy. The games are purposely designed to be fun and to bring the producers of the games a profit; one would be pressed to find a game that is trumpeted as a great experiment for democracy. However, democracy could potentially arise through the games, both by way of democracy in the games and by way of making participants more apt to take part in democracy in their daily lives. Players give their online alter-egos actions as well as voices in the chats that take place between players during play. Though pools of players are dominated by particular demographics, online video games are becoming increasingly popular for other demographics as well, so unlike chat rooms catering to particular mind sets, online video games can provide a meeting ground for all kinds of view points. Since the video games are meant to be fun, people don't generally shy away from them because they don't feel they know enough about what's going on in the world as they may shy away from news groups or online news sources. The internet games are widely available on home computers and even consoles, like the currently popular Xbox and Playstation II. As broadband internet connections become more widespread, likely so too will online video game usage become more widespread. Considering online video games in light of
Arendtian conceptualizations suggest that perhaps even Arendt would have appreciated the potential for democracy in online games. Many of her concepts readily apply to this medium, as will be shown herein.

Early in *The Human Condition*, Arendt distinguishes between the Earth and the world. Earth is the planet on which we live, the conglomerate of all the natural things that surround us. While it may be possible to live on another planetary body, to do so would be fundamentally different from living on Earth because a human habitat on another planet would be significantly dependent upon conditions as manufactured and maintained by humans. Earth, the existence of circumstances beyond our control that give us sustenance, is a necessary foundation. Nature makes it possible for us to live, but the world, a man-made construction, makes it possible for us to be human.

The things perceived and experienced online become part of someone as much as things encountered in the physical world, but the online environment does not fit neatly into either the category of the Earth or the world. Unlike the Earth and nature, the internet isn't equally accessible to all or beyond our control. However, like the Earth, no one owns the internet, though social systems may be set up for individuals or groups to own and control pieces of the internet, be those pieces internet servers, web sites, or texts typed in emails or chats. With sites and texts generated by people and organizations set up by people, the internet probably comes closer to the realm social constructions, the world. However, just as the internet may be used to help people learn more about the world, some say that it is also an escape from the world. This is most evident in the world of online video games, particularly the category of massive multiplayer online games (MMOG). These games typically involve users taking on characters with personally selected attributes and then using these characters to achieve the goals of the games. Characters interact with and communicate with other characters throughout the course of the game.
Within MMOGs, we find models of the world; indeed, many of the games involve players moving through what are termed “worlds.” Two of the most popular MMOGs are Everquest and the Sims Online. Within Everquest, players set up make-believe characters that must move through different fantastical continents. Within this framework, there is a model of Earth (within the continents) and the world (within the interactions with other players). However, the game itself, the computer software and internet subscriptions, is very much a social construction. Similarly, the Sims Online provides players the opportunity to place their characters in different geographical locations in the game, yet the objectives of the game are embodied in interactions with other players within those cities. While the world allows us to be human, not all online characters are those of humans. People may choose fantastical characters that are not human, but perhaps more interestingly, some of the characters encountered online that may seem as if they are being controlled by other humans may actually be controlled by computers. The phenomenon of people playing online video games with other people, people they never see, and occasionally computer driven characters has interesting consequences for the separation of Earth and world, as well as the idea of human and otherwise.

Other Aredtian concepts are also easily applied to the world of online video games. Given the parallels of Arendt’s ideas of world, public sphere, private sphere, politics, and so on with online video games, it seems that this entertaining medium may be an excellent forum for keeping democracy alive. Isolated citizens may learn to come together and share their concerns in these forums. No online activity is without risks, and dangers to democracy may arise if games and game subscriptions become more expensive or if advertising begins appearing more often within the games. In any technology that promises to improve democracy, a careful and critical citizen must ask himself who will profit from the technology’s proliferation more – society or the corporations producing the technologies. As of now, it seems that online video games have been kept from being over-inflated in price and in virtue simply because they
guarantee no grand virtuous promises. The very fact that online video games are not a necessity for democracy or any other reason may make them the ideal catalyst for allowing players to play with democracy. A test of online video games chats will be used to test this claim.


This paper describes the contours of the community networking movement in the United States from the late 1980s to its current state. Drawing on work in Communication Studies, Urban Geography, Sociology, and Community Informatics, the paper seeks to identify a set of factors to account for the emergence and decline of the movement.

A community network is both a computer network and a network of people (Longan, 2000). The specific configuration of each network differs, however many subscribe to a similar set of goals and pursue similar projects to achieve those goals (Virnoche & Marx, 1997; Longan, 2000). The majority of community networks are independent nonprofit organizations, though they may be linked with local governments, libraries, school districts, and universities (Harrison & Stephen, 1999). Community networks can be said to engage in building an “electronic commons” in that they emphasize the production and presentation of local information and encourage community discussion of local issues (Friedland & Boyte, 2000). Beamish (1995) notes that it is the emphasis on facilitating social change that distinguishes community networks from other networked systems. There are no clear numbers describing all of these efforts, however there were more than 400 such organizations in the United States alone in 1996, with hundreds more in other countries (Schuler, 1998). Today, however, there may be only 200 or so networks operating in the United States (Association for Community Networking, 2002).
How do we account for the sudden emergence and decline of this movement? Should the reduction in the number of operating networks be understood as a failure or does it represent a period of abeyance or retrenchment for the movement? Recast at a higher level of abstraction, the question I want to address is, to what extent should the democratic potential of community networking efforts be understood as the product of broad political-economic structures, local political processes, or individual agency? The fact that so many networks sprang up during the same time period in different spaces suggests that they are in some way determined by a political economy that transcends specific location. The apparent divergence in the current shape of community networking in the United States, however, may also suggest the primacy of specific contexts to account for their reproduction.

- “Hate and Peace in a Connected World: Mobilization of Civil Society Movements”, Noriko Hara and Zilia C. Estrada, Indiana U

What part does the Internet play in social mobilization? The Internet has influenced the ways that we interact with each other. At their advent, the new media and communication technologies of telegraph, telephone, and television were greeted with enthusiasm and the rhetoric of the possibilities for a new society and greater democratization. In a similar way, the initial rhetoric about the Internet has followed the same pattern. It has been hailed as a great potential force to enrich a civil society. Many authors have claimed that the Internet would mobilize civil society movements. We have found a few cases that support this claim, e.g., recent presidential election in Korea, the pro-democracy movement concerned with Burma, etc. However, most of the articles that report successful use of the Internet to support civil society movements rely on anecdotal accounts, but tend to remain theoretical and prescriptive, and not grounded in empirical data.
In order to understand the extent of the Internet’s influence on civil society movements, we examined newspaper and journal articles to identify indicators of that influence. Combining these indicators with elements drawn from theories of resource mobilization, political opportunity, and communication models, we propose a framework for analysis. In this presentation, we focus on two distinct civil society movements (hate and peace movements) online and examine the roles of the Internet in each.

For example, through the use of the Resource Mobilization framework, we perceived that the Internet can capitalize the following five resources: knowledge, money, labor, solidarity, and legitimacy. Websites and e-mail mailing lists can easily disseminate knowledge world wide. Some hate websites sell games and music CDs to raise money, while some peace websites directly solicit funds. In terms of labor, it used to take months and years to organize protests and resistance movements, but with the Internet it can take only hours or days to generate a similar level of activity. It has also been argued that the Internet can provide a tool for like-minded people to find each other and network; such activity creates and enhances solidarity. Additionally, for marginalized groups, the Internet can provide opportunities to legitimize their existence and increase visibility and marketability. Such an example can be seen in the ways that hate groups have engaged the Internet to establish an aura of legitimacy. Such attempts have been successful to the extent that others have perceived such websites as a threat and have initiated legal action to shut them down.

By scrutinizing these two particular civil society movements and their use of the Internet, this analysis sheds light on conceptualizing the use of the ICTs in social movements. The framework may help inform social scientists as well as practitioners who are involved in civil society movements, and provide a baseline for comparison with future research, which examines social movements with the use of the Internet over time.
Conception and adoption of new technologies do not happen in the same way everywhere. Thus, to understand the adoption of any technology requires observing each specific cultural location. A good example of these specificities comes from the adoption of Internet solutions, which seems, in principle, as an unequivocal strategic resource. However, a website development as part of institutional communication strategies is not always received enthusiastically. The so praised "digital inclusion" is not necessarily a reason for everybody to commemorate. This paper aims to bring the attention to one of these situations where the process of conception/ adoption of an institutional website has suffered resistances, trying to identify actors, objects, texts and relations which had constituted this resistance. The case under study is the creation of a site for the AAFBB - Associação dos Antigos Funcionários do Banco do Brasil (The Bank of Brazil Veteran Worker’s Association), a profitless association, established in 1951 (Bank of Brazil was established in 19th century), whose main objective is to protect the interests of the Bank's workers and their families. The analysis is based on the concept of discourse as developed by Paul Edwards in his book The Closed World - computers and the politics of discourse in cold war America, used to describe how the technological discourse, also identified as a "modernizing" one, as especially built and defended by the company in charge of developing the site, found resistances coming from what we call a "Bank of Brazil culture" rooted inside the AAFBB. Other considerations for cultural environments and their relations with technological developments are taken from Annalee Saxenian's Regional Advantage - culture and competition in Silicon Valley and Route 128 as well as from a Brazilian classic, Sergio Buarque de Holanda's Raizes do Brazil (Roots of Brazil).
Writing in his own name in the Enchiridion, Erasmus presented himself as a responsible philosopher dealing with respectable ideas, but when he took on the persona of Folly, he was able to explore wider territory and express more challenging ideas. The same principle of exploratory extremism applies to many forms of computer-mediated communication, though not usually at the same level of erudition.

When joining a chatroom or instant messenger, a user is often required by the software to choose a screen name, or persona. Along with the screen name come attitudes, expressed beliefs, and behaviors. Extreme, crudely drawn personae are both simple to create and readily noticeable in the exhibitionistic world of cyber-communication. In these contexts, as well as on listservs, newsgroups, and other computer “bulletin boards,” the shield of anonymity further increases the likelihood that users will express extreme and anti-social attitudes.

The cultural context of internet communications is derived from hacking and computer gaming. John Perry Barlow has shown how modest teenagers readily adopt frightening and anti-social hacker personae in order to make a splash. In computer games, the computer itself (or the program) typically adopts a challenging persona. In the classic Colossal Cave Adventure game, the computer taunts and condescends to the user, a bit like a network administrator patiently explaining the mysteries of a computer system. When composing their own games, students effortlessly adopt this same persona.

For young users, the development of a persona, like the development of a character in a role playing game, is a process of finding both the persona and the expressed attitudes that will produce the greatest social rewards in the cybersocial environment. For those seeking an immediate response, extreme attitudes provide a quick payback in the form of "hits" and responses. Curiosity
seekers are more likely to visit white supremacist or incest sites than sites maintained by (boring) solid citizens.

In general, then, on-line communities often develop as techno-social environments where initiates gain social status by adopting extremist personae and expressing attitudes that challenge the norms of everyday life. When the on-line persona becomes confused with the real life self, as in the case of the Columbine High School students, this on-line extremism may lead to real life behavior that threatens the stability of civic life.

5.7 STI Indicators and Changes in Science Practice and Policy

Sub-Panel 1

Morningside Room

- “Transition Indicators: Linking Science with Its Social-Economic Impacts”, Eliezer Geisler, Illinois Institute of Technology

The evaluation of science and technology and their impacts on society and the economy has been primarily carried out via co-variation methods. This paper explores the use of transition indicators in a multi-stage approach to this evaluation. Transition indicators are measures of the various outcomes from science and technology as they progress towards impacts on social and economic entities. The methodology for the application of transition indicators is described and examples are given of specific impacts of science and technology, as measured by transition indicators. The paper concludes with the advantages of this method over co-variation design. In particular, the paper describes the method by which indicators are grouped into three categories of outcomes: alpha, beta and gamma, each containing indicators of the progression of the outcomes from science and technology along the continuum from science to social and economic impacts. This method allows for a more flexible evaluation
effort, in which evaluators select the range of the domain they wish to assess in this continuum.

- “The Nature of Academic Disciplines: A Case Study of Susan Carey’s Citation of Thomas Kuhn”, Robert J Rosenberger, State U of New York – Sunnybrook

In this paper I conduct a case study of an instance of cross-disciplinary citation in order to find out how this citation is handled by other members of the importing discipline. I hope that by investigating the way cross-disciplinary data is cited by others in the importing discipline, interesting features of the nature of that discipline, and perhaps also the exporting discipline, will be revealed. In the present study I explore the way psychologist Susan Carey’s citation of philosopher Thomas Kuhn is dealt with and utilized in the journal articles that cite her work. I proceed by consulting a citation index that lists those who have cited journal articles of Carey’s where she has cited Kuhn. From that list I analyze those articles that cite Kuhn as well, gathered from a variety of journals, to see if anything is revealed about the nature of the disciplines of psychology and philosophy.

- “Can Sociological and Scientometric Theories of Citation Explain Variations in Citation Behavior?”, Jo Orsatti and Concepción S. Wilson, U of New South Wales

An empirical analysis of the complete publication records(1) of one hundred scientists in the field of consciousness research, comprised of disparate disciplinary backgrounds, has shown a strong regularity in citation behavior. There is a high correlation between the ratio of cited authors to citations (Coefficient) and the Gini index, a measure of dispersion of citation. This enables a distinction of two types of citation behavior (as shown in the table below): Type
one is a scientist who seldom re-cites authors, i.e. refers to most of the authors he or she cites only once, and ‘uses’ all cited authors with a similar frequency. Type two is a scientist who frequently re-cites authors and refers to authors unevenly, e.g. cites few authors very often, while others are cited much less frequently.

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of references</th>
<th>Number of different authors cited</th>
<th>Coefficient (Ratio of authors cited to citation)</th>
<th>Gini index (measure of dispersion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>6041</td>
<td>1677</td>
<td>0.28</td>
<td>0.60</td>
</tr>
<tr>
<td>Type 2</td>
<td>958</td>
<td>821</td>
<td>0.86</td>
<td>0.13</td>
</tr>
</tbody>
</table>

The variations demonstrated by this finding should be explained by a theory of citation, which links variations of causes to variations in patterns of citations. The aim of this paper is to examine theories of citation and to find out to what extent they are able to explain the observations. Five theories of citation will be examined: Classical normative theory which is based on Merton, Gilbert’s ‘persuasion’ theory, Cozzens’ ‘rhetoric’ theory, Latour’s ‘political’ theory and Leydesdorff’s theory of self-organizing information systems. It will be shown that none of these theories supports the analysis of the observed variations in citation behavior. Most of these theories are focused on citer motivations, thus reducing the explanation of citation behavior to one factor. To further describe the work processes of scientists and therefore attempt to overcome this limited focus of previous studies, additional variables derived from the publication data and from Curriculum Vitae data are introduced. Citation behaviors inferred from previous
studies, citation and sociological, are examined and an assessment made on whether these behaviors fit with the current observation. For example it is found that, contrary to general expectations, disciplinary affiliation does not contribute to the explanation of the different patterns of citation behavior as described by the observed regularity.

(1) As represented in the Institute of Scientific Information’s (ISI) Citation Indexes

- “US Science in a Globally Competitive Research System”, Diana Hicks, CHI Research

Open publication in peer-reviewed research journals traditionally characterizes scientific communication, and a count of a country's papers in these journals is the basic indicator of a nation's scientific output. Increases in published output are routine, expected and taken as indicators of a healthy scientific research system. Declining publication counts on the other hand have caused nations such as Australia and the UK to declare crises in their science systems and take action. NSF’s Science and Engineering Indicators reports that counts of US academic publications have declined in recent years. This talk will examine a series of possible causes – method, electronic publishing, commercialization of university research, demographic shifts, shifts in R&D funding, and trends in foreign publishing. We argue that the most likely scenario is that foreign science policies over the past decade are paying off and US researchers are facing stiffer foreign competition. The strange thing about this is that nobody seems to have noticed. The implications of this hidden "crisis" for the future of US research will be discussed.

5.8 Computing Like a State: Information Technology and Governance in the Developing World

Eden Miller, MIT
In late 2001, a legislative proposal was introduced to the Peruvian Congress that if passed, would mandate the use of free software on government computers. The introduction of the bill made Peru one of first countries where the government had begun to pursue legal measures for the use of free software as an alternative to closed, proprietary software in public administrations. The legislative emergence was immediately positioned by both the broader free software movement, and within the international press, as an “inevitable” choice for Peru; the former seeing it as simply an extension of the movement’s other continued successes, and the latter seeing it as a “clear” economic decision for developing nations.

This study explores the practices and processes that were at work behind the production of Peru’s Free Software legislation. Moving beyond a language of inevitability, I ask what made the proposal of Peru’s legislation for the use of free software in government, and the eventual emergence of Peru as a prominent site of free software development, even possible? What social and technological practices, work and relations were necessary for such events to be produced? What were the networks and bodies of actors who operated to generate meaning around such events? And what were the diverse constellations of interpretation that were constructed by such actors?

- For exploring Peru’s free software movement reveals a network of actors, distributed through multiple national contexts, and invested in and inventing a diversity of practices around free software advocacy. Encompassing relations between Peruvian legislators, independent entrepreneurs, local associations of Linux user groups, and Argentinean free software proponents, such a network serves to foster an environment
that allows for the emergence of the movement itself. Such actions within the network further make possible its expressions in both the technology of free software and in the prominent events that come to announce its presence and power. Significantly as well, what such an inquiry into the practices that both sustain and are sustained by Peru’s instance of a free software network uncovers, is that central to the network’s performance is not merely the production of the technological artifacts of free software, but the production of narratives that testify to the technical and social value of free software.

- “Networks of Governance: Technology, Politics, and Economic Control in Chile”, Eden Miller, MIT

This paper examines the history of "Project Cybersyn", an early computer network developed during the socialist presidency of Salvador Allende (1970-1973) to manage the transition of Chile’s economy from capitalism to socialism. This unprecedented system was designed to connect all factories in the newly nationalized sector of the economy to a central mainframe computer in Santiago and allow the government to view factory activities in real-time. Cybersyn offered a means of “peaceful revolution,” where economic regulation, not bloodshed, spurred socialist change. Its design reflected both the socialist ideology of the Allende government and the democratic beliefs of the Chilean nation, simultaneously empowering workers and respecting individual liberties. Symbolically, it represented a new vision of modernity pioneered by a South American country marginalized both geographically and politically. Although the idea for this technology originated in Chile, its construction occurred under the direction of British cybernetician Stafford Beer using computer systems from U.S. corporations, an important point considering the Cold War context and the Nixon administration’s open hostility toward the Popular Unity government.

This paper examines the construction of the Cybersyn system and the idea of socialist governance it tried to promote. It will detail the contributions of the
international actors and foreign technologies needed to bring this “national” technology into being. It will also study the expansive network of Chilean politicians, engineers, and factory workers needed to advance the project toward completion and the strategies they used to overcome resistance to this unorthodox technology. The resultant analysis illustrates how developing nations have applied information technology to achieve different technical and political ends than those in the developed, western world and the complexity of “transferring” a technology from one geo-political context to another.

- “E-government Initiatives in Indian Villages: Possibilities for Democratic Politics?”, Richa Kumar, MIT

Over the last five years, information and communication technologies (ICTs) are being used increasingly to connect local governments to village communities in developing countries like India. The ability to send online applications for basic documents such as birth-death certificates and pensions, to access confidential information such as land records, and to send petitions and complaints to higher authorities has been made possible in several pilot-level initiatives that set up internet centres in villages.

The underlying rationale for these e-government initiatives is to increase government accountability towards citizens through improved access to officials and a reduction in corruption and red tape. Proponents of these projects also believe that ICTs have an inherently egalitarian and empowering quality that enables marginalised groups to exercise their rights, especially within India’s highly stratified local society.

Ethnographic studies of such initiatives reveal the deeply politicised context, both of communities as well as local governments, within which ICTs are introduced, and raise important questions about the nature of change expected within the governing process. Government officials, local politicians, advocacy groups, proponents of e-government projects, rural entrepreneurs who manage village
internet centres, and other social groups based on caste or community affiliation are all actors with vested interests that exert varying degrees of control over ICTs. The interplay of these forces has created numerous instances of failure and success.

This paper seeks to go beyond traditional narratives that describe failure as the result of elite technological control or present isolated examples of success. It seeks to develop a more inclusive narrative by asking whether it is possible to create democratic online networks that can penetrate and overcome hierarchical real-life networks as governments and citizens create new ways of communication within cyberspace.


This presentation is about the dynamics between technology, organizational and institutional embeddedness, and the way they can affect the performance of public agencies to deliver public ends by digital means in a networked environment.

It presents a study of the Chilean e-Procurement System since its beginnings in 1997, showing how an once-best practice fell down to almost a lost case. Recognizing the potential benefits of information technologies, the Chilean Government developed a strategy to address problems efficiency and transparency in government procurement in the form of a comprehensive reform of its procurement system. The reform considered the development of an e-procurement platform which objective was to make business opportunities with the Chilean Government more transparent, reduce firms' transaction costs, increase opportunities for feedback and cooperation between firms and public agencies, and reduce opportunities for corruption. The results, however, felt
short expected and eight years after the system it is finishing its recovery. This presentation will address the major issues involved, lessons learned from the process, and future plans and expected outcomes for the government until 2005.

- “Inequalities in Internet Access and Patterns of Scientific Collaboration”, Marcus A. Ynalvez and Wesley Shrum, Louisiana State U

Prior studies discuss but present little evidence of the digital divide in science. We suggest answers to two “digital-divide” questions: Does differential Internet access attenuate or exacerbate existing inequalities in scientific collaboration? If so, what contextual, individual, and human capital factors determine differential Internet use among scientists from the developing world? Using face-to-face survey data on 918 scientists in India, Kenya, and Ghana, we investigate: (a) patterns of inequalities in Internet access and use, and (b) the net effect of Internet access and use on the frequency, concentration, and diversity of scientific collaboration. We draw on the literature in social stratification to discuss the impacts on both macro- and micro-level aspects of social inequality.

5.9 Ethnographies of Care

Athens Room

- “Nurturing Care. Combining Actor Network Theory and Care Ethics”, Alice Stollmeyer, U of Groningen

This paper combines Actor Network Theory and 'care ethics' to study the politics and ethics of food in psychogeriatry. Ethnographic research was carried out in a French psychogeriatric hospital and in a Dutch psychogeriatric nursing home, using the method of participant observation. The researcher participated in the daily practice of care for the patients, meanwhile observing the behaviour and interactions of the nursing team, patients and relatives.
The subject of this empirical-philosophical study is the role of food in daily care for, and daily life of people with Alzheimer's disease and other kinds of senile dementia. In the terminal stage of dementia patients often start refusing food, leading to the question whether or not to administer food artificially. But what actually happens prior to this difficult decision? In this paper I focus on food and related objects as mediators of care, and on questions like: what are the consequences of different kinds of 'food logics' for the degree of 'humanity' that is attributed to the patient in the act of feeding him?

Based on Actor Network Theory, I use ethnography as an approach to ethics because I see morality as being located in practices rather than underlying them. Instead of focussing on ethical debates in which medical decision making is analysed, or on public accounts in which care policies are justified, ethnography studies daily care itself. Ethnography is an appropriate approach when one is not so much interested in peoples' moral reasons for acting in a certain way, but in these actions themselves: how they differ, how they are mediated by other humans and nonhumans, and what their consequences are for the quality of life and care in psychogeriatry.

- "Boundaries: Combining Frames of Evaluation in the Articulation of Clinical Guidance", Tiago Moreira, U of Newcastle

Evidence-based clinical practice guidelines are one the main tools through which clinicians, policy makers and patients presently hope to make health care more reliable and efficient. These hopes have been critically interrogated by social scientists mainly through studies of the local adaptation of standards in clinical practice. Little has been reported on the practices of gathering and evaluation of 'evidence'. This paper analyses those practices drawing on an ethnography based on three main sites: two multidisciplinary guideline development groups, and the everyday work of the guideline research and support team. Its describes guidelines as developed a trajectory of articulation from the moment when the
disease/condition was, as the methodologist put it, “possibly connected to everything” to it becoming a bounded set of relationships, flows and exchanges between different actors relevant for the disease’s management.

The paper argues that guidelines groups articulate clinical guidance by working in four different frames of collaborative evaluation – agonism, contingency, politics and process - which they constantly confront and combine in the construction of the document.

It is argued furthermore that to understand the practices of combination of repertoires it is necessary to observe how group members construct boundary relations between these different forms of judgement, and how this boundary work defines proper ways for interaction between practices and makes such interaction possible and conceivable.

- “Medical Holism in Clinical Practice: Divergence of Theory and Therapy”, Ellen J. Salkeld, Wayne State U

‘Holistic medicine’ as practiced by biomedical practitioners is often represented as a recent advance in disease treatment. While holistic thinking about disease and the human body is frequently portrayed as ‘moving beyond’ perceived confines of biomedical science into innovative therapeutic territory, holism and biomedicine are historically linked. This paper examines clinical discourse employed by biomedical physicians to contextualize their holistic approach to diagnosis and treatment as an improvement over biomedicine. Adopting theoretical constructs pertaining to disease, society and human physiology the physicians posit their holistic clinical practice as simultaneously deep-rooted and progressive. The physicians’ holistic stance fragments alternative systems of medicine for use within a western clinical setting, while selecting diagnostic and therapeutic approaches that reject contemporary medical technology.
The research presented here is based on fourteen months of field research in an holistic medicine clinic, where practices range from acupuncture and nutritional medicine to homeopathy and spiritual hypnotherapy. This ethnographic study employed qualitative methodology, and included interviews with physicians, other clinical staff and observation and audio-recording of clinical encounters between physicians and patients.

Preliminary results indicate physicians’ perception of ‘difference’ and progressiveness of their holistic approach is related to moral superiority felt in relation to their biomedical colleagues. Authenticity assigned by the physicians to their holistically based diagnosis and treatment, reflects their assessment of themselves as ‘old time’ physicians, more in tune with the needs of their patients than their biomedical contemporaries. Cultural analysis of the holistic medicine clinic including clinical discourse clarifies the process through which clinicians reify natural over technological. Simultaneously the physicians choose to legitimize their therapeutic approach through reliance on ‘real’ science conducted prior to the medical-pharmaceutical industrial era. By filtering historical medical practices through the lens of biomedicine, equating contemporary clinical practice with techno-medicine and historical practices with ‘natural’, the physicians in this study strive to achieve a more natural and therefore ‘superior’ type of clinical practice.

Research funded by NIH/NCCAM Grant # 1F31AT00642-02

- “Pictures, Practices, Paradoxes: Medical Imaging and Reflexive Modernity”, Regula Valérie Burri, ETH Zurich

This paper argues that medical imaging technologies and practices imply several paradoxes. On the one hand, imaging technologies open up a set of new options and possible choices for patients and physicians, while on the other hand, they narrow the scope of self-perceptions, agency, and alternatives in certain situations. The new freedom of diagnostic choice contrasts with the limitations of
available treatment for several indications or the shaping power of the images regarding to self-perception. Imaging technologies can also force physicians and patients into decision situations that are difficult to cope with. For example, despite the uncertainty of the further course of a detected, but only potentially dangerous, disease, the patient has to decide whether to have surgery or not. The freedom of choice here goes along with the obligation to make a choice. This paradox corresponds to the ambiguous feature of contemporary societies described by Beck et al. (1994) who note the characteristic of reflexive modernity to offer new choices to individuals while forcing them into a steady process of decision-making. Drawing on these theoretical concepts and on fieldwork at several MRI units, and interviews with physicians and patients, this paper will explore the paradoxes related to medical imaging and raise questions about their consequences for the construction of identities.

- “Ethnicity in the Consultation Room: Interactions Between Company Doctors and Client of Different Ethnic Backgrounds”, A. Meershoek and A. Krumeich, Maastricht U

In the paper we present the results of a research project focusing on the way the ethnic background of clients plays a role in the practice of illness certification for the Dutch Sickness Benefit Act. In this project we view ethnicity as a result of activities in daily practices rather than a pre-given characteristic. By participant observations of encounters between company doctors and their clients, we investigated what kind of definitions of ethnicity are “enacted” in this practice and what the (political) consequences of these definitions are for the people who apply for a sickness benefit.

Analysis of the encounters shows that company doctors tend to attribute problems in the interaction with clients of minority groups to the ethnic background of these clients. They suppose that this ethnic background includes
specific cultural beliefs related to illness, pain and work, and that these beliefs complicate the routines doctors normally apply to stimulate clients to return to work. Although the doctors’ suppositions coincide with prevailing explanations for problems with clients of minority groups in social research, it is not satisfying. The analysis of the encounters brings up many “traditional Dutch” clients with comparable cultural beliefs related to illness, pain and work, as well as clients of ethnic minorities who comply with the implicit rules of the practice. They behaving in a very active and cooperative manner, and do not cause any problems.

In our paper we will show that definitions of ethnicity in terms of “culture” do not offer adequate explanations for the problems company doctors encounter nor promising starting points for possible solutions. We will argue instead that the very use of cultural explanations can be held responsible for the problematic development of the return-to-work-process, because they interfere with the rather productive ways in which company doctors normally handle problematic “Dutch” clients.

To this end we will describe in detail the way company doctors supervise return-to-work activities of ‘ideal’ and ‘problematic’ clients, the implicit norms and expectations of client behaviour, and the processes that lead to specific constructions of ethnicity. We will end our paper with the discussion of the normative and political implications of our findings.

5.10 Social Movements and Public Participation in Science and Technology

Savannah Room

- “Democratic Theory, Public Participation and Scientific and Technological Innovation”, R. P. Hagendijk, ISHSS

One major accomplishment of studies of public understanding of science over the last decade has been to delegitimate the deficit theory of public
understanding of science. A second major accomplishment of work in this key area of STS has been to show that ordinary citizens are quite able to assess science and technology in the context of their practical implications and public policy. Both accomplishments provide arguments against elitist views on the governance of the interface between science and technology. They have stimulated and informed experiments to engage the public in key areas of science and technology policy. Yet, the question remains how such new forms of public engagement relate to existing practices of political decision-making, social mobilization and mass media coverage of controversial science. My paper explores that question drawing on the EU STAGE-project about public participation and governance and a Dutch project on patient advocacy groups and the new genetics. How to understand the processes of accommodation with respect to public participation that are going on in the public realm? What conclusions can one draw for democratic theory as discussed and developed by political scientists and philosophers?


The post-industrial dependence on experts and its related power imbalances has engendered social movement demands for participation. Given the reliance of environmental policy on science and expert knowledge, one such key group of movements and collaborations is those that attempt to democratize environmental research and slow the environmental degradation. This paper examines the social movement and resultant participatory methods that democratize environmental knowledge. I conceptualize the democratization of knowledge as the process through which local, lay perspectives become legitimate in science and/or expert knowledge to the point that they affect political decision-making. Theorists have pointed to movement contestation of research and technology as characteristic of new social movements, but have yet to empirically study this movement tactic. The environmental movement is the
classic case to contest knowledge in order to improve policy. This paper examines the movement of dam-affected people in Brazil to understand its 1) strategies, ideologies and alliances, 2) resultant research collaborations between experts and lay people, and 3) the affects of these collaborations on policy. Based on interviews with movement actors, government officials, and scientific experts, I find that this movement has been effective in constructing new environmental research that serves as an alternative to that conducted by industry proposing potential dams. This paper is therefore an examination of the processes involved therein. Such projects play a pivotal role in the achievement of movement goals. The anti-dam movement in Brazil provides an empirical instance in which to explore how movements contest and consequently shape expert knowledge.

- “Life and Death Politics: Social Movements and Stem Cell Research”, Robin Downey and Edna Einsiedel, U of Calgary

Stem cell research has revitalized the debate concerning the regulation of reproductive technologies in Canada. In 2001, the Canadian Institute of Health Research (CIHR) released guidelines that would allow stem cell research on embryos in the face of quite vocal opposition from some ethicists, conservative religious groups, pro-life pressure groups, and politicians. However, scientists and patient advocacy groups have expressed substantial support for the guidelines. Regulation in stem cell research will have significant implications for scientific, healthcare, and patient-based communities in Canada.

Patient-based movements can have an important impact on the way that research and policy develop. Medical practices and legislation are often shaped by the discourses produced by these groups. Social Movements theory is used to understand the activities and impact of these groups on the formation of this legislation and on the development of stem cell research. Interviews with key members of these groups and analysis of policy and media texts are the main
sources of data for this paper. Using the analytical tools of framing and (social movement) political processes, the paper examines how patient organizations and the scientific community use linguistic and symbolic resources to mobilize public support through the development of research guidelines and the use of position papers directed to parliament and the media.

COFFEE BREAK

Session 6:  10:30-12:15 PM

6.1 Technoscience, Race and the Politics of Identity in Europe

Georgia Room

• “African Voices in the Dutch Republic. How a Former Slave, Jacobus Capitein, and an Ashanti Prince, Aquasi Boachi, Became Objects of Racial Research”, Dienke Hondius

      No Abstract

• “‘Ancient Hunters and Their Modern Representatives’: Evolutionary Racism, Imperialism, and War”, Marianne Sommer, Pennsylvania State U

Drawing upon the tradition of his instructor of paleontology at the Muséum National d'Histoire Naturelle, Albert Jean Gaudry, Marcellin Boule formulated his influential theory of human evolution as a branching tree similar to those drawn for mammalian evolution. This meant that the hominid fossils so far discovered, such as 'Homo neanderthalensis' and 'Pithecanthropus', represented dead-end side branches rather than stages in the evolution of modern 'Homo sapiens'. Boule's work led to a general change in opinion, also in the case of William
Sollas, professor of geology and paleontology at Oxford University, who had formerly envisioned Neanderthal and 'Pithecanthropus' as 'the piers of a ruined bridge which once continuously connected the kingdom of man with the rest of the animal world'. In his 'Ancient Hunters' (1911, 1915, 1924), Sollas presented a race succession paradigm according to which natural selection, 'the stern but beneficent tyrant of the organic world', had led to the successive marginalisation or extinction of 'inferior races' of man. Though not everybody agreed with Sollas's identification of fossil human 'races' with modern 'races' of man, the white supremacist view that the line of modern Europeans had a long history independent from other fossil or modern human forms was wide-spread. The paper will address this evolutionary racism and its mutual feedback with eugenicist and imperialist ideology as well as the uncertainty generated by a war between 'the master nations'. Besides discussing the theoretical aspects, it will touch on the every-day problems or opportunities that arose for the work of human paleontologists through imperialism and war.


No Abstract

- "Inherited Memory: An Examination of Freud's Lamarckism", Eliza Slavet, U of California - San Diego

Central to Freud's theory of memory is his particular understanding of evolution and heredity. Freud's insistence that memory could be inherited has led scholars to disparagingly refer to this aspect of his work as his "psycho-Lamarckism": a reliance on the principles that "ontogeny recapitulates phylogeny," and that acquired characteristics can be inherited.
A re-evaluation of Freud's Lamarckism reveals that these principles were central to his theorization of both individual and collective memory, from at least 1898 until the very end of his life. According to Freud, certain memories (such as the Oedipal trauma) are passed from generation to generation without any conscious activity or communication. The apotheosis of this Lamarckian line of argument is reached in Freud's last work, Moses and Monotheism (written 1934-1938), in which he theorizes that Jewishness is an indelible collective memory inherited from one's ancestors. Here Freud argues that Jewishness is biologically inherited, and as such, is more akin to what was (and continues to be) commonly referred to as race rather than as religion. Thus, Freud's Lamarckism is central to a certain discomfort which attends much of the scholarship on Freud's Jewishness, whether in regards to his "theory" of Jewishness (what constitutes it and how it is transmitted from generation to generation), or his own identity as a Jew.

This discomfort has contributed to the confusion and apprehension regarding Freud's Lamarckism, particularly his continued insistence on these principles in the 1930's. True, by the 1950's Lamarckism had become so scientifically outmoded that in preparing his biography of Freud, Ernest Jones seemingly deliberately downplayed the Lamarckian underpinning of psychoanalytic theory. Following Jones' (and other psychoanalyst-historians') attempts to keep such "specious" science at a distance from the "real" basis of psychoanalytic theory, most scholars have continued to puzzle over Freud's obstinacy and to concoct elaborate theories as to why he would have continued to insist on Lamarckism. While most scholars have assumed that Lamarckism had been definitively disproven by the 1930's, in fact, Freud was not alone in his insistence on Lamarckian principles of heredity, for the debates between neo-Lamarckians and neo-Darwinists continued well into the 1940's. More specifically, Lamarckism was condemned by the Nazis who associated Lamarckism with the "evils" of Bolshevism and Jewishness. Such condemnations
were in fact partially true, for Lamarckism offered both Communists and Jews-- and Freud-- a scientific basis for the argument that social problems of particular populations were the effects of the environment (rather than simply "bad blood"), and as such, could be fixed by instituting social reforms.

6.2 Media Meets Technology: Thinking Through Media Technology Studies

Pablo J. Boczkowski, MIT and Fred Turner, Stanford U

Sub-Panel 2 - Uptake

Ardmore Room

- “Location, Location, Location”: Considering “Presence” as a Replacement for “Interactivity”, Michele H. Jackson, U of Colorado

"Interactivity," in two senses of the term, has been critical to communication and technology studies over the past two decades. The first sense of interactivity refers to the ability of an individual user to manipulate the technology so as to directly influence the outcome. Interactivity in this sense is a variable property, with a technology being more or less interactive. The second sense of interactivity is a property that allows new media to approximate (or perhaps imitate) face-to-face (FTF) communication. In this second perspective, FTF communication is the sine qua non, and interactivity is its central component.

Interactivity has proved an enormously rich concept for theory and research. First, it captured our imagination for how technology might create new possibilities for communication. Interactivity decisively separated old media from the new. Yet it is variable, providing room for innovation and creativity in conceptualization and design. By taking FTF as a benchmark, interactivity allowed ICTs to be compared to each other, producing a useful kind of ranking.

Second, interactivity is easily accessible as a communication construct. The
notion fits well with common understandings of communication that are grounded in sender-receiver encoding-decoding models. The concept calls for us to problematize the medium, rather than communication itself per se.

Despite this success, there are signs that the concept may soon be stretched thin. We can witness a subtle shift in the nature of very recent communication technologies away from interaction and toward the concept of "presence." In presence technologies, location and embodiment become as important as interactions. This paper explores the implications of "presence" as a generative concept for theory and research in communication technology studies. The exploration is grounded in two emerging technologies: MMPOGs (massively multiplayer online games) and IVEs (immersive virtual environments). I argue that “presence-based” media technologies require a reconceptualization of communication away from the traditional transmission model to one that sees communication as constitutive and formative of social relationships.

- “Australia’s Dingo Fence: Layers of Infrastructure and Meaning”, Susan Leigh Star, U of California-San Diego

This is a study of the history of the dingo fence in Australia as a communication media infrastructure. The fence, which is more than 3,000 miles long, has been built across southeastern Australia and maintained for decades. Its purpose is to separate dingoes from sheep (they don't mix well, it seems; a single dingo can destroy a sizeable herd of sheep in one night). So the fence is first a block to communication between these two animal groups. It is also symbolically weighted. That is, the dingo have a special relationship with many Aboriginal communities, both spiritually and culturally. The fence barrier thus carries some messages of racism and reinforces the troubled relationship, at times genocidal, between the white Australian government and Aborigines. Finally, the workers who maintain the fence and troubleshoot have multimedia forms of communication along this narrow corridor: primarily two-way radio, also email,
telephone, material messages at the fence itself, shelters along the fence that are also messaging centers, and regular mail and newsletters. The advantage of this paper would be to broaden the category of media technologies, interweave work and practice with cultural nuances with media technologies that span low-to-high tech. It also speaks to issues of "layering" media technologies, something theoretically quite important, as new media are interwoven into old, low-tech structures, and all forms of the technology continue to be used and reconfigured over time.


When accidents occur or documentation practices fail to provide data for effective risk management, agencies must rethink documentation practices in the same way they rethink engineering practices. This paper applies a rhetorical framework developed to investigate documentation practices in the coal mining industry (Sauer 2003) to examine five critical issues that contributed to the Shuttle Columbia disaster: (1) visual/sensory inspection methods; (2) documentation of maintenance and operations procedures; (3) methods of tracking and organizing data related to safety; (4) communicating data to appropriate decision makers; (5) training and certifying workers. As Admiral Gehman recognized, what we see in the investigation, what we see in operations, and what we see in materials are “shared issues” that are not easily separated in the investigation. If previous data is hard to access, difficult to understand, or poorly documented, analysts will not be able to determine the cause of an accident or prevent similar accidents in the future.

Despite their differences, both industries face similar concerns: high levels of uncertainty; a high reliance on sensory knowledge to identify hazards (tapping, visual inspection); complex technical systems dependent on workers to identify
problems in maintenance and operation; aging technologies; and a high reliance on material data to manage risk.

Previous studies of communication in the Challenger disaster found few grammatical or semantic misunderstandings in the now-famous NASA memo (Herndl, Fennell, and Miller); readers could understand the memo, but they applied different standards in assessing outcomes (Winsor; Dombroski). This paper extends this analysis to examine how documentation practices influence decisions at all phases in the system—from operations and maintenance to command and control at NASA headquarters.

In The Rhetoric of Risk, Sauer (2003) uses the notion of rhetorical transformation to show how documents are linked in a Cycle of Technical Documentation. At each moment in the cycle, documents created for specific audiences must be translated and transformed to have meaning as warrants in risk decisions. Unless agencies continually reassess these documents in the same way they re-assess technical practices, they will not learn from the past to prevent disasters in the future.

Ultimately, this paper demonstrates, the notion of rhetorical transformation can provide an expert system that agencies can apply to (a) understand the role of document design at the systems level and (b) investigate local documentation practices that affect safety throughout the system.

- "The Social Dynamics of the Internet in Britain", William H. Dutton, U of Oxford

This paper will discuss the results of a household survey of Internet adoption and use in the United Kingdom. It will draw on a theoretical perspective on the role of the Internet in reshaping access to information, people, services and technologies, one which is anchored in the intersections of communication and technology studies. Cross-national comparisons will be drawn to reflect on the
ways in which the cultural context of the UK might be reshaping access to the Internet and, in turn, reconfiguring access to information, people and services in the UK.

- “The Symbolic Shape of Media Technologies”, Tarleton Gillespie, Cornell U

The study of media has achieved a complex understanding of communication and its role in society, but is limited by an underdeveloped theory of technology -- imagined either as neutral, or as having some predictable, and unwavering impact on society. Conversely, the scholarship concerning technology offers a rich awareness of the way human choices shape the design and implementation of technologies -- but is hampered by a materialist focus overlooking how technologies are also discursively constructed as symbolic objects.

Joining these perspectives allows an investigation into how our interactions with media technologies are themselves mediated by deliberately deployed and culturally available representations of those technologies. I will pursue this line of inquiry by considering the Supreme Court decision to reject the Communications Decency Act; much of the debate around the statute, and the justification for finding it unconstitutional, hinged on a dispute over what the Internet "is" -- a question answered by imagining its symbolic shape in contrast to other existing media systems.

6.3 Augmented Bodies

Lucy Suchman, Lancaster U and Ana Viseu, U of Toronto

Sub-Panel 2: Bodily Enhancements

Sherwood Room
“Producing the Natural and Hypernatural in Bodybuilding Discourse”, Jennifer L. Croissant, U of Arizona

What kinds of bodies are produced through “natural bodybuilding?” What is meant by the term ‘natural’ and that to which it is opposed? What are the relationships between nature and subdisciplines of science presented in bodybuilding discourse? What is taken to be scientific, or as sources of expertise? How does science help to produce the hypernatural, that is, the more-natural-than-nature-could-make-it, in bodybuilding and other arenas of popular culture? What are the implications of discourses of the hypernatural for issues of policy and practice in various arenas. This paper will be a preliminary study of ‘natural bodybuilding’ discourse from various media.

“Extraordinary Bodies”, Linda F.Hogle, Stanford U

The theme of augmented bodies conjures images of prosthetics that are added-to and procedures that are done-to bodies. Whether therapeutic, restorative or cosmetic, the implication is that technology and its associated procedures remain distinct from the body, even though they may serve as extensions of physical capability or as supplements to functioning. But what if a biological or synthetic entity stimulates processes whereby the body remolds itself or self-alters its developmental patterns? What if parts of the body are produced to augment technologies intended for commercial production? Does this alter definitions of the ‘normal,’ the ‘technological’ or the ‘biological?’ How are we to think about agency and subjectivity? Are radical bodily transformations made in the name of national security valued differently than those made for medical treatments or for consumer desire? Examples from cellular therapy, proposed nanotechnologies and bioengineering for civilian and military uses will be used to pursue these and other questions.

“Acoustic Daylight Imaging and Augmented Senses”, Christine A. James, Valdosta State
There have been dramatic changes in the history of sonar and underwater imaging in the last fifteen years. The earliest forms of sonar (especially those used in military applications in the World Wars) would involve the use of "active" sonar arrays, which send out a sound and listen for an echo to return. This can be the classic single "pings" or an array of multiple echoes used to create images of the underwater floor, as in "swath bathymetry." But since the late 1980s, a research group at Scripps Oceanographic Institute in La Jolla, California and another at Woods Hole has been using a new type of sonar that does not send out its own active sound, but which uses the underwater ambient noise. Bodies underwater will naturally displace this noise, and by using an array of passive hydrophones, the researchers can augment their senses and create images of objects and topography underwater. One further implication of this type of research is that the researchers themselves feel a certain kinship and moral responsibility for the underwater life that creates noise, especially snapping shrimp colonies in the Pacific. A number of articles produced by this research collective involve not only descriptions of their hydrophone arrays, but a careful study of their obligations to care for the underwater life on which their research relies.

- “Wearable Augmentations”, Ana Viseu, U of Toronto and Lucy Suchman, Lancaster U.

In Western societies seamless access to and integration with information is increasingly perceived as central to the success (and survival) of individuals. This premise is evident the growing number of technoscience projects emphasizing augmentation as a way of linking digital and physical worlds. Augmentation implies the coupling of a human or nonhuman actor with a computational device, taken to extend the native capacities of the former through information processing. Rather than building self-contained machines, machines and humans are coupled together into a new hybrid actor. Rather than leaving the body behind, real world and computer-generated information are brought
together, allowing individuals to simultaneously affect and be effected by both realities. In an augmentation paradigm the human is no longer the measure of all things, the entity that machines are designed to imitate. Instead the human body is viewed as being deficient, in need of improvement through the addition of advanced computing capabilities. This imperative stems from the urge to bring it up to speed with the production demands of a society where digital information is the most valuable asset.

A primary site for research and development in augmentation technologies are personal wearable devices that are used in synergy with the human body. With wearable computers the body is not simply extended by information and communication technologies, but becomes their intimate host. To date the literature on wearable computers has focused mostly on their technical features, with little discussion about what leads designers and engineers to create them. What social theories are being constructed? What are the assumptions behind wearable computers? For whom are they being built? What models of ‘humanity’ and personal identity do they foster?

This paper addresses these questions through a set of cases, that include empirical data generated in the course of an ongoing ethnographic study of the implementation of wearables among technicians within Bell Canada, as well as interviews with wearable application developers—in Europe and the US—from the 4 main areas of wearable research: work, medicine, leisure and the military. The goal of the paper is to examine critically the visions, motivations, problems and solutions that animate the various actors involved in the process of prototyping wearable computers, and to understand the kinds of subjects, objects and entities that are being created.

- “Hi-tech Wardrobe, Hi-tech Bodies”, Esra Ozkan, MIT

This paper will present research on the ways in which science and technology are being integrated into new clothing projects. These projects are known as
"techno fashion" or "hi-tech fashion" and range from remote control couture to wearable wireless communicators, surveillance systems and body monitoring systems. These products reconfigure the boundaries between technology and bodies. Besides their obvious commercial uses, the potential uses of high-tech fashion exist in military and medicine.

Based on interviews with designers, researchers and scientists, this paper will analyze the implications of hi-tech design for our experiences of body and mind, communication abilities, health care and lifestyle. By comparing commercial, health and military uses of hi-tech fashion designs, the paper will also explore the intertwined relations between arts/design, science/technology and market.

6.4 “Social Studies of Models and Simulations”: Models and Simulations as Mediators in Scientific Practice

Catherine Hasse, U of Copenhagen, Erika Mattila, U of Helsinki and Martina Merz, EPF Lausanne

Discussant: Aant Elzinga

Sub-Panel 2

Fulton Room

- “On the Ontology and Epistemology of Models: the Case of Self-Organising Maps”, Tarja Knuuttila, U of Helsinki

Science and technology studies have typically been critical of representation and concentrated on the epistemology of experimentation instead. For instance Ian Hacking and Andrew Pickering claim that we should stop thinking science in representationalist terms and concentrate on "intervening" and "coping with material agency" instead. This agenda has, indeed, been realized by STS in their focus on laboratories. Along with the recent interest in models and modeling the
question of representation is back on the agenda. Models are customarily thought of as being representatives or representations of some target systems. However, many models used in science do not derive their epistemic status from being primarily representations of some sort.

The claim of this paper is that the epistemological problems concerning representation cannot be avoided unless we take an ontological look into models trying to find out what kind of things are being called models by scientists. From the scientific practice point of view the models in science can be considered as artefacts, materialized in some medium and having multiple epistemic uses. Thus even though they are typically constructed by representing some real entities or processes, they are often used in scientific practice without being considered as straightforward representations of anything. Representation is just one of the uses a model can be put into. Neural network models, such as Self-Organising Maps, which I will consider in more detail in this presentation, make a good example of this. Even though they have their origin in the analogy to the functioning of the human brain, perhaps the most researchers developing them nowadays do not consider this very relevant for their work. Yet at the same time there is a heated debate going on in the cognitive science about the merits of "connectionism" in explaining our cognition.

- “Models of Success vs the Success of Models: Reliability without Truth”, Eric Winsberg, U of South Florida

In the practice of computer simulation, the construction of models of physical systems is guided, but not determined, by theory. In this respect, simulation models are semi-autonomous. At the same time simulations models are often constructed precisely because data are sparse. They are meant to replace experiments and observations as sources of data about the world; hence they cannot be evaluated simply by being compared to the world. So what can be the source of credibility for simulation models? I argue that the credibility of a
simulation model comes not only from the credentials supplied to it by the governing theory, but also from the antecedently established credentials of the model building techniques employed by the simulationists. In other words, there are certain sorts of model building techniques which are taken, in and of themselves, to be reliable. Some of these model building techniques, moreover, incorporate what are sometimes called "falsifications." These are contrary-to-fact principles that are included in a simulation model and whose inclusion is taken to increase the reliability of the results. The example of a falsification that I consider, called artificial viscosity, is in widespread use in computational fluid dynamics. Artificial viscosity, I argue, is a principle that is successfully and reliably used across a wide domain of fluid dynamical applications, but it does not offer even an approximately "realistic" or "true" account of fluids. Artificial viscosity, therefore, is a counter-example to the principle that success implies truth-a principle at the foundation of scientific realism.

- “Through a Glass, Darkly: Meteorological Prediction and the Promise of the Future”, Gary Alan Fine, Northwestern U

Social systems are Janus-faced. They peer intently forward at the moment they gaze back. Given that most social systems - both those that are traditional and those that are modern - create ritual specialists whose responsibility is to prevent ambiguity, exploring how we access that which has not arrived is of considerable interest. My data address short-term predictions, examining the work routines of operational meteorologists. I argue that to make a public prediction three components are necessary. First, the predictor must have a set of current empirical data from which extrapolations can be made as to the future course of events. Second, the predictor requires a theory or model which permits the routinization of extrapolation. Finally, and perhaps most significantly, there needs to be legitimation of prediction. Specifically I address three forms of legitimation, one situated within the domain of knowledge (occupational legitimation), the second tied to organizational features of the social order (institutional
legitimation), and the third grounded in the power of interpersonal persuasion (presentational legitimation). To generalize my claims beyond the world of meteorologists, I draw from research that examines the practices of prognostication among doctors, fortune tellers, and financial analysts.

6.5 IT and Education

Ken Fleischmann, RPI

Sub-Panel 2:
Highlands Room

- “Learning IT: Seniors’ Experiences in the US and China”, Bo Xie, RPI

This paper focuses on older adults’ experiences with learning to use computers and the Internet. Available research indicates that older adults are interested in and capable of using new information technologies. Due to age-related changes in perceptual, motor, and cognitive abilities, however, they may require special learning and training strategies and settings when learning to use new technologies. In this paper, I first review existing research on older people’s learning experiences with IT. I then report the preliminary results of a cross-cultural study, which compares and contrasts the learning experiences of older Chinese and older Americans.

The graying of the population of the United States and China is coincident with the dramatic development of information technology in these two countries. Although in both countries, all age groups have experienced growth in Internet usage in recent years, the use of the Internet among different age groups is far from even; older people, especially older Chinese, are much less likely than younger people to use the Internet. Various studies suggest that, among the factors that inhibit older peoples’ Internet usage, lack of training is an important one. Available research also indicates that, if provided with appropriate training
help that fits their special needs, older adults are quite able to use computers and the Internet. Therefore, designing and developing senior-friendly training strategies and educational settings, which takes into full consideration of older adults’ special needs, is a necessary step toward narrowing the digital gap between older and younger people.

Although some scholars have paid attention to this topic, more systematic research is necessary. Also, my literature review on older adults and IT shows that so far most research was conducted in the U. S. context. Almost no research has explored older Chinese's experiences with IT, not to mention comparisons between older adults in these two countries. In this pilot study, I plan to collect comparable data for older Chinese Internet users, focusing on the same core issues as existing studies of older American Internet users. This research can serve as the foundation for a broader study comparing older American and Chinese Internet users because it fills the almost total gap in research about older Chinese Internet users' experiences with IT.

- “Exploring the Design-Use Interface: Values and Knowledges Embedded in Educational Computer Simulation”, Ken Fleischmann, RPI

Who decides what values and knowledges are embedded in educational computer simulations? To answer this question, I first look to sites of design, such as companies and university laboratories that produce simulation software. Next, I look at sites of use, including classrooms where students and teachers use simulation software. Finally, I also look at sites of the design-use interface, such as conferences where designers and users interact. In each of these settings, I examine which values and knowledges are embedded by whom and for what purposes.

This project is also a practical application of STS theory to the fields of IT and education. My exploration of values embedded in simulations follows the work of Langdon Winner, Richard Sclove, and Douglas Schuler. My pluralistic notion of
knowledges is shaped by Michel Foucault, Clifford Geertz, Donna Haraway, and David Hess. In my research, I bring these STS concepts as well as insights from the field of design to IT and education. To accomplish this goal, I use a variety of methodologies, including semi-structured interviews, participant observation, comparative usage, and content analysis, to explore the values and knowledges explicitly and implicitly embedded in educational computer simulations.

The policy implications of this work unite IT and education. My conclusions about the process of embedding values and knowledges into software have clear implications for IT policy. My exploration of the use of simulations in pedagogy has obvious relevance to education policy. The theme uniting these two threads is that decisions should be as conscious and collaborative as possible; new educational technologies should be evaluated according to how well they meet the desired pedagogic goals, and the embedding of values and knowledges into software should occur at the design-use interface.

• “The (Re)socialization of Technical Students: Integrating STS Perspectives Into the Pedagogic Design”, Atushi Akera, RPI

This paper presents a problem that is, in effect, the inverse of the problem addressed by others on this panel. Rather than dealing with the use of technology for pedagogy, this talk focuses on a radical pedagogic design suited to the socialization of IT professionals. The necessary pedagogic innovations draw quite directly from the dominant discourse in STS: the significance of social inclusion and exclusion in the technological design process; the challenges of inculcating an ability to “read” the complex sociotechnical dimensions of technology; a critical engagement with ethics as an instrument of professionalization; and most importantly, an understanding of the technical socialization process rooted in the ethnographic literature of science studies. This talk engages STS concepts not in the abstract, but in terms of the deep and
practical challenges of implementing these concepts in a concrete curriculum foundational to the IT profession.

The opportunity to pursue this work comes from an invitation to Rensselaer’s STS Department by the institute’s new undergraduate degree program in information technology. The principal concern has been to take students whose sole interest in information technology may be their initial exposure to computers, and to re-socialize them towards a broader vision of their profession. “Politics and Economics of IT” is the second course in a two-course sequence that constitutes an H&SS “core” required of all first year IT students at Rensselaer.

The principal pedagogic approach taken in this course is that of large-scale educational simulation. The strategy has been to produce a simulacra of the “silicon valley phenomenon,” but to constitute a subtly different social field in which students are required to engage a different set of assumptions about the proper constitution of the IT profession. Given the complexity of the pedagogic strategies used, specific connections to the STS literature will be reserved for the body of the talk. However, it can be said that the course draws on the students’ latent entrepreneurial interests, and asks them to accept a “faustian bargain” that requires them to engage with the notion of “social advocacy.” This opens the space for complex social analyses that demand simultaneous engagement with the social, cultural, political and economic dimensions of information technology. The course is team based, and is designed to ingrain social analysis as a student’s disciplinary practice.


The use of course management systems (CMS) in the higher education setting is quickly and steadily increasing. At the same time, the organization of higher education is in a period of enormous transition. CSM use is booming; the university is evolving; yet discussions about the relationship between these two
phenomena are rare. While extremely general connections have been drawn between changes in educational technology and changes in advanced learning organizations, too often, specific technologies such as CMS are considered apart from the larger context of higher learning organization. This disjointed approach to understanding CMS technology seems problematic, especially since the dramatic increase in adoption of these new technologies is occurring during a particularly dynamic transitional moment in higher education history.

One might address this problem by analyzing CMS in terms of their relationship to the changing organizational structures of higher education. Yet finding an appropriate model for such study is challenging. A handful of experts writing generally about educational technology have begun to shift their view from a transmission view of technology to a constitutive view and have started to emphasize the importance of the social context of technology (Smith). Though these kinds of discussions represent an important shift for educational technology literature, they touch only the outer edges of these issues and leave readers hungry for specifics. More in-depth studies do exist that describe a constitutive relationship between technology and organization (Barely, Beninger, Orlikowski, Poole and DeSanctis). This communication technology research, however, has concentrated on studying technologies in for-profit business settings and has not considered education-based technologies such as CMS.

Hence, current models are insufficient for studying CMS as they relate to higher education structure. In this session, I will present a possible alternative to current study models. Rather than a completely original framework, the model represents a marriage of the theories of two well-established scholars: Wanda Orlikowski and Burton Clark. I invite those interested in the relationship between technology and organization processes, in general, and in the higher education context in particular, to dialogue with me about the analytical framework I have developed and to collaboratively analyze an enactment case from the higher education context.
Senior citizens are not the first group to start utilizing Information and Communication Technology (ICT). Thus there is a danger that they will be excluded from the growing information society. At the same time it is obvious that ICTs creates new possibilities for raising the quality of life for a lot of old people.

In a Danish program financed by the Danish Research Agency, six local experiments are trying out the possibilities of utilizing ICT to fulfill the needs of old people. Many ideas are to be tested. Some of these experiments are dealing with e-commerce, others with democracy and others again with flexible work for the retired person. The experiments thus represent a variety of application areas for ICT and senior citizens.

The paper will present the program and study of it. Finding solutions to difficult problems by making social experiments is a part of the Danish tradition. The paper will position the program for elderly and ICT in this tradition just like it will discuss the implications of the direct participation of the elderly in social experiments like this.

The experiments are supposed to have a long-term effect on the diffusion of ICT to senior citizens in Denmark. The paper will discuss whether or not the Danish government gets value for money by financing a program like this.

• “Learning to Design in Use? Examining the Social Learning About a Technology After its Implementation”, Sampsa Hyysalo, U of Helsinki
Both innovation and diffusion processes are typically dependent on a stream of improvements in the new technology that follow from its modification and adaption to suit the requirements of various users and sub-markets (Rosenberg 1979). This process depends on the ways the designers and users manage to learn from one another. And also, how they manage to turn their complementary perspectives into improvements to technology and development in the practices of use. Sörensen (1996) and Williams et al (2000) call this process social learning. But what are the mechanisms through which this learning takes place or fails to do so?

This paper studies a case of learning and interaction between designers and users in the development of a health-care innovation, after its market launch. While the case lends support for the textbook wisdom about the importance of the mutual learning, it draws our attention to the tensions and prerequisites for learning between designers and users. The issues of trust and power feature alongside the more "practical" concerns: the ways, means and tools that allow them to learn from one another. Most of the interaction and learning between the two took place in rather unfavourable circumstances and alongside other concerns, such as bug-fixing, assembling, maintaining and struggling to operate the technology. The case allows us to specify some of the mechanisms that hindered or promoted the mutual learning in these arrangements.

The case also draws our attention to the power of the resistance of users in shaping new technology: the company’s original mass-production and fool-proof design logic had to gradually give away to making the products customisable and made them emphasize use in their design considerations. Achieving a successful mass-produced good may require significant amounts of co-design and adjustment with users that initially run contrary to many aims to standardize it.

- "Frail Users - Invasive Technologies", Marjo Rauhala and Ina Wagner, Vienna U of Technology
In this paper, we will discuss the ethical aspects of (setting up) user participation in technology development by using two case studies from the field of assistive technology design. In constructing the discussion we will rely on the discourse of ethics and ethical principles and the notion of participation as defined in the tradition of participatory design.

User participation in the development of assistive technologies is of interest from the point of view of ethics for a number of reasons. On one hand, the users, the well-being of whom assistive devices are intended to improve, are often frail or vulnerable. On the other hand, the assistive devices – their use and development together with users – can be invasive. These reasons place developers under a special duty to act responsibly toward users. Furthermore, participation of users in technology development is itself an ethical and a political issue, as it has to do with empowerment of users who tend to occupy a weaker position in society.

Apart from the necessity of involving users as 'experts of needs and context', it is important that they develop a sense of 'ownership' of a system. More specifically ethical issues emerge in the methods and timing of user participation (which part of the trajectory?), selection of users (who is allowed to participate?), and the test design in general.

To illustrate the ethical aspects of user involvement in assistive technology design, we will refer to two case studies, a computer interface – a mouth-held mouse - and an intelligent toilet. The cases illustrate the (ethical) significance of dealing with

- the invasiveness of the technologies under development – how to deal with situations that may create embarrassment and distress

- the fact that technology production and use are connected to different systems of valuation – participants' interests, perspectives, and gratification systems may differ largely
• the question of adequate methods – e.g. the problems for technology designers to understand the value of video observations (in contrast to anthropometric measurements)

• the fact that the users often will not be the immediate beneficiaries of the technologies to be developed

• and questions of the 'good life' (in terms of trust, transparency, privacy and confidentiality, control, etc.) and the 'good professional' (how to cope with conflicting valuation systems, set priorities, how to recognize ethical aspects in one’s work.)

• “Participation”, Brian Haven, Carnegie Mellon U

Historically the focus of design practice has been concerned with creating visual forms of communication and physical objects. In the past decade, design has moved beyond these issues of styling and has directed its attention to supporting interaction, focusing on what activities or actions the communication or object enables. Recent trends, such as the open source software movement, public exposure of hacking, and customizable online gaming, have suggested that products and systems can be designed beyond interaction to include and facilitate participation. There are important questions regarding what constitutes participation and how it can be enabled through design. The answers to these questions could radically transform design practice.

As westerners we are often defined by our interactions with products, which include physical artifacts, services, systems, and environments. As social beings we interact with other people as individuals, as groups, and as cultures. Products typically mediate these interactions, constructing and defining how they will take place. Participation, as a construct for interacting with products and interacting with people through products, has the potential to alter how we exist as consumers and social beings. But, as designers, we need to identify the
characteristics that mark the distinction between interaction and participation. What meaningful attributes elevate the interaction to a higher level - expression, critical thinking, creativity?

Levels of interactivity vary amongst products. The simplest interactions are based on the functional uses or aesthetic responses to the product. More complex interactions occur when individuals take advantage of the flexible or modular capabilities of a product, modifying it to meet their specific needs or desires. In some cases unintended changes are forced on a product. These modifications are typically influenced by the behavior of social groups or are embodied in a counter culture.

We believe that certain product characteristics make participation more purposeful and meaningful than interaction. In our paper we will explore this distinction by identifying the characteristics that support each. We will also present research on products that use flexible or modular platforms intended to accommodate change by the people who use them. Finally, we will discuss the implications of these findings within the design discipline.

- “From ‘Two Cultures’ to Many: The Trouble with Conversation in Computational Social Modeling”, Jessica Turnley, Galisteo Consulting

C.P. Snow coined the phrase, ‘the two cultures,’ in his well-known discussion in 1959 of the communication gap between those engaged in mathematics and humanities. Nearly half a century later, E. O. Wilson points out in Consilience (1998) that profound discontinuities still exist in the discourse structures of the natural and social structures. The emerging field of computational social science underscores these discontinuities as physicists and biologists work on interdisciplinary teams with social and behavioral scientists to create useful models of human behavior. Different philosophical and methodological premises
are expressed through model architectures, data structures, and general vocabulary. Compounding the problem is the increased number of ‘cultures’ acting in this environment. Computer scientists must be on the team, as the tool requirements often push the boundaries of current capabilities and/or approaches. A wildly heterogeneous user community also is present in the conversations, for the models and their outputs can be applied in environments as diverse as military operations and business strategic decision-making, and users may be computer novices or highly technologically literate. This discussion will examine some of the difficulties of constructing this new dialogue, using as a case study an interdisciplinary effort at Sandia National Laboratories that focused on the development of a model to help understand the emergence and persistence of extra-legal violent groups.

6.7 STI Indicators and Changes in Science Practice and Policy

Sub-Panel 2

Morningside Room

- “Institution-Technology Interactions in IT Policy: The case of US Supercomputer Policy”, Juan D. Rogers, Georgia Institute of Technology

Recent large scale information technology developments, such as the Internet and supercomputers, are not only heavily reliant on government support due to conditions of market failure. They are also tightly coupled with actual institutional arrangements as far as the shape of the actual technologies is concerned. It has already been shown how the Internet architecture was shaped by social networks and organizational values as they were built into software design and implementation.

In this paper, we present the recent evolution of supercomputer policy and development. The set of actual design choices in supercomputing is tied to the
ability of the institutions of science and science policy to coordinate in ways that go beyond simple division of labor. It is well known that supercomputer architectures use computing techniques that mirror the problems that they will be used to solve. When the set of problems diversifies, the architectural solutions diverge. Large scale scientific problems tend to span the concern of many government agencies so they are unable to pursue a single technological path. However, both costs and the institutional relations with computer vendors constrains agencies’ flexibility in pursuing multiple paths. As a result, actual technological solutions and technology policy are deeply intertwined. The United States is still searching for technological and policy solutions to this problem.

- “Web Indicators? Potential and Limits of a New Generation of STI Indicators”, Andrea Scharnhorst, KNAW

Science is turning to e-science. E-science is understood as scientific and scholarly research that is dependent on the use of information and communication technologies and computer networks, both in its daily research practice and in its information and communication processes. An increasing part of on-line scientific communication and research is not (or only incompletely) visible via traditional S&T indicators. More particularly, the first results of the WISER project (Web indicators for Science, Technology and Innovation Research, funded by the EC) will be presented. The objective of this project is to explore the possibilities and problems in developing a new generation of Web based S&T indicators. By presenting results of different subprojects of WISER, such as the invisible web project or the web page persistence project the process of developing indicators based on web data is problematised.

The aim of the paper is to present a state-of-the-art overview of different initiatives in the emerging field of cybermetrics and webometrics which use web data to monitor scholarly activities. Web indicators should produce information about the following: visibility and connectivity of research centres forming a
common EU research area; innovations and new research fronts in e-science; about equal rights, access and participation in e-science according to gender and regional dimensions.

The presentation introduces the theoretical and methodological framework for Web data collection and analysis. Several promising approaches are suggested for improving the sampling of websites, including larger coverage, better description and the creation of more error-free statistics. The presentation will elaborate a number of definitions of novel concepts and illustrate them with results from the Wiser projects.

• “How is Meaning Codified in Networks of Words Representing “Stem-Cell Research”, its Applications and Relevant Policy Debates”, Loet Leydesdorff, Amsterdam School of Communications Research

"Stem-cell research" has become a subject of political discussion in recent years because of the social and ethical implications. However, the scientific research program has a history of several decades. Therapeutic applications and patents on the basis of stem-cell research became available during the 1990s. Currently, the main applications of stem-cell research are found in marrow transplantation (e.g., for the treatment of leukemia). In this study, I examine the various meanings of the words "stem cell" in these contexts of research, applications, and policy debates. While the case can be considered as an instantiation of the Triple Helix of university-industry-government relations, the study itself provides an exercise in automated content analysis. The word frequencies are normalized and the codifications can then be visualized.

For theoretical reasons one expects two types of codification: (a) the codification from common language to specific (e.g., scientific) jargons, and (b) the codification from variation by reflexive selection in both the scientific and non-scientific domains. We found both these processes ongoing, but in directions different from the expectations. Although Internet search engines were expected
to provide us with the widest form of variation, we found that the variation in scientific databases like the 'Science Citation Index' and 'Medline' was even higher than in the data generated by using 'AltaVista'.

Newspapers can be expected to provide the readership with "story lines" that reduce the uncertainty. Both the patent database of the USPTO and 'Social Science Citation Index', however, were almost twice as specific in the selection of title words as the newspapers under study (the 'NYT' and the 'Guardian'). The extreme difference between 'Science Citation Index' (representing variation) and the 'Social Science Citation Index' (selective codification) was unexpected. Furthermore, translation mechanisms between contexts can be specified when selections from the knowledge base are made within the documents under study (e.g., title words in scientific references of patents). A quantitative indicator for the degree of codification in the networks of words is proposed.

- "The Intellectual and Social Shaping of Scholarly Communication on the Web", Jenny Fry, Netherlands Institute for Scientific Information

Current understanding in research into scholarly communication indicates that a range of intellectual and social conditions will influence the uptake and use of computer-mediated communication (CMC) technologies. Comparison of these factors across scientific fields is problematic due to the multi-faceted nature of disciplinary cultures. For example, Whitley (2000) explains the heterogeneity of scientific fields on the basis of differences in levels of 'mutual-dependency' and 'task-uncertainty'. In the development of his theory Whitley does not specifically address patterns of mediated-communication, whereas Kling, Spector and McKim (2002) focus on cultural difference from the perspective of scholarly models of publishing. Current understanding lacks an explanatory framework of the cultural conditions that shape scholarly communication 'on-line' due to the gap between systematic sociological studies of disciplinary cultures that
investigate process and studies of scholarly communication that focus on final products.

The paper will be developed on the assumption that in order to understand how cultural factors influence patterns of scholarly communication it is necessary to first develop a sociological understanding of the intellectual and social organization of a field. Followed by examination of the predominant modes of communication in that field, including those that are used for the pre-production of scientific products, such as conferences. It will be empirically based using three case study fields within the social sciences and humanities. Data will be gathered using interviews and on-line observation techniques. It will take the ‘off-line’ world, e.g. research schools, professional associations, conferences and journals, as a basis to investigate if and how each field is represented on the Web. For example, does the field appear as a top-level category for major Web portals such as Humbul (Humanities Hub)? Whitley’s (2000) broad ranging taxonomy of the intellectual and social organization of science will be used as an analytical framework to compare data across the case studies. Thus, enabling the development of a conceptual understanding of the disciplinary shaping of ‘on-line’ scholarly communication that is grounded within empirical data.

6.8 Emerging Technoscience, Emerging Law

Michael Fortun and Jean Francois Blanchette

Crown Room

- “The Law of Emerging Technologies”, Michael G. Bennett, RPI

Increasingly, traditional governmental functions are being out-sourced from the state to non-governmental organizations (NGOs). These organizations now perform as surrogate governments in areas as diverse as social welfare, primary education, prison management and policy-making. One significant outcome of
this transition is the partial exclusion of these functions and their effects from the review of legal regimes, the traditional state’s main mode of governance. This trend is particularly pronounced with respect to emerging technologies. Increasing complexity, abstractness, potentially significant economic value and, hence, geopolitical influence, simultaneously nudge these inventions beyond most critical legal frameworks and into the lap of economically driven legal protection schemes largely devoid of any critical capacity.

Even when technological controversies reach the relatively independent federal courts, entrenched traditions of technological optimism, determinism and progress at play there make it unlikely that the court system, under the sway of current legal precedents and policy, will be an active tool for critical engagement with emerging technologies.

This paper will further explore interpenetrations of legal regimes and emerging technologies and, focusing on nanotechnoscience, the growing influence of NGOs as surrogate sources of governance of the technologically novel.

• “Institutionalizing Toxicogenomics, Merging Scientific and Legal Initiatives”, Kim Fortun, RPI

Toxicogenomics aims to understand the impact of environmental stressors on an entire organism, through genomic level analysis. Toxicogenomics utilizes new technologies such as the microarray. Toxicogenomics is also utilizing a range of legal mechanisms to spur its development, largely through the direction of the National Institute of Environmental Health Sciences (NIEHS). NIEHS has made collaboration between universities they fund a contractual obligation, for example. NIEHS is also working to establish legal mechanisms (such as “safe harbor” provisions) that will encourage corporations to contribute in-house toxicological data to a public database. This paper will describe and examine such initiatives to develop supporting legal mechanisms for toxicogenomics. The paper will also map the “downstream” legal challenges and opportunities that
have been anticipated by scientists, by lawyers and bioethicists and by environmental health activists.

- "Giving the Lie to Polygraphs", Hugh Gusterson, MIT and Georgia Tech

The perfectly scientific lie-detector test has always been a fantasy of the American national security state. In the 1950s scientists were secretly funded by the CIA to experiment with LSD, psilocybin and marijuana as truth drugs for use in interrogations. Recently some scientists have expressed the hope that PET scan technology might offer the perfect lie-detector test. In the meantime, the national security state uses polygraphs as its preferred method.

Polygraph tests function as old-fashioned interrogations adorned with scientific trappings. Skilled polygraph administrators concede that they are more useful for breaking a subject's will than for the determination of truth, and that the efficacy of polygraph tests lies in the psychological relationship between interrogator and subject, not in the nature of the testing equipment. Some have said that polygraph tests have a 20% false positive rate, for example.

Polygraph tests have become newly controversial since the Clinton Administration decided to greatly expand their use in response to allegations of Chinese espionage at American nuclear weapons labs. Nuclear weapons scientists have organized petition drives against their use and the National Academy of Sciences has been enlisted to investigate the tests, which it has condemned as lacking in scientific merit. Nonetheless, use of the tests persists. How do those in favor of polygraphs marshall partial scientific evidence, transmuting the art that goes into their interpretation into an apparent science? Why have those opposed to them had so little success in portraying them as unscientific despite the impressive scientific authorities who agree with them? And on what grounds might constructivist academics in science studies condemn them?
By the late 1990s, policy debates over genetically modified (GM) foods became the center of international tensions over trade, characterized by Europe’s generally more critical attitude towards biotechnology than that of the US. As European nations began to impose trade-barriers on the unpopular products, disputes between US and European government officials spilled over into international trade arenas, culminating in the opposing rationales of the US’s “sound science” and Europe’s “precautionary principle”. While many attributed the standoff to irreconcilable cultural differences, that Europeans were “risk-averse” and Americans “risk-prone”, one had only to look to the 1970s NIH moratorium on recombinant DNA research to find the roles reversed, with US scientists responding to uncertain risks with “undue” precaution. How did such a policy reversal in the US regarding genetically modified organisms come about? This paper examines four phenomena, which led to the shift in the US from precautionary concern over GMOs to an enthusiasm back by “sound science”: 1) a shift in the political atmosphere surrounding scientific research in general, from the 1970s anti-war distrust to a 1980s global economic technology imperative, 2) in the wake of the rDNA debates, lingering frustrations and sensitivities of US scientists and officials regarding the encroachment of public debacle into scientific controversies, 3) the continued lack of observed hazards—despite increasing use and release—that became the de facto “evidence” for the safety of rDNA products, and 4) the post-Asilomar acceptance of the molecular characterization of rDNA products as “substantially equivalent”, despite remaining uncertainty. Meanwhile, political movements in Europe took an
opposite path regarding genetic technologies, food safety, agriculture and the environment, resulting in a standoff with the US in the 1990s. The confrontation between “sound science” and the “precautionary principle” was temporarily resolved by favoring consumer choice, in the form of labeling GM foods, while acknowledging that there remains no solid proof of risks associated with them.

- “Cultural Dissent and Bergmanesque Tents”, Lena Eriksson, Cardiff U

Is scientific dissent managed differently in different cultures and under different employment conditions? This Science in Society project is studying scientists working with GM foods in Britain and Sweden and how their presentation of 'laboratory self' appears to vary, despite identical material settings and a shared culture of aims and accreditation.

- “Dissident Science in Agricultural Biotechnology: The Discovery, Controversy and Significance of Transgenes”, Jason Delborne, U of California – Berkeley

In 2001, David Quist and Dr. Ignacio Chapela of the University of California, Berkeley published an article in Nature (November 29) that made two dissident claims: 1) that native landraces of maize in Oaxaca, Mexico had been contaminated with transgenic DNA elements, and 2) that the patterns of genomic contamination suggested a higher instability of transgenes than of normally occurring genes. A controversy soon erupted over both the significance and integrity of their work. Debates exploded onto scientific listserves, at international meetings on biodiversity, within the Mexican government, into the popular press, and back into the pages of Nature. Nature’s editors even withdrew support from the original article on April 4, 2002 without calling for a retraction, an unprecedented act in the journal's history. A review of publicly available documents and interviews with Quist, Chapela, and several of their published
critics shed light upon both the construction and impact of dissident science in agricultural biotechnology.

This paper engages three bodies of STS theory to analyze this controversy. First, to what degree do Fleck’s “thought collectives” and/or Kuhn’s “paradigms” explain the lack of constructive communication between dissident scientists and their critics? Chapela and Quist argue for the establishment of a new field of “transgenic ecology” while their critics locate such research within traditional domains of microbiology and plant genetics. Second, engaging social worlds theory, how do various aspects of boundary work combine to push this controversy beyond normal scientific communication? Boundaries that separate good science/bad science, genetic pollution/normal gene-flow, biased research/objective knowledge, and transgenic/natural all are contested and serve to locate this particular moment of science in larger political controversies of regulating GMOs. Third, the paper organizes scientific and political conflicts in this case as contested representations at different scales.

This paper aims to explore the possibilities and paradoxes of dissident science in agricultural biotechnology. Is it a useful characterization of participants in a scientific controversy? Does it signify unjustified political bias or ethical professional conduct? Who constructs, or attempts to construct, the boundaries around such dissidence, and how do these boundaries affect both the production of knowledge and the use of science in policy formation?

6.10 Articulating Ethics in and of Science and Engineering

Savannah Room

- “Agoral Gatherings, ELSI-fication and Genetic Modification”, Sally Davenport, Victoria U of Wellington and Shirley Leitch, U of Waikato
The ethical, legal and social implications (ELSI) of science were introduced as a new component of scientific funding with the Human Genome Project funded by the Department of Energy and the National Institutes of Health in the USA. It has become institutionalized in these major funding agencies such that all programmes must now have an ELSI component. The ELSI acronym has come to stand for the increased participation of ‘society’ in science and also that social science and humanities understandings can be brought to bear on issues of science in society. Nowotny et al. (2001) argued that science is moving from a culture of autonomy to a regime of greater accountability such that “society has begun to speak back to science” and that this took place in the ‘agora’ (a term borrowed from Ancient Greek political life) described as “the new public space where science and society, the market and politics, co-mingle”.

In New Zealand, the ELSI-fication of science increased greatly in the last decade primarily because of the rise in biotechnology and genetic modification initiatives. The introduction of the HSNO (Hazardous Substances and New Organisms) Act in 1996 and the creation of the agency ERMA (Environmental Risk Management Authority) are key examples of this process. High-profile GE related events such as the deformed salmon case (eg Weaver & Motion, 2002), ‘eco-vandalism’ of research crops and an application to ERMA for approval for research on inserting a human gene into a cow, stimulated calls for a societal debate around genetic modification. The resultant Royal Commission on Genetic Modification of 2000/2001 triggered probably the most widespread voicing of ELSI concerns and societal consultation about a scientific issue in New Zealand’s history. Using this example of ELSI-fication and the facilitation of an apparent ‘agoral gathering’ (Biela, 1989) this paper will attempt to shed some light on the concept of an ‘agora’ as it applies to science and society in New Zealand.


- “Reporting Cloning: Journalists Perceptions About the Relationships Between Science and Society”, Carrie Friese, U of California – San Francisco

There is growing scholarly interest in the diverse meanings that scientific knowledge and practices have to different peoples. In order to better understand how the meanings of technologies are produced, contested and constrained within power differentiated fields, it is important to interrogate the role of the media in representing the meanings that science and technology holds for some of these groups. Using the reporting of therapeutic and/or reproductive cloning as a case study, this project examines how reporters in the print media go about researching and writing stories on cloning. In addition, it investigates how they understand their role vis-à-vis scientists and their readership with regards to controversial science. In other words, this paper examines how print news reporters understand their role within the debates surrounding cloning as well as how they produce representations of these debates. This paper is intended to interrogate the ways in which reporters try to unravel the politics of doing cloning, and thereby link science and society. I am specifically interested in how bioethics operates as a platform through which certain types of science can be popularized. I will situate this analysis in the context of growing critiques that bioethics works to reproduce the status quo. I conclude by questioning how the popularization of science via bioethics shapes notions of cultural citizenship in the current historical moment.
• “Agency and Professional Responsibility in Science and Engineering Research”, Rachelle D. Hollander, National Science Foundation

This paper tries to integrate philosophical work on agency and responsibility with work in science and technology studies and applied ethics, to explore issues of professional responsibility in science and engineering research and issues of research ethics. Concepts of collective agency and collective responsibility are useful in explaining how professional responsibility creates boundaries for what is viewed as appropriate professional behavior. They are also useful in explaining how those boundaries can be overcome.

• “Regulating Stem Cell Technology in the Netherlands”, Loes Kater and M. Kirejczyk, U of Twente

The use of human (embryonic) stem cells to replace damaged cells and tissues promises future hope for the treatment of a variety of diseases. Often mentioned diseases in this context are Alzheimer’s disease, diabetes, heart disease and Parkinson. Developing knowledge about differentiation processes is complicated by ethical concerns over obtaining human embryonic stem cells from early human embryos or aborted fetuses.

Medical-ethical controversies like stem cell technology are debated amongst a variety of actors. Every debate has its own trajectory and path dependency for the issues raised. One general pattern in such paths is how experts are called in for advice. Experts can claim certain aspects of the debate (health risks, research concerns or issues like the status of the embryo) and therefore influence the regulation of an issue. Of course this need not to be the only general pattern, but it is definitely a recurrent one.

The main purpose of this paper is to give insight into the dynamics of ethics in regulating stem cell technology in the Netherlands. The framing of ethics in the debate on stem cell research is like a shifting balance. Ethical boundaries, for
example a definition of the status of the embryo (biological, religious), can be reinterpreted if new developments augment promising expectations. At this stage the Dutch debate on regulating stem cell technology is mainly the province of researchers (biologists, geneticists, embryologists). The creation of arguments about whether the Dutch government should legitimize stem cell research is the work of these actors. I will analyze the consequences of this particular influence on the ethical framing of the debate on stem cell technology.

LUNCH

Race and Transnational Politics  12:15-1:30 PM

Fulton Room

Session 7:  1:30-3:15

7.1 Indian Science Between Traditionalism and Transnationalism

Kavita Phillip

Georgia Room

•  “Constructing Futures: Science and Tradition in the Work of Ashis Nandy”, Srikanth Mallavarapu, State U of New York – Stony Brook

Starting with the publication of Alternative Sciences in 1980, Ashis Nandy has offered a sustained critique of science in the postcolonial context. In addition to exploring questions of “creativity and authenticity” in figures such as Jagadis
Chandra Bose and Srinivasa Ramanujan, Nandy has offered a critique of the way science is implicated in the violence and authoritarianism that he associates with the modern nation state. Nandy’s rejection of science has to be situated within his larger project that attempts to challenge the project of modernity through a creative (and critical) rereading of tradition. While acknowledging the significance of Nandy’s work, Dipesh Chakrabarty in a recent essay has pointed to the problems that arise with the assumption that we can use tradition in a “voluntarist or decisionist” manner. In another critique, Meera Nanda has argued that given the rise of Hindu fundamentalism in India, it is important not to uncritically privilege “tradition” at the expense of science. This paper examines Nandy’s work on the negotiation of modernity and science in the context of these debates.

- “Mobility of Asian Indian Scientists/Engineers between the United States and India”, Roli Varma, U of New Mexico

Debates over the new immigration, or immigration from non-European sources, of scientists/engineers to the United States focus on the extent to which new immigrants take highly skilled jobs away from Americans or whether high-technology companies lay off native scientists to hire foreigners in order to maximize profits. Recently, some scholars have begun to focus on the existence of a “glass ceiling” that impedes upward career mobility for new immigrants in science. Most studies have yet to explore the complexities/contradictions associated with the presence and experiences of new immigrants in science and engineering occupations.

I present findings from a qualitative-quantitative study, funded by the National Science Foundation (SES-0136467), on the situation and experiences of foreign-born scientists/engineers from India in the United States. I focus on the factors, which prompted Indian scientists/engineers to migrate to the United States as well as factors, which led some of them to move back to India. The paper is
based on in-depth interviews with (i) over 65 Indian scientists/engineers in the
United States from a centralized research lab, two national labs, and ten
research universities; and (ii) almost 40 Indian scientists/engineers who worked
in the United States for some time and then moved back to India.

Historically, there have been more Indian scientists/engineers moving to the
United States and few returns from the United States. A study of factors that
prompted Indian scientists/engineers to migrate to the United States, and linking
this to the factors that prompted them to return to India will give new insight on
new immigration.

- “Stories About Technology Transfer”, Mithra Moezzi, Lawrence Berkeley
  National Laboratory

Within international development circles, thousands of unofficial stories circulate
that tell what “really happened” in technology transfer projects. They relate, for
example, how and why transfers went wrong: why the allegedly improved cook
stoves brought in by a government program lie broken and discarded, why the
solar-powered well pump hasn’t worked for years, and so on. For example:

"A development team assisting in rebuilding dwellings after the 1993 Gujarat
earthquake used a participatory process to design geodesic domes of chicken-
wire and microconcrete. The domes were inexpensive, easy to build, strong, and
relied on locally available materials. The execution appeared successful. Upon
return visit some months later, however, observers discovered that nobody lived
in these houses. Hindus wouldn’t use them, given the dome shape that was
associated with mosques and thus Moslems. Moslems used them only as
storage spaces, finding the curved walls unworkable for arranging furniture and
producing a livable space, given the tradition of rectangular walls." (Prasad
Vaidya, personal communication, February 2003. Heard from Alejandro Salazar,
January 2003.)
Such stories focus on disjunctures between theory and practice and provide social and technical explanations for these disjunctures. They are crucial counterparts to official discourses, which have highly political agendas to satisfy. I will present illustrative examples of stories about technology transfer and will analyze them along two dimensions. First, I use them to reflect on the idea of transferring “socially constructed” technologies, developed in and for one set of social, environmental, and technical conditions but placed, with limited adjustments, into a very different situation. What do technological objects and systems bring with them, what incompatibilities do they rub against, and with what result? How are these assumptions ingrained in design, planning, and policy, and how is information about them conveyed or hidden? Second, starting from Merton’s concept of “unanticipated consequences”, I argue the theoretic importance of stories about technology as one of the most widespread and interesting mediums for containing and expressing ideas about technology, its meanings, and its effects, and show the benefits of a folkloristic perspective in examining such stories.

- “Science Weighs In: Race and Caste in India”, Banu Subramaniam, U of Massachusetts

The World Conference Against Racism, Racial Discrimination, Xenophobia and Related Intolerance was held in Durban, South African in 2001. Dalits, a group of oppressed minorities in the class system wanted to bring the case of caste discrimination to the international conference. They argued that the Indian government must be held accountable and that the matter needed international attention and monitoring. The Indian government disagreed. They argued that caste was not race and therefore, ought not to be discussed at the UN conference against racism. In keeping with the long history of scientific studies on race, science weighed in on this occasion. A recent study has reported just a few months before that suggested that upper castes in India were more closely related to Europeans and lower castes more closely related to West Asians. The
DNA evidence also suggested that unlike men, local women were able to move up the caste ladder by interbreeding with men of upper castes. Dalit groups used the scientific evidence to argue, that contrary to traditional claims, caste was analogous to race and therefore merited a hearing at the World Conference. Intellectuals on both sides of the case joined the debate. Some argued the position of the government, others the position of the Dalits, and yet others that while caste discrimination was a horrendous practice, we must be intellectually honest and not confuse "race" which was already a biologically dubious concept by equating caste with race. In this paper, I will explore the contentious history of race and science and what this history has to offer our understanding of recent debates on race and caste in India.

7.2 Media Meets Technology: Thinking Through Media Technology Studies

Pablo J. Boczkowski, MIT and Fred Turner, Stanford U

Sub-Panel 3 - Experiences

Ardmore Room


In this paper I draw general lessons from my on-going study of the evolution of the electronic music synthesizer (see, for instance, Trevor Pinch and Frank Trocco, Analog Days; The Invention and Impact of the Moog Synthesizer, Harvard U. Press, 2002.). The development of the first commercial synthesizers in the 1960s heralded a new dawn in the production of electronic music and sound effects. New machines were introduced, new sorts of sound were made, and users had new sorts of listening experiences. I will review the general themes from technology studies that have informed my work and argue that we
need some new ideas to explore how identities of machines and people are transformed in the course of developing and using these new instruments.

• “Becoming Digital: How Media Technology Inspires The Posthuman Imagination”, Timothy Lenoir, Stanford U

This paper offers a case study of current developments related to radio frequency identification (RFID) tagging of physical objects, the embedding of these tags in nano devices, such as MOTES, and their potential for being embedded in the environment (human and natural). These technologies will enable hand-held devices, cell phones, and other communications devices to read web links attached to physical objects, a development which will create the possibility to surf reality. I intend this case study material to provide an occasion for exploring how media technologies are reshaping our environment as well as our perceptions of both physical nature and ourselves. Specifically I will explore the convergence of market forces, agreements on standards, technological development and the cultural imaginary in shaping the acceptance of the world and ourselves as digital.

• “Independent Media Technology and Activist Identity: Microradio in Philadelphia”, Christina Dunbar-Hester, Cornell U

This study is based on ethnographic fieldwork on independent microradio producers in Philadelphia, viewed from a Science & Technology Studies and anthropology of media perspective. [Because this is at present a work in progress, this abstract is presented in the format of research questions rather than conclusions.]

The study examines the history and present of this group, a grassroots network of radical activists using combination of Web and low wattage FM broadcast technology (together, “microradio”); the current group is engaged in legal broadcast activity, but had grown in part out of a pirate radio group who were
active in the mid-1990s. The actors’ backgrounds in relation to both broadcasting and activism are considered: what gives the actors their sense of identity or alterity with regard to the technologies they employ? Are they first activists, to whom the technology by which they transmit their message is incidental? What other media technologies do they employ? Does the (il)legality of the activity make a difference in how they perceive themselves and their activities? How is identity performed in this context? How is identity conceived of, both in relation to use of technologies, and in relation to questions about critical intellectual agency/relationship of these actors to the mainstream and their ideological position as a dissenting or challenging one?

Another aspect of the group under consideration is the sense of community these actors have or imagine, in relation to both other activists and the perceived audience(s) for these transmissions. What is these actors’ sense of place or locality (because the Web is potentially so ‘connected,’ while microradio broadcasting is necessarily quite bounded)? What are their purported ideological reasons for their activities, e.g. democratic participation and making media more democratic? As they have been doing broadcast radio transmissions for a long time, what do they feel are the implications for the range of possibilities offered by the Web?

- “Communication Technologies and Modes of Communication”, Susan J. Douglas, U of Michigan at Ann Arbor

Communications technologies have especially evoked deterministic predictions and assessments about their ability to alter individual behaviors and institutional structures. At the same time, historians and sociologists of technology eschew technological determinism, at least the “hard” version that simplistically asserts that machines make history on their own. Debates have thus ensued about how much television, say, on its own, has forever altered American politics or email has altered the workplace and created virtual relationships that sometimes
supplant familial or other face-to-face relationships. In my own work on radio, I have argued for, I guess, a somewhat “soft” determinism when it comes to changing radio technologies and the extent to which they evoked and cultivated different modes of listening among the audience.

In this panel, I propose to summarize my own thoughts on the relationships between evolving radio technology and cognition, and to use that framework as a jumping off point for collective discussion and brainstorming about how communications and technology studies scholars can most fruitfully theorize about the dynamic relationships between different communications technologies and changing modes of interpersonal communication, reception of mass communication, and the construction of imagined communities that these different technologies make possible. In particular, I’d like to provoke comparisons between radio and the Internet. I am especially interested in exploring where scholars see themselves now in the ongoing debate about communications technologies and determinism.

- “Cyberspace: The Local History of a Ubiquitous Metaphor”, Frederick Turner, Stanford

In 1984, novelist William Gibson coined the word “cyberspace” to describe an array of data ringing a world dominated by highly centralized and brutal corporations. Less than ten years later, the metaphor of “cyberspace” emerged as an emblem of a decentralized, personally and collectively liberating marketplace. Cyberspace, to this new way of thinking, was in itself already such a market, and it was about to transform those material markets around the globe with which it intersected.

Drawing on archival research and interviews with John Perry Barlow, Stewart Brand and others, this talk will trace the evolution of the concept of cyberspace in the San Francisco Bay Area from its early deployment in the Virtual Reality industry, through its use on the Whole Earth 'Lectronic Link (the WELL), to its
reconfiguration as a libertarian “electronic frontier” in the Foundation of the same name. The talk will pay particular attention to how Barlow and others linked their interactions with digital media to countercultural practices and political ideals. It will then show how these locally developed meanings were exported nationally and internationally. In the process, it will offer a model for thinking about the power of geographically localized networks and their local experiences of media technologies in the shaping of what otherwise might appear to be global discourses of socio-technical change.

7.3 Augmented Bodies

Lucy Suchman, Lancaster U and Ana Viseu, U of Toronto

Sub-Panel 3: Refigured Bodies

Sherwood Room

- “The Contemporary Data Subject and the Ethics of Information Storage”, Stuart Bailey, Knowledge Media Design Institute, U of Toronto

The language of privacy advocates gives us a definition of the contemporary data subject, describing it as the information that relates to an identifiable individual. That being said, the concept of the contemporary data subject is far from universally agreed upon. International laws protecting the rights of a data subject have developed over the course of the past three decades to provide legislators, business leaders and academics with a concept of how regulations and guidelines can be attributed to individuals. To date, we do have laws and guidelines that both describe and articulate what rights are covered under the concept of “data subject.” Simply put, a data subject is anyone to whom personally identifiable information is ascribed. But this doesn’t give a clear sense of how a data subject is embodied; the simple definition implies that we are nothing more than a list of events. If a body is a physical thing, the way your
body and my body is, then the physical thingness of the data subject’s body is its
textuality. A data subject lacks any 'real' body, however; the information
collected, stored and retrieved about an individual can nevertheless identify
someone the same way the physical characteristics of height, weight, hair and
eye colour or other physical attributes might. This paper is concerned with two
outstanding items begun by the privacy debate: first, how we know
(epistemologically) who we are as data subjects, and second, how the data
subject is embodied. Ultimately, the answer as to how we should apply ethical
standards to a data subject will be positioned in respect to this concept of the
data subject being just a list of events. Beginning with a background and
introduction on what the data subject can be considered to be, the argument will
then proceed in three ways. The introduction will be presented through three
perspectives: a) history, b) philosophy, and c) our every-day actions. The
examination of the problem, which will comprise the main body of the essay, will
be looked at through three lenses: 1) intentional participation in the world of
knowledge media, 2) explicit collection of our personally identifiable information,
and 3) what will be referred to as “implicit” collection of data. Each lens will have
three grinding stones: policy, narrative events, and market forces.

- “Engineering Perfect Beings”, Daniela Cerqui, U of Lausanne

In our so-called "information society" there are mainly two trends that coexist.

1) an increasing importance of mind, information and more generally immaterial
   elements, over matter and body;

2) a strong tendency to replace and improve everything human with artificial
   elements (for instance retina implants, artificial limbs or hip prosthesis) or through
   practices such as genetic engineering.

These tendencies could at first sight seem contradictory. But in fact, they are not
at all.
In the first case, information is directly considered as a value. Intelligence is supposed to be the most valuable element, whereas matter and bodies are considered as interferences.

In the second case, information is indirectly used: we try to create organized matter and this means that one has to know what we call the « informational code ».

In both cases, information is the most important element, which we have to master.

Such a point of view is not new. We already find it in Wiener's cybernetics. According to it, alive and not alive elements can be reduced to an amount of information. In other words, according to cybernetics, the essence of someone (or something) is not the result of the matter he (or it) is made of, but the way he (or it) is organized and their (or its) relationship with the environment. In Wiener's view, the world is made of « patterns », and each one is an arrangement characterized by its order more than by the intrinsic nature of its elements.

The relationship between the different elements of the whole are ruled by an informational code. The mastery of which should theoretically allow reproduction with other matter atoms. Thus, if you know the code, you become able to engineer what you want.

Many linked desires are present in these practices: mastery, perfection and immortality. By mastering information, we can master everything. Such practices aim at engineering a "perfect" human being, defined as predictable and infallible in his body as well as in his mind. Such a human being is supposed to be "better" than we are and could theoretically become immortal and, who knows, transform itself into a "post-human" being.

- "Grotesque Bodies", Sara Cohen Shabot, U of Haifa
The use of different figurations, for criticizing classic and modern philosophies in general and their concept of the subject in particular, is very common in postmodern theories. The aim is to bring up an alternative thought in which elements such as multiplicity, difference, corporeality, ambiguity, hybridity and fragmentation will finally find the place they were lacking within the frame of most Western philosophies.

The grotesque body can be a useful figure in describing the fragmented, abject and open embodied subject, and can therefore, I want to argue, be used as a complement to the figure of the cyborg. The reason for my arguing this is that the grotesque body seems to express a recognition of the (already) "non-closed" human subjectivity, of the open and connected-to-others embodied subject, even before it gets technologized under the figure of the cyborg. The cyborg accounts for the contemporary body that gets connected to the world by way of machinery and technological devices. The grotesque body grounds this connection on the very condition of human subjects: the embodied subject is open, fragmented and connected to the world and to others in itself, even before getting technologized and becoming a cyborg. I will also argue that the grotesque body helps to ground the subject in corporeality, gender and flesh, what in fact "protects" this subject from becoming again a "neutral", "de-sexualized", "de-gendered" subject. This kind of grounding on "fleshed-specificity" protects the subject (her/him) from a possible "escape" from embodiness and corporeality all together, as may happen within certain forms of the figure of the cyborg.

I believe that it is within the power of the figuration of the grotesque to shed new light on postmodern critique. Approaching the grotesque may be a new and creative way to contribute insights to postmodern thought in general and to the postmodern thought on the embodied-subject (and its philosophical and political implications) in particular.
This paper examines the integration of biotech and infotech in contemporary biotechnology research and application. This integration of genetic and computer “codes” has not only fueled various genome projects, but it also promises to revolutionize biology research, the pharmaceutical industry, and medical practice. At the center of this integration is the concept of “biological information,” in which information is both material and immaterial, culminating in online genome databases, and lab-grown tissues and organs – data made flesh, and flesh made data. The concept of “biomedia” is proposed as a way of understanding this phenomenon, in which biological components and processes are recontextualized through the lens of informatics. This leads to a condition in which the body is understood as informatic “source code,” and informatics enables the body to be “a body more than a body.” The effects of this view can be witnessed in three political contexts: the economic context of patenting, the ethnic context of population genomics, and the military context of biowarfare. Together these applications of biomedia produce a view of a “global genome,” in which the material and immaterial aspects of biological life is recontextualized in a range of instrumental ways.

7.4 “Social Studies of Models and Simulations”: Models and Simulations as Mediators in Scientific Practice

Catherine Hasse, U of Copenhagen, Erika Mattila, U of Helsinki and Martina Merz, EPF Lausanne

Discussant: Aant Elzinga

Sub-Panel 3

Fulton Room
"How will the terrestrial climate develop during the next decades" is a much-debated question in both science and policy. The answer will have extensive consequences for societal development. But answers can neither be gained by extrapolating the currently available overall data, nor can an answer be deduced from the basis of the fundamental physical mechanisms in the atmosphere, and their interactions with the geological and biological environment. These interactions, and their interdependencies are so complex that a theoretical solution that would describe their dynamics is impossible. Complexity makes predictions of the development of the global climate impossible. Because of the associated risks, an experimental approach is likewise out of question.

Computer simulations provide a solution to this problem. They have become the main tool in climate research. Moreover, simulation models are highly significant for many applications in industry as well as in policy. Therefore, it is important to know how reliable such simulations are and to investigate what strategies of validation can be observed. In literature there are different positions about the status of simulation models and the knowledge orduced by these models. The range goes from nothing new to a new approach between theory and experiment. The talks within this session want to concentrate on this topic and try to find answers about the epistemological status of simulation knowledge.

What is an adequate account of simulations? And what is the relation between simulating and modeling? In the current philosophical debate, the views on what would be the answer differ considerably. On the one side, it is claimed that simulation is a method mainly based on the capability of computers as number crunchers and that, consequently, there is nothing philosophically significant to
note. The opposed standpoint holds that simulations provide a conceptually new approach between experiment and theory.

In our talk, we will argue that simulations are not mere calculations yielding the properties of an underlying mathematical model. Rather simulations involve a further and characteristic modeling step they are models of the 2nd order.

We will consider the case of climate research, which makes extensive use of huge and complex simulation models. Its history exemplifies important conceptual insights into simulation modeling. In particular, N. Phillips’ “first experiment” of 1956, i.e. the first simulation of the general circulation of the entire atmosphere, was a stimulating success, both for climate research and for the simulation method. It established the status of “the basic physical equations” by showing “experimentally” that their implementation could reproduce the complex dynamics of the atmosphere. But in other respect, this computational experiment failed as the climate system got unstable after some (simulated) weeks. At first, this difficulty was conceived of as a minor problem of the numerical handling of truncation errors. But it turned out to be a deeper lying riddle that was successfully tackled only by A. Arakawa who proposed his discretization scheme in 1966, thereby enabling long-term integrations of the basic equations. Our main point will be that this major breakthrough was based upon a conceptual change. Namely, Arakawa’s modeling efforts did not aim at a more accurate calculation scheme that would be more or less deduced from the basic equations. Instead the construction of a simulation model was conceived of as a partially autonomous modeling step, and was permitted to be in conflict with the “physical basis”. We hold that “2nd order modeling” is not a phenomenon restricted to the simulations in climate research, but can be seen to be a characteristic feature of simulations more generally.
Industry dynamics is a new field within industrial economics which is concerned with the innovation driven dynamics and structural changes within industries. It draws basically on two different strands of analysis, namely evolutionary economics and industrial systems. One of the major goals is not to focus on quantitative development processes only but also to include prominently qualitative changes. Therefore, the strict assumptions of neoclassical economics are relaxed: e.g. perfect rational and homogeneous economic actors are substituted by only bounded rational actors which are heterogeneous according to their personal experiences and acquired competences. Furthermore, as innovation processes are central, true uncertainty is considered instead of treating innovation simply as a risky process. Finally, as also historical time and path dependencies are considered to play a prominent role, most often no longer analytical solutions are possible. Meanwhile different strands of simulation analysis have been emerged supporting the development of an understanding of the dynamics going on as well as the mechanisms behind them. So-called “history-friendly-models” and “agent-based models” are among the most frequent applied approaches. The paper deals with these methodologies and their potential contribution of our understanding of industry dynamics.

GCMs (Global Circulation Models, including ocean and atmospheric global circulation models, or OAGCMs) receive a huge share of the annual $1.7 billion dollar budget of the US Global Climate Change Research Program (USGCRP). Is this money well spent? Is it likely that continued modeling of the climate system will provide society with insights that will lead to effective decision-
making? Or does the USGCRP, and the climate change debate generally, misframe the role that scientific information can play in decision-making?

For all the assistance that climate change science can offer, our reliance on the results of computer predictions for the fashioning of public policy rests upon a fundamental misreading of the meaning and use of scientific facts. Trying to produce more and more precise facts can be an excuse for not making good use of the facts we already have. In some instances, scientists and politicians have combined to invest in scientific knowledge production at the expense of recognizing their social and ethical obligations for providing timely advice.

The problem underlying modeling exercises such as GCMs is that they mistake the role of human agency in reflections upon future action. The future is not something that simply happens to us; being human means that we exercise a significant degree of influence over our future, both through the choices we make and the attitudes we take. Rather than trying to predict the future, as if it is something outside of us and beyond our control like the movements of the heavens, challenges such as global climate change require that we engage one another in a debate about the kind of future we want to have.

7.5 IT and Education

Ken Fleischmann, RPI

Sub-Panel 3:

Highlands Room

- “Fragmented Centralization: Building Technological Infrastructures in Public Institutions”, Torin Monahan, Arizona State U

This paper investigates the development of technological infrastructures in public institutions – specifically the public education system in Los Angeles – to explore
organizational co-constructions of globalization. Organizational reactions to globalization have been well documented and theorized under the rubric of post-Fordism, characterized by decentralization, labor outsourcing, just-in-time production, and computerized automation, but little research has been done on post-Fordist manifestations in public institutions. I claim that the organization of the Los Angeles school system is morphing through a process of fragmented centralization where decision-making power is becoming more centralized while accountability for centrally made decisions is becoming more distributed down the hierarchy chain. This splintering of authority and responsibility gives the organization the appearance of responsible management but simultaneously decreases worker autonomy while intensifying workloads. This trend of fragmented centralization then maps onto the decentralized urban geography of the city, suggesting ways that spaces mediate global flows and institutional changes.

• “How May Actor Network Theory Enhance Our Understanding of an Implementation Process of a Net Based Learning System?”, Erna Håland, NTNU

How may actor network theory enhance our understanding of an implementation process of a net based learning system? In my PhD-project I am conducting a study of an implementation process in a big Norwegian oil company. The company is concerned with, and uses quite a lot of resources on, net based learning (e-learning). They are now in the process of implementing a system for net based learning, a so called “learning management system” (LMS). This system is supposed to give an overview of relevant courses for any employee regardless of particular job/position, and make it easier to sign up for courses, withdraw from courses etc. In principle every employee in the entire company will be using this system in about six months. The company has established a project team that is responsible for the implementation process.
I have been conducting interviews with decision-makers, the project manager and his team, and with users of the system. In this paper, drawing on these interviews, I want to explore and discuss how actor network theory may be a contribution to the understanding of this process, and if and how the concepts of inscription (Akrich and Latour 1992) and translation (Latour 1987) can be useful in the analysis. Inscription refers to the way technical artefacts embody patterns of use. Designers of technology inscribe a vision of the actors’ interests, motives, competencies etc in the technical content of the new object. In the design process translation refers to how actors’/users’ interests may be translated into specific needs, and these needs may be translated into more general and unified needs and then be translated into one and the same solution (system). In the end the users’ translate the technology into their specific work situation. The users can follow the program of action inscribed in the system, but they can also act otherwise and follow an anti-program.

Thus, I want to investigate how the network of different actors (or actants) in the organisation relates to and shapes the implementation process. Through theoretical discussion and empirical exemplification I hope to enhance the understanding of the implementation process in the organisation.

• “New Role Structures in the Classroom in the Internet-based Self-Service Societies”, Lars Fuglsang, Roskilde U

The beginning of the 1980s saw the publication of books and articles about the self-service society (Gershuny 1978; Gershuny 1983; Gershuny & Miles 1983; Skolka 1976). Foremost among these was Jonathan Gershuny who argued that the service society would be replaced by a self-service society as households, instead of buying services, will prefer to buy self-service technologies (vacuum cleaners, washing machines and so on). This hypothesis was based on the assumption that the price for such technologies was decreasing, whereas the price for services was constant.
The advent of the Internet has provided a significant new dimension to the self-service society. It creates Internet-based self-service possibilities in many areas not only for households, but also for organizations, and not only for personal services, but also for knowledge services. In addition, new forms of self-service cannot be understood in the same way as proposed by Gershuny, where services were seen as substituted by technology. The new self-service possibilities consist of entirely new “service relations”, which are defined by the fact that service providers and consumers are acting independently in time and space.

New Internet-based self-services go hand in hand with the development of new “role structures” and new “frameworks of interaction”. One example is the use of Internet-based self-services in teaching in the classroom. Here, the introduction of Internet-based services is often closely related to the construction of new role structures and new frameworks of interaction between teacher and student and among students.

This paper presents some results from a research project about the use of the Internet as a learning tool in high school teaching in Denmark. The paper has two general objectives. The first objective is to examine how the interaction with the internet goes hand in hand with the development of new role structures and arenas of interaction in the classroom. The second objective is to investigate how users can cultivate these arenas of interaction through artful integrations of the technology (Suchman 2000).

The paper applies the so-called critical incident technique (Flanagan 1954). It identifies certain “situations” involving the use of Internet in teaching and learning and studies the critical incidents in these situations. The method is based on interviews, observations, video recording and subsequent analysis.
On April 7, 2003 and its eve, a nationwide birthday celebration took place. The festivities included ceremonies, a parade, parties, exhibits, and a new TV series. Various magazines carried feature articles on it. Media covered various events extensively. It was the birthday of Astro Boy, a robot character of Tezuka Osamu's comic and anime, who was supposed to be born on April 7, 2003. The birthday of this fictional character somehow found its way to the real world.

This paper aims to analyze this phenomenon in terms of the place of technology, in particular, in the Japanese society and culture. This unusual display of public enthusiasm toward Astro Boy and media hype on this occasion seem to reveal an aspect of the relationship between technology and culture in contemporary Japanese society. The date of Astro Boy's birth is only briefly mentioned in Tezuka's original story, which most readers would not notice or remember. April 7, 2003 caught the limelight as Astro Boy's birthday, not only because it is the only explicit date of Astro Boy's birth that appears in the story, but also because there were social and cultural conditions that encouraged the idea of seeing this day as Astro Boy's birthday. There were people who wanted that day to be Astro Boy's birthday. In particular, engineers and manufacturers of robots seized this opportunity to advertise their work and products. The timing was perfect: they were beginning to produce various kinds of robots, including humanoid robots. Japanese public and media were very receptive to the idea of celebrating the birthday of a cartoon character because Astro Boy represented many positive things, such as Japan's technological prowess, future technological utopia or at
least economically more comfortable life depicted in Tezuka's comic, and Japan's nostalgic past of the 1960s when its first TV series was aired.

It is often claimed that Japan's inclination toward the humanoid robot came from the popularity of Astro Boy. Many Japanese robotics engineers read (or watched) Astro Boy in their childhood, and it is likely that the vision of Astro Boy motivated them to develop humanoid robots. Yet, Japanese robotics engineers and public, far from being simply "influenced" by Tezuka's comic character, positively appropriated the popular image of Astro Boy and the values that he represents to their advantage or satisfaction.


How does an anti-militaristic non-western society reconcile a discredited wartime technology and a highly acclaimed civilian technology? I will argue that the former can constitute the solid foundation of the latter in countries like Japan after 1945. A kamikaze-to-the-bullet-train story offers a powerful testimony to this. With a bottom-up approach and the analytical framework of $BEQ(Bresumptive anomaly," I will argue that the postwar conversion of wartime manpower was a recipe for successful technology transfer in trans-World War II Japan. Aircraft design know-how for wartime kamikaze suicide missions underlay the successful development of high-speed ground transportation for commercial service. The Japanese bullet train, Shinkansen, demonstrates a counter-example to typical, Whig interpretation of top-down central directives bearing fruit in technological development at the national level. This is a tangled history of technology in war and peace, and it points to critical issues in our historical understanding about technology and society of modern Japan.
• “Using GIS to Research Environmental Hazards in Japan”, Kate M. Syfert, State U of New York – Buffalo

Geographic information systems (GIS) are computer programs that allow the user to store, retrieve, and manipulate spatial data. Japanese scholars from academia, government, and private industry are using these programs to illustrate environmental problems and provide possible solutions. Due to Japan's unique geographical features, relative lack of natural resources, and densely-packed population, environmental problems, such as nuclear waste, fishing territories, and seismic activity, are the subjects of many studies using GIS as a tool for analysis.

This paper is based on field research in Japan, including interviews and observation. In it, I discuss the ways that Japanese scholars are using GIS in their research. I examine the ways that Japan's geography, business climate, and academic structure influence research using GIS. Finally, I propose that the opportunity to mitigate natural hazards is a motivating factor for many researchers to pursue GIS-related careers.

7.7 Governing Innovation

Morningside Room

• “Local Innovation Systems in Finland”, Pekka Berg and Juha Nummi, Helsinki U of Technology

Finland’s economic performance since the mid-1990s has been good among OECD countries. There is evidence to suggest that this good performance is closely related to the operation of Finnish national innovation system. Especially the knowledge intensive industries such as the ICT sector have been doing well. The reasons for this are diversified. The various responses and proactive policies to meet the challenges of globalisation and the fast technological development
have to be well prepared in various levels of the economy, organisational level, regional level and national level.

The Local Innovation System (LIS) –project investigates the behaviour of local innovation systems. The research approach is to undertake comparative studies of the conditions of innovation in United States, United Kingdom, Japan and Finland. The aim of the project is to understand the dynamics of innovation in local settings where one or more industries or technologies are particularly strong.

At the first phase of the project the research focus has been to get a better understanding of the multiple ways in which universities and public research institutions contribute to sustaining local innovation systems. The project is based on research collaboration between Massachusetts Institute of Technology (MIT), USA, University of Cambridge, UK, University of Tokyo, Japan, and Helsinki University of Technology and University of Tampere.

This paper concentrates on the first phase of the LIS-project in the year 2002 in Finland, and reports the functions-impacts and innovation networks theoretical frameworks used in the study, as well as the case studies about university-company co-operation in medical equipment industry in Oulu region.

- “Themes in the Funding of Engineering Research”, Bhavya Lal and Brian Zuckerman, Abt Associates I

During the 1980s, the National Science Foundation (NSF) launched several initiatives to promote research in areas that contribute to U.S. economic competitiveness and discover new knowledge. Since the mid-1980s, NSF has carried out fundamental research in design and manufacturing through the Division of Design, Manufacture, and Industrial Innovation. We carried out fifty-two case studies of DMII grants funded during the late 1980s and early 1990s, to assess whether variables such as research goals, grant size, or researcher
reputation affected research- and industry-oriented outcomes. Several conclusions emerged from our study:

Both tool-driven (or “pure”) research and need-driven (or “applied”) research produced significant industry impacts. We expected that pure research would be less likely to find industrial applications, but there was no statistically significant difference. As expected, pure research led to greater research impact than did applied research.

Grants produced high-quality research regardless of the academic ranking of the university with which PIs were affiliated. We expected that researchers in prestigious universities would tend to produce higher-quality research, but there was no statistically significant difference in research impact.

Grants distributed as part of special initiatives did not produce statistically significant increases in either research quality or industry impacts. We expected that DMII special initiatives such as an industrial internship program and large grants in research areas of strategic interest would have produced higher-quality industry impacts.

These findings suggest some broad themes in the funding of engineering research. First, research that leads to industrial applications is less a function of the motivation for the research and more a function of the environment in which the research takes place (size of grant, collaboration with non-academic researchers, experience of university with technology transfer). Second, peer review works to ensure high-quality research, but at a cost. Research by investigators from lower-ranking universities proved to have similar impacts, but they received only a small percentage of grants. Finally, the findings suggest that targeting research at specific problems appears not to be successful.
In my recent study of the correlation between the age of scientists and significant scientific discovery, I found that young scientists are not more likely than older scientists to make significant scientific discoveries (see my "Is Science Really a Young Man's Game", Social Studies of Science, 33:1). Because my study was based on a relatively small sample size, I was unable to control for a variety of variables.

In this paper, I aim to determine: (i) whether or not my findings are typical of the various periods within the time-frame of modern science, and (ii) whether or not there are significant differences in different disciplines or fields.

My preliminary study suggests that the 1800s may have been a period in which youthfulness was correlated with significant discovery. By examining a larger sample of discoveries in the 1800s and 1900s in bacteriology and virology, I will be able to determine if, during this period, science was more of a young person's game than it has been throughout the history of modern science. This period is marked by an important change. More and more fields became professionalized. This change may have made it easier for scientists to make a significant contribution to their field at an earlier stage in their career.

Most of my data from my preliminary study pertains to the physical sciences. It is widely believed that in the physical sciences it is a more straightforward and less contentious matter of determining what is a significant discovery that in other fields of study. Zuckerman and Merton (1973) suggest that it is easier for young scientists to make contributions in "more codified" fields of study because the norms of good research are precisely articulated. In "less codified" fields the reputation of an investigator will have a greater impact on the reception of a discovery. Hence, it will be more difficult for young scientists to make significant
contributions in less codified fields of study. I want to examine whether the findings of my preliminary study are an artefact of the contingency that most of the discoveries I examined in that study came from the physical sciences.

The two fields that will be the focus of my study are virology and bacteriology.

7.8 Experts and Politics Approaches I

Stephen Turner, U of South Florida

Crown Room

- “More in Interactional Expertise”, Harry Collins and Rob Evans, Cardiff U

The paper by Collins and Evans entitled ‘The Third Wave of Science Studies: Studies of Expertise and Experience (SEE) -- Social Studies of Science, 32:2 -- has attracted a number of comments. At the heart of the paper is a primary distinction between three levels of expertise: Contributory expertise, Interactional expertise, and No expertise (CIN). The argument of the paper can be advanced or criticised in a number of different ways. The majority of critical comment has attacked SEE and CIN's significance for understanding the relationship between science studies and science policy questions; we have responded in a recent issue of Social Studies of Science. But the relationship between Interactional and Contributory expertise also touches on questions which, at first sight, are very distant from the manifest concerns of the original Third Wave paper. One of them is the methodology of the social sciences. Another, as Mike Gorman points out, is the notion of “trading zone.” Another, we want to suggest, is the idea of ‘embodiment.’

The `embodiment debate' could be said to be partly about the relationship between conceptual structures that are learned through physical participation
and those learned only through linguistic socialisation. Collins has argued against Dreyfus that embodiment is less significant for an individual (as opposed to a social group), than linguistic socialisation; the bodily form of the members of a community gives that community its language (If a lion could speak we would not understand what it said!), but the same does not apply to a differently bodied individual immersed in a familiar society. It follows, according to Collins that, say, the congenitally wheelchair bound can acquire the larger part of the language of the surrounding community through linguistic interaction -- the person can acquire interactional expertise! It also follows that the congenitally deaf are more likely to establish their own independent languages than, say, the congenitally blind. In respect of the science being studied, the sociologist of scientific knowledge is more blind than deaf.


Studies of Expertise and Experience (SEE) can help us understand and improve the kinds of multi-disciplinary trading zones that are becoming prevalent on the cutting edge of technology. In their article outlining SEE, Collins and Evans distinguish between three levels of expertise:

1. None

2. Interactive

3. Contributing

These three kinds of expertise can be linked to three kinds of trading zones. The first is a network controlled by an elite in which there really is no trade: those not in the elite either obey, or they are ignored. The elite can be a group of experts who use their specialized knowledge to dictate how a socio-technical
system will function. The expertise of such an elite is black-boxed for other participants in the network; access to the knowledge is tightly controlled.

The second is a boundary-object trading zone, where experts from different fields interact around the development of a technology or system like radar or MRI. Here the system of concern serves as an object that links the participants in the network, but experts from different fields see the boundary object in ways dictated by their expertise. This kind of a trading zone includes a continuum, from limited, adversarial interactions where different groups of experts try to throw their parts of a technology over the wall to each other to a more constructive engagement among interacting experts who agree on common goals. AIDs research protocols served as a boundary object for activists, medical researchers and statisticians, each of whom saw them in a different way. Initially, groups of activists demanded changes in the protocols and researchers made some concessions a primitive trading zone, more adversarial than cooperative. But as activists grew in sophistication and attracted allies among statisticians, the trading zone became more collaborative and the activists moved from reacting to interacting to, in some cases, contributing.

Contributing expertise brings us to the third kind of trading zone, in which the participants share a common understanding of a goal and collaborate closely. The presentation will include societal dimensions of nanotechnology and Earth Systems Engineering Management as examples.

- "Expertise and the Production of the Unknowable", Stephen Hilgartner, Cornell U

This paper argues that studies of the role of scientific expertise in political decision making should more explicitly address the processes through which things are rendered unknowable. Put otherwise, studies are needed of how knowledge incapacity is actively produced, distributed throughout societies, and (un)used in (non)decision making. In the arenas where science and politics
interact, much work is done to prevent the collection of data, to control the
distribution of knowledge, to create zones of confidentiality, to erase the past, to
produce regions of ignorance, and to manage the display of information. Shifting
our angle of vision to focus on this work—and the absences of knowledge it
creates—sheds new light on the limits of expertise, and illuminates the role of
gaps, holes, and densities of knowledge in stabilizing social orders.

- “Performing Transparency, Contributing Expertise: The Health Council of
  the Netherlands and the Democratization of Science Advice”, Roland Bal,
  Erasmus MC; Wiebe E. Bijker and Ruud Hendriks, University of Maastricht

No Abstract

7.9 Governing GMOs – Transnational Perspectives

Sub-Panel 2

Athens Room

- “Colonial Ecology and Corporate Science: The Case of Novartis, UC
  Berkeley, and Genetically Engineered Corn”, Earth Duarte-Trattner, U of
  California – Berkeley

Two scientists, David Quist and Ignacio Chapela of UC Berkeley, accidentally
discovered transgenic corn in a remote region of Oaxaca, Mexico while testing
some DNA equipment. They published an article in the November 2001 edition
of Nature documenting their findings that precipitated an industry-based attack
on their research, their characters, and even their lives. I will document the
historical and social context of their research to illustrate the political and
economic interests behind the scientific critiques published in Nature and on the
Internet, as well as the disavowal of the article by Nature itself.
The interests reveal a drama played out in the College of Natural Resources Department at UC Berkeley when it partnered with Novartis Corporation in 1998. The partnership created a divide on campus in terms of the University’s role in partnering with private corporations. Ignacio Chapela and David Quist were active opponents of that partnership and the greater institutional trend in science to support research that leads to a return on investment and products that can be turned into commodities.

The development of biotechnology that led to Bt corn spreading from the United States into Mexico is indicative of an institutional stance in science that supports corporate and industrial research. That institutional bias is exemplified in the great “corn controversy” of 2001 that found Ignacio Chapela and David Quist at its center because of an accidental discovery. This paper will demonstrate how biotechnology, specifically, has changed the ecological, political, academic, and economic landscape of science, technology development, agriculture, and environmental policy.

- “Unilever: A Socially Responsible Corporation in the Anti-Political Economy”, Robert Doubleday, U College London

During the 1990s Unilever, a multinational consumer goods company, engaged in an extended programme of dialogue with NGOs in the UK over genetically modified foods. Controversy over genetically modified foods and Unilever’s experience of NGO dialogue contributed to the development of Unilever’s ‘Environmental & Social Responsibility’ initiative.

Andrew Barry has recently suggested that regimes of measurement, auditing and monitoring are emerging to govern the relations of politics, technology and the economy. These regimes have anti-political effects as they reduce space for disagreement over innovation in terms of established political categories, however, Barry argues that these anti-political regimes can open up new objects and sites of political action. This paper uses Barry’s notion of an anti-political
economy to attend to the role of the corporation in controversy over new technologies.

Unilever’s NGO dialogue programme over GM foods is used by this paper to explore the production of ‘corporate social responsibility’ through regimes of ‘public engagement’, and the ways in which this production intensifies corporate identity as an object of political action.

- “Risky Business: The Proliferation of Stem Cell Technologies in India”, Aditya Bharadwaj and Peter Glasner, ESRC Centre for Economic and Social Aspects of Genomics

No Abstract

- “GM Cotton as a Beachhead Technology in the South: The Role of Academic Research on the Performance of Bt Cotton in the Global Struggle Over Biotechnology”, Aya Hirata and Frederick H. Buttel, U Wisconsin, Madison

No Abstract

7.10 Controversy and the Democratization of Science and Technology

Savannah Room

“Scientific Controversies as Different Articulations of Science in the Collective”, Maja Horst, Copenhagen Business School

The paper analyses arguments on regulation of genetic technoscience in Denmark from a perspective inspired by Bruno Latour. The paper argues that the controversies are not ‘just’ about delimited areas of technology, solvable by offsetting a deficit in either knowledge or legitimacy as many accounts have
argued. Rather they must be seen as full-blown political controversies over the social role of research in the collective of humans and non-humans.

On the basis of previously conducted case analyses of the mass mediated coverage of the issues of human cloning and human gene therapy, it is argued that these issues are inscribed in different networks of articulation, where the arguments subscribe to different articulated collectives. Articulated collectives can be seen as implicit or explicit articulations of social order including a normal way of solving problems, which make the arguments function as arguments (propositions that establish a particular connection between problems and solutions).

- “Against the Libertarian Solution of Technological Conflicts”, Hidetoshi Kihara, Kokushikan U

This paper will examine the broader political context where we should place democratic procedures such as participatory technology assessments adequately to deal with technological conflicts.

When considering how to solve technological conflicts, we are prone to take either view of the should-be relationship between experts and lay people: either “the authoritarian theory of knowledge” or “the liberal theory of knowledge”.

The former theory says that it is more rational for lay people to obey the authority of relevant experts than to think by themselves. The latter, on the contrary, insists that lay people should think by themselves, recover their self-decision making, their freedom and stop obeying experts’ authority in order for our society to be democratic.

But, our understanding of each theory is in itself somewhat misleading. This is for example prominent in case of the libertarian interpretation of the latter theory,
which requires us to reduce the expertise gap between experts and lay people so as to stop obeying experts.

We must not choose between these two theories but find the third way in order to accomplish our task of democratic control of technologies. On the way, we will find that the very social cooperation makes experts’ knowledge rational and also makes lay people’s self-decision making, their freedom secured.

Moreover, we will show that the social cooperation takes various forms and accordingly the rationality of expertise and the substance of people’s freedom, both supported by the cooperation, are various.

Participatory technology assessments such as the consensus conference don’t work well without full-functioned expert systems: this will be also one of the consequences from our discussion.

- “Regulating Stem-cell Research and Human Cloning: An Exercise in Protecting the Status of the Human Identity”, Olivia Harvey, U of New South Wales

Typical accounts of technological change would suggest that new technologies are either good or bad because of a perception of what their consequences will be. This has been made particularly clear in Australia recently with the development of two separate pieces of legislation designed to cover what are thought will be the possibilities and the consequences of stem-cell research and human cloning. The intensity of debate on this issue indicates that the scientific and medical achievements forecast by proponents of these techniques clash head-to-head with beliefs about the sanctity of the human and how stem-cell research and human cloning are thought to transgress the basic principles of human identity. The current debate over stem-cell research and human cloning is therefore a perfect example of how political reactions to new technologies reflect what we consider proper to human identity. In effect, what is really at stake in the
rejection of particular technological developments is an attempt to determine, in advance, how the boundaries between human and machine (or nature and culture) are to be demarcated.

- “Enrolling the Public to Regulate Science: The Case of Genetic Engineering in New Zealand”, Keiko Tanaka, U of Kentucky

No Abstract

COFFEE BREAK

Presidential Plenary 3:45-5:30
Ballroom North

“Building Democracies with Science and Technology”

Organizer and Chair: Wiebe E. Bijker, President 4S
Speakers:
Dr. Hendrik C. Marais, Chair, South African National Advisory Council on Innovation
Professor Bruno Latour, President-Elect 4S

SATURDAY, OCTOBER 18, 2003

Session 8: 8:30-10:15 AM

8.1 Transnationalising Asian Medicine
This paper examines how Korean traditional medicine (KTM) reconstructs its knowledge, identity, and community in relation to science in a globalizing age. Through ethnographic research at the Graduate School of East-West Medical Science (GSM) at Kyunghee University in South Korea, this paper attempts to comprehend how the hybridization of science and KTM actually occurs and how it redefines the KTM community.

The scientization of KTM is intertwined with multiple, intersecting political and ideological dimensions such as colonialism, scientism, nationalism, and globalism. Researchers in GSM struggle against and negotiate with biomedical professions, government, Western scientific fields, and their own members at the local, national, and global levels. Simultaneously, it is essentially a technological process through which KTM researchers and scientists blend seemingly different knowledges and skills. This process entails the multiple productions of a hybrid subject, knowledge, lab, and school. Therefore, this paper seeks to show how the open-ended tuning process between KTM and science interacts with diverse political and ideological forces and how it contributes to new, multiple, emergent, and shifting socio-technical formations at different levels and scales.

This paper especially focuses on how the scientization involves diverse and interconnected power structures. I introduce what I call “powerscapes” to understand polycentric, fluid, and interconnected power structures and relations germane to the hybridization process. The scientization of KTM resists and succumbs to various power structures and relations, disorganizing existing power structures and generating its own inequality within its locality. New power structures emerge in ironic and contradictory ways, and this hybridization
becomes another way of survival and distinction rather than an epistemological subversion.

- “Making National Medicine in South Korea: Accommodation or Appropriation?” EunJeong Ma, Cornell U

Oriental Medicine with origins in China is widely practiced in many East Asian countries. In South Korea, Western-medicine trained pharmacists and Oriental-medicine trained (OM) doctors clashed in the 1990s over the right to prescribe herbal medicines. The strife started from the abolition of a legislative clause stipulating the regulation of the traditional type of medicine cabinet (Han-Yak-Jang) at pharmacies. The cabinet is used to organize, categorize, and store herbal ingredients for OM. Although it was depicted through media as ‘the game of monopoly’ or a ‘fight over rice bowl’ for securing economic interest, the dispute raised more fundamental questions about the conceptualization of medicine and the making of medical policies. I discuss how such issues were contested and resolved. For example, each party imparted a different meaning and status to the cabinet. OM doctors held that it was a storehouse of experiential knowledge and that OM principles had been built into the cabinet. For them, the cabinet was a semiotic device upon which herbal remedies were prepared for individual needs. According to the OM view, pharmacists who lacked such qualifications should not appropriate the cabinet and herbal medicines for their economic interest. In response, pharmacists maintained that the cabinet was a mere set of drawers for storing herbs without any tacit meaning attached, which was based on OM relevant knowledge. This led to the further claim that herbal medicines had become separable from the cabinet and subject to scientific medical knowledge. By making herbal medicines amenable to scientific knowledge, pharmacists tried to assimilate the lucrative market of herbal medicines.
During the Meiji period (1868-1912) when medical ideas and practices from Europe, particularly from Germany, were being introduced, the medical establishment in Japan began their research on women’s bodies with specific emphasis on their reproductive functions. In such medical research, physicians introduced a method of racial typology: they classified bodies into different racial or ethnic groups, and attempted to find particular traits pertaining to each racial or ethnic type. Subsequently, physicians, state officials, educational professionals, and women reformers engaged in vociferous discussions about the characteristics and problems of “Japanese bodies.” They claimed that Japanese women in particular possessed inferior physiques and constitutions. State officials, physicians, and educational experts viewed this supposed deficiency in Japanese women’s bodies as a serious problem for the nation: Mothers with weak constitutions would reproduce unhealthy children, which would ultimately result in the weakening of the nation.

Given such concerns, state officials, physicians, and educational professionals, along with the establishment of health associations for the general public, established an association to improve the health of Japanese women in 1887. They scrutinized Japanese women’s diet, clothing, living conditions, and other everyday habits from scientific and medical perspectives. Two issues which medical experts paid particular attention to were women’s clothing and their physically inactive and sedentary lifestyle. Their proposals included clothing reforms against wearing a wide and heavy “obi (sash).” Also, they encouraged women to wear the “hakama (divided skirt)” over their kimono, which would allow women more physical movement.

This paper also discusses discourses on women’s bodies that appeared in medical, educational, and women’s journals in addition to the journal for the
Association for Women’s Hygiene. My analysis is focused on how women’s bodily functions and their everyday habits were re-interpreted through medical and scientific language. I also discuss how medical professionals employed ideas of nation and race in their discussions of Japanese women’s bodies. Finally, I examine how medical discourses and practices constituted new systems for surveillance and the formation of subjectivity through interpreting women’s bodies, situating them in nationalistic discourse, and transforming women’s everyday customs.

- “Why the Nephrologists, but Not the Cardiologists: The Professionalization of Taiwan Medical Specialties”, Ying-Chia Huang, Muyen Hsu and Chunghsi Lin, National Yunlin U of Science and Technology

Tracing the technological and social context of Taiwan medical history, we try to find the reason why the nephrologists, but not the cardiologists or the chest physicians, get the exclusively dominant power from the transformation of the national health insurance (NHI) system.

Unlike the diversity of the cardiologists or chest physicians, the nephrologists shared some common characteristics and value to establish the paradigm smoothly, and then formed a solid society, Taiwan society of nephrology (TSN). TSN focused the technology domain and combined it with license renewal system to form a solid socio-technology core. By the numeral characteristics of the nephrology patient profiles, TSN easily improved the nationwide dialysis quality with the computer-aided assurance system, and confidentially communicated the result with the stakeholders.

For recent 3 decades of economical growing and political democratization, Taiwan expands the national insurance caring scope more broadly. Patients receiving hemodialysis accumulated fast by the annual rate of 12-24% in the past ten years. Due to the mutual benefit, patients and some close legislators of TSN formed the hard outer shell to struggle against the condemnation of
reimbursement proliferation. But the patients of cardiology and chest medicine failed to do that. At the same time, the state tried to control the reimbursement expansion by the peer review. In contrast with the cardiologists striking each other at reviewing, TSN collaborated with the bureau of NHI (BNHI) and empowered the paradigm.

BNHI introduces global reimbursement system since 2001, and tries to balance TSN by other specialists. But TSN lobbies and then gets the exclusive power finally. The independent dialysis territory is acknowledged since 2003.

8.2 “Freeing” Open Source: Action Research and Ethnographic Perspectives

David Hakken, SUNY Institute of Technology

Sub-Panel 1

Ardmore Room

The range of technoscientific practices associated with the idea of open computer source code—Free Software, Linux, Open Source Code Programming—commands attention for several reasons. Some of its advocates hail it as a transformative social movement. Scholars describe it as the clearest example of how basic social activities like creating new knowledge are changed in cyberspace. Motorola’s early 2003 announcement of its intention to use an open platform for its next generation cell phone is one of many indications of its growing importance to the reproduction of capital; Open Source is arguably the terrain for organizing the next great assault on Microsoft. The recent decision of the Chinese government to adopt/develop Open Source software for public computing is one indication of its importance to a very broad range of technology and economic development issues in the non-Western world as well.

But just what is Open Source? The breadth of the apprehensions of Open Source described above suggests that ethnography may be a good way to try to
answer this question. In this session, researchers using fieldwork to study Open Source begin to outline a research agenda. What is the institutional structure within which Open Source has developed? How should one characterize the relationships among its various contesting factions? What is its relationship to previous forms of Open Computing, like social informatics and participatory design? What is the political economy of Open Source; what are the interests in a capitalist economic system served by giving away potentially valuable proprietary resources? Is it the same everywhere (a force of globalization) or are there substantial differences between Open Source activities based in different regions of the world (glocalization?) What is the relationship between the way its advocates describe how it works and actual Open Source Projects? What research approaches (e.g., action research) are likely to be the most fruitful? To what extent must one be a coder, or at least a scripter, to do meaningful ethnography of Open Source?"

- “Open Computing and Knowledge Networking: A Research Agenda”,
  David Hakken, SUNY Institute of Technology

Why should social science be interested in phenomena like Open Source Code, Free Software, and the increasing popularity of Linux-flavored software? These phenomena constitute some of the most significant current manifestations of the long tradition of socially-informed approaches to automated information technology—Open Computing, for short. This paper argues that current-wave open computing should be examined in relation to the “Computer Revolution” hypothesis, the notion that ours is a time of technology-induced transformational social change. In particular, these phenomena constitute the best case for the “Knowledge Society” form of the CR, the idea that technology is changing fundamentally the way knowledge is produced, reproduced and shared.

The paper begins with a summary of the author’s argument about what would have to be transformed in order for a CR of the knowledge type to have taken
place. It then turns to some illustrations of unjustified K-CR claims, like the transformation of knowledge creation through collaboratories or of knowledge sharing through distance education. Presented next is the argument for why, if what is claimed by its proponents were true, current Open Computing really would indicate a transformation of knowledge. A set of these claims are presented as a core agenda for the ethnography of Open Computing, and the author’s current comparative research project on open source used to illustrate how these issues can be approached.

- “The Case is Closed: How Talk about Open Source Technologies Complicates Freedom of Expression on the Internet”, Patricia Gonzalez Lange, U of Michigan

An important aspect of the Open Source movement is to promote computer platforms, such as Linux, which enable free access to powerful and personalizable technologies. Linux advocates have a democratizing vision of the Internet and believe that Microsoft’s monopolistic business practices contribute to a wide distribution of expensive, low-quality products that are bundled in ways that remove consumer choice. Many Internet participants believe they must expose such practices to maintain the Internet’s integrity. Notably, manipulating Linux is typically not for the technologically-challenged. Promoting and using Linux can socially mark an Open Source advocate as technologically superior to novices who are unfamiliar with it. Participants may therefore perform their affiliation to Linux in order to increase their online techno-social capital. Ironically, such performances may contain linguistic forms and structures that make open discussion of computer platforms’ merits more difficult. This paper examines two online communities in which participants share knowledge and mentor each other with respect to computer and networking technologies. The data show that when participants become linguistically caught in a performance of their technical affiliation to Open Source philosophies, debate often assumes a pre-programmed format that stifles individual expression. Informants express
frustration at seeing their choices (such as Microsoft products) for certain applications summarily dismissed. The paper concludes with a discussion of how ethnographers may be caught in such performances and may express alignment to the Open Source movement to increase their techno-social capital. The paper hypothesizes that the closer one wishes to be to the technical community, the more difficult it is to avoid getting caught in such linguistic performances. Ethnographers farther from the technological center (e.g. ethnographers who are not coders) may thus add important insight into how discussions of Open Source technologies may ironically complicate freedom of expression and circulation of technological knowledge on the Internet.

- “Red Flag Linux in Tibet and the Plight of Unicode”, Christopher Walker, U of Chicago

The social and legal stakes inherent in the Open Source movement appear differently in Lhasa, Tibet, a city far-removed from hackerdom both in terms of geography and technology. Though the typical angst against Microsoft and other proprietary packages is commonly voiced in China, the rhetoric of information transparency is largely silenced, especially in a place as sensitive as China's Tibet. Yet, the practical mode of Open Source engineering, that of international cooperation based on voluntary association, is seen by several Tibetan computer engineers as a possible avenue of enhancing Tibetan language publication. To this end, the computer science head of the Lhasa's sole university is proposing to meld the most popular version of Linux in China, aptly named "Red Flag," with the emerging standard of Tibetan Unicode. Red Flag Linux, however, is not ideally suited to this effort, nor does it sit well with general Open Source guidelines. Red Flag asks a significant price for the its server version, and most importantly, does not adhere to open-type fonts like many of the Western variants of Linux. In theory, Red Flag is supposed to respect the GPL, but in practice, the picture is rather cloudy. In this uncertain context, one hears of "legal" and "illegal" installations of Red Flag. Beyond troubling questions of legal
ownership, the practical limit of Red Flag's Chinese language encoding, which adheres to state standards regardless of Unicode initiatives, implies that an updated Red Flag including a Tibetan language interface would also have to rely on font standards set by the state itself. The question remains whether such state standards would expand to make room for the complex Sanskrit stacks which populate the Buddhist literature in Tibet.

Strangely enough, the national standard for Tibetan encoding was developed by Tibet University in Lhasa, though the same programmers would now prefer to join the international bandwagon toward Unicode. This overall lack of international standards for Tibetan computerized communication spells disaster for a language that is already endangered from the hegemonic force of other languages. Open Source products, specifically Red Flag, are in the position of offering both hope and frustration. This year sees the first time Linux has been taught at Tibet University, and the ethnography I present depends on my participation with this class in the second semester of this academic year.

- “Social Code”, Jennifer Cool, U of Southern California

This paper describes what might be called the "view source" worldview and argues that it serves as a strategy for knowledge production, cultural reproduction and reinvention in a period of rapid change. Though proponents of open source and free software are the most self-conscious and vocal people with this view, it is by no means limited to them. "View source" can be seen as the cultural strategy that brought about the World Wide Web, the Internet, and personal computing as mass social phenomena.

Drawing on studies of the Internet Engineering Task Force (IETF), and on ethnographic fieldwork with a group of open-source developers building a community forum application (calliope.sourceforge.net/), this paper will look at "view source" in social processes, modes of governance, and development methodology.
In recent years, a number of technologies have been developed or reintroduced in the United States in response to threats of mass casualties posed by bioterrorism and the use of weapons of mass destruction (WMD). In this presentation, I discuss a number of these technologies, including vaccines against biological agents, atropine/2-pam injectors to 'reverse' the effects of certain nerve agents and larger technical systems to facilitate epidemiological surveillance of populations. I also highlight a number of organizational, institutional and state-level actors in the public and private spheres who either develop or use these technologies, or who make policy in the fields of public health and emergency/disaster management. Conceptually, the arguments presented center around some of the larger meso- and macro-level contexts in which the technologies are developed, employed and talked about. Building on data derived from an extensive analysis of documents (primarily public testimony, official reports, press briefings, plans and guidelines, and technical literature) and interviews with policy-makers; medical, public health and EMS personnel; and hospital officials, I test three hypotheses: 1) these technologies help to redefine the boundaries of two of the core social institutions charged with preparing for and responding to mass casualties, namely those of medicine and public health; 2) a new social arena has begun to emerge that incorporates these more traditional, albeit changing institutions with the heretofore rather obscure emergency medical services (EMS) and disaster preparedness communities; and 3) these technologies act as objects around which a novel (and definable) social order is being produced at the macro- (i.e., state) level. Specifically on this latter point, I examine if and how technologies developed and utilized to address the
effects of bioterrorism and WMD?concepts laden with layers of politics?are recast as the centerpieces of a socio-technical worldview in which these political contexts are obscured.

- “Moral Science”, Rhona Leibel, Metropolitan State U

Philip Kitcher, in his recent "Science, Truth and Democracy", develops a vision of science as a public good, and decision-making about its research as appropriately placed not in the hands of scientists, but rather, under the control of the society in which scientists work and by which they are funded.

Because the knowledge created by a scientific community profoundly effects the society in which it is embedded, decisions about which projects that scholarly community ought to undertake, can be made morally, Kitcher argues, only by the society, not by the scientists alone. And whatever institutions a society uses in order to make those decision, Kitcher argues, their practices ought to result in decisions that approximate the decisions that would be reached by a set of rational deliberators representing discreet societal interests, and, with good will, educating and debating with one another.

In this paper, I take on the nature of these deliberators in Kitcher’s account, and the role of rational deliberation in moral action-guiding accounts more generally. Using the security studies community as an example, I argue that an account relying on interests, reason and good will alone, cannot display, much less provide guidance for the resolution of, the most central conflicts that challenge in the morality of any society’s decisions about its scholars' research.

- “Quantifying the Apocalypse”, Greg Wilson and Sarah Michalak, Los Alamos National Laboratory

Areas of scientific inquiry consist of a certain set of objects (concepts, instruments, practices, etc.) and an established and accepted set of relationships
between those objects. At times, though, a field of objects and relationships can be upset (i.e., objects are moved around, added, and/or subtracted; relationships are broken, called into question, realigned, and/or re-forged in ways yet to be explored). Two forces that can cause such upsets are (1) innovations in technology that allow for new conceptions of areas of inquiry, and (2) changes in the decision framework that drive an area of inquiry.

This paper will examine work the two authors performed to help develop and parameterize smallpox models after 9/11 for an advanced epidemiological simulation at Los Alamos National Laboratory (LANL). The authors, members of the Knowledge Modeling and Integration team at LANL, collaborated with computer scientists to develop a new type of epidemiological simulation (EpiSims) based on TranSims, a transportation model of the city of Portland, OR that follows 1.6 million demographically representative citizens through their daily routines. We will explore how the infrastructure underlying the EpiSims technology required a new epidemiological modeling approach. We will also discuss how the post 9/11 shift in the conception of smallpox from long-eradicated disease to likely bioterrorist weapon required the development of new research questions, the extension of existing (but inadequate) data, and the development of new data sources to support decision-making about this national concern.

- "September 11 and Technology: Creating Security and Constructing Privacy", Lisa S. Nelson, U of Pittsburgh

September 11, 2001 ushered in profound changes in the structure, policy, and responsibilities of the United States government. One objective of these changes is to increase information sharing among between the public and private sector. Meeting the challenges of the new environment requires reconsideration of industry and government information sharing policies, requirements, and methods of data exchange. The topic of this paper is to consider the use of
technology to facilitate the flow of data and information across these governmental and industry divides necessitates the development of an intricate web of policy to accommodate the divergent interests of the governmental and industrial partners while protecting the Constitutional concerns of privacy and civil liberties. Technology, such as Radiant Trust - is said to offer a potential solution to the difficulty associated with information and data exchange. Radiant Trust™ Technology (RT), a collaborative information acquisition, analysis and distribution system developed and maintained by Lockheed Martin has been proposed as a method of facilitating the sharing and exchange of data and information. Elements of RT are currently deployed in more than 70 installations to support classified U.S. and allied military operational information analysis and distribution requirements. A contract has been awarded to a team (of which I am a part) led by Lockheed Martin to develop a passenger risk assessment and prescreening system, also known as the Computer Assisted Passenger Pre-Screening System II (CAPPS II). This program is designed to increase security with information sharing and data exchange is called the Computer Assisted Passenger Prescreening Program. The purpose of CAPPS II is to serve our national security without sacrificing individual privacy rights of American citizens. CAPPS II requires access to private data in the form of airline passenger reservation records. This paper will consider the problems and potential successes of the deployment of CAPPS II and Radiant Trust technology within the complex regulatory framework of post-September 11.

8.4 The ‘Fate’ of the Ascetic Subject of Truth

Rebecca Herzig, Bates College and Andrew Lakoff, U of California – San Diego

Discussant: Jan Golinski, U of New Hampshire
This panel considers the relation of self-formation to the capacity to speak the truth in three 'modern' contexts. It engages two intersecting, and perhaps conflicting lines of investigation in science studies. The first proposes a profound break in the early modern period, in which access to truth became independent of exercises of self-constitution and purification. As Foucault put it, "Before Descartes, one could not be impure, immoral, and know the truth. With Descartes, direct evidence is enough. After Descartes, we have a nonascetic subject of knowledge. This change makes possible the institutionalization of modern science." The second strand of investigation instead emphasizes the ongoing importance, despite this alleged 'break,' of questions of virtue, character and trustworthiness in the production and dissemination of scientific truths. Based on research in three distinct settings of scientific practice, the contributors to this panel examine the contemporary 'fate' of the ascetic subject of truth. These sites include: the ascetic exercises of 'men of science' in the United States at the turn of the twentieth century; the practices of a contemporary inventor, in which it is possible to see the emergence of a subjectivity both distributed and situated in a singular body; and the relationship between the authority of founding texts and the experience of self-analysis in the capacity of psychoanalysts to access the contours of the patient's unconscious.

- "Willing Captives: Science and Self-Constitution in Nineteenth-Century America", Rebecca Herzig, Bates College

A number of recent studies have argued that "modern" epistemic credibility presupposes the removal of bodily specificity and familiarity. Where once veracity required the assurances of a virtuous individual, reliable knowledge has come to be based on a carefully fashioned anonymity. Matters of fact are no longer based on the perception of individuals especially worthy of accessing truth, but on the perceived interchangeability of disinterested, featureless
observers. "This change," concludes one historian, "makes possible the institutionalization of modern science." While scholars have produced competing historical accounts of this epistemological shift, few have disputed the claim that a shift in the subject of knowledge did in fact occur. This paper questions the consequences of this shift for subjects of knowledge, exploring the formations of selfhood affiliated with the emergence of "modern science" in the United States. Through a discussion of two nineteenth-century yellow fever experiments, the paper elucidates the particular techniques of the self which enabled submission to the "impersonal collectivity" described in recent scholarship. In so doing, the paper both affirms and complicates existing accounts of the relations between individual embodiment and access to truth.

- "How to Speak about Subjectivity in Science", Helene Mialet, Cornell U

The new studies of history, philosophy and sociology of science tend to describe science in terms of action, cultural practice, social construction or, better still, an entanglement of multiple actions, practices and socio-technical realities. In doing so, they have eliminated the presuppositions of an implicitly or explicitly recognized epistemology of rationality (and/or diffusionist model) of science that takes for granted the dichotomy between knowing subject and known object. In my paper I shall describe both the deconstruction of scientific criteria and suggest ways that we might fruitfully return to—and reassess—our analysis of the knowing subject. Thus, we shall see the omnipotent and bodiless knowing subject of the rationalist tradition brought into the light of day, at the same time as “he” loses “his” monopoly of action. This is the paradox that I wish to explore. By drawing on an empirical study of the practices of an inventor, I shall try to paint a new picture of the subject: a subjectivity not at the origin of the constitution of an object, but emerging from a collective consisting of heterogeneous elements—that is, a subjectivity that is both distributed and situated in a singular body.

- “Analytic Virtuosity”, Andrew Lakoff, U of California – San Diego
In the natural sciences, at least in theory, subjectivity is not central to the capacity to access the truth—it is the world itself that testifies to the validity of what is said. In psychoanalysis, subjectivity and truth are linked in a quite different way. One finds a complex relationship between the ongoing authority of the founding texts of the discipline and the process of discovery, within the self of the analyst, of the truth of the founders’ claims. And while Lacan argued that “the psychoanalyst is authorized only by himself,” this work can be accomplished only in relation to a master, and the passage has a relatively standardized structure and a set of institutional preconditions. The ambivalence between discovered and revealed truth leaves the discipline veering between proclamations of scientific status and accusations of religiosity. This pathos is particularly acute when psychoanalysis must sustain itself in a medical context. In this paper I describe the production and reproduction of psychoanalytic knowledge in an unexpected site: a public hospital psychiatric ward in a poor neighborhood of Buenos Aires. How do doctors there maintain analytic identities and sustain truth-claims in a place where the institutional task is not interpretation but risk-management, and where patients are not susceptible to classical strategies of intervention?

- “Thinking the World with Things: Scientists’ Narratives on Research Practices and Cultures”, Priska Gisler, Federal Institute of Technology (ETH)

Laurent Thévenot (2001) describes his regimes of engagement, which he needs to elaborate a “political and moral sociology of an ‘equipped’ or ‘furnished’ humanity”, with the “material adjustment with the world”. The alignment goes along, he writes, with a “reality test that depends on the way the agent captures the world within a certain type of format”. Reality tests can be observed in one way or the other, when scientists conceptualise displays of their projects for public exhibitions within scientific institutions. But research institutions elaborating exhibitions in cooperation with scientists have to be understood in a
much broader way than this. They arrange scientific knowledge and findings in a certain way. They make propositions of adjusting sense to things and thoughts.

My paper starts from the observation that the political pressure for scientific institutions to communicate about research projects and scientific practices to “the public”, has been increased, undoubtedly during the last ten years. Rather seldom though the need to react on such demands is put into analytical connections to changes in educational standards, science politics and a transforming landscape of research and development. A set of questions tough arises through such a perspective. How does inter- and transdisciplinary research govern new scientific fields and disciplines? How does science-practice-transfer reflect back into research practices in the lab? How does collaboration occur along and through newly invented organizations like knowledge transfer offices, corporate communications departments etc.? What role plays the material reality under changing financial circumstances? I’ll highlight these questions with examples of my study about scientific institutions, displaying their research projects and practices through establishing museums. My point will be that information revealed by scientific exhibitions goes far beyond the notion of the interested lay-person having fun experiencing science in a friendly context. The situation the lay-person and the scientists find themselves in resembles a pact. By using concepts of narratology, I’ll analyze this pact as an autobiographical one where the autobiographer is establishing authenticity and truth through using certain conventions and codes. My paper will discuss where exactly scientists re-discover their engagement in an autobiographical pact with society, in order to capture the worlds they originally wanted to reveal.

8.5 Structuring Distributive (Service) Work

Highlands Room

- “Run Time” and Walk Time”: Multiple Times and Temporal Structuring in Distributed Work”, Hyun Im, MIT
Recently researchers and practitioners have demonstrated increasing interest in organizing work across time and space, in particular the various forms of dispersed (different places), asynchronous (different times), distributed or virtual work. One of the critical questions raised by this new way of organizing is how they affect the way time is perceived, used, managed, and coordinated by the members who work in these technologically mediated, geographically distributed work environments. Understanding time(s) and temporalities in organizations as embedded in everyday practices, this paper explores this question by looking at the temporal structuring in distributed work, through an empirical study of a small start-up (which I call LC) whose members were geographically dispersed across four different cities and three different time zones in the United States. This study is based on data from the first year of LC’s existence, up to the alpha release of its product, including all email among all members of the firm (over 2000 messages), meeting minutes from all of the phone conferences, interviews with the three full-time LC members, and other documents produced and distributed by the LC organization. The analysis of the data provides insight into how members temporally structured and coordinated their work in local contexts. In particular, technologies—in practice, work process, and home/work boundaries are examined in detail as important aspects that shaped and were shaped by the perceptions, experiences, and practices of time(s) in LC. This paper argues that 1) members constructed and used their "collaborative technologies" around their shared notion of "real-enough time," rather than around a temporality "imposed" by technologies; 2) reconfiguration of the "job" and constant recalibration of work and task schedules were critical in temporal coordination of their distributed software development work; and 3) the "temporal flexibility" as experienced by members was a social accomplishment, the consequence of negotiations and cooperation among members to help each other juggle multiple temporal boundaries and enact more effective temporal structures. Although the paper singles out each aspect for analytical purposes, they were inevitably interrelated and mutually constructive in temporal structuring in LC. It is this
multi-layered, dynamic, situated temporal structuring that characterizes the temporal experience and practices in distributed work.

- “The Social Shaping of Technological Determinism: Accomplishing Determinism Through Discursive Strategies”, Paul Leonardi and Michele Jackson, U of Colorado

Technological determinism (TD) enjoys prominence as the foil to the social shaping account. In the late 1980’s, David Edge laid upon it the blame for the widespread mistaken practice of black-boxing technological artifacts. Other treatments have tried less to discount determinism than to examine more directly the power of technological determinism as an idea (e.g., Winner 1986, Marx & Smith 1994). These studies take as their starting place that technological determinism exists, and may proceed to critique that construction, or to underscore the significance of that construction, or perhaps to explore how the construction is promulgated on a societal level through social and cultural mechanisms.

An alternative starting place for studying TD is the period leading up to its social construction, at least within a specific social context. The research literature shows clearly that technological determinism not only boxes, but it is a box itself. We propose that in addition to being a belief and an idea, technological determinism is a strategy that can be enlisted within social interactions--particularly within organizations--to accomplish specific objectives, typically those of control and authority. This paper introduces a model for technological determinism as a discursive strategy used to shape users' "perceptual affordances" (Gibson 1979) of an artifact such that that artifact is not seen as malleable or flexible. In other words, through these strategies, technology comes to be perceived by users as neutral and natural: it is "boxed." The belief or idea of technological determinism should not itself be assumed to be natural or taken-for-granted; that it, too, is socially shaped and actively accomplished.
Unboxing technological determinism contributes to studies of technologies in organizations. The core elements of a deterministic mindset—that technology is neutral and its consequences natural—may mask managerial interests promoted by the introduction of a technology (Edwards, 1980). Alternatively, workers may invoke technological determinism for establishing credibility or authority over each other or over customers. To explore this approach empirically, we analyze the strategic use of technological determinism within telephone conversations between agents and customers who called in to the "help desk" of a telecommunications and computing services organization over a four week period.


Today’s business press is signaling a transformation in how technology infrastructure will be sold and consumed. Rather than selling servers and databases, IT vendors will market services enabled by these technologies. In a new “on demand” era consumers will be offered “just what they need when they need it.” One motivation for this shift to on demand services has been the failure of IT to deliver on its promise of making businesses more productive. During the 1990s significant investments were made in technologies designed to overhaul business processes such as customer relations management and supply chain integration. While significant changes occurred in how companies interacted with their customers and suppliers as a result of the adoption of these applications, doubt remains about of the real value added by these technologies. Today only a fraction of the computational capacity of computers and file servers are exploited. By providing services not servers, IT vendors assert they will be able to make possible the virtualization of computing resources, drawing from a single, potentially distributed resource pool, thus enabling businesses to automatically respond to shifts in demands and more efficiently use available computing
resources. In addition, providing services will demand an integration of IT and business processes, the Holy Grail for IT vendors and customers alike.

However many questions remain about associated shifts in the social infrastructures required to support an on demand era. What new relationships between service provider and customer will be mandated? How deeply will service providers need to understand their customer’s businesses? What level of trust will be required when providers supply essential business services? And how will this trust be developed and maintained? In this paper we explore these issues as are manifest during the development of a web portal technology that offers a view onto the real time operations of outsourced technology infrastructures and an open communication channel between the customer and service provider. This technology is positioned as a first step in developing the transparency needed for trusting relationships and identifying interactional requirements for mapping between IT performance and technology enabled business services. The web portal will enable potentially profound changes in relationships between customers and service providers, remaking boundaries between corporate identities.

- “Consulting in Practice – a Cross Border Working?”, Kristin Lofthus Hope and Eva Amdahl, NTNU

It has become commonplace to observe that production of knowledge is increasingly important as an economic activity. “Knowledge work” or “knowledge workers” is from the field of organizational theory or the management schools presented as the backbone of the “new economy”. It says that much of the job in such organizations is to be truly heterogeneous, but on the same way the workers has to work in team. Despite (or because of their ability to handle) ever-changing constellations of projects and activities, consultants or professionals claim to deliver top quality services to their customers. One take on this is to acknowledge them as experts in boundary crossing.
Many tasks and problems are solved in what we can call knowledge groups. These groups can vary in size and members, but to solve the task they have to contain some degree of trust, cooperation, communication and identity forming between the members. We would like to look into these knowledge groups or project teams in such knowledge firms, especially consultant firms. However, what is to be a commonplace activity when people work together just for one reason to solve a particular problem? Could it just be so simple that human relation are made and unmade at a quick pace as people work on different projects with different clients at different places?

We have studied project work in two different ICT- consulting firms, and also project work in a research institution in Norway. This is a comparative study of how project work is conducted in three different environments, where mainly the employers are highly educated engineers with professional identities as consultants or researchers.

- “The Quality of Evidence in the Knowledge Management Literature: Where is the Beef?”, Norikp Hara, Rob Kling, and Hamid Elbia, Indiana University

No Abstract

8.6 Changing the Classroom: Science and Technology Education Reform

Sub-Panel 1

Piedmont Room

- “Spotlighting: Women, Gendered Knowledge, and Engineering Education Reform”, Lisa McLoughlin, RPI

Undergraduate engineering education is now undergoing a re-definition away from individualized and competitive science-based inquiry, recently considered male and elite, toward feminized design and co-operation (Downey 1998). This
paper, built on four years of undergraduate engineering education research including seventy longitudinal interviews with women engineering students, and participant-observation in three engineering programs, explores how women students are caught in the middle of this revision of the definition of engineering because of the gendered nature of the content being discussed. Both sides of the engineering education debate have used women as tropes for historically “feminized” knowledge. Those aiming at improving engineering education through the introduction of design and cooperative assignments have attempted to bolster their efforts by arguing that all students but especially women (an under-represented population in engineering) will be better served by these innovative programs. Those seeking to exclude women from engineering have traditionally used women as tropes for applied—and therefore less abstract and less rigorous—engineering practices, which they consider undesirable in the curriculum.

Contemporary attempts to improve engineering education must first recognize the gendered historical context of the types of knowledge they are attempting to meld, and then decouple the existence of women students from the definition of feminized knowledge and behaviors. This paper explores the implications of the changing definition of engineering toward the inclusion of historically feminized knowledge as it affects women students. Special attention is paid to how women in engineering (WIE) programs can respond to this transition without undue burden to women undergraduate engineering students. In particular, the paper develops a theory that existing WIE programs create an unintended backlash labeled “spotlighting;” that is, they highlight women by gender in ways that are uncomfortable to them. It suggests that WIE programs require revision to reduce the spotlighting burden they place on women students, and explores ways that this could be accomplished while retaining their positive effects.

• “Claiming the Classroom: A Case Study of Feminist Pedagogy at a Technological University”, Deborah Blizzard, Rochester Institute of Technology
Technological universities or “polytechnic institutes” in the US are bastions of science, technology, and the pedagogical stances that support their instruction. These settings are intriguing sites of knowledge production as their students (and administration) privilege “the sciences” and student populations tend to be white and male. Although a polytechnic institute may offer undergraduates a sound technological education, it may threaten the perceived validity of other non-science courses and instructions. The worldview promoting a technological university may be challenged by liberal arts courses that critique or theorize the sociological, cultural, and epistemological foundations on which the institute is founded and from which it develops. Some liberal arts faculty and students may feel marginalized as they promote other ways of “knowing” and “doing” as relevant methods and sites for exploration. This problem may be heightened when the topic examined is critique or theorization of gender, science, and technology. This paper examines a pedagogical attempt to create a feminist classroom designed to critique and theorize gender, science, and technology at a technological university. Utilizing student interviews and drawing upon daily questions submitted by students for class, this paper examines the various iterations and growth behind the questions to demonstrate that students claimed the classroom through their questions and discussions. Through the process of finding and using their political voice (as students) they were able to engage in feminist critique. A hallmark of feminist theories and approaches is to find silent or hidden voices within sociopolitical interactions. This pedagogical approach invited students to anonymously voice their concerns and, when comfortable, to develop these issues in a classroom setting. This approach laid the groundwork for students to feel comfortable critiquing and theorizing gender, science, and technology at a technological university.

- “Does the ‘Cyborg’ Label Apply to US Women of Color Physicists?”, Maria (Mia) Ong, Harvard U
In contemporary science studies literature, the cyborg is primarily marked by its embodiment of human-technology interdependence. However, as theorized by Donna Haraway in her seminal work, “Manifesto for Cyborgs,” the cyborg is more broadly defined as a hybrid entity that lives out "permanently partial identities and contradicting standpoints" and, in so doing, counters existing hegemonic categorizations that exile the minority experience. In other words, the cyborg’s presence enables the possibility to politically and socially transform communities of practice.

Haraway specifically identifies U.S. women of color as cyborgs who are "synthesized from fusions of outsider identities." She acclaims the liberatory writings of minority women as evidence that cyborg identity is about the power to survive and to transform communities. As cyborgs, women of color are beings who should celebrate and gain power from their monstrosity, multiplicity, and marginality.

Given recently emergent research on experiences of women of color, and particularly women of color in science, it is appropriate to re-consider whether or not the “cyborg" label may be applicable to members of these groups. My seven-year study on the career trajectories of young, aspiring female minority physicists provides some empirical data against which to test the optimistic claims about cyborg possibilities of empowerment and transformation. Physics provides a curious research site because of its composition of predominantly White, middle class men who claim that cultural attributes in the context of science are neither meaningful nor consequential.

The cyborg concept must be re-theorized in two major areas to apply to contemporary women of color. First, they are not monolithic in their everyday practices, as they are portrayed in Haraway’s work. They do not all act and think the same towards a goal of feminist liberation. The research finds that women of color in physics sometimes act in self-interest, sometimes not, depending on
individual circumstance. Second, Haraway emphasizes the main cyborg tool of power as writing. The study finds that this role is too limited. Transformation of community and self may be co-constitutive via other means. A stronger, more responsible, more dynamic theory for the true transformation would consider—alongside writing—the contributions of performance, of political activism and social movement, of lived experience of emotion, and of notions of time and space.

8.7 Commercializing Science

Morningside Room

- “Science Policy in Private: SETI and Political/Economic Change”, Arthur C. Fricke, RPI

This presentation explores how one area of 'big science' has been transformed in response to economic and political changes. SETI (Search for Extra-Terrestrial Intelligence) is a scientific research program in which radioastronomers use large radio telescopes to search for alien radio signals. Until the early 1990s, SETI research was funded primarily by NASA. In 1993, however, all direct government support for SETI was terminated due to congressional cost-cutting pressure and the field’s popular association with UFOlogy.

Rather than lobby for a continuance of federal funding, SETI researchers instead built a private financial network from direct public enrollment, foundation grants, and donations from wealthy individuals. Today, the SETI Institute (the largest research organization in the field) manages a $15 million dollar yearly budget – $5 million more than when it was subsidized by NASA. SETI's success with private funding is indicative of larger trends in scientific research. Similar
changes in scientific practice and funding have occurred in biotechnology, space
exploration, and other ‘big science’ fields.

SETI is a particularly illuminating example of science research privatization for
two reasons. First, it is frequently associated with UFO investigation, which
makes fundraising based on popular media exposure somewhat complex.
Second, the fact that SETI researchers have generated no evidence of extra-
terrestrial intelligence in nearly fifty years of searching places SETI in a difficult
position; it competes for donations against other private organizations whose
benefits are quantifiable, immediate, and socially acceptable, such as hunger
relief. Their enormous success in fundraising despite an unusual cause and no
evidence of effectiveness deserves study. This paper will therefore explore how
SETI scientists have worked throughout the 1990s to build new forms of scientific
legitimacy and material support for their research.

- “Sex, Drugs, and the Depression: The 1930s As the Foundation for
  Patenting University Research”, Jane Robbins, U of Pennsylvania

By the 1930s, the National Research Council of the National Academy of
Sciences (NAS/NRC) had been struggling for years with the “patent problem,” or
how to handle discoveries made in universities with funds provided by public and
charitable sources and intended for the public benefit. When several discoveries
with staggering potential to affect public health and safety emerged from the
NRC-funded Committee on Drug Addiction and Committee for Research in the
Problems of Sex, it became clear that a more coherent approach to patent
questions was needed. At the same time, the country, with the help of some
leading scientists and industrialists, was trying to find ways to “stimulate new
industries” as a means of speeding recovery from the Depression.

Drawing on the archival records of the NAS/NRC, this paper will provide an
overview of the environmental conditions and the key patent cases that prompted
two important conferences in the 1930s that brought together representatives
from academia, industry, and government around the question of patent policy for universities. It will describe the issues under consideration and the debates (as memorialized in their complete, unedited, unpublished transcripts) that provided a foundation for university patent policy today. Attention will focus on ideas and their fate; who argued which positions and the extent to which their views dominated or influenced those of others; and the reasoning or evidence offered in support of various approaches to the problem.

This paper will show that the mounting contemporary legal and ethical concerns often characterized as unintended consequences of Bayh-Dole were more aptly “ignored” or “minimized consequences” that were well recognized and hotly debated at the time. It will argue that the 1930s laid the foundation for the widespread adoption of patenting by universities through an organized campaign to convince research institutions that patenting university research was the prudent way to ensure the “public good.”

- “Changes in Attitudes Towards Patents: Bibliometrical Analysis of Quality Papers in Japan”, Masashi Shirabe, Tokyo Institute of Technology

Much has changed in attitudes concerning patents in Japan. Specifically, awareness about the importance of academic sectors in patenting has risen rapidly.

Since late 80s, "Japan's technology free ride", which is not necessarily adequate, had been a quite common criticism of R&D activities in Japan. In response to such criticism from abroad, Japanese government set The 1st Science and Technology Basic plan in 1996. In 2001, the 2nd plan was also issued, but the government shifted emphasis on policy priorities. That is to say, the role of science and technology in restoring the competitiveness of Japanese industry was emphasized increasingly, mainly because of the lingering recession in Japan
and partly because of US universities’ success in generating new industries by science and technology.

In addition, Japanese government and also society have repeatedly called for dramatic reform of the Japanese national university system, due to changes in demographical and economical conditions. Finally, it is decided that all the national universities in Japan will be turned into independent administrative entities.

These two pressures, which came from common grounds, is forcing Japanese universities to develop their policies for contributing to Japanese economy and secure their financial independence, although they have been strongly urged by the government to improve their level of basic research until recently. As a result, Japanese society, as well as universities, comes to focus on activities / organizations / policies in universities relating to patents.

In this paper, I’d like to illustrate this series of changes in attitudes towards patents appeared in quality papers, by using bibliometrical methods.

- “What are the Consequences of Scientists’ Increasing Dependency on External Funds?”, Grit Laudel, Australian National U

In many countries we can observe a tendency for scientists to become increasingly dependent on external funds for financing their research projects. The positive impact of external funding – it enables research that could not be done otherwise – is counteracted by the increasing share of non-scientific work for ‘fundraising’. What raises even more concern is that scientists adapt their research to conditions of funding.

The aim of the paper is to identify the conditions that affect scientists' opportunities to apply for external funding, and to show how the necessity to
meet prerequisites for funding affects researchers' decisions about their research.

A comparative study of conditions of resource acquisition by experimental physicists working at Australian universities and German universities was conducted. The field Experimental Physics was chosen because research in this field requires significant resources, most of which have to be available locally in a research group's laboratory. 45 German and 21 Australian research groups were studied. In the semi-structured interviews, the researchers were asked about their general working conditions; how their research is funded; and how they choose their sources of funding.

In both countries, the increasing dependency on external funding appears to affect the content of the research that is conducted. Scientists' growing dependency on external funding undermines their ability to maintain continuous research trails, which in turn is one of the prerequisites for successful fund acquisition. A second finding is that conditions of external funding appear to promote the production of certain types of knowledge (short-term, empirical contributions to the mainstream), while the production of other types (e.g. long-term methodological developments) is discouraged.

8.8 Experts and Politics Approaches II

Stephen Turner, U of South Florida

Crown Room

- “Principal-Agent Theory and 'Science in Policy': Strategies and Mechanisms for the Generation and Use of Reliable Knowledge”, David H. Guston, Rutgers U
This paper uses principal-agent theory – a political-economic model of delegation and contracting previously applied to science policy only in areas of the sponsorship of research – to examine issues of expert input into policy decisions. As such, the paper’s central focus is the variety of strategies and mechanisms through which reliable knowledge enters the policy debate. It draws from a variety of cases in regulatory science and other ‘science-in-policy’ activities in the United States. The first section of the paper introduces relevant points of principal-agent theory to articulate a preliminary vision of ‘science in policy.’ The subsequent sections elaborate how these issues play out in the design of institutions providing ‘science-in-policy.’ The paper concludes by outlining a general set of science policy strategies and mechanisms that may help reduce the problems of agency involved in generating and using reliable knowledge in a policy context.

- “Can Liberal Democracy Co-Exist with Expertise?”, Stephen Turner, U of South Florida

Liberal democracy assumes, and to operate as it is intended to, requires, a certain level of de facto equality between its citizens. Traditionally it has been understood that certain forms of economic inequality would undermine, or make sham, liberal institutions. Various devices have been designed to avoid this, for example by restrictions on political expenditures to "level the playing field." This paper considers knowledge inequality as a parallel condition, and asks whether differences in knowledge between experts and citizens, even if experts are not a "class," can have similar consequences for liberal democracy, and considers whether the usual devices for protecting against these consequences, such as popular science education or attempts to make science "accountable," can have meaningful effects-- or whether their effect is the unintended one of increasing the power of experts.

- “The Power of Knowledge in Policy Making”, Peter Weingart, Bielefeld U
Science Advice to Politics may be understood as a conflict between two different types of knowledge. The conflict is unavoidable because modern democracies rest on two legitimating resources: delegation of power by vote and knowledge. The influence of scientific experts has increased steadily over the last half century but has neither ended in technocratic regimes nor has it led to a higher rationality in policymaking. The plethora of arrangements of scientific advice to politics reveal, instead, the continued attempts on the part of policymakers to maintain the independence of their decisions against the ‘uncontrollable influence’ of experts. The latest development is the call for the ‘democratisation of expertise’ which leads to the involvement of a broader public and the media but raises questions about the meaning of representation with respect to interests, values and knowledge.

- “Bodies of Expertise”, Sheila Jasanoff, Harvard University

No Abstract

8.9 Feminist Perspectives on Technology and Medicine

Athens Room

“TechnoFeminism”, Judy Wajcman, Australian National U

- “Negotiating Acceptability of the IUD: Co-construction of Technology and the Body”, Chikako Takeshita, Virginia Tech

No Abstract

- “Pharmaceutical as Fetish: Technologies, Gender, and Commodification”, Jennifer Fishman, Case Western Reserve U

No Abstract
In science and technology studies, a focus on unravelling technical and scientific relations often marginalizes social and political relations. From a sociological standpoint, it is critical to conceptualize social relations, or the social, as central to changes in sciences and technologies. Tracing everyday actions of social movements as they intersect with the state, capital and experts is one way to expose social relations and group agency as integral to theory and practice of science and technology in contemporary contexts. This paper draws on cyborg feminism, the politics of counterhegemony, and institutional ethnography to outline a comparative approach to science studies and social movements that ensures social relations remain visible at the surface of analysis. This approach is used to compare everyday actions of different social movements confronting similar topics, including women's health, pharmaceuticals access, and environmental degradation. This comparison of social movements demonstrates how the production of counterhegemonic cyborg discourses can be a conscious strategy to keep the social visible by cutting across specific science and technology discourses.

- "Wild Women and Military Men: A Story of Gender and Engineering in 17th Century France", Chandra Mukerji, UC San Diego

No Abstract

8.10 When is a Citizen an Expert? When is an Expert a Citizen? Contemporary Science and Technology in the Biosciences

Richard Tutton and Anne Kerr, U of York and Sarah Cunningham-Burley, U of Edinburgh
STS scholars are at the forefront of efforts to unpack notions of expertise and citizenship surrounding contemporary science and technology. Patient support groups are one example of new forms of biosociality which blur the boundary between expertise and lay knowledge. Public consultation exercises about developments in the biosciences also stress the values of ‘active citizenship’ and ‘consumer involvement’. As Collins and Evans (2002) argue, expertise is no longer to be considered an exclusive attribute of professionals but can be seen as existing more widely in society. We might add that scientific experts must also be seen as citizens with particular responsibilities for the consequences of their work. This panel would investigate a number of issues in relation to expertise and citizenship. In what sense are the identities of citizen and scientific expert becoming blurred? Is citizenship being redefined as involving a form of expertise? How do expert-citizen relations map onto professional-public relations? How do people come to represent themselves or are represented as ‘experts’ or ‘citizens’ in particular arenas? What functions do these identities serve especially in public consultation exercises about contemporary science and technology? How do professionals negotiate their identities as both experts and citizens in relation to policy processes?

“Expert Patients”, Lindsay Prior, Cardiff U

This paper focuses on the concept of an ‘expert patient’. Expert patients are a product of sociological discourse, but have since been realized in policy-making bodies – such as those of the UK health care system (the NHS). Their emergence raises interesting sociological issues about the nature and substance of lay expertise. Here, the salient issues will be examined in relation to the deployment of vaccinations in the UK. Responses to the use of 2 types of vaccine will be examined – flu vaccine for older people, and MMR vaccine for
infants. Core data will be drawn from interviewee accounts of what vaccines ‘are’ and what vaccines ‘do’. With respect to flu vaccine, the paper will rely on data collected from in-depth interviews with older people (n = 45) and health professionals (n = 12) in South Wales. With respect to MMR vaccine, the presenter will draw on work in progress (again in South Wales) concerning the decline in the proportion of parents who agree to have their infants inoculated against common childhood diseases. This latter is currently tied up with debates in professional journals concerning whether or not MMR vaccine may be associated with the onset of autism. The debate raises fundamental questions concerning the nature of licensed and unlicensed expertise and how the concerns of lay people may or may not overlap with the concerns of health professionals. The paper will conclude with an assessment of the nature of lay expertise and of the role of expert patients in the construction of health policy.

• “Positioning Experts: Beyond the Lay-Expert Divide”, Richard Tutton and Anne Kerr, U of York and Sarah Cunningham-Burley, U of Edinburgh

Recent work in both STS and sociology has investigated the changing dynamics of professional and lay knowledge and expertise about genetics, especially with respect to public consultation exercises and the role of patient support groups. A plurality of expertise can be found in a variety of new hybrid discussion fora where experts and publics engage with each others’ views on the social implications of developments in genetics. Yet other evidence suggests that patients and publics are still in dependent positions in relation to experts, when they rely upon their guidance and advice both in the clinic and in wider policy making circles. This paper examines how groups with contrasting experiences of disability, disease, policy-making, genetic research and services, appeal to certain forms of knowledge and experience as they debate and discuss the social aspects of genetics. We argue that expertise is a relational concept so that when
people position themselves as particular kinds of experts, either implicitly or explicitly, they often position others as non-experts. However, people’s multiple identities and the different contexts in which these discussions take place, means that expert positioning is both flexible and contingent. We examine expert positioning in different contexts where professionals and publics talk about the social aspects of genetics: focus groups conducted with both professionals and publics, as well as public debates and events in which professionals and publics participated. We conclude by considering the implications of our analysis for the lay-expert divide and the construction and use of expertise as developments in genetics and health are rolled out at population and individual levels.


Fundraising, citizenship and redemptory knowledge; the social context of lay expertise in a breast cancer research charity policies aimed at increasing 'public' consultation and/or participation have emerged across a wide range of political agendas and institutional spaces in the last few years, particularly those within or linked to new developments in science, technology and medicine. The transactional social space of a 'grass roots' identified UK breast cancer research charity funding basic genetic science provides a unique and important 'practice site' (Rabinow 1999) for examining the socio-political context and consequences of such initiatives. Here the institutional identity and history of the organization powerfully links the (in this case, pre-dominantly female) activity of fundraising, as a form of 'gift' giving, to a practice of 'memorialization'. My research suggests this is a process which emerges from, as well as having consequences for, the need and desire for the knowledge or science 'lay' supporters help fund, to be 'redemptory'. That is fundraising as memorialization is done in the pursuit of and hope for a 'cure' for breast cancer. In this paper I explore how 'ethical' policy initiatives aimed at increasing lay advocacy bring new articulations of and
requirements for authority, expertise and citizenship in ways that threaten to de-stabilize the established nexus of social relations between lay supporters and scientists.

- “Introducing Science, Introducing Hierarchy: Genetic Engineering and the Clash Between Consensus and Expertise”, Sara Skodbo, U College London

The blurring of consumer, citizen and expert roles has been characteristic of many European responses to the genetic engineering of foods, as the ‘consumer’ and ‘citizen’ are increasingly involved in political decision-making. Attempts to address the question of who has a right to decide has also been central to Norwegian regulatory responses to genetic technology. The public or ‘lay’ people are drawn into decision-making processes through consultation exercises, citizens’ juries and the close interaction between consumer groups and government agencies. The case of Norway provides an interesting contrast to countries such as the UK or the US. The ‘battle lines’ between expert-led governance on the one hand and non-expert public on the other, do not exist in the same way in Norway. Historically, rather than a political tradition dominated by hierarchical, expertise-based decision-making processes, the Norwegian one has been characterized by close identification between state and citizen, based on values of consensus, equality and sameness. Decisions have traditionally been made by the government on behalf of the people, based on moral adherence to the perceived will of the majority. Science and expertise have not formed the primary basis for political legitimation. This paper shows how the current establishment of ‘expert’ and ‘non-expert’ roles has unforeseen consequences. The introduction of genetic technology and the accompanying international political technologies (such as consultation exercises and the subsequent importance of scientific knowledge in the public body) are radically challenging traditional practices. Notions of scientific authority and expertise that were hitherto relatively unimportant to the legitimation of political power have become central, with striking consequences for Norwegian understandings of the
relationship between self and state. Previously close identification between
governed and governing appears to be under threat from the need to regulate
genetic technology in line with international practices, exemplified by the EU and
UN. Consultation exercises and interaction between consumer groups,
environmentalists, government and industry in Norway are in fact redrawing the
meanings of the relationship between state and citizen.

- “From Deficit to Democracy: the Changing Framework of Scientific
  Governance”, Alan Irwin, Brunel U

There has been a noticeable shift in the international rhetoric of science and
technology policy over recent years. As the European Commission states in its
2002 action plan: “the objective...is to change the relationship between science
and society”. Similar expressions are found in the 2000 House of Lords report on
Science and Society. No longer dismissed as dangerously radical or
controversial, the language of public engagement and consultation is more
widely accepted (and indeed presented as self-evident). Previous STS research
has proven influential so, for example, concepts such as trust and the existence
of multiple publics are routinely expressed within policy statements and
government reports. Industry also has taken a lead in encouraging the new
climate of transparency, responsibility and dialogue - as corporate web-sites
often indicate.

This apparent paradigm change raises a series of further questions about the
framing of public engagement with science and technology - and the relationship
between the expressed commitment to citizen participation and institutional
practice. Old notions of the deficit theory tend to re-emerge in the structure of
consultation exercises. Lingering institutional assumptions about the ‘general
public’ also appear highly resistant to change. Science communication still
largely assumes an ignorant and uninformed public for science. Scientific
institutions often place themselves as neutral 'referees' within discussion and
thus effectively exclude themselves from public scrutiny. Industrial organizations are confronting difficult issues of the public response (and potential opposition) to technical innovation - and the possibilities for a more anticipatory approach to social concerns. Meanwhile, the government commitment to science-led economic growth is generally undimmed. In this situation, the relationship between the public as 'citizens' and as 'consumers' becomes especially pertinent.

It is timely to reflect upon the changing character of scientific citizenship and governance - including the possibilities for a more creative approach to science and technology policy. The proposed paper will reflect upon these issues and their significance both for scientific governance and for the theoretical and empirical development of STS. Where next for the STS-governance relationship? The paper will argue that this is as much a challenge for STS researchers as it is for science policy practitioners.

COFFEE BREAK

**Session 9: 10:30-12:15**

**9.1 4S and the World Summit Process – Roundtable Session**

Wes Shrum, Louisiana State U

Georgia Room

- “North / South Perspectives on the Information Society”, William J. McIver, Jr., U at Albany; Olinca Marino, LaNeta, Mexico

This will be a comparative examination between the perspectives of the global North and South around the social impacts of information and communications technologies (ICTs) and the corresponding development of ICT policy. The
specific context for this study is the process of the World Summit on the Information Society and the civil society actors engaged in them. See http://www.itu.int/wsis


Globalization is the buzzword of our time. In areas as diverse as finance, environment, and trade, policy makers increasingly confront issues that cross national boundaries and affect people around the world. However, global issues can confound national governments, because no government’s jurisdiction covers all the areas affected by a policy.

The United Nations is the preeminent institution for the governance of global issues. In recent decades it has held a number of “world summits” to addressing pressings issues in globalization in such areas as women’s rights, racism, sustainable development, and environment.

Currently the UN is planning a World Summit on the Information Society (WSIS), to be held in December 2003 and 2005. The UN hopes that WSIS will promote understanding of the myriad ways that information technology impacts society, including development, gender, intellectual property rights, and knowledge creation. More importantly, the UN claims that WSIS will produce a political action plan by which ideas will be put into practice. The point of WSIS will not be to merely understand the information society but also to realize it in practice.

How likely is this? How much action can result from a UN summit? What kind of opportunities for change does WSIS present? This research will seek to answer those questions.

The research will study previous world summits with an eye towards identifying “things that worked.” To the extent that other summits lead to social change and political action, what form did that change and that action take?
Questions we will examine include:

- What actors produced change? Governments, industry, NGOs, or some combination?

- What was the scale of change? Did it take the form of broad agreements, or were smaller deals struck that achieved something concrete?

- What mechanisms embodied change? Was it funding, changes in discourse, new alliances, modifications in behavior, social networks, etc.?

The research will produce a document intended to be useful to participants in WSIS. It should help them recognize the opportunities presented by a world summit and the tactics and strategies by which change can be realized.

- “Science and Global Sustainability: Where Do We Go Next?”, Clark A. Miller, U of Wisconsin-Madison

  No Abstract

- “A Role for Science Studies in the World Summit”, Wiebe E. Bijker, U of Maasstricht

9.2 “Freeing” Open Source: Action Research and Ethnographic Perspectives

  David Hakken, SUNY Institute of Technology

  Sub-Panel 2

Ardmore Room

- “Opening Content”, Karl Hakken, Cultural Practices

A large and ever increasing portion of the programming effort behind the internet has been directed at building content management systems (CMS). A CMS is a
piece of software that employs a set of information organizing rules to invisibly guide browsers to whatever information they need. For example, the two big picture W3C initiatives at the moment, XML and the Semantic Web, appear to be just new approaches to CMS.

Dozens of open source/free software CMS have been built, a proliferation that seems somewhat contrary to the spirit of the open source movement. Except to the expert programmer these systems are often hard to tell apart. An STS critique of the methodology will reveal three key errors in the methodology that guides CMS development: First, that the information organizing methods universally employ formal rules to separate out types of information, causing a proliferation of alternate cases in contextual situations. Second, that the development of these systems routinely confuses information with knowledge, making the systems only useful to the most expert of users. And third, that the tenuous relationship between the sharing of source code and the political agenda of the open source community fails when it encounters an intellectual property landscape that is multi-textured.

In addition to detailing the parts of this STS critique, this paper will describe the early stages of an action research project that mobilizes the critique into a new approach to the provisioning of appropriate resources via the web – knowledge networking.

- “Independent Alliances, Dedicated Defiances: Community, Contest and Collective Action on Slashdot.org”, Anita Chan, MIT

For advocates of free/libre and open source software (FLOSS), the online news and discussion site Slashdot.org has served as the primary source for daily, geek- and technology-centered news. With its content contributed, constructed, and moderated through the collective participation of its users, Slashdot’s assemblies of news and discussion boards serve as dynamic spaces where new formations and expressions of techno-sociality and online collectivity manifest.
This study contributes to the research on contemporary social movements and online communities through an exploration of the various modes of collective network action that emerge from Slashdot. Incorporating a consideration of Slashdot users’ own descriptions and interpretations of their experiences both on and off the site, an analysis of content from Slashdot and related sites, and mainstream news accounts of the site, this study reveals the diversity and (at times latent) power in network actors’ modes of participation. Such modes include user practices exhibiting allegiances to the site itself – in, for instance, the exercise of social and political activisms that express shared values with other Slashdot users, and in users’ combined impact on the access of digital information beyond the site. They may also, however, encompass practices reflecting defiances of the site – in moves to break away from the site to form distinct, often contestory ones, and through users’ attempts to exercise and display “improper” uses of the site.

For while collective action has traditionally been approached the expression of a social movement whose participants share a unified sense of purpose and cohering body of political practice, the forms of collective network action that are expressed on online news and discussion sites like Slashdot are not ordered by any single logic or structure, but by multiple ones that operate at times in support of it and at times in conflict with it. Critically, as well, Slashdot’s forms of network action are reliant upon the activity of a diffuse body of participants who may often not even recognize the collective dimension or impact of their action. That the practices of network actors, despite their diversity and disunity, nonetheless call attention to and may generate pronounced visibility around, themselves, however, ultimately testifies to the power and strength of collective network actions.

- “Ethnographic Research and the Internet”, Bernhard Krieger, Cambridge U
Alongside recent developments in information and communication technologies new forms of social interaction arose during the last years. Especially the Internet brought along changes in communication patterns within existing social relationships. The issue of my considerations, however, are groups of people whose integration into a community is constitutively based upon the Internet. Open source software developers pose a challenge to ethnographers since this new form of dispersed community is not referring to a specific locale, but to a technological matrix. In this paper I shall discuss how one can undertake ethnographic research among people who are using recent communication technologies to build important relationships. The argument will be that the ethnographer has to engage reflectively in the virtual environment as well as in the offline settings of the field. In these circumstances the research methods are extended by new techniques of data collection, however the principles of the ethnographic approach stay the same. I begin this paper by pointing out how the ethnographic approach has conventionally been understood in anthropology tracing some of the challenges to and changes in the methodology focusing especially on moments where it became apparent that working in a single field site is not sufficient. I will then look at methodological problems of ethnographic inquiries among people who use the Internet. This will lead to the specific situation of open source software development. Since open source programmers are placed in different social and cultural contexts, any research on this phenomenon must be comparative.


Software developers, in many Open Source Software (OSS) projects, work in geographically distributed locations, rarely or never meet face-to-face, coordinate
their activities exclusively over the Internet and are often unpaid volunteers or are paid by an institution or company that does not own the project. This software development practice appears miraculous to some: how can loosely interacting, volunteer labor produce high-quality software? While it might appear that OSS projects defy the norms of conventional or commercial project organization we hypothesize that, perhaps, OSS project organization is not at all revolutionary.

For any large software system one can map out, what in software engineering is called, an "ownership architecture" (cf., Bowman and Holt, 1999). Specifically, one can chart out who "owns" -- i.e., who makes changes and extensions to -- which modules of the system. General software engineering implications for such "architectures" include, for instance, "Conway's Law": the social structure of the project (e.g., who manages whom, who communicates with whom, etc.) has a direct influence on the structure of the software itself (e.g., its division into modules).

Most OSS projects produce conventional software products (e.g., programming languages, operating systems, network clients and servers, etc.). We are exploring the possible influences of an "inverse Conway's Law" that could explain how the "miracle" of organization of OSS development is not at all miraculous: the technical structure of the software might directly influence the social structure of the project. It may be the case that OSS development methods work only because the "parceling out" of the work is well-known to most computer scientists even before the start of the project.

Our research interrogates the design processes of an OSS project devoted to the development of a programming language called Python. Through ethnography and close readings of email archives and source code, we are examining the socio-technical couplings produced through the Python development process and then comparing this to the social structure (i.e., the “ownership architecture”)
embodied in the source code of the Python project. Our paper will explore the evidence for the possible influence of an “inverse Conway’s Law.”

- “Mediating Ethnography”, Anne Beaulieu, KNAW

The Internet, as both a new setting and a set of new technologies for doing ethnography, raises new issues for ethnographic work, and for theorising anthropological approaches. This paper analyses and contributes to current discussions about methods in anthropological (especially ethnographic) research on the cultures of the Internet. It considers how technology has been presented in turn as an epistemological boon and bane in methodological discourse around virtual or online ethnography, and cyborg anthropology. It maps these discussions with regards to intellectual traditions and ambitions of ethnographic research and social science.

Two important discourses can be identified, which reflect on challenges to the practice and meaning of ethnographic work. The first seems to revive a number of traditional notions of objectivity. Notably, the ideal of the unobtrusive observer has been heralded in relation to various internet contexts (lists, MUDs). The invisibility of the lurker has been celebrated, for ‘finally’ enabling the gathering of material at the ethnographic level, without the intrusiveness of the tape recorder or disruptive physical presence of the analyst. A second set of arguments concerns the possibility of retrieving the totality of relevant interactions, via the ‘traces’ these leave in cyberspace (email archives, etc.) The paper considers how, and where, these claims serve to (re)establish the ethnographic approach as a particular kind of objective social scientific practice.

A second discourse raises issues that are familiar to STS scholars under the label of ‘situated knowledge’. The Internet is presented as exploding the complexity of these questions, rather than enabling the ethnographer to overcome or bypass them. Concerns with technological elements in the practices of fieldwork are thus the starting point for further reflexivity, and
highlight the need to situate knowledge of the virtual, or the opportunity for enriching the ethnographic armamentarium.

The paper therefore proposes that these new discourses around ethnography help shape the place of ethnographic work in current practices of knowledge production (including attempts at social relevance, contributions to technological innovation, etc). It also sheds light on the continuing importance of the modernist link between technology and objectivity, and on the ways in which this relation can be rearticulated in order to serve the study of cultures of the Internet.

9.3 Nature, Information, and Materiality

Rachel Prentice and William Taggart, MIT

Sub-Panel 1

Sherwood Room

• “(Dis)Illusions of Life: Robotics and the Elderly Body”, William Taggart, MIT

With populations in the post-industrial world expected to age dramatically over the the course of the next two decades, technologists in these societies have begun to imagine and design new technosocial regimes for the care of the elderly. In the context of critical labor shortages and rising costs, technologists in Japan and the United States are envisioning a significant role for so-called "personal service" robots within these new regimes. These robots are currently being designed to perform a number of different roles, including carrying out basic surveillance and data collection, enabling remote tele-medicine capability, and providing a modicum of social interaction for the aged. The development of these technologies raises a set of important and complex problems and questions. For example, how is the development of these technologies promoted and legitimated by roboticists and their supporters? How are these technosocial regimes imagined and how do public fears inform and shape the design process?
How is human behavior and culture understood by roboticists and how are these understandings inscribed upon and within their creations? How do such inscriptions work within and across cultures? This paper seeks to examine the constructive tension between the public anxieties provoked by the development of these technologies and the ambitions of robot designers, who seek to mitigate such fears.

- “Implementing the Autonomy of Science in China”, Wen-Ching Sung, Harvard U

On April 20 2003, Jinto Hu, the State President and the Party Chief of China, visited the Beijing Genomics Institute (BGI) in recognition of its speedy release of the SARS coronavirus genome sequencing to the GenBank. This visit reveals the mutual dependence between scientists and the state. For the Chinese government, science has been promoted as an impetus for economic development and as a final remedy for health problems. For Chinese scientists, the visit of a national leader symbolizes governmental support for that institute; and BGI had longed for the government’s blessing since its establishment in 1999.

Based on my 10 months of fieldwork at BGI in 2002, I find that the development of BGI has created a niche at the interface between the local and the global contexts; and its path indicates that a new way of practicing science is emerging in China. In contrast to the norm of government-planned science in China, BGI was set up and owned by several overseas Chinese scientists retuning from abroad, with startup money from Wenzhou businessmen. Initially, the Chinese government had no interest in joining the HGP consortium because it considered genome sequencing to be a costly technology without major scientific value. The Chinese government was eventually motivated to invest in BGI after it had joined the Human Genome Project (HGP) without governmental support. That is, BGI utilized its participation in the HGP to legitimize itself in the local scientific
community on the one hand, and became a Chinese representative among the international genome sequencing network on the other hand. Because BGI never produced any profitable product, government funding has been essential for its survival. Yet government funding for BGI has never been secure since BGI is a privately-owned company. To secure government funding, leaders of BGI have continued to seek more opportunities for international collaboration, because this will not only bring about the social and cultural capital necessary to survive, but also function as a protective umbrella for BGI to walk the subtle line between the private and the public research sectors. Furthermore, the choice of species for genome sequencing has to be in line with the national agenda. As a result, BGI sequenced the pig genome, rice genome, and SARS coronavirus genome. In the past, China controlled its scientists by nationalism; now, Chinese scientists use nationalism to articulate the value of their scientific interests.

- "Managing Diversity in Germany: Developing New Strategies for Importing New People", Stefan Sperling, Princeton U

In 2002 two debates occurred in Germany: the first concerned efforts to reform the immigration law and centered on establishing criteria by which to judge which foreigners should be permitted to enter the country, who should be given what kinds of work visas, and who should be granted the benefits of full citizenship. The second debate surrounded the importation of human embryonic stem cells for research, and focused on establishing criteria by which to assess which cells possessed human dignity and were therefore at least partially subject to those rights conferred by the German constitution. Both debates resulted in controversial laws that are now in different stages of being implemented.

In analyzing these two debates and the laws they helped shape this paper investigates the processes of selection, evaluation, and classification through which stem cells and immigrants are, or are not, constituted as citizens. The
paper also investigates the rhetorical resources through which conceptual spaces were constructed in which new legal statuses and rights could emerge. Although the links between the two debates and their laws went largely unnoticed, their parallels reveal strategies by which Germans seek to manage the differentiation and proliferation of dangerous entities entering their culture. By paying close attention to the roles of legal, scientific, and ethical discourses and practices in these controversies and their settlement, the paper seeks to contribute to understanding the constitutive roles played by law, science, and bioethics in constituting governable polities.


Can we think of citizenship without the creation of the “population”, a practice that is always associated with a demographic counting and classification? Can a pre-state society transform its members into citizens without conducting a census or applying any kind of demographic gaze? And if this is the case, why the statistical aspect of supplying/establishing citizenship is neglected in the literature on citizenship? Following these questions, the purpose of this paper is to draw some sociological comments on the theoretical and empirical possibilities of the connection between citizenship and statistics as major practices of the modern nation-state. Three different aspects of this connection will be discussed: 1) The liberal notion of citizenship has ideological similarities with the statistical gaze, especially in both implications: both create individuals as the basic unit of each discourse; both function as inclusive and exclusive institutions; 2) The relationship between the two discourses is also practical in the sense that by the definition of the “population” statistics enables to form the infrastructure for supplying citizenship, especially in newborn states. As a consequence, the civil subject is being constituted; 3) Citizenship and statistics, while creating and demarcating the boundaries of the collective, they both deconstruct the
boundaries of the communities within this collective and transform their members to a chain of unmarked individuals who are seeing directly by the state.

The empirical focus of the paper is the first major project undertaken by the Israeli Central Bureau of Statistics - the population census. It was conducted in November 1948, the year of the establishment of the new state, during the height of the War of Independence. The first census was the main practice that determined what would be the nature of the political participation of the prospective citizens. The categories appeared in the census defined the type of citizenship that was allocated to the residents in Israel-Palestine. It also created a unique category of Palestinian citizens - “Presents-Absentees” – citizens that their citizenship rights were legally denied.

9.4 Application Dominance and the Disciplinary Structure of Science

Michael Stoeltzner, U of Bielefeld

Fulton Room

During the past few decades science has lost the monopoly of knowledge production. To an increasing extent, knowledge is produced in the context of concrete applications that are hardly accessible to laboratory research and within already developed social contexts that cannot be freely modified as the parameters of an experiment. In virtue of these developments, sometimes tagged “knowledge society”, science is forced to meet the complexity of real-world situations which do fit into disciplinary boundaries.

The session addresses the effects of these developments on scientific modeling, the role of simulation and experiment, and the dynamics of application-oriented subdisciplines. (i) In the field of waste-management and recycling, we typically encounter real-life experiments and a recursive learning process. Long-term experimental investigations at actual disposal-sites involve a variety of social and
economic concerns that add to the inner-scientific complexities of the problem. (ii) In climate research, application dominance is expressed by the results' potential use in political discourse. This has led to a hegemony of complex simulation models and to pragmatic – sometimes “artificial” – integration of various parts of the climate system in order to reach “realistic” models that make possible politically unambiguous conclusions. (iii) Nuclear fusion requires the stable confinement of hot hydrogen plasmas in a reactor. Since decades the goal has been to build one reactor demonstrating the feasibility of this technology, because not all questions could be modeled in smaller scale experiments. Plasma technology, the physics of low-temperature plasmas, is conducted by small research groups that are more detached from fundamental theories. Despite these differences there exists a fruitful exchange of various modeling strategies and technology that is more likely to keep the newly emerging field of plasma science together than a common cognitive object. (iv) Nanotechnology is a rapidly growing new research area that combines different fields of physics and chemistry under the roof of promising technological applications. With the formation of new research organizations funding and steering these applications, the influence of the disciplinary structures is challenged. By bibliometric methods the thematic and social structure of this new field, and the disciplinary profiles of collaborations will be shown.

- “Plasma Science or Fusion Research? On the Notion of Discipline in the Context of Application-Cominated Science”, Michael Stoeltzner, U of Bielefeld

Application-dominated science differs from both epistemically oriented science, where applications come after theoretical insight has been reached, and applied science that operates in a domain the scientific foundations of which are already reasonably understood. In application dominated science, the solution of a large-scale application problem cannot be found by local trial-and-error strategies but requires to establish a local context of models and, in order to increase reliability,
connect it with other local contexts of models, theoretical insights, mathematical
techniques, user communities, etc. These links often transcend the traditional
boundaries of disciplines or subdisciplines and provide a new embedding of the
various research programs launched to solve the application problem. The aim of
the paper is to discuss at a case study whether such an embedding can be
understood as a surrogate of a scientific discipline.

In virtue of its comparably long history, the promise of clean energy production,
the high scientific complexity of core issues, its concentration in large research
centers, fusion research is a good example of application-dominated science. But
in recent years also plasma technology has underwent rapid progress. Dealing
with a great variety of applications, plasma technology is done by small research
groups in connection with local industry. Although both communities are largely
separated, in recent years the idea of a plasma science embracing both fields
has been propagated. How can such a claim be justified? Talk about a fourth
state of matter covers too large a scale in the physical world to be comparable
with well-entrenched subdisciplines such as condensed matter physics or high-
energy physics. The paper argues that the various types of links, in particular the
transfer of strategies, keep the discipline together to a larger extent than the
intuition of a common object of study.

- “Real-life Experiments or Simple Social Practice? Science and the
  Production of Knowledge in Complex Settings”, Ralf Herbold, U of
  Bielefeld

In the late 1960s Donald T. Campbell coined the term “Reforms as Experiments”.
His widely discussed pretentious program failed because society wasn’t willing to
carry out wide parts of social politics under the guidance of science. Technocracy
might no longer be a key issue but scientification and expertise are since then
core themes of the social and political sciences. Today we can observe a
renaissance of Campbell's ideas in form of experimental clauses in legislation
and as real-life experiments in technology, or a tentative stabilization of socio-
technical systems. The leading pattern here is a type of recursive learning
process of knowledge production.

Complexity and the lack of knowledge are typical characteristics for real-life
experiments: In the field of waste-management, numerous substances might
interact in a disposal-site in unforeseen ways. The function of a new system of
recycling depends on heterogeneous actors and their compliance, the
development of markets, technologies, and regulation. Therefore pilot plants and
projects are used to cope with uncertainties and to gain knowledge which is fed
back in form of improved functional hypotheses. This recursive strategy of
knowledge generation differs from sheer trial-and-error processes by the
consciousness of uncertainty admitted by involved actors and society.

It will be argued that this form of knowledge generation and coping with
uncertainty is a main feature of the recent social evolution.

- “Simulation in Climate Research. Tinkering as a Fingerprint of Application-
  Dominated Science”, Johannes Lenhard and Günter Küppers, Bielefeld U

In climate research, the so-called general circulation models (GCMs) occupy a
position at the top of a pyramid of different simulation models. GCMs are huge
and complex simulation models, running at only a few research centers
worldwide. The majority of researchers in the field, however, is working with
smaller models of different specific aspects of climate, e.g. the formation of
clouds, the dynamics of winds in the stratosphere, and so on. Why is this plurality
of models getting down to one big simulation model and how can such
heterogeneous parts be integrated?
Stated shortly, we claim that the hegemony of complex simulation models is a phenomenon of dominance by application. The results of climate research have to be good for arguments in political discourse and that means that one is interested in “realistic” and “unified”, i.e., all-encompassing, models. This condition affects form and method of simulation models and can be called an effect of application-dominance.

In some sense, the architecture of GCM models is reflecting the conditions for their application, as the coupling of subfields (atmosphere, oceans, cryosphere, biosphere, …) takes place despite the absence of any general theoretical framework. Input-parameters of one part are influenced by the dynamics of other parts and vice versa. This relation is implemented by the ongoing exchange of parameters during the (simulated) time-steps. These coupling mechanisms could be described as tinkering together the different parts of the climate system. Somewhat ironically, the demand of ‘realistic’ models – on the part of the application in the political context – leads to ‘artificial’ integrations – on the part of the architecture of simulation models. For this reason the pragmatic integration of heterogeneous models in general can be understood as the “fingerprint” of application dominance.

- “The Disciplinary Structure of Nanoscience. On the Role and Functions of Disciplines in a Strongly Interdisciplinary Research Organization”, Holger Schwechheimer, U Bielefeld

The disciplinary organization of the production of scientific knowledge is one of the most important and fundamental characteristics of the modern sciences. Disciplines are involved in many functions which are constitutive for the science system. Education, allocation of reputation or financial resources inside the science system as well as the markets for expertise, skills and funding are organized bearing on disciplinary categories. The concept of disciplines links the cognitive and social structures of science by providing a mutual reference frame
for competing claims inside both spheres. The idealized autonomous and internally driven dynamic of science depends partially on the ability of disciplinary fields to translate external demands into their own logic.

Although the disciplinary system adapts to external changes by further differentiation, by the emergence of new disciplines and more or less transient inter- or multidisciplinary research areas, the retreat of disciplinary research is an important aspect of the fundamental change of the science system (postulated by Gibbons et. al.). Significant changes in the role of the disciplines should be detectable by looking at fast growing interdisciplinary research areas like nanoscience, with a strong orientation to future technological applications and roots in the large traditional disciplines physics and chemistry. With the formation of new interdisciplinary research organizations, explicitly fostered or initiated by national funding initiatives, the influence of disciplinary structures especially on the allocation of funding is challenged. A bibliometric analysis based on the Science Citation Index shows the development of the cognitive and social structure of Nanoscience research. Disciplinary profiles and institutional co-authorship relations in the main fields of Nanoscience will be visualized.

- “Soviet Communication Studies: The Unfulfilled Project”, Maxim (Koupovykh) Waldstein, U of Illinois

The social studies of science are often aimed at providing constructivist accounts of certain recognized achievements in hard sciences. Alternatively, my study deals with an obvious failure story in social sciences. The question I would like to explore is why, despite repeated attempts and rich conceptual resources accumulated by adjacent disciplines, the field of communication studies did not emerge in Soviet academia. This question is motivated not by the normative expectations based on American experience but rather by close observation of the politics of science and intelligentsia in late Soviet period and after the fall of communism. Based on original interviews and previously unexplored archival
materials, this observation reveals a number of influential groups, both among authorities and scholars, interested in translating their respective discourses and practices through “communication” as a basic metaphor, technological medium and professional field. These groups include government’s planning agencies, party’s propaganda departments, educators, economists, psychologists, sociologists, linguists, even literary theorists, and art historians. By following a number of specific encounters, I reconstruct the structural and eventual conditions of the ultimate failure of the projects in which these groups were actively involved.

In answering my main question, I am addressing a number of issues of more general applicability. Methodologically, I am advocating the significance of failure stories for illuminating the nature of existing structural constraints as well as contentious relationships between different fractions of governmental and academic elites. Substantially, this idea implies that non-institutionalization and paucity of applied research in such fields as speech and mass communication points to specific oppositions and conflicts on multiple levels of Soviet academic and political regimes (i.e. oppositions between those who produce and who order scientific results, between Soviet and Western academia, and more). Ultimately, my analysis of the unfulfilled project of Soviet communication studies contributes to the methodology of the sociology of knowledge and to the currently underdeveloped field of Soviet/Russian science and knowledge studies.

9.5 Environmental Ethics

Sharon Anderson-Gold and Rachel Dowty, RPI

Highlands Room

- “Ethical Dimensions of Global Warming”, Sharon Anderson-Gold, RPI
STS scholars have long been aware of the manner in which scientific uncertainty is used to obscure the recognition of the ethical dimensions of science policy and impede the political debate of different policy options. Similar issues arise concerning environmental policy. Global warming is an environmental phenomenon with complex ecological and economic ramifications of international significance. Because of these impacts global warming is an issue of international distributive justice. Yet Americans are largely unaware and apparently unconcerned about their own inequitable role in creating barriers to international cooperation in this area. This paper analyzes the question of ethical responsibility for human induced climate change, examines and criticizes the current US position on this issue and explores alternative approaches to ethical responsibility for the global climate.

- “Designing the Face of an Oil Corporation Through Public Relations”, Rachel Dowty, RPI

Changing World Technologies announced the opening of their first commercial thermal depolymerization (TDP) plant in May 2003. The company claims that TDP can turn waste materials like plastic bottles, sewage, all agricultural wastes (animal and plant), medical wastes (transfusion bags, needles, razor blades), biological and chemical weapons (just not nuclear waste), and anything else that has carbon in it, into natural gas, oil, carbon and salable minerals. And, at 85% efficiency and scalable from acres to the back of a flatbed truck, CEO Brian Appel makes oil for $15 barrel now, but plans to lower that to $10 within three years, the same price he says oil is sold now by medium-sized oil exploration and production companies. But he also stresses that the oil industry is not expected to assume a competitive posture against the process, and instead embrace it because of the many ways it can make the oil companies’ business practices cleaner and more profitable. What does “cleaner” mean in the culture of oil? Where is it shown? As a citizen by law, a corporation has a “face” just like any other citizen. Public relations departments at Changing World
Technologies, like at Exxon-Mobil, ChevronTexaco, and Shell Oil attempt to use sophisticated trial and error to portray the face they want to portray successfully. They have information gathered with focus groups and market testing. How does it show in the “face” of the corporation painted by public relations information? Public relations strategies reflect what companies want the public to think about them. What do they want the public to perceive about their company and its products? They want to be generally seen as good and as clean as possible in the face of fears of environmental degradation, global warming, and bioterrors summoned by “dirty” technology. The design of the corporate face through public relations thus characterizes what the corporate citizen thinks the public thinks of as “clean,” representations of environmental and economic stewards keeping the treadmill of production in sync with ideas of ecological modernization. Designing such a face involves planning to bring a face to the world that reflects what the corporation thinks that the public thinks is a good thing to do.

- “Message to the CDC: Let’s Get Real about Obesity!”, Ann F. La Berge and Catie Piehl, Virginia Tech

The dialogue on obesity is ongoing, from the Centers for Disease Control (CDC) to medical journals, to popular health magazines and newsletters, to the latest diet book. In spite of the evidence before our very eyes—that Americans are getting fatter and fatter—the optimistic discourse continues: Individuals can take control of their appetites and bodies and can lose weight and be healthy. The latest expert organization to contribute advice is the CDC, which has proposed a simple technological solution: everyone should wear a pedometer. Only 10,000 steps a day could put overweight and obese Americans on the road to weight reduction. I read about this proposal in my local newspaper, The Roanoke Times and World News, in an article entitled: “Get Off Your Lazy Bum and Walk, says CDC.” The article did not mention that 10,000 steps a day equal about five miles.
Is this just more advice which most Americans will not heed? My message to the CDC is: Let’s Get Real about Obesity!

In the land of elevators, moving sidewalks, drive-through businesses and automatic everything—the latest I have seen is an automatic soap dispenser, now available at select airports—many Americans can move through the day without engaging in much physical activity. Our technologies conspire against us. Meanwhile, those who resist such slothful tendencies engage in what I call “industrial exercise.” The prison treadmills of the past fill the exercise clubs of those who think they have found a technological fix.

In this paper I will explore the contemporary discourse on obesity and argue that most of the suggestions on weight loss, both scientific/medical and popular, are doomed to failure. We have, in short, done ourselves in. We have developed technologies ranging from labor-saving devices to industrial food production that seem designed to promote the very obesity we fight. While we pursue profits, we get fatter. Experts encourage individual solutions. Yet these do not work. I will ask: what if we took public health history seriously? Can the lessons from public health history offer possible approaches to help us manage what has been widely called “the obesity epidemic?”

9.6 Changing the Classroom: Science and Technology Education Reform

Sub-Panel 2

Piedmont Room

• “Technoscientific Civic Engagement: Unsettled Citizenship, Tactical Controversies, and the Constitution”, Michael Flower, Portland State U

Bruno Latour’s Politiques de la Nature argues for a New Constitution and a new politics characterized by a ‘power to take into account’ and a ‘power to put in order’. I wish to advance the argument that Latour’s approach to the constitution
of common collectives can inform the increasingly prominent interest in civic engagement. I will argue that several key networks of national association, think-tank, and agency civic engagement initiative offer interestingly different commitments to engagement and citizenship, and that as a consequence they offer us different opportunities for testing Latour’s two new powers, especially as they regard local and regional technoscientific controversies. This presentation will include suggestions for university-community projects appropriate as test cases for interdisciplinary science courses designed for general education. This work is part of a continuing effort to bring together science studies, university-level science education reform, and civic engagement understood as a return to more democratic governance.

- “Beyond Science Education: Why Scholars Working Within the Social Studies of Science Must Engage Social Justice Pedagogies”, Jane Lehr, Virginia Tech

Some have employed the critical lens provided by work emerging from our field to ask these Social justice approaches to education begin with a recognition of inequality and multiple forms of oppression in our world today. Part of their educational project, then, is to challenge inequality both inside and outside of the classroom by examining the creation and maintenance of systems of oppressions and privileges – and to encourage students to challenge the silences and omissions within the texts of our everyday lives: “Whose voices? Which stories? What meanings? Who benefits? Why?”

questions within science education settings. For instance, Emily Martin’s sociological work on the “romance of the egg and the sperm” pushes science educators to ask: How do our biology textbooks and curricula reinforce oppressive gender discourses? What are our students learning about gender and gender relations in science classrooms? How do other metaphors – metaphors
about race, gender, sexual orientation, physical or mental ability, religion – shape scientific knowledge today?

However, little attention has been paid to the education about science that happens outside the traditional science education setting. In place of the critical engagement of scientific knowledge in non-science classrooms, a silence dominates. What happens within this silence? The libratory potential of social justice pedagogies goes unrealized.

Scientific knowledge, knowledge production practices, authority, and expertise function as ultimate truth in our society – science speaks for nature, or so the story we are all told goes. This scientific knowledge is then used to achieve closure in public and private debates, in most cases silencing alternative knowledge systems and knowledge. Thus, how we are trained to think about science – or not think about science – embodies different understandings of the status of its knowledge, knowledge production practices, authority, and expertise. These understandings then shape our ability (or inability) to challenge science, which, in turn, determines our ability which, in turn, determines our ability (or inability) to challenge all forms of expertise and authority – our ability to create a more just and equitable world.

As scholars of the social studies of science, we must help to break the silence about science across the K-12 and university curricula. It is our responsibility to engage those committed to social pedagogies. We have much to offer.

• “Flexible Technoscientists: Meanings, Challenges, and Opportunities for STS Education and Activism”, Juan Lucena, Colorado School of Mines

“Flexible technoscientist” is a complex concept with a multiplicity of meanings, challenges, and consequences to students, educators, activists, and university administrators. It is often assumed that flexibility in human resources is a requirement brought by changes in global capitalism that people either accept or
resist. Some higher education administrators and faculty use “flexibility” as a justification for organizational and curriculum change, internationalization of their programs and people, conference themes, etc. Some have successfully incorporated this concept in a variety of ways. Yet a detailed analysis of the meanings of flexibility, along with its challenges and opportunities for STS education of technoscientists, remains to be done. In this paper I analyze the meanings and practices of “flexibility”, outline existing and potential challenges associated with this concept, and provide concrete examples of opportunities for STS education and activism to refine “flexibility.”

- “No Attention to Exactness”: Framing the Curricular Values of Chemical Education at the University”, Donald Cotter, Mount Holyoke College

Introductory education is one means by which the scientific community differentiates itself from and mediates its relationship with the lay population, by legitimating that separation and inviting a few recruits across the border. As scientists withdraw professionally from popular communication, it can be no surprise if introductory curricula remain static. Chemical education exhibits such stasis. Its essential features have been conserved since Alexander Smith's 1906 "Introduction to General Inorganic Chemistry", a text that established modern curricular practice by injecting Ionist thought into American chemical education. Some of the contemporary barriers to general science education and scientific literacy can be traced to the packaging of chemical information for educative consumption during the early framing of the persistent curricular structures of general chemistry

Smith's transformation from a competent but undistinguished organic chemist into one of physical chemistry's most ardent and influential curricular advocates has lingering implications for contemporary practice. When he was called to the University of Chicago in 1893 by the organic chemist John Ulric Nef, he was a little-known, journeyman organizer at a provincial college. Professionally
suspicious of the inorganic and physical chemists he had hired to build his undergraduate program, Nef saw an opportunity to replace them with a like-minded young colleague from his own field. Ten years later, Nef's relationship with his intended protégé had strained to the breaking point and Smith had rejected both Nef and his entire discipline as professionally unsound. This upheaval of his professional values occurred just as Smith was beginning the work that would establish him as the central figure in chemical education in the US. After Nef, Smith would express consistent disdain for organic chemists, characterizing them as imprecise, careless, sloppy. In Ionist physical chemistry he found his antidotes to these qualities, and he embraced them with a convert's fervor. Two of general chemistry's characteristic features - the almost complete exclusion of organic chemistry and its concerns, and the monolithic importance of quantitative problem-solving - are thus developmentally related. His rift with Nef set Smith on the course he would follow for the rest of his career, and is thus the critical event in the professional maturation of American teneral chemistry's chief architect.

9.7 Science and Art

Morningside Room

- “Social Identity in Science Fiction and Artificial Intelligence”, Corinna Schloombs, U of Pennsylvania

This paper analyzes Science Fiction Fandom in the 1950s and its relation to Artificial Intelligence. It argues that Science Fiction fans and AI researchers expressed similar social identities. The relation between science fiction and science has often been framed in terms of science popularization: science fiction, it has been argued, serves to popularize scientific methods and ideas, and it inspires scientific research and career choices. AI is exemplary among the fields that feature as prominent topics in Science Fiction literature, and fandom in this paper is seen as a link between professional Science Fiction writers and reading
scientists. Based on analysis of fiction writing, autobiographical, historical and other reports, this paper studies typical fan activities such as conventions, magazines, and clubs. It compares generational patterns among fans and AI researchers, expressions of self-images and political attitudes, and organizational forms. Both groups expressed similar exclusionist identities and critical positions towards mainstream culture. These parallels suggest that they are expressions of similar subcultural group identities in reaction to the mainstream culture of the 1950s, especially its McCarthyist and Cold War rhetoric. This paper goes beyond understanding the relation between science and science fiction as an exchange of ideas. It shows that consideration of social identities provides new ways of understanding the cultural embeddedness of science.


This paper will look at the Darwinist origins of nuclear apocalypse stories through a close reading of H. G. Wells' The World Set Free (1914). This novel coined the term "atomic bomb," and also provided the first narrative where civilization is destroyed by an exchange of these bombs. Much has been written about Wells' prescience in this novel, but little attention has been paid to the fact that the entire novel is in the form of an evolutionary metanarrative. In other words, Wells sees the development of the atomic bomb as the inevitable result of man's evolution as laid out by Charles Darwin. In The Descent of Man (1871), Darwin argued that tool use was central to the physiological evolution of humanity. Humans had been naturally selected for tool use, he asserted, which is why humans developed larger brains, upright posture, and agile hands: these physiological traits contributed to the better invention and manipulation of technology. H. G. Wells was trained in science by T. H. Huxley—who was also known by the nickname of "Darwin's Bulldog"—and was heavily influenced by the Darwinist vision of human nature. Thus when Darwin tells the story of atomic
power and atomic bombs in The World Set Free, he sees these technologies as the ultimate manifestation of man's unique evolutionary gifts. The Darwinian framing of this narrative will be explored to show how Wells not only naturalized technology, but also how he distrusted human nature. In order to continue to progress, Wells' narrative shows how humanity must confront its animal nature in which the classic Darwinian impulses of both cooperation and competition are constantly at war with one another. The atomic apocalypse scenario provides a dangerous warning, as humanity destroys its civilization due to its inability to control its fierce competitive nature. Thus we can see Wells' ambivalence towards technology, as it is simply an outgrowth of a terrible animal nature that can destroy us all. At the same time, the destruction of civilization provides a "blank slate" where the world can be rebuilt by the better part of human nature. This is Wells' utopian vision: that we can learn to cultivate the better part of our natures and use technology to build rather than destroy. In this way, this paper argues that The World Set Free establishes both the generic frame and the major themes of nuclear apocalypse narratives all the way to the present day.

- “Mining the Arts for Digital Visualization”, David Ribes, U of California – San Diego

Transforming the massive and intractable data produced by contemporary scientific instrumentation into comprehensible and useful representations has become a major endeavour for digital visualization. This paper will focus on the emerging profession of visualization researchers and their relationship to the domain-sciences. For this presentation I will closely follow the research paths of three individuals who work on visualization, and who take their inspiration from art, artists and art history.

Computer scientists and information technologists have turned to the arts, both living artists and art history, as an unformalized resource for knowledge about effective representation techniques. These researchers take the arts as a sort of
database to be mined, extracting techniques for visual representation, and have then begun to incorporate these techniques within computer programs for digital visualization. This phenomena includes a double movement of formalization of arts knowledge, and the informalization involved in delegating and automating these rendering tasks to software/interfaces.

Guiding questions include 'Where do visual conventions in digital visualization come from?' and 'What might be the implications of a new semi-autonomous profession of representation creators?'

- “Expressive AI”, Michael Mateas, Georgia Institute of Technology

The field of Artificial Intelligence (AI) has produced a rich set of technical practices and interpretive conventions for building machines whose behavior can be narrated as intelligent activity. Artists have begun to incorporate AI practices into cultural production, that is, into the production of artifacts and experiences that function as art within the cultural field. In this talk I describe my own practice of AI-based cultural production: Expressive AI.

Expressive AI combines art practice and AI research. For Expressive AI, the essence of the computer as a representational medium is not the ability to intervene in the production of three dimensional forms or visual imagery, nor the ability to interact with a participant/observer, nor the ability to control electro-mechanical systems, nor the ability to mediate signals sent from distant locations, but rather computation, that is, processes of mechanical manipulation to which observers can ascribe meaning. In my work I pose and answer novel research questions that would not be raised unless doing AI research in the context of an art practice, and make interactive art that would be impossible to conceive of or build unless making art in the context of an AI research practice.

Expressive AI is a form of critical technical practice (CTP), that is, a technical practice that actively reflects on its own philosophical underpinnings and, by
bringing in humanistic and artistic knowledge, approaches, and techniques, results in new technological systems that would not otherwise be built. This reflective critique consciously constructs new, contingent myths to heuristically guide the practice.

In this talk I describe why AI is a particularly interesting technical tradition to combine with an art practice, offer a brief survey of some of the genres or modes of AI-based art, and position Expressive AI as a research and art practice that simultaneously makes technical contributions within AI while engaging in critical reflection on the foundations of the discipline.

- “The Paleontology of Knowledge”, Sha Xin Wei, Georgia Institute of Technology

No Abstract

9.8 The Politics of Science Advice

Sub-Panel 1

Crown Room

- “Tracking Scientific Expertise in U.S. Policy Deliberations on Environmental Problems”, Stephen Zehr, U of Southern Indiana

This paper looks at some changes in how scientific expertise is constructed and brought to bear on policy deliberations in the acid rain, ozone depletion, and global climate change cases during the 1980s and 1990s. Empirically, it draws mainly upon congressional hearings. Several issues pertaining to scientific expertise will be considered including: 1) tensions and transitions in boundary maintenance between science and politics; 2) the place of consensus documents in constituting and legitimating scientific expertise; 3) a transition in the treatment of economic issues/interests from a realm separate from expertise (falling within
the domain of interest groups and policy actors) to something increasingly colonized by scientific expertise; and 4) the development of expertise discourses that encapsulate scientific, environmental, political, and economic aspects of environmental issues. Theoretically, the paper connects up with work on co-production and the development of hybrids as they relate to environmental policy-making.


A number of organizations are created with the express purpose of bringing science to bear on policy questions. These organizations operate on the boundary between science and policy and, like other boundary organizations, must successfully serve two distinct constituencies whose respective goals for the organization are in tension. Specifically, organizations on the science-policy boundary must negotiate between the demand for objectivity and the requirement of policy relevance. At the heart of this tension is a myth about the usefulness of objective information in guiding policy decisions. The myth arises from the erroneous assumption that objective information dictates, without being interpreted normatively, specific policy choices. In practice, however, organizations on the science-policy boundary must engage in the exercise of filtering objective information through a set of values in order to derive from science a set of policy implications. This practicality does little to temper demands both within and outside such organizations that both goals must be met equally, in spite of the fact that success in one increases the likelihood for failure in the other. It may be surprising, then, that some organizations on the science-policy boundary have been relatively successful.
This paper explores success and failure on the science-policy boundary by examining the efforts and fates of three organizations involved in science and policy regarding acid rain and climate change. These organizations are the National Acid Precipitation Assessment Program (NAPAP), the Intergovernmental Panel on Climate Change (IPCC) and the National Research Council. The paper relies on data from the media and congressional hearings in order to measure salience and legitimacy of these organizations’ respective outputs. While all three organizations achieve a relatively high degree of salience in terms of media stories and attention in congressional hearings, the IPCC and the NRC are much more effective in defending the legitimacy of the reports they produce than NAPAP. Given the variation in success, the paper explores the strategies employed by each to conduct “good science” while maintaining policy relevance.

Finally, the paper examines the extent to which the relevant strategies—namely, “buffering,” “loose coupling,” and “barrier”—reveal or disguise the underlying values used to derive policy implications from scientific information.

- “Toxic Torts, Think Tanks, and the Vertical Integration of Expertise”, David Mercer, U of Wollongong

Examples from litigation and 'public inquiries', in the U.S., Australia, and New Zealand, involving alleged health risks of EMF/RF, "Electric and Magnetic Fields and Radiofrequency Radiation" (eg. powerlines, telecommunication installations and mobile telephones), will be used to explore the notion of the 'vertical integration' of expertise: where the same experts who produce scientific research are also actively involved in shaping the legal/regulatory environments where it is evaluated. 'Vertical integration' can be understood as a strategy of resistance to the problems of the 'deconstruction' of expertise in legal settings and a response to recent legal trends (eg. "Daubert") where experts find that they are increasingly required to frame their evidence according to formal 'hybrid'
legal/scientific standards. The growth of 'vertically integrated' expertise has also been promoted by the effective lobbying of politically conservative 'think tanks' who have amplified public and legal concern that there has been a socio-legal crisis involving the spread of so called 'junk science'. The growth of 'vertically integrated' expertise in the EMF/RF debate will be used to critically reflect on some of the challenges associated with Collins and Evans recent calls for science studies to develop a 'normative theory of expertise'.

- “Models of Expertise for Public Policy”, Willem Halffman, U of Twente

In the recent calls for a 'normative theory of expertise' the problems that such a theory should address are under-defined. Either problems remain unspecified or are narrowed down to a particular problem, such as the over-extension of expert status. This paper proposes to lay the groundwork for a normative theory of expertise in a more wider inventory of problems of expertise. The expansion of the agenda is compensated in the restriction to the more specific problem of expertise for public policy.

In various fields, public policy has actually already addressed the question of how to integrate expertise in policy making in a wide variety of ways. The variety of de facto 'solutions' are not only drawn up in response to different conceptions of the role of experts, but also in response to specific policy problems at hand and the wider institutional an power configurations in policy fields. Experiences with such models for the organization of expertise suggest two major tenets for new approaches. Firstly, that an normative theory of expertise will have to break out of the epistemological fascination of constructivist STS to include more developed notions of politics policy making, taking into account the field of forces in which expertise has to operate to develop viable alternatives. Secondly, that there is no obvious one single best model for the organization of expertise, since expertise has to operate in a large variety of public policy settings.
STS studies have convincingly shown that formal strategies, such as protocols and standards, do not adequately reflect the day-to-day reality of professional practices. Practices are too specific and complex to comply with general rules. Practices nevertheless continue to perform their duties. So the question remains how practitioners do carry on. What kind of resources do they develop to produce reliable performances despite uncertain circumstances? In our presentation we will present some strategies that are used by professionals who deal with uncertainty in practices in which the future play a key role. Our findings are based on ethnographic research in a medical and governmental practice.

Our past and current ethnographic research aims at description and analysis of the strategies used to dissolve prognostic uncertainty in practices. As an outpost of today’s health care system a neonatal intensive care unit (NICU) serves as an exemplary case for studying some of the concrete vulnerabilities in the health system triggered by the need for intervention and making adjustments on the one hand and the associated risks and uncertainties on the other. With reference to ethnographic research among professional futurists working at strategic departments of ministries, governmental laboratories and planning agencies, we will argue that similar strategies can be observed in both practices despite their different character.

One of the strategies observed is rhetorical shifting between different forms of uncertainty as a way to disguise uncertainty and in doing so, new options for acting are created. Based on observations, we would like to propose three categories of uncertainty: ontological uncertainty refers to uncertainty that a professional community attribute to the (random) variability of ‘reality’. Epistemological uncertainty refers to uncertainty that a community describes as limited knowledge, which may arise due to lack
of observations, conflicting interpretations as well as due to limited theoretical understanding. Perceptual uncertainty refers to uncertainty associated with the individual experience and evaluation of the practitioners involved.

Furthermore, we observed that strategies to deal with uncertainty are not without risk and don’t guarantee a certain future. In the proposed paper, we will illustrate this type of walking a tight rope with our observations.

9.9 The Politics of Pharmaceuticals

Athens Room

- “Clinical Problems and their Corporate “Solutions”: The Rise of Auxiliary Professions in the Clinical Trial Industry”, Jill A. Fisher, Rensselaer Polytechnic Institute
- In studies on the effects of globalization, the pharmaceutical industry has received a fair amount of attention due to its recent merger and acquisition activity and due to its stance on patent protection for drugs in developing nations. What have received significantly less attention are industry practices concerning clinical trials, particularly the recruitment of human subjects. In the past two decades, pharmaceutical companies’ inclination to outsource clinical trials has prompted the development of auxiliary professions to support medical research. In addition to the pharmaceutical (and biotechnology) sponsors of human subjects research, there are now contract research organizations (CROs), site management organizations (SMOs), clinical trial advertising agencies, and central patient recruitment companies, all linked through the Association of Clinical Research Professionals (ACRP). The reorganization of the clinical trial industry is an important symptom of globalization because the new outsourcing infrastructure serves as a decentralized risk management strategy for substantial biomedical investments. This is to say that
pharmaceutical sponsors’ fears of failure on logistical grounds (i.e., the need to have effective research sites with enough human subjects for statistical significance) has encouraged the growth of professions whose livelihood depends on minimizing the risk of trial failure and maximizing the potential profit of research developments. In addition to mapping out the new clinical trial auxiliary professions, this paper will discuss the need for this complex organization of medical research in light of systemic problems in medical practice that have made it no longer possible for individual physicians to coordinate recruitment of human subjects or management of clinical trials.

• “The Politics of Personalised Medicine: Pharmacogenetics in the Clinic”, Adam Hedgecoe, U of Sussex

Over the past 5 years there has been steadily increasing interest on the part of the pharmaceutical industry in ‘tailor made’ or ‘personalised’ medicine. This concept revolves around pharmacogenomics – the use of genetic tests to decide how to prescribe drugs. Despite the extensive interest on the part of scientists, industry and increasingly policy makers there are very few example of pharmacogenetics in use in the clinic. This paper presents the results of a three year research project exploring the use of pharmacogenetics in two conditions (Alzheimer’s disease and breast cancer), showing how this technology is entering clinical practice and its effects on professionals and healthcare provision. Taking a position from within the social shaping of technology, I show the different levels at which personalised medicine can be seen as ‘political’, moving from the clinical encounter, through scientific disputes upto healthcare rationing. This paper shows how pharmacogenomics is continually being reshaped by the social context within which it is being applied, focusing on four
main themes that come out of this research: Expectations, Resistance, Consent and Funding

- “Assessing the Impact of SSRI Antidepressants on Popular Notions of Women’s Depressive Illness”, Jonathan Metzl, U of Michigan

This study examines how Selective Serotonin Reuptake Inhibitor (SSRI) antidepressants have played a contributing role in expanding categories of women’s “mental illness” in relation to categories of “normal” behavior. I hypothesized that between 1985 and 2000, as PMDD, postpartum depression, and perimenopausal depression were increasingly treated with SSRIs, popular categories of depressive illness expanded to encompass what were previously considered normative women’s life events such as motherhood, menstruation, or childbirth. I quantified and qualified this expansion through an in-depth analysis of popular representations of depressive illness during the time period when SSRIs were introduced. Using established coding methods I analyzed popular articles about depression from a mix of American magazines and newspapers spanning the years 1985 to 2000. Through this approach, I uncovered a widening set of gender-specific criteria outside of the Diagnostic and Statistical Manual criteria for dysthymic or depressive disorders that have, over time, been conceived as indicative of treatment with SSRIs. My results suggest that SSRI discourse may have helped shift popular categories of “normal/acceptable” and “pathological/treatable” womanhood, in much the same way that the popularity of Ritalin has shifted these categories for childhood.

- “Using SSK for Historical Analysis: Inhalation Anesthesia in America”, Jenene Wiedemer, U of Toronto

Unreflective disciplinary bias limits historical investigations of Science, Technology and Medicine (STM). Creating interdisciplinary methodologies that add to the greater academic scene encourages us to explore ideas that others may have previously examined with an entirely different set of intellectual
standards. As an example of the utility of interdisciplinarity, I import from the Sociology of Scientific Knowledge (SKK) the idea that the construction of knowledge itself is paramount to historical analysis. In the case of surgical anesthesia in the United States during the Nineteenth Century, what emerges is a multiplicity of avenues leading us to drive historical narrative in novel directions.

Theoretical considerations endorsed by sociologists of science are used to enlighten this historical narrative in at least two ways. From an adaptation of D. Bloor’s symmetry principle emerges the idea that scientific, or in this case medical, knowledge has no privileged epistemic status. Clinical successes and failures cannot be judged by different explanatory criteria. In the case of inhalation anesthesia in America, traditional explanations which resort to claims about truth are insufficient to explain why surgeons believed that nitrous oxide did not cause insensibility in some contexts, but did in others. By bracketing truth as an explanatory principle, we find that the success of ether and the failure of nitrous oxide can both be explained sociologically.

I use H. Collins’ Experimenters’ Regress to show how clinical demonstrations of anesthesia were loci for the construction of knowledge. The 1844 nitrous oxide demonstration at Massachusetts General Hospital was disputed not because of empirical error or faulty testimony by witnesses, but because there was no criteria for defining a successfully anesthestized patient. The 1846 demonstration at the same facility was successful in breaking the regress by introducing Letheon (ether disguised with aromatic essences). Unlike knowledge of nitrous oxide or ether, both of which included references to entertainment and intoxication, knowledge about Letheon was negotiated ex nihilo specifically as medical knowledge.

In using some sociological tools and presenting this historical example, I hope to encourage novel interpretations in historical research. Questioning the
assumptions of one field can open up the forum to intellectual contributions from a variety of professional spheres.

9.10 Strategizing Public Understandings of Science and Technology

Michael Fortun and Kim Fortun, RPI

Savannah Room

Public understanding of science has been extensively studied, producing important insight into the ways knowledge is produced, circulated and legitimated. Particularly important studies have described multiple modes of rationality, and how the rationality of “experts” often trumps the rationalities of others. Papers on this panel will build on these studies, focusing on how public understanding of science has been conceptualized and valued by people in different organizational, cultural and historical contexts. The focus of the papers is not on the ways people actually understand science, but on the ways “public understanding of science” emerges as a goal in particular settings, is defined, and is granted both instrumental and ethical purpose. Papers will also describe different ways that public understanding of science has been pursued, through the development of organizations, communication initiatives and technologies. Papers will draw on ethnographic material from both the United States and Africa.

- “Mapping the Public / Mapping for the Public: Spatial Analysis of Environment and Health Interactions in the Case of Breast Cancer”, Erich Schienke, RPI

The ethical and methodological nuances of a public understanding of science are far from straightforward in cases where public interest initially calls for scientific data and analysis, where the public volunteers in the production of the data, and where the public itself is a key part of the data set. This paper elaborates on the ethical and methodological nuances of Silent Spring Institute’s (SSI) Spatial
Proximity Tool (SPT). The tool was developed by the Institute for risk analysis of environmental factors that have led to increasing breast cancer incidence rates in Cape Cod, MA. The SPT is an example of a diverse and ethically open technology, thus appropriate for and representative of its users, because 1) it can create new scientific analysis for peer review; 2) it successfully brings together different types of discursive data; 3) it can be used in the future both with new data and in other data contexts; and 4) it can visualize a scientific argument and thereby enhance public understanding of environment-health interactions. Research for this paper is based on interviews with the designers at Silent Spring Institute and is part of a broader study being conducted on breast cancer mapping in the U.S. and U.K.


In the last decade, there has been an increasing demand for access to treatment for people living with HIV/AIDS in Africa. However, the development industry, which is the most accessible avenue for Africans to address HIV/AIDS, favors and almost solely funds, public education initiatives for prevention campaigns. HIV prevention strategies represent the widest circulating information on AIDS in Nigeria. But for those who have access to global debates on treatment access, linked to debt and trade regimes, there exists is a great deal of resistance to prevention campaigns as a singular strategy to combat HIV/AIDS in the country. Moreover, public education on HIV prevention is sometimes viewed by people living with HIV/AIDS as flawed, inaccurate, and doomed to fail. In considering these tensions, the paper analyzes ethical arguments that are embedded in the politics of the post-colonial state, namely the state’s relationship to development, trade and debt—a relationship that emphasizes certain public education and information of HIV over and above other educational practices. The paper concludes by considering the connection between tensions of public education
strategies and the inefficient management of the AIDS crisis on the African continent.

• “Public Understanding of Science and “Development” in Kenya”, Marie Rarieya, RPI

Many development initiatives in contemporary Africa revolve around efforts to provide scientifically sound while culturally relevant information to people. Many initiatives to respond to the spread of HIV/AIDS, for example revolve around efforts to provide people with information about HIV/AIDS. Similarly, many plans to promote sustainable agriculture revolve around plans to better inform farmers about appropriate adoption of new and improved technologies, pesticide use, weather patterns, natural resources management and a range of factors that shape annual yields and long term sustainability. Thus, fostering public understanding of science and technology has become a central part of “development.” This paper will briefly describe how this is happening in Kenya today, explaining what better information about science and technology is expected to accomplish in particular development domains, and how particular organizations (government agencies and non-governmental organizations) are strategizing the circulation of information about science and technology. The second half of the paper will focus on the development and decline of agricultural extension services in Kenya as a source of public understanding of science and technology, arguing that contemporary efforts can be informed by this historical example.

• “Scientific Citizenship”, Karen-Sue Taussig, U of Minnesota

With the funding of the Human Genome Project the life sciences have become big science and big business. This status, which continues to depend on public funding for much basic research, depends, in part, upon the willingness of ordinary citizens to support that funding. One result of this necessity has been sustained attention to what the National Institutes of Health have crafted as
“ethical, legal and social implications (ELSI),” a phenomenon that has been called nothing short of a full-employment act for bioethicists and which allows scientists and policy makers to assure the public that their concerns are being addressed. A major focus of the Human Genome Project’s ELSI program has been attention to public education about genetic knowledge and new genetic technologies. This paper, based on ethnographic fieldwork, examines one such NIH-ELSI funded project—The Vermont Community Genetics and Ethics Project—as a case study in strategizing public understandings of science and technology.

LUNCH

STS Handbook Open Session 12:15-1:30

Georgia Room

Open Sessions 1:30-3:15

Open Roundtable: Launching Your Career – Getting a Grant

Georgia Room

Author Meets Critic 1

Sherwood Room


Chair: Shelia Jasanoff, John F. Kennedy School of Government, Harvard University

Discussants: Joe Dumit, MIT; Joseph Sanders, University of Houston; Andrea Tone, Georgia Institute of Technology
For a long time, there has been much concern about the need to transgress disciplinary-based specialisation when engaging with important "real-word" challenges. Thus, interdisciplinarity has been a science policy buzz-word for at least three decades. It has been and still is used by science critics who would argue that science is too specialised and that there is too little holistic thinking. However, the strongest voice is the pragmatic one who reminds us that complex problems are best handled by combining disciplines and approaches.

Increasingly, there are a lot of researchers engaged in interdisciplinary projects for such pragmatic reasons, some also for reasons of curiosity and interest.

Compared to the frequency of the use of the concept, there is little scholarly work on interdisciplinarity. The most prominent exception is the work of Michael Gibbons, Helga Nowotny et al., who have proposed a new concept?
transdisciplinarity. However, many empirical issues related to interdisciplinarity are unresolved, probably not even formulated.

For STS, interdisciplinarity is both a pragmatic and reflexive challenge. Clearly, STS offers theoretical and analytical tools that are important resources to provide a better understanding of interdisciplinary practices. Also, STS competence is very useful as a basis from which to participate in interdisciplinary projects with engineers, scientists, etc. At the same time, STS usually claims to be an interdisciplinary field in itself, but the nature of that assertion is seldom explored.

This paper will discuss various ways in which interdisciplinary practices may be described and understood, drawing upon a wide range of observations of different ways of performing interdisciplinarity in collaborative projects. These efforts to theorise interdisciplinarity will be used to reflect on how this is practices in STS research.

- “When Disciplinary Worlds Collide: Reform and Conflict in a University Department”, Juha Tuunainen, U of Helsinki

By using the social-world perspective, this paper examines an attempt to radically transform the departmental research and teaching activities in the field of agricultural science. What was sought out in this reformation was to enhance the use of natural scientific approaches in the field of plant production research and, by so doing, to modernize the department. The interview data used in the study revealed that after the reform aspirations were articulated, the departmental work community was subject to the process of segmentation generated by 1) dissimilar objects and methodologies of agronomy and the new research approaches (farming-systems research, biotechnology and physiology), 2) embodiment of disciplinary subworlds into different organizational units within the university and 3) larger social controversy between biotechnology and agroecology. As the resolution of the departmental conflict involved formation of a university spin-off company, the paper suggests that it might be productive to
conceptualize such collisions as contradictions, that is, important sources of organizational change rather than mere conflict and quarreling.

- “Social Topology of Salmonid Enhancement”, Leanna Boyer, Wolff-Michael Roth and Yew Jin Lee, U of Victoria

This study is situated within a national research program aimed at elucidating the multiple challenges faced by small coastal communities who are sensitive to the social and environmental events that shape their livelihood. Decisions that affect these communities are often embedded within scientific discourse and neglect the diverse and rich locally situated knowledge that exists within the communities themselves. This study centers on a salmon hatchery, which not only produces fish, but a wealth of knowledge about salmon biology, health and ecology. This community exists within a federal salmonid enhancement program made up of research scientists who conduct experiments on salmon and whose findings shape aspects of hatchery practices. This study was designed to understand the social topology used by the actors in their exchanges of knowledge and artifacts with others. Drawing from interviews with hatchery staff, support biologists, and research scientists as well as an ongoing three-year ethnographic study, we document the flow of knowledge between hatcheries and between hatcheries and research scientists in scientific centers and labs. We articulate knowledge flows between human and non-human actors, places, communities, networks and regions that constitute a fluid social topology. Understanding how knowledge flows, sometimes freely and sometimes not, gives us insight into ways in which scientists can work with communities and foster a mutual learning environment. We offer a potential design for scientist/non-scientist relations, based on an already existing position within the salmonid enhancement program, the support biologist.

- “Values, Policy and Research Ensembles in Socio-Technical Networks”, Dave Conz, Arizona State U
The sociology of technology remains an understudied phenomenon. Three approaches -- Actor-Network Theory, the Social Construction of Technological Systems, and Socio-Technical Networks all rely on network-type diagrams to plot the ties between actors and technological artifacts, but fall short of the promise offered by sociological network analysis. Furthermore, these approaches tend to grant primacy to technological artifacts while social actors and their interaction take a secondary role. The role of social values in network entry, formation, and maintenance is often ignored. This study synthesizes what we have learned from these approaches regarding technoscientific endeavors and lessons from sociology regarding power, agency, and interaction in social practice at the intersection of policy and economics, science and technology, professionals and hobbyists. Policy and network position both affect Research Ensembles – the arrangements of tools, skills, processes and equipment that both enable and constrain actors—which in turn affect the network in an iterative process. Actors may encounter both technological and social/institutional opposition. Peripheral actors, once thought to lack power in relation to central actors, have distinct advantages. Two strategic cases – organic food and biodiesel – are compared across the US and the UK policy milieus.

10.2 The Politics of Intervention

Teun Zuiderent, Erasmus MC and Emily Gomart, OMA/University of Amsterdam

Ardmore Room

- “Representing the Users in Systems Design. Challenges in Mediating Knowledge from One World to Another”, Line Melby, NTNU

Understanding the social character of work has increasingly been accepted in systems design as a necessary part of the design process. In some design approaches, such as computer supported cooperative work (CSCW), the need for a detailed understanding of how work is performed, how workers cooperate
and communicate and what resources they draw on, is seen as vital and integrated as part of the design process. As a consequence of this increased focus on social aspects of work, social scientists have become important participants in system design projects, conducting ethnographic studies as a basis for design. The social scientist may hold several roles in such a project, and are often politically dedicated to giving users a voice and developing more democratic technologies. Social scientists may be assigned the role of a spokesperson for users, or at least acting as a mediator of the users' world to the designers' world.

In this paper I want to elaborate on what use ethnographic data may have in system design and what the social scientist’s role may be in a design project. Furthermore, I want to discuss challenges of communicating knowledge, gained through ethnographic studies, to system designers. The discussion is based upon own experiences as a participant in a multidisciplinary group, aiming at developing a technological tool for supporting communication and information storage and retrieval in hospitals. As part of this project I have conducted an ethnographic study in the Neurological dept. in a University Hospital in Norway. The primary focus of this study is doctors' use of information. Considering myself as partly a spokesperson for the users and partly a 'neutral' intermediary, I want to communicate the doctors' world to the others in the group, as correct and truthful as possible.

Previous research in this field does neither pay very much attention to the collaboration itself between social scientists and computer scientists in design projects, nor does it give any specific advice on how to communicate findings from ethnographic studies. The collaboration and communication in our project is thus constantly evolving and changing, and the paper looks into this process in closer detail.
Researchers in Science and Technology Studies (STS) claim to ask politically relevant questions about their own work. The concern for the politics of STS has taken on a very specific form. It seems that – under the influence of feminist research concerned with the consequences of socio-technical arrangements – STS analysts came to conceive of their political task as one of being reflexive about their own role in shaping science and technologies.

Strikingly, deliberate interventions in the design, that is, in development of materialities, are uncommon moves of STS work. Despite strong pleas for the involvement of STS researchers in design practices, directly taking part in the coming about of materialities has rarely been attempted. In contrast to several neighboring fields (e.g. participatory design, computer supported cooperative work, action research) where intervention has been the practice for several decades, STS has not developed the aim to tentatively intervene, try out and test different socio-technical arrangements with the actors. They have not come to ‘situated politics’ in the heart of technology.

Several questions can be asked then. First: why? What in our field (what concerns, theoretical and methodological reflexes) has made it so difficult to conceive of ‘intervention’ as a possible activity of the analyst-researcher?

Second, once we do seek to ‘intervene’, how can we ‘translate’ theoretical concepts into relevant material forms. For example, how does health care or architecture look concretely different when STS researchers intervene in their arrangements?

Third, is speaking of ‘intervention’ a useful way out of the field’s a prioris about the role of the analyst, or may it be that when we problematize ‘intervention’ we
are still perpetuating traditional concerns specific to our field in a perhaps unproductive manner?

By opening up the range of roles of STS researchers, we hope to contribute to making STS politically relevant in new ways.

• “Making it by Making it Strange: the Politics and Design of Domestic Technologies”, Genevieve Bell, Intel Research, Mark Blythe, U of York and Phoebe Sengers, Cornell Information Science

Everyone is an expert on the home. Without being aware of it, we have been trained in the micro-politics of domestic life: what we can get away with, what we can't, who does what and why, what homes mean, and to whom. The ubiquity of 'home' and our 'natural' expertise in it can make technology design for the home intensely problematic. Technologies in the home share our intimate spaces, tacitly encouraging particular behaviors and associations, while making other forms of being in the world more difficult to accomplish. A lifetime of rich associations and deep assumptions about the home and the roles that designed objects could or should play in it provides a wellspring of inspiration for meaningful domestic research and technology design. But the challenge for researchers and designers is to see beyond the apparently natural connotations of devices and experiences to their cultural roots, since the home provides a large store of personal, cultural, and political assumptions that, if unexamined, can be unwittingly built into and propagated through domestic technology design.

In this paper, we will argue that history and ethnography of domestic life and technology can play an essential role in new domestic technology design by defamiliarizing the apparently natural meanings of domestic technology. We offer three specific examples that can support this defamiliarization in the development of home technologies for the West. Drawing from our own research in the United States, the United Kingdom and Asia, we provide three different narratives of defamiliarization: a cultural/historical reading of American kitchens
provides a lens with which to scrutinize new technologies of domesticity; an ethnographic account of an extended social unit in Great Britain problematizes taken-for-granted domestic technologies; a comparative ethnography of the role of information and communication technologies in the daily lives of urban Asia's middle classes reveals the ways in

• “Technology Trouble? Talk to Us: Findings from an Ethnographic Field Study of New Technology Implementation at a Canadian Hospital”, Ellen Balka, Simon Fraser U & Vancouver Coastal Health Authority and Nicki Kahnamoui, Simon Fraser U

Suchman and Jordan (1987) suggested that the design of technology is only completed fully once it is in use, an idea shared by many who now investigate the domestication of new technologies. Taking this idea as our starting point, we developed a research to action project with a major Canadian acute care hospital, to address technology implementation issues that arose as most units in the hospital moved to a new building, in which every piece of technology was new to staff.

Hanseth, Thoresen and Winner (1994) have suggested that typically there are no frameworks to support or encourage negotiation of all the actors’ different interests in system design and implementation, which means that explicit negotiations often do not occur, and outcomes of new technology implementations are often not equitable. To counter this frequent omission, our research team was given free reign to collect data (through field observation and interviews with staff) during and after the move to the new facility, about socio-technical problems staff were experiencing.

With assistance from the hospital, our research team developed a campaign (titled Technology Trouble? Talk to Us!) to encourage hospital staff to share information with us about the difficulties they were having with a range of new technologies introduced when the new hospital building opened. Reporting our
findings weekly to senior management staff as well as to front line workers, we attempted to assume the role of negotiators between actors with often-divergent interests in system design and implementation.

In this paper, we report on findings from this project. Emphasis is placed on how institutional arrangements influenced the range of socio-technical possibilities that could be pursued (Hanseth, Monteriro and Hatling, 1996). Work practice problems are discussed in relation to the meso or organizational contexts in which they were situated, including organizational, vendor and staff actor networks, as well as the macro-politics (which include the politics of Canadian facilities doing business with US vendors, as well as provincial politics that played a significant role in the timing of the move to the new facility) that helped shape this large scale technology implementation.

10.3 Nature, Information, and Materiality

Rachel Prentice and William Taggart, MIT

Sub-Panel 2

Sherwood Room

- "Whose Bones in Turkish Bodies? Imagination of an Economy of Violence", Aslihan Sanal, MIT

There are no Tissue Banks in Turkey. Most allografts--human bones and tissues--are imported from tissue banks in the West, which have recently started making a profitable business on the sale of human bones harvested from cadavers in the US, Europe, or elsewhere. The subject of this talk questions the imagination of this "elsewhere" which has become a space providing resources of an economy of bios in the minds of bone merchants and orthopedists in Turkey. They believe that human bones; fresh frozen, deminarilized, chopped up or in whole pieces are harvested from Nigerians, African Americans or immigrant Mexicans and sold
to the medical market in the Muslim world. This belief extends beyond the widespread rumors on the trafficking of body parts, or urban legends on kidney thefts. Bone merchants engage in conversations with their American counterparts, joke together with them on how normal it is to expect Americans to kill Blacks for their economy of expansion. While Turkish bone merchants believe that these bones might come from Africa, they also think it poses no danger to the health of the Turkish patients, for these "Black bones" have been screened and radiated such that there is no life left in them; hence no HIV, no syphilis and no other virus that they know of. In this economy of violence we see the birth of what I would like to call "objects without biographies." It is a dramatic shift in the circulation of human originating medical products and how they get naturalized through narratives of a supreme power which conducts science, produces technology, owns and sells bodies in parts and pieces.

- “The Fragmentary Female: Making Women’s Bodies Digital”, Rachel Prentice, MIT

Four digital bodies—a white male, a Korean male, a white female, and a white female pelvis—now inhabit the Internet. They are archives of cross-sections made from cadavers, used for teaching gross anatomy and graphic modeling of bodies. In their passage from cadavers to data-sets, these bodies are subject to a technological discourse, such as resolution of cross-sections and elimination of artifacts from death and imaging. But these digital bodies also have been interpellated into cultural discourses about male and female, normal and pathological, universality and race. This paper focuses on one rich intertwining of technical and cultural stories: the relation between the Visible Human Female and the Stanford Visible Female pelvis. When turned into models, the Stanford cross-sections change name, becoming Lucy 2.0, implying that she will spawn generations of digital progeny. The National Library of Medicine’s Visible Human Female contains sections of an entire woman and is technologically superior to Stanford’s model. But Stanford’s model is in high demand for two reasons: the
cadaver was upright when frozen, so organs are in more lifelike positions, and
the woman was of reproductive age when she died; the Visible Human Female
was post-menopausal. The anthropologist Thomas Csordas asks what effect
finding digital bodies, especially their interiors, transcribed and transmitted on the
Internet might have on our experience of our bodies. In this paper, I begin to ask
what might be the effect on women of experiencing the female body as merely a
reproductive-age pelvis.

• “Ethnographies of Cloning: The Life and Death of Dolly the Sheep”, Priscilla
  Song, Harvard U

As the first mammal cloned from the cell of an adult animal, Dolly made
headlines across the world after her birth in 1996 and became the most
photographed sheep of all time. Branded both monster and miracle, this instant
hybrid celebrity provided genetic engineers with untold possibilities of control
over biological processes. Debate spiraled quickly out of the livestock realm as
journalists, presidents, ethicists, scientists, infertility doctors, grieving mothers,
religious leaders, and talk show hosts seized on the feminist implications of
fatherless reproduction, decried the specter of an army of cloned Hitlers, or made
demands to resurrect beloved family members. Although the prospects of
human cloning offer much fodder for anthropological analysis, as investigators of
science and technological processes we should resist rushing into
pronouncements about the promises or perils of cloning humans and linger
instead over the concrete material reconfigurations of scientific work.

I therefore focus on a more intimate and immediate investigation of the
celebrated sheep who unleashed such a torrent of controversy: Dolly herself.
Through a life history narrative of Dolly's storied birth, premature death, and
afterlife as a stuffed museum exhibit, I explore how an ethnography of the world's
most famous sheep can provide productive ways of thinking about some of the
most fundamental concerns for an anthropology of science: constructions of
difference, issues of normativity, kinship and reproduction, and the dynamics of life and death. Instead of leaving the details of sheep cloning to the scientists and jumping directly into the political skirmishes and ethical debates surrounding human cloning, we must plunge into the world of the laboratory to participate in and witness science in action.

- "Animals in Transition - Innovating Institutions, Discipline and Cultures in Transpecies Biotechnology", Nik Brown, U of York and Mike Michael, U of London

The paper reports findings arising from UK based research entitled ‘Xenotransplantation: Risk identities and the human/nonhuman interface’. Xenograft innovation articulates with emerging configurations of the boundaries between humans and nonhumans. But just as importantly, the field also mediates and reflects wider boundary innovations between regulatory regimes, disciplinary epistemologies and longstanding cultural identities. Drawing on documentary material (media and regulatory), interview (experts, regulators, spokespersons) and focus group data (publics), the paper examines the way actors’ patterns of species identification serve to ‘ground’ favoured models of regulation, biomedical practice and political activity. We go on to expand on this notion of species identification, suggesting an underlying heterogeneous (or biosocial) relation with animals that takes the general form of ‘natural/social’ hybrids. The implications of such hybrids for the management of the novel and complex risks associated with xenotransplantation and allied innovations are discussed.

10.4 Biologies of Multiplicity: Lively Bodies, Life Histories and Livable Lives

Jeanette Simmonds and Chloe Silverman

Discussant: Rachel Prentice
Research communities in the contemporary life sciences have become deeply concerned with contingent, context-dependent processes as explanatory sites. Differential genetic expression, neonatal development, symbiotic interactions, and imaging technologies all hinge on conceptualizing the processural and time-dependent in order to conceive of the whole. Each of these conceptualizations, in turn, represents a choice of one point and perspective among other possibilities. This panel, itself a kind of exploration in productive interaction between bodies and minds, explores the implications of biologies of these temporal and interactive processes, always keeping in mind their implications for therapeutic practices and lived consequences. Representation has been an important site for thinking through technoscience; we now need to consider more deeply the consequences of materialized representational choice and the multiple bodies always implicated in technological knowledge of any single body. Significantly, the close technological attention we write of tends to produce complexity rather than the unitary organisms more commonly associated with technologically mediated and standardized visions: genetic mosaics, symbionts, neonates, and live tissues are irreducibly multiple and infectiously lively. Attuned, then, to unforeseen outcomes, we all also explore the ways in which representations tied to productively-oriented research communities (producing publications, diagnostic technologies; proprietary visualization techniques) may not always be oriented toward the relentlessly reductive. In this way, each of our communities is invested in using their techniques and knowledge to produce new ways of thinking about and living inside of biological difference.

- “One Body, One Genome? Mosaic Selves and Hybrid Identity”, Aryn Martin, Cornell U

Genetic personhood or identity is a dominant trope both celebrated and problematized in contemporary science and/as culture. In this paper, I am
interested in the political, epistemological and lived challenges that genetic mosaicism evokes for notions of genetic identity. I begin by exploring the historic and technical emergence of the doctrine that the genetic information in one cell can ‘speak for’ an entire body; it is this biological assumption that underwrites a number of contemporary practices of biotechnological surveillance, including prenatal genetic testing, forensic DNA sampling, DNA banking for purposes of identification, and pharmacogenomics. These practices, I propose, shore up resources for thinking, treating and managing the uniform genetic subject as the self-same entity as the autonomous, identifiable subject of liberal democratic states. Mosaics, however, evoke dilemmas of genetic multiplicity and hybridity, inadequately accounted for by rigid or reductionist approaches to genetic identity. Curt Stern, a prominent cytogeneticist, described genetic mosaics as “those curious creatures” who are “irregular compounds, seemingly created ‘against Nature’” (1968:28). Mosaicism is a condition in which two or more genetic constitutions, “each of which would usually be found in a separate individual,” co-exist in a single body (Stern, 1968:28). For example, someone who is mosaic for Down Syndrome has some proportion of cells with the normal two copies of chromosome 21, and some proportion of cells with three copies of this chromosome. The diagnosis of mosaicism depends crucially on which cells, from which tissues, end up under the microscope. Once a rare genetic anomaly in the purview of research cytogeneticists, genetic mosaics are newly garnering the interest of parent and patient groups, as well as disability legislators. At most, genetic mosaics present a profound challenge to the assumption that genetic identity overlaps neatly with phenomenological and political identity. At the very least, mosaics are constituted, in the laboratories, support groups and institutions through which their existence is enabled and/or suppressed, as beings with hybrid – and arguably abject – genetic identities.

- “The Shifting Visibility of Liveliness”, Natasha Myers, MIT
Analyses of The Visible Human Project have examined the implications of the shifting visibility of the human body in simulations archived in new forms of digital anatomy. Waldby (2000) compares the different interiorities of the body inscribed by two comparably intensive mapping projects: the Human Genome Project (HGP) and the Visible Human Project (VHP). Here she hits on one of the central problems in contemporary life sciences, the empirical and ontological gap in visibility between the informational content of genes, and the actualized form, processes and life histories of bodies. Life scientists working in the domain of biology however are continually working to narrow this gap by increasing the resolution of their imaging technologies. As such the species of data generated by the VHP and the HGP are currently being surpassed by the informational capacity of new techniques such as microarray analyses and live-cell imaging. In contrast to Waldby’s depiction of the genome as a unidimensional data set comprised of linear sequences of code, more currently, genomes are imaged and imagined through efforts in post-genomic research to make visible the expressive modalities of genomes through microarray analyses. This work suggests that genomes are more articulate and agile than earlier characterizations could convey. In addition, the lively materiality of bodies is being observed with new eyes through novel genetic, energetic and informatic interventions which enable the observation of bodies, cells and tissues through time. Live-cell imaging, in combination with fluorescence confocal microscopy, radically reconfigures the bodies it observes to create four-dimensional, high magnification movies of cellular dynamics and developmental processes. Reinvigorating the lost art of life science cinematography (see Landecker 2000; Cartwright 1995) live-cell imaging offers an optics that can resolve the depth, detail and duration of living forms in radically new ways. These computer-intensive simulation technologies present STS analyses of visual culture with the challenge of a new logic and language of optics. The cusp of the visible is changing again in biology. Tracking the aesthetics, desires and metaphors concatenated with these emerging practices, this paper explores an emerging language of liveliness and the changing
narrative forms of natural history made possible through new bioimaging technologies.

- “Rethinking Symbiosis Through Plant-Microbe Interactions”, Jeanette Simmonds, RPI

Emerging research programs of plant-bacterial symbiosis present an opportunity for thinking though the sciences (again) as sites of something other than reductionism: sites for emerging experimental systems, and sites of singularity and multiplicity. This paper examines the transformation of a research program that had reached its limits as an experimental system by the 1970s. With the shift from a focus on nitrogen fixation to nodulation, an experimental system pushing the limits of how to think interspecies communication events emerges. Developing a genomics (and other ?omics) of symbioses, scientists depart from research programs using biochemical analysis to quantify the products of a linear progression of events on the way to predetermined end states, to approach nodulation?often thought as complex systems of communication, interaction, and dynamic exchange?by way of an experimental system; what HJR calls ?a machine for making the future.? Models (e.g., Drosophila, Maize, and bacteriophage) have been productive of multiplicity as well as reductivity in the life sciences (‘what’s true for E. coli is true for the elephant?’). As legume and rhizobial models are selected for shotgun sequencing, a receding reductivity returns insistently. Yet insistent too is thought towards singularity; thought challenging organismal ‘integrity’ as defined by the separation of interiority and exteriority, plant and microbe, signal and receptor in a system. Drawing from ethnographic oral history interviews with symbiosis scientists and my participation in their meetings, I explore the multiple ways these scientists engage with plants, bacteria and each other. Scientists who work with these dynamic, complex systems are compelled to work at the limit of binaries such as cooperation/competition and mutualistic/parasitic, in moves that promise more nuanced approaches to communicating with the other.
Autism, a neurodevelopmental disorder that is defined by early onset and marked deficits in social interaction, communication, and behavioral characteristics, has also been defined as a constellation of symptoms around a “core deficit” in “Theory of Mind.” This concept is performed most strikingly in the now-classic “Sally-Anne” tests administered to children with autism: can the subject of the test hypothesize a mental state in another individual that differs markedly from their own (Baron-Cohen, Leslie and Frith, 1985)? As with any disorder around which symbolic meanings are negotiated daily, advocates for high-functioning autistic syndromes like Asperger’s syndrome contest both the interpretations of such tests and the implied definition of “mental disability” (see Institute for the Study of the Neurologically Typical, http://isnt.autistics.org/index.html), even as others (Klim, Volkmar, et al, 2002) seek ever finer gradations in “social phenotype,” and others (i.e. Keller, Shanker and Greenspan) suggest with a certain sense of foreboding that human populations may all be developing away from relational, affective, and embodied modes of cognition. Investigators of the neural mechanisms underlying autism wonder how the ability to perceive other bodies is grounded in somatosensory processing and self-perception. Each of these interpretations involves a translation of symptoms into signs, thus participating in a structured economy of meaning (Lukacs, 1922; Zizek, 1989); these logics are reified in diagnostic technologies, and aid in the construction of behavioral and sensory integration therapies or programs for remedial social skills instruction. Although they emerge from a range of perspectives, these approaches also share a common burden of disentangling themselves from visions of unitary self-authorship and biological normativity in favor of recognizing forms of embodied pluralism, inclusion of difference and variance, and biological commingling. While therapeutics are frequently destined to operate within a marketplace driven by profits and commodified forms of illness, ironically,
therapeutic rather than interpretative approaches to autism have focused on making difference liveable, rather than merely categorizable.

10.5 Issues in Standardization

Highlands Room

• “The Making of Sensory Analysis Standards”, Danielle Chabaud-Rychter, CNRS

In this paper I study the process of standardization of sensory analysis methods. Sensory analysis is a set of procedures and practices which aim to describe and measure human beings' sensory perceptions. It was first developed in the food industry to measure sensations related to taste. Nowadays, there is a growing trend in the design of technological artifacts produced for consumers' use, to take into account the range of sensory perceptions through which the users enter into relationships with the artefact.

Therefore, the French agency for standardization (AFNOR) has set up a new commission working on "The sensory characterization of materials". Two recommendation documents have been issued by now: one on general methodology, and the second on the analysis of touch. I have observed the work of this commission from the start.

Three points will be developed in this paper:

1) The standardization of sensory analysis as generalization and stabilization of a specific metrology. This metrology has two main characteristics: 1- the measuring instrument is the human person, 2- the object submitted to measuring has to be shaped to be measurable (i.e. to be broken down into basic organoleptic attributes). And this shaping is essentially a semantic work of categorization. This section will study this particular metrology and examine the question of its possible universalization through its standardization.
2) Writing standards and constructing consensus. This part will examine how, and on what, the experts representing different industries, sensory analysis laboratories, scholars...negotiate a consensus. And it will study the influence of the normative frame of the AFNOR on the writing of the standard.

3) The contribution of sensory analysis standards to the construction and legitimation of a professional practice.

- "Technical Accuracy and Technological Ownership: Observation from Slide Rule's Long History", Aristotle Tympas, U of Athens

Following recent sociological studies that support a socially situated conception of technical accuracy, specifically manifest within electronic computing accuracy, I propose to elaborate upon this argument by incorporating my observations from the study of the extended history of computing. Instead of rehashing the theme that technical accuracy is socially constructed, I contend that the historically-specific form of socially constructed accuracy that dominated the recent centuries resulted from the hegemonic drive toward the detachment of the computing worker from the means of computing production. I develop my argument from my investigations on the lengthy and widespread employment of the slide rule—an artifact that to date may qualify as the most important computing artifact of historical capitalism. Until the recent decades, engineering was defined by its attachment to computing with the slide rule. As I elaborate specific argument, in defending a socially situated conception of accuracy for the inexpensive slide rule against the constant attack by those who sought to promote the expensive calculating machine through a decontextualized comparison of computing accuracy, the average engineer fought a struggle to defend his ownership of the means of computing production. To be sure, this long struggle was not only between defenders of the inexpensive slide rule and the promoters of the expensive calculating machine, but also between defenders of inexpensive slide rules and promoters of expensive slide rules. As I argue further, the calamitous
history of the slide rule versus calculating machine provides us with a broader context to understand the analog versus digital contrast, not to mention the software versus hardware distinction. By interpreting debates concerning technical accuracy as debates concerning technological ownership, I relate the slide rule (analog/software) and the calculating machine (digital/hardware) positions to emphasize variable and constant computing capital respectively.

- “Fighting Interference with Standardization”, Chen-Pang Yeang, MIT

American radio grew rapidly in the 1920s. Owing to the progress of technology and the emergence of broadcasting, the number of licensed stations increased from dozens to thousands in a decade. When so many transmitters shared a limited spectrum, interference from one another was a serious problem. To the U.S. Bureau of Standards, the solution of this problem was standardized oscillators with precise frequencies. This paper examines the work of the Bureau of Standards on frequency standardization in the 1920s. Led by John Howard Dellinger, the Bureau’s radio engineers developed highly precise piezo-electric oscillators and used the devices to give an operational definition of standard frequencies. They also attempted to make the standard international by transporting the oscillators to Britain, France, Germany, Italy, Canada, and Japan for comparative measurements. Their ultimate goal was converting technical results into legal prescriptions. Dellinger and his colleagues advocated that interference could be suppressed if the radiation from every licensed station remained, under the stipulation of laws, within a bandwidth defined by a common standard. Eventually, the frequency standard became a critical reference when the Federal Radio Commission consulted the Bureau’s engineers on the issues of spectrum allocation [Hugh Slotten, Technology and Culture, 36:4, 950-986].

Historians have analyzed standardization’s roles in techno-scientific practices. They focused on the functions of standards as rhetoric to invoke scientific authority [Norton Wise (ed.), The Value of Precision], a substitute for experts’
subjective judgment [Theodore Porter, Trust in Numbers], and an interface to modularize heterogeneous objects and knowledge [Bruno Latour, Science in Action]. This paper explores a different perspective: Standardization was used to control the harmful interactions among distinct components of a technological system.

• “Give Me a Place to Stand”: Places of Leverage in the History of an Information Technology”, Nicholas Chrisman, U of Washington

Origin myths hold a particular place in the story that is used to create a new discipline or a community of practice. Geographic Information Systems have emerged from a tiny community of professionals in the 1960s to a major billion-dollar industry with trade shows and attempts to produce professional certification. At these events figures from the early days are frequently credited as founders or pioneers, but what role does this play in understanding the practice that encompasses the technology?

It may be true that the Canada Geographic Information System was the first GIS. When Roger Tomlinson first described CGIS, it was at a conference on land evaluation held in Melbourne Australia. Why did he carry the message first to this audience? What were the directions of this group that were deflected and reoriented by the prospects of GIS? The same year, Samuel Arms presented a comparison of a few competing information systems, using Tomlinson’s term as unproblematic. His audience was the fourth annual URISA meeting. If CGIS was first, what were they doing in those previous years?

Part of the question can be resolved by interrogating the maps produced for CGIS. The Canada Land Inventory had elaborate multi-criteria categories and mixture codes that show little relation to the simplicity of computer-based analysis. This project, Janus-like, is firmly rooted in a prior practice. Any sense of origins may need to be replaced with a rhizome-like web of tangled connections.
This paper will describe the community into which CGIS emerged. I will follow Archimedes (and a few others) in saying that you cannot move the earth without having a place to stand. Being "first" is only something that is apparent in retrospect. It makes sense to remember a bit more about the pre-history of GIS, not just to get the history right, but to understand how the events of prior periods influence the way the technology develops. Current GIS may owe as much, or more, to the prior development than it does to CGIS.

10.6 Instrumentalities in Science

Piedmont Room

- “Selling Science, Constructing Gender: The Role of Chemical Instrument Advertisements in the Construction of Stereotypes”, Maria Rentetzi, Max Planck Institute for the History of Science and Jody A. Roberts, Virginia Tech

In the wake of WWII, the chemical laboratory was transforming—physically and conceptually. This process of transformation included new instruments, new settings, new buildings, new funds, and new personnel. Instrument makers, too, were adapting their products based upon the changing needs of those in the laboratory. The standardized production of cheaper, but less powerful instrumentation allowed laboratories to invest in an instrument that effectively “black-boxed” much of the technology responsible for the creation of laboratory phenomena. These new instruments - smaller and less complicated - could be operated by trained technicians without requiring a full comprehension of the details of how the instrument, itself, operated.

The advertisements created by the companies in these years reflect this shift in production. Moreover, as we argue, advertisements of scientific instruments in the 1950s and 1960s created and maintained specific gender discourse through the ways they portrayed men and especially women in relation to the advertised
products. Along with the information about the instrument and its seller, advertisements also reflect constructed stereotypes of the roles of men and women in the laboratory and their participation in science, more generally.

In our paper, we explore the role advertisements played in recognizing and reifying gender within the cultures of experimentation and instrument making. Specifically, we examine the advertisements of two prominent chemistry journals—the Journal of the American Chemical Society, and the Journal of Chemical Physics.


This essay outlines the creation of the Biological Computer Laboratory at the University of Illinois under the vision and direction of Heinz von Foerster. It also considers the work at that lab in relation to two significant scientific movements in the 1960s, the Self-Organizing Systems movement, and the Bionics movement. The essay will consider the history and goals of these broad movements. More specifically, it considers several of the machines built at the BCL under the guidance of von Foerster, including the Numa-Rete, Dynamic Signal Analyzer, and Adaptive Reorganizing Automata, and how these machines constituted intellectual contributions to these new fields. The relation of these machines to these movements was highly significant, especially insofar as these devices could not be easily construed as contributions to more traditional science and engineering sub-disciplines. The paper argues that von Foerster’s contributions to biological computation lay as much in his ability to help forge entire new disciplines as it did in contributing theories and technologies to those disciplines. It concludes that von Foerster’s approach contributed to a new kind of design methodology that was far more conceptually-driven than most traditional engineering methodologies.
In late-eighteenth-century Europe, the public science museum "La Specola" in Florence was renowned for its production and exhibition of models of human anatomy in wax. The Florentine models were based on bodies obtained from the local hospital, and were supposed to contribute to the education of the general public. In the 1780s, a large set of copies was made for the Austrian emperor's newly founded military training hospital "Josephinum" in Vienna, where they were to serve a different purpose in the recently reformed training of surgeons and physicians. The models arrived during a heated public debate led by teachers at the "Josephinum" that was carried out over the relationship between the "art" of surgery and the "science" of medicine. Actors in the debate argued this redefinition of the two disciplines on the basis of the relative merits of tactile and visual skills. In this paper, I analyze how actors affirmed or challenged the models' epistemological status in this conflict, both on the level of the published debate and on the level of teaching and healing practice at the hospital. I focus on two questions: (1) What notion of the "model" emerged at the hospital from the debate and from model use? (2) How did this notion of the model figure in the articulation and implementation of institutionalized knowledge production in the service of the state?

This paper critically analyzes the Great Moments in Medicine, a series of commercial paintings produced by Parke, Davis & Company between 1948 and 1964. Using the paintings themselves, Parke-Davis company documents, and new evidence from the artist’s research files, I explore the surprising popularity of images whose stated purpose was to depict stories of outstanding persons and events whose contributions “moved medicine forward.” Beginning in the early
1950s, Parke-Davis delivered reproductions of the Great Moments series to physicians and pharmacies nation-wide. Prints with subject matter ranging from Hippocrates: Medicine Becomes a Science to Avicenna: The “Persian Galen” soon adorned the walls of waiting rooms, pharmacies, and private homes. The images, which were widely reproduced in calendars, popular magazines, educational brochures, also became the subjects a full-length promotional movie that explained the “story behind the story” by retracing the production of each image. By the mid-1960s, articles in the popular and medical presses lauded the Great Moments for “changing the face of the American doctor’s office,” while describing the artist, Robert Thom, as the “Norman Rockwell of medicine.”

Critics in the popular and medical presses have attributed the success of the Great Moments series to the artist’s ability to recreate defining moments in the history of medicine and pharmacy with an attention to detail that provided viewers with an unmediated glimpse of prior eras. Numerous articles have detailed Thom’s “intensive research” and passion for “accuracy.” However, I show that far from being a transparent recording of historical events, much of the point-of-view reproduced in the Great Moments images resulted from the fact that a pharmaceutical company employed Thom and the amateur historian George Bender to promote their “good name.” On a deeper level, the images were also shaped by prevailing 1950s American cultural assumptions about greatness, and indeed about the telling of history itself. Through this lens, present-day viewers can appreciate how the paintings translated contextual assumptions about doctors and patients, and about gender, race, and class, into universal characteristics of illness and health. The Great Moments in Medicine thus provide contemporary viewers with recordings of a particular 1950s worldview, and perspectives on the aesthetics of present-day medical marketing.

10.7 The Politics of Science Advice

Sub-Panel 2
Morningside Room

- “Diplomatory Science: a Model for Accounting Effective Policy-Advisory Science in Diplomacy”, Atsushi Ishii, Natinal Institute for Environmental Studies, Okubo Ayako, U of Tokyo and Shohei Yonemoto, Center of Life Science and Society

Complex international environmental problems necessitate massive use of advisory scientific knowledge from its detection to problem-solving. Science studies had developed several elaborate models for accounting the hybrid character of policy-advisory science. However, we argue that no appropriate model is yet developed to account for the distinct hybrid character of policy-advisory science stemming from the cultural context of international diplomacy. Moreover, it is important for science studies to provide guidelines for effective and robust conduct of policy-advisory science by taking the approach of epistemological realism. Therefore, we will construct a model which addresses these concerns and name it as diplomatory science. The model is constructed through case studies on international environmental regimes such as the European acidrain regime, the whaling regime, and the US-Canadian acidrain regime. The first regime provides a case in which advisory science is well accepted and implemented in a cooperative diplomatic process with benign atmosphere. The second regime provides a case in which advisory science is accepted but yet to implement it partly because of the harsh polarized diplomatic politics, which also affected the mode of conducting advisory science. The last regime provides a case in which advisory science failed to influence the diplomatic process partly because advisory scientists could not change the mode of conducting advisory science to address the diplomatic context and went on with usual disciplinary research science. These diverse case studies provide robustness for the construction of diplomatory science model. Regarding the details of the model constructed through these case studies, the objective of diplomatory science is to produce diplomacy-relevant and policy-useful
knowledge. In order to achieve this, the quality criteria of advisory knowledge are: political neutrality; user-friendliness; and advocating consensus of both epistemic and policymakers of communities. The utilized methodologies to achieve these criteria are: setting diplomatic-relevant time and spatial scale; managing uncertainty and ignorance; communication between scientific and policymakers of communities; utilizing boundary objects; etc.

• “Science Advice for Subpolitics”, Malte Schophaus, U of Bielefeld

The discourse on the knowledge society emphasizes the increasing role of science for all societal subsystems. That this is true for the realm of political advice can be seen by looking at the exploding number of scientific advisory committees. The discussion about science advice has even entered the opinion pages of daily newspapers – as can e.g. be seen in the case of the recent German National Ethics Council.

Interestingly, until now science advice has primarily discussed with regard to established politics (e.g. advising governments), with the exception of participatory research and action research. The discourse does not seem to connect to the line of literature claiming that Nongovernmental Organizations (NGOs) have become the “third power” besides state and market. Playing an increasing role in global politics, subpolitical organizations - like NGOs and social movements - are confronted with complex political issues as much as traditional political institutions. Subpolitical organizations also need expertise in order to define and legitimate their claims and to make decisions about campaigns.

In this paper I will address the question: what role does science advice play for social movements and NGOs? I will attempt to unfold the field of science advice for subpolitics. Starting from the presumption that NGOs and social movements are as reliant on scientific expertise as established politics, I will investigate the practices of scientific advice for the case of the globalization-critical movement in Germany.
The paper elaborates on three aspects: a) exploration of how the globalization-critical movement in Germany acquires, processes and uses scientific expertise, b) the differences between advisory processes for established politics versus subpolitics, and c) the possibility of transferring existing models of science advice to subpolitics.

It appears that scientific knowledge has similar functions (legitimation and problem solving) for subpolitics as it does for established politics. In these terms the existing models can be fruitfully applied to explain the relation between science and subpolitics. But the procedures of knowledge acquisition and production differ in subpolitics. The experts are more heterogeneous in terms of academic background and status, are rather committed to the specific political goals and maintain stronger links to the political basis and its political actions.

- “Managing Expertise: Performers, Principals, and Problems in Canadian Nuclear Waste Management”, Darrin Durant, U of Toronto

For some odd reason, practitioners of the social study of science and technology (STS) have tended to merely dabble in terms of links to science policy. Recent work, though, offers the hope of STS grounded theory-building for science policy. In particular, David Guston’s Between Science and Politics (2000) and Stephen Hilgartner’s Science on Stage (2000) offer potentially complimentary theoretical groundings with which STS practitioners can tackle science policy. Guston uses principal-agent theory to understand the broad problem of delegation (how do nonscientists get scientists to do what citizens decide), while Hilgartner draws on Erving Goffman to analyze science advice as performance (how do advisory bodies create a trustworthy and credible voice). The two perspectives can be combined in the concept of ‘managing expertise’, which takes as its subject the interactions between government, science advisory or research ‘performers’, and the broader public. The ambiguity of ‘managing’ can be exploited. Given an asymmetry of information, how does government (the principal) manage the
performers (the agent) to ensure the integrity and productivity of research? In turn, how do the performers manage the theatre of advice, not only to convince the government, but also the public (the ‘first principals’), of the credibility of their performance? This hybrid concept of ‘managing expertise’ will be tested against a new performer in the Canadian nuclear energy industry, the Nuclear Waste Management Organization (NWMO), created in 2002 to “manage and coordinate high level nuclear fuel waste in the long term.” The managing of expertise will be explored by considering the debate over the definition of ‘stakeholder’, which posed immediate delegation and performance related problems for the NWMO.

- “Expertise and Democracy: Interaction and Reversal between Validation Boundaries for Experts and that for Public”, Yuko Fujigaki, U of Tokyo

Scientific evidence required for decision-making in public sphere is sometimes different from that required at most advanced research by experts. This difference can be conceptualized by using “validation boundary”. Validation of scientific research is based on a refereeing system (the peer review system), and scientific evidence required by experts is controlled by this system. Some papers are accepted and others are rejected in the refereeing process for a specific journal, and this accepted-rejected action constructs the validation boundary of knowledge production (Fujigaki, 1998). Validation boundary is the most essential boundary work (Gieryn, 1994) by scientists.

In most cases, the validation-boundary of current research is considered more rigorous than that for the public. However, the following example shows the reverse case. Haynes (1990) points out that one famous medical journal accept papers that use questionable scientific methodology, including uncontrolled studies. He also points out that such problematic papers—being in their early stages and therefore not having undergone rigorous testing—are essential for communication between scientists, but that more rigorous testing and strictly controlled studies are needed for communication between clinicians who
encounter the public every day. This indicates that rigorous scientific methodology is more important for communication at the boundary between science and society than in publishing within scientific community (i.e. advanced research).

In this case, the validation boundary for the public is more rigorous than that for scientists, which is the opposite of what we ordinarily expect. We should pay attention to the difference between the criteria required for research and those for implementation of that research. The judgment of reviewers reflecting the validation of a paper is not the same as the validation boundary for implementation. We will show the interaction and reversal of those two validation boundaries using the case of food poisoning by O157 and the case of the trial by the Aids patients who were infected through non-heat-treated blood products in Japan.

10.8 Empire's Pharmacy: Cures, Poisons, and the Disorderliness of Post-Colonial Ordering

Peter Redfield, U of North Carolina – Chapel Hill and Diane Nelson, Duke U

Crown Room

Modern empires and nations base much of their moral legitimacy on the promise of curing, improving as a sign of modernizing. These claims are biopolitical in the sense that they promise more and better life, especially through the deployment of "advanced" medical technologies. Whether colonizing a landscape and people, an internal "other," the mind, or the interstices of global regimes, intervention is justified as contributing to the health and well-being of individual bodies and of larger bodies politic. Postcolonial critics may scoff that the cure is worse than the disease but this has not eroded the hopes deposited in such promises nor stopped the interventions. The papers gathered in this panel offer
genealogies of pharmakons - simultaneous cures and poisons - in colonial and post-colonial settings. Addressing the militarization of inner space through the psychopharmacology of panic; the efforts of the humanitarian organization Doctors Without Borders to intervene in disasters worldwide (and now in global access to medications); malaria and dengue eradication campaigns in Latin America and South Asia; and Nazi images of Jews as vectors of disease and how such imagery informed the development of Zionism, these essays explore how actors and networks may be partial causes of the ills they seek to cure.

- “A Social Science Fiction of Pharmakons and Fevers: Malaria, the Colonial Laboratory, and the Postcolonial Ordering”, Diane M. Nelson, Duke U

This paper explores malaria research and eradication campaigns through both social science and science fiction. Malaria is a classic actor-network in that it is caused by a parasite transmitted by a vector to humans and thrives in a range of milieux. It is more a relation than a thing and thus very difficult to eradicate, as many aspects of the disease and its cure remain little understood. Because of this I deploy social science fiction as a laboratory to explore malaria as a disease, a transmittor, and human attempts to confront it as a pharmakon, both cure and poison. I draw on my own fieldwork on malaria research and changing public health regimes in Latin America as well as a science fiction novel, "The Calcutta Chromosome: A Novel of Fevers, Delirium, and Discovery" written by the social scientist Amitav Ghosh. I put social sf in play with critical studies of technology, medicine, and empire, to explore Europe's colonies as laboratories of modernity where both work (labor) and slippage (labi) occur. "The Calcutta Chromosome" is a mystery thriller in the guise of science fiction and alternative history that explores a range of human/technology interfaces from railroads, computers, and bureaucracies to genetic engineering and the mysterious working of the malaria plasmodia. The Calcutta chromosome (the thing) is a form of tranmission that shapes the human through books, whispered secrets, and email messages as surely as through genetic transfers, disease vectors, and
medical contagion. My paper will follow Ghosh in linking malaria with colonial tropes (ways of knowing) and troops (the militarized aspects of colonial and postcolonial science) to imagine a new human arising from the interconnections and counterscience devised in such laboratories.


This paper addresses new initiatives by the humanitarian organization Doctors Without Borders/Médecins Sans Frontières (MSF) to combat global inequities in research on diseases and access to medications. Founded three decades ago in a French effort to create a more daring and independent alternative to the Red Cross, MSF has grown into a transnational fixture of emergency responses to international health crises, particularly those in postcolonial settings. During this time the group has sought to be both efficient and outspoken, pioneering mobile techniques of crisis intervention while practicing a form of advocacy under the name of witnessing. Here I present their effort to alleviate suffering as a different form of global technology than that of corporate development or state expansion, one that delineates and enacts a minimal politics of survival, even while reflecting inherent tensions within humanitarian projects that offer temporary relief to political and social failure. After receiving the Nobel Peace Prize in 1999, MSF launched the Campaign for Access to Essential Medicines, an advocacy effort to increase availability of biomedical treatments for poor people on a world scale. Focusing on conditions that particularly affect populations suffering from economic marginality and the absence or failure of state institutions, the Campaign has sought to lower prices on existing drugs and encourage the research and development of new treatments for unprofitable diseases (e.g. tuberculosis, malaria, sleeping sickness). To support the latter endeavor, MSF has supplemented its advocacy campaign with a joint venture in directly promoting pharmaceutical production, known as the Drugs for Neglected Diseases Initiative (DNDi). While still in their initial stages, both the Access
campaign and the Drug initiative represent departures from MSF’s tradition of operational independence focused on field missions. Here I suggest that they reorient MSF’s already global frame, by engaging corporations as well as states, and by extending humanitarian biopolitics into the moral economy of suffering at a deeper technical level, repositioning neglect beyond particular bodies and into the apparatus of treatment itself.

- “PSYCHOpower, Cybernetics, and the Militarization of Inner Space”, Jackie Orr, Syracuse U

This essay considers the contemporary militarization of U.S. civilian psychology within the historical context of World War II and Cold War efforts to target the psychic and emotional life of civilians as a battlefield component of total war. Selectively tracing the entangled histories of academic social science, the mass media, military and corporate technoscience, and government agencies, I suggest that the post-World War II emergence of the U.S. national security state is founded in part on the calculated promotion of civilian insecurity and terror. PSYCHOpower—conceptual kin to Michel Foucault’s notion of ‘biopower’ in which the psychological life of individuals and populations becomes a proliferating surface of contact for strategies of (self)government—may be a useful name for the emergent arsenal of tactics for measuring, monitoring, and managing the psychic landscape of U.S. civilians. Public opinion polling, survey research, psychopharmacology, cybernetic images of the brain-as-information-processor—each of these mass(ively) mediated techniques for reconfiguring or representing individual and mass ‘perception’ offers new possibilities for managing the dis-orders of an increasingly militarized civil society. That is, a civil society increasingly organized around the imperative to produce, and legitimate the production of, systematic state violence.
“Revolta da Vacina: a Popular Revolt Against Scientific Authority”, Ivan da Costa Marques and Henrique Luiz Cukierman, U Federal do Rio de Janeiro

Perhaps nothing is more explicitly sociotechnical than an artifact, a vaccine, which by itself names a popular revolt. The vaccine against smallpox put together science and popular reaction to science in the same tragic plot, and configured a great surprise to scientists: the Revolta da Vacina in the early 20th in Rio de Janeiro, Brazil. Scientists believed that the plot should be ‘purely technical’, and hence abiding by an undoubted and simple scientific authority: smallpox was bad and existed, but then the vaccine came and was able to eradicate it. So, the solution was seemingly simple: to impose vaccination to all the population ... However, his name was Horácio José da Silva. But what did it matter? This black man went far beyond the anonymity of his trivial name to become the famous Prata Preta (“Black Silver”), a nickname feared all over the city. He fiercely resisted the Police and the Army attacks against the popular barricades downtown Rio. But, after all, what did Prata Preta want? What did encourage him to fight so bravely against such a powerful enemy? There is no answer because there is no record. It was by December 1904 when the voiceless Prata Preta was embarked together with a crowd of people who had been arrested in the streets during the Revolta da Vacina (Vaccine Riot) towards exile in Acre, a faraway Amazonian state. The departure of the fatidic ship marked the end of the rebellion provoked by popular resistance to the compulsory smallpox vaccination, a rebellion that conflagrated the city between the 11th and 17th of November of that year ... Many decades later, the historiography of those times comes back in an attempt to auscultate the reasons of the Revolta da Vacina, surrendering to an unconfessed need to enforce Prata Preta to speak. Here we consider the Revolta da Vacina as a result of the authoritarian adoption of a model authoritarian in itself, the diffusion model of technoscience. Doctors and hygienists were absolutely convinced not only of the effectiveness of the vaccine
but also, and mainly, of the superiority of scientific and technological knowledge, positioned apart from society but in the privileged position of its tutor.

10.9 Surveillance and Society

Athens Room

- “Constructing Security and Implementing Biometric Technology: Prospects and Problems”, Lisa S. Nelson, U of Pittsburgh

Biometric systems provide the means to bind the physical presence of an individual user with their cyber action. These biometric systems for personal authentication and identification are based upon physiological or behavioral features which are sufficiently unique, universal, time invariant, and collectable to generate data for subsequent pattern recognition and matching and provide acceptable performance for a given application. Typical biometrics include fingerprints, hand geometry, face, voice, lip movement, keystroke, and iris patterns. While law enforcement and human services agency use of semi-automated biometrics was well established before 9-11, much larger scale, fully automated and distributed systems have now been mandated or are under serious consideration for application in visa, passport, and drivers license issuance. Fundamental challenges face the pervasive use and scaling of biometric technology which are necessary for both near-term national security applications and the long-term emergence of biometrics as an underpinning for ubiquitous and trusted IT processes. This paper considers the prospects and problems associated with constructing security through the development and deployment of biometric technology. There are several issues at play. First, there exists no comprehensive analytical framework within which the performance of individual biometric systems can be modeled and predicted there are difficulties of inoperability. Second, as evidenced by recent high profile cases, well established, high performance biometric systems under consideration to meet national security needs (e.g. fingerprint) are vulnerable to low-tech spoof
attack unless system countermeasures are researched, tested and deployed. Third, user acceptance and privacy concerns animate the development and deployment of biometric technology in various ways.

- “Intellectual Property and Techno-Power”, A. Aneesh, Stanford U

The question of intellectual property has emerged in recent years as a matter of heated debate around the public versus private ownership of knowledge. The contrast of private and public realms is used both in favor of and in opposition to the rapidly developing technological protections of intellectual property on the Internet. Some scholars conceive the Internet in terms of a commons where laws of private property, and thus, surveillance, should be minimal. I attempt to take the issues of surveillance and intellectual property beyond the private and public binary, arguing that new technological developments should be looked at – not as threats to privacy – but as possible ways to limit certain possibilities and as structures of power that are increasingly embedded in technology itself.

To attain greater theoretical clarity on this issue, I distinguish three modes of power – bureaucratic, panoptic, and algocratic – and emphasize the salient features of each in terms of three different mechanisms of power: office, surveillance, and code respectively. The logic of algocratic forms of governance is explored methodically to demonstrate how algocracy (i.e., the rule of the algorithm) differs from other forms. I emphasize the need not only to understand the role of programming languages and code in the emerging complex of techno-power, but also to go beyond the problems of public versus private domains of intellectual property.

- “Computergate: How One Email Spam Sparked a Debate Over Academic Freedom and Privacy at a State University”, Martha McCaughey, Appalachian State U
The increasing reliance on electronic information and computing systems, particularly at universities, presents a host of legal and policy questions that remain unanswered. Using as a case study the 2002 seizure and search of my workplace computer by armed police officers, without a warrant, at my state university, I outline some of those questions. For instance, who owns digital information stored on computers—does it depend on IP policies of the workplace, on who created the information, with which software they created it, or where the information is stored? What are the rights of access to such information? What are employees' obligations to disclose such information? To answers these questions, I present research on legal cases, universities policies, and advocates’ policy guidelines, and argue that some of the worst civil liberties violations and threats to academic freedom in the electronic environment have not been anticipated or yet addressed.

Using a politics of technology perspective (ala Langdon Winner and Andrew Feenberg), I examine the ways in which the shift from work on paper to work on computers has enabled increased policing of employees and enables intrusions that were not before possible, as well as creating a shift in consciousness (and not for the better) about employee privacy. At the same time, I present evidence that new communications technologies are set up in university environments not to preclude privacy but to protect privacy and expectations of privacy. I also argue that recent STS scholarship on the meaning of computers in our everyday lives, online selves, and bodies/machines must be used to assess the meaning and impact of searches of electronic files. I argue that STS scholars are in the best position to help frame how and why computer privacy is necessary—even in the workplace.

Finally, I argue that computer privacy policies are crucial for averting a new McCarthyism and offer guidelines of my own, after working for a year on a computer privacy task force, which formed as a result of faculty uproar in the wake of the computer seizure.
Much of the new European Union regulation of food biotechnology is predicated on the control and traceability of the 'transformation event' that defines a specific genetically modified organism. This entity, however, does not have a clear, physical existence outside legal texts and policy documents. This paper analyzes the activities of a number of research groups across Europe trying to materialize this metaphysical object by developing tools and techniques of detection capable of identifying a genetically modified organism at the level of the 'transformation event.' The effort to develop methods with this degree of specificity, however, raises new questions and challenges to the confidentiality of proprietary molecular information and the very nature and definition of the transgene. This paper thus explores how the natural entities anticipated by recent legal texts are produced through new testing tools and data sharing networks.

- “Transgene Flow: the Making of a Scientific Object”, Christophe Bonneuil, CNRS
Less than 15 years ago, the potential of the escape of genetic traits from GM plants was mainly discussed by the scientific community on the basis of two analogies, i.e. biological invasions and laboratory hybridization experiments. In the last years, transgene flow has become a research object in itself, grasped by a growing number of scientists through thick field observations, dedicated experiments, and modelling.

The aim of this paper is to analyse the making of transgene flow as a scientific object and the rise of a research domain dedicated to this theme in Europe, in the context of an intense public controversy ("contamination" affairs, field destructions…) and new regulatory policies (monitoring, co-existence…).

The paper will first analyse how the competition between molecular biologists, population biologists and agronomists for framing the issue of transgene flow articulated with the dynamics of the GMO public controversy in France and Europe. The international dynamics of the "transgene flow" research domain will then be mapped with the "Reseau-Lu" network analysis program and the social history of this regulatory science will be discussed.

This paper thus explores how transgene flow was co-constructed as a scientific object and a policy object.


When international regulatory differences lead to trade conflicts, does this mean that safety standards are pushed down -- or up? How can standards (and changes) be identified?

These questions can be explored through a case study, the trans-Atlantic conflicts over GM crops. In the USA numerous GM crops were commercialised for all uses through the 1990s. In Europe the anti-GM opposition largely halted
commercialisation -- partly through a boycott by retail chains, and partly through a de facto moratorium on new commercial authorisations. Amid these conflicts, regulatory conflicts can be analysed as implicit standard-setting, even if standards are never formalized or stabilized.

For agro-environmental issues of crop cultivation, early safety claims took for granted the normal hazards of intensive monoculture, as a basis for accepting some plausible harm from GM crops. NGOs demanded that risks of GM crops be compared to relatively less-intensive cultivation methods, and that test methods be more rigorous to detect risks. In different ways across the Atlantic, regulatory procedures began to incorporate more critical perspectives within official expertise. New risk-research methods have been appropriated back-and-forth across the Atlantic. Criteria for evidence have become more stringent, as regards environmental norms and the uncertainties which must be tested.

For health issues of GM food, the early regulatory framework of ‘substantial equivalence’ emphasised similarities between GM food and non-GM counterparts. This framework was criticized by NGOs, e.g. in various international fora and in the Trans-Atlantic Consumer Dialogue. Some NGO representatives gained the opportunity to influence expert documents, e.g. in the US-EU Consultative Forum and Codex Alimentarius. These emphasized the need to look for possible differences in GM food and recommended new test methods. The EU and US regulatory procedures face pressures to incorporate these.

Those dynamics can be interpreted as ‘trading up’, i.e. regulatory standards being raised in response to trade conflicts (along the lines of the 1995 book by David Vogel). In effect, trade barriers provided political opportunities and scientific resources for challenging safety assumptions. European critics gained more time to develop their arguments before commercialisation, while their weaker US counterparts could cite critical approaches from Europe.
This paper examines how South Africa constructed its policy for genetically modified organisms (GMO). South Africa’s policy is a compelling analytical study because it stands in sharp contrast to the GMO policies and politics of other sub-Saharan countries. South Africa’s rationale and vocabulary in the debate are also distinct from the GMO politics found in other democratic, developing countries such as India and Brazil, and from the policies of developed countries in Europe and America.

Moreover, South Africa’s GMO policy diverges from the country’s own recent history in dealing with scientific uncertainty. The country long rejected the commonly accepted scientific consensus about the cause of AIDS. However, none of the arguments the South African government made during the AIDS controversy - about disputed and uncertain science; about disproportionate control in hands of a few multinational companies; about contested patent rights – were raised with regard to agricultural biotechnology.

How were the risks associated with a new technology reframed by the political and social processes of a democratic developing country? I examine how a strong political and rhetorical commitment to food security and poverty alleviation affected the interpretation of uncertainty and the certification of new scientific facts and technologies.

- “Reconfiguring the GMO Debate: South Africa’s Policy on Genetically Modified Crops”, Manjari Mahajan, Cornell U

- “Title TBA”, Helga Nowotny, ETH Zentrum