We begin the Fall 2007 semester after a great inaugural year. We have now successfully launched our graduate certificate program, postdoctoral fellowship program, and lecture series. Last year, we welcomed fourteen students into our graduate certificate program. These students come from a variety of schools and departments, including law, business, public policy, public health, engineering, biomedical sciences, chemistry, physics, and SNRE. We also taught Public Policy 650 (Introduction to Science and Technology Policy Analysis) and a science and technology policy variant of PubPol 585 (Political Environment of Policymaking) for the first time. These two courses join Jim Duderstadt’s research seminar (PubPol 754) to form the STPP core curriculum.

Dan Plafcan and Paul Erickson completed their first year as STPP postdoctoral fellows. They have become valued members of the STPP and Ford School communities, teaching courses (Last year, Dan taught Science and Technology in International Affairs and Paul taught Global Environmental Governance) and running the STPP lecture series. Indeed, the Winter 2007 lecture series was a great success. The four lectures covered a variety of topics, from bioterrorism to climate change policy, and were accompanied by commentaries from U-M professors. We were also successful in getting co-sponsorships from a variety of departments and programs around the university.

This year, we look forward to welcoming more graduate students into the certificate program. The fall deadline for applications is October 15th, and we will hold an information session and fall kick-off reception on September 27th (starting at 6PM, 1210 Weill Hall) to introduce prospective students to the program. We hope that current STPP students

(Continued on page 3)
The STPP lecture series is sponsored by the Herbert H. and Grace A. Dow Foundation.

Events are held on Mondays, 4:00-5:30pm in the Betty Ford Classroom (1110 Weill Hall)
at the Gerald R. Ford School of Public Policy

1 October 2007
“Standardizing Regenerative Medicine Products: Another Side of Public Policy and Politics”

Linda Hogle
Associate Professor, Department of Medical History and Bioethics,
University of Wisconsin—Madison
Commentary by K. Sue O’Shea, Professor of Cell and Developmental Biology,
University of Michigan Medical School
Co-sponsored by the University of Michigan Center for Stem Cell Biology

29 October 2007
“The Rise of Innovative China?”

Adam Segal
Maurice R. Greenberg Senior Fellow for China Studies, Council on Foreign Relations
Commentary by Kenneth Lieberthal, Arthur F. Thurnau Professor of Political Science,
William Davidson Professor of Business Administration, University of Michigan
Co-sponsored by the University of Michigan Center for Chinese Studies and the Department of Political Science

12 November 2007
“All We Lack is The Political Will: Technology and Effectiveness in Human Affairs”

Dan Sarewitz
Director of the Consortium for Science, Policy and Outcomes, Arizona State University
Commentary by Paula Lantz, Professor and Chair, Department of Health Management and Policy,
University of Michigan School of Public Health
Co-sponsored by the Department of Health Management and Policy at the University of Michigan School of Public Health

10 December 2007
“Transnational Authority in International Technoscientific Collaborations”

Dan Plafcan
Postdoctoral Fellow in Science, Technology, and Public Policy,
Gerald R. Ford School of Public Policy, University of Michigan
Commentary by Steven Jackson, Assistant Professor of Information,
University of Michigan School of Information
Co-sponsored by the University of Michigan Science, Technology & Society Program
A Successful First Year (continued from page 1)

and faculty will attend the events as well, to meet one another and celebrate the coming year. We also have an active lecture series planned for the year (the fall series is described in detail on page 2). Our first speaker, Linda Hogle, will be discussing the regulatory politics of stem cell research on October 1st. We look forward to seeing you all there!

Finally, we have welcomed a new Program Administrator, Bonnie Roberts, to the program. Bonnie splits her time between STPP and UM's Labor Studies Center. She has over 15 years of experience in program management, budgeting, and special event planning, and previously worked as the Administrator for the Pew Scholars Program in Conservation and the Environment. Bonnie will be a wonderful addition to the STPP team; her skills and expertise will be quite valuable as we work on growing and developing the STPP program. Bonnie will be in charge of the day-to-day operations of all facets of the program and will serve as the first point of contact for program-related matters.

Overall, we are looking forward to a very exciting year and expect STPP to continue to blossom!

Scientific uncertainty and public policy (continued from page 1)

...maries of the state of the science on a wide array of topics. And repeatedly, the underlying science indicates that all these topics are burdened with uncertainties. It is therefore not surprising that uncertainty is regularly in the news.

Frequently we hear “scientific uncertainty” offered as an excuse to avoid making important policy decisions—but we must recognize that delaying decisions because of uncertainty is an implicit endorsement of the status quo and often a thinly veiled excuse for maintaining it. It is a bulwark of the take-no-action policy popularly known as “business as usual.”

Discussion of uncertainty in the media and elsewhere should be welcomed by scientists. Scientists are trained to couch their results in terms of the attendant uncertainty. We are encouraged to display our data with “error bars” and to frame our conclusions in terms of probabilities.

...of the attendant uncertainty. We are encouraged to display our data with “error bars” and to frame our conclusions in terms of probabilities. While developing public awareness about the nature of scientific uncertainty should in principle be a good thing, in reality it has led to confusion because the uncertainty has been both misunderstood and distorted.

...and the typical human reaction is one of awe and a feeling of personal insignificance. Although a person individually may feel helpless when compared to these titanic forces of nature, collectively Earth’s human population is staggeringly powerful.

(continued on page 4)
Humans are currently the most important geological agents at work on the planet, but many people have a hard time believing it.

Another barrier is the fact that the general public is not well trained in science—too often the power of many independent lines of evidence goes unappreciated. Confidence in an answer should grow if the same conclusion is reached through independent avenues of research, even if the individual results have greater uncertainties or are on occasion simply wrong. There is a tendency to focus on the weakness of the parts rather than the strength of the whole, supposing that if a single piece of evidence can be discredited, the entire construct will fall like a house of cards. In fact, discrediting a single line of evidence is more like snipping a strand in a net hammock—the hammock continues to be supported by the many strands that remain intact. The scientific evidence for climate change in the natural world is compelling in its totality, although individual pieces of the story may indeed be open to some question.

With little skill in understanding science, it should come as no surprise that many Americans are fertile ground in which other opinion-shapers may plant seeds of uncertainty, confusion, and doubt. I call these opinion-shapers the “manufacturers and marketers” of uncertainty. Their ideological and/or economic interests lie in maintaining the status quo, and they work actively to sow confusion. They tarnish scientific results they don’t like with phrases like “unsound science,” “junk science,” or “uncertain science.”

We have seen these manufacturers and marketers of uncertainty in many settings over the years: the agro-chemical industry’s obfuscation of the environmental consequences of widespread pesticide use, the tobacco industry’s decades-long denial of smoking-related health problems, the electric utility industry’s rejection of the role of high sulfur coal in producing acid rain, the leaded gasoline industry’s foot-dragging when faced with the deleterious health consequences of environmental lead, the synthetic chemical industry’s reaction to the role of CFCs in ozone depletion, and, of course, the fossil fuel industry’s long denial of the role of anthropogenic greenhouse gases in climate change.

**Why Not Wait for More Research to Clarify Uncertainty Before Forging Ahead with Policy Decisions?**

This is a legitimate question, but upon analysis and reflection waiting cannot be easily defended as a course of action. A frequent outcome of conducting more research on complex systems such as planetary climate or terrestrial ecosystems or the human body is that uncertainty, rather than being diminished, actually grows as research reveals an even greater complexity than previously supposed. Additionally, there is an element of wishful thinking (some would say hubris) in imagining that with just a little more research we will find “the right answer” or a “silver bullet” solution.

One must also recognize that much of the uncertainty about how climate will evolve over the twenty-first century will not yield to more research. This irreducible uncertainty is related to demographic, economic, and political developments. The range of unfolding climate pathways that appears in reports from the Intergovernmental Panel on Climate Change (IPCC) is wide indeed, not only because of uncertainties in the climate modeling but also because of uncertainties in world population projections, the economics of alternative non–carbon-based energy development, the degree of integration of the global economy, and the vagaries of international conflicts that impact the production and distribution of international conflict-related health problems, the electric utility industry’s reaction to the role of high sulfur coal in producing acid rain, the leaded gasoline industry’s foot-dragging when faced with the deleterious health consequences of environmental lead, the synthetic chemical industry’s reaction to the role of CFCs in ozone depletion, and, of course, the fossil fuel industry’s long denial of the role of anthropogenic greenhouse gases in climate change.

Calling for more research must also be seen as a double-edged sword. Because causes and consequences of environmental problems are typically nonlinear, a decade of delay can have a century of consequence. Moreover, the benefit/cost ratio of remediation is generally greatest when a problem is first recognized.

The climate system may also have “tipping points” that, when reached, would have truly catastrophic consequences. Just a few years ago, conventional scientific wisdom held that ice loss from Greenland and West Antarctica was proceeding on a millennial time scale. Recent observations, however, have shown that ice loss is occurring at a much faster pace, as meltwater lubricates the base of ice sheets, and floating ice shelves, which impede the flow of ice from the interior, are rapidly disintegrating. Greenland and West Antarctica each have an ice vol-
Three simple principles provide a framework for formulating policy under conditions of deep uncertainty. The first is a straightforward acknowledgment that there is a problem to be addressed, that we have incomplete knowledge about the problem, and that as we shape policy on the basis of incomplete knowledge we are likely to make mistakes. This is somewhat akin to the introductory confessions at Alcoholics Anonymous meetings: “My name is John Doe and I am an alcoholic.” If we don’t acknowledge a problem, we will never solve it.

The second principle follows directly: because the chances for going astray are relatively high, we need to have many balls in the air at once—we need to think of a multiplicity of pathways forward in order to find one or several that prove helpful. T.C. Chamberlin, an early President of the American Association for the Advancement of Science, urged scientists to embrace “multiple working hypotheses” so as not to fall into a rut of confinement that a single hypothesis frequently becomes. In the context of mitigating climate change, we need many horses pulling us toward a greenhouse-stabilized future; e.g., energy conservation, renewable energy sources, and carbon sequestration. That a single “silver bullet” solution will emerge is nothing but wishful thinking.

Third: monitor the future as it unfolds, and make mid-course corrections as necessary. This principle derives from our acknowledgment that we are likely to make some mistakes along the way and policy adjustments may be necessary. We should anticipate the need for and be prepared to make mid-course corrections. This strategy, known as “adaptive management,” is one of action coupled with continual evaluation and adaptation to changing circumstances or misguided decisions. Adaptive management is premised on optimism but grounded in skepticism. In the assessment and reevaluation of policy, we must not have unrealistic expectations. A multifaceted policy that does a pretty good job of moving us forward under a range of possible futures is a safer bet than a fantastic solution appropriate only to a very particular future world.

CONCLUSION

We can ill-afford to allow uncertainty to lead to policy paralysis or to be invoked as a reason to maintain the status quo. Scientists should not let science or policy be hijacked by those who, parading beneath a banner of uncertainty, don’t like what science is telling them. More research may lead to some better understanding, but uncertainty will never be eliminated—it simply will take on new forms. Long term solutions will emerge from policies that encourage many incremental and diverse steps and a continuous evaluation of their efficacies. Uncertainty should be recognized not as a barrier to policy formulation and implementation, but rather as a stimulus for creative solutions as it promotes a competition of ideas.

References:
1Author’s note: This essay first appeared in the March 2007 issue of GSA Today, a publication of the Geological Society of America
CALL FOR APPLICATIONS:

STPP Postdoctoral Fellowship Program

The Science, Technology, and Public Policy (STPP) Program in the Ford School of Public Policy at the University of Michigan seeks to fill up to two postdoctoral fellow positions (each for two years in residence), starting Fall 2008. Fellows will be expected to perform research in some aspect of science and technology policy, teach courses in science and technology policy (one course in Year 1 and two courses in Year 2), help to organize a seminar series, and work with faculty to develop the STPP program. In addition to working with colleagues in STPP and the Ford School, fellows will find a wide range of programs at University of Michigan that provide opportunities for enrichment and collaboration, including leading programs in law, business, public health, medicine, engineering, the sciences, and science & technology studies. Applicants can learn more about the STPP Program through our website, http://stpp.fordschool.umich.edu.

Applicants should be recent recipients of the doctoral degree, with demonstrated interest in science and technology policy. Areas of specialization and disciplinary approaches are open. These fellowships are made possible through a generous gift from The Herbert H. and Grace A. Dow Foundation. Salary is competitive and includes benefits. Modest funds will also be provided for moving, conference travel, and research. Awardees will be expected to be in residence in Ann Arbor, Michigan, for the time of their award and be an active colleague within UM.

Applications received by January 15, 2008, will be given first consideration, although we will continue to accept applications after that date. Please send application materials, which should include a CV, letter describing research and teaching interests, a statement outlining the proposed research project, teaching evaluations, and three letters of reference to:

STPP Fellow Search
Attn: Bonnie Roberts
Gerald R. Ford School of Public Policy
University of Michigan
735 S. State Street, 4204 Weill Hall
Ann Arbor, MI 48109-3091 USA
(734) 615-6942
from STPP People

Monamic Bhadra (STPP research assistant) has left us for a much warmer and drier climate. This month, she begins her Ph.D. studies in the Department of Political Science at Arizona State University. She will also be affiliated with the Center for Science, Policy, and Outcomes there, and hopes to conduct research on issues of technology and global equity. She is also doing ethnographic research on ASU’s "Tubes in the Desert" project, an effort to use bionanotechnology to produce biodiesel products. Monamic continues to work with us in maintaining the STPP website.

Paul Erickson (STPP postdoc fellow) is currently working on a new project about how tacit models of populations influence public decision making in economics, epidemiology and conservation biology. This past spring he presented a first paper on the topic to a conference held at the London School of Economics. The paper has subsequently been released as a working paper of the department of economic history. This fall, in addition to teaching Public Policy 650: Introduction to Science and Technology Policy, he will be presenting his research at Arizona State University’s Center for Science, Policy and Outcomes, and at the History of Science Society annual meeting in Arlington, VA.

Christine Kirchhoff (STPP student) is a Ph.D. student in the School of Natural Resources and Environment. She took and passed her preliminary exam at the end of her third year (Winter ’07) and is now busy working on her dissertation proposal. Her research will examine how experts and non-expert stakeholders help shape and democratize science and policy through the assessment process, in particular the U.S. National Assessment of the Potential Impacts of Climate Change. Assessments link science and policy and so provide a vehicle for the study of the relationship between stakeholders and science policy.

Steven Jackson (STPP faculty) is the Coordinator of the new Masters-level specialization in Information Policy. As part of this program, he is teaching a new course, SI 507: Foundations of Information Policy Analysis and Design. This course will count as an STPP elective.

Nathan Palpant (STPP student) presented his research on the embryonic stem cell controversy at the "Science and Technology in Society" graduate student conference sponsored by the American Association for the Advancement of Science this past March. His research focuses on the role of scientists in this controversy and, specifically, the political dimensions of their involvement. He says, "In addition to presenting some of my work, I was able to hear from Sheila Jasanoff and John Marburger (Bush's science advisor) who were excellent keynote speakers." This fall he is looking forward to presenting this research at the Society for the Social Studies of Science conference in Montreal, Canada. Nathan is a Ph.D. student in Molecular and Integrative Physiology.

Shobita Parthasarathy (STPP faculty) is on leave this year, doing a fellowship at the Woodrow Wilson International Center for Scholars in Washington, DC. She also received a fellowship from the American Council of Learned Societies. She will use this year to conduct research on the recent debates in the United States and Europe over whether and how patent offices should incorporate public interest concerns into their decision making.

Dan Plafcan (STPP postdoctoral fellow) is conducting preliminary research in preparation for a second project that will comparatively analyze the foreign policymaking and foreign direct investment of China, Japan, and the United States with respect to petroleum production systems in Central Asia and Sub-Saharan Africa. During the summer, he took intensive Chinese to supplement his Japanese language skills. In October, at the annual meeting of the Society for Social Studies of Science, Dan will present a talk on projections of energy security in public policymaking. This fall he is teaching Public Policy 655: Energy in World Politics.

Henry Pollack (STPP faculty) recently published a short essay titled "Scientific Uncertainty and Public Policy: Moving on Without All the Answers" in GSA Today, the monthly newsletter of the Geological Society of America – also our feature article for this issue of the STPP Newsletter.

Brian Tremblay (our first STPP graduate) is currently a Presidential Management Fellow finalist. Through the PMF program he’s had job offers from the National Cancer Institute, Department of Housing & Urban Development, Homeland Security, and NASA. Although he is still in the process of selecting a position, he says the STPP experience has proven very helpful during his interviews and has definitely added value to his graduate school experience.

FOR MORE NEWS AND INFORMATION ABOUT STPP VISIT OUR WEBSITE:
www.stpp.fordschool.umich.edu
Certificate Program in Science, Technology, and Public Policy (STPP)

Application Deadlines: February 15th and October 15th

CURRICULUM

The STPP certificate requires 15 credit hours of coursework, including three core courses and 2 electives of the student’s choice. These courses can be taken in any order.

Core Courses

STPP Core Course 1—PubPol 650: Introduction to Science and Technology Policy Analysis (Offered in Fall; 3 credits)

STPP Core Course 2—PubPol 754: Research Seminar in Science, Technology, and Public Policy (Offered in Winter; students must enroll in 3 credit option)

STPP Core Course 3—PubPol 585: Political Environment of Policymaking (Offered in both Fall and Winter, Winter option focuses on science & technology policy examples; 3 credits)

Elective Courses

Information/Communication Technology

SI 507/703 : Foundations of Information Analysis & Design (NEW)

SI 605 : Special Topics: The Development and Future of the Internet

SI 648/748 : InfoCulture: Theory and Method in the History and Sociology of Information Technology (NEW)

PUBPOL 720/SI 621 : Ethics, Values, and Information Dilemmas

SI 668 : Seminar in Information Policy: Regulation and Politics

SI 741 : Systems, Networks, and Webs

*SI 519 : Special Topics: Intellectual Property and Information Law

SI 532 : Digital Government I - Information Technology and Democratic Politics

SI 533 : Digital Government II - Information Technology and Democratic Administration

Biotechnology

HMP 517 : Issues in Public Health Genetics

PUBPOL 759 : Genetics and Biotechnology Policy

*EPID 776 : Bioterrorism and Other Weapons of Mass Destruction

Automotive Technology

UP 572 : Transportation and Land Use Planning

UP 671 : Public Policy and Transportation

Space Policy

AERO 583 : Management of Space Systems Design

AOSS 581/AERO 581 : Space Policy and Management

Environmental Policy

CAAS 596 : The History of Environmental Thought and Activism

NRE 558/CEE 587 : Water Resource Policy

NRE 559 : International Environmental Policy and Law

*UP 532 : Sustainable Development: Resolving Economic & Environmental Conflicts

PUBPOL 563: Politics of Environmental Regulation (Newly Listed)

PUBPOL 653: Global Environmental Governance

PUBPOL 564: Government Regulation of Industry and Environment

General Health/Medicine Policy

ANTHRCL 548 : Theory and Practice in Medical Anthropology

ANTHRCL 458/558 : Maternal/child Health, the Environment, & Pollution in Africa

CAAS 443 : Pedagogy of Empowerment: Activism in Race, Gender, and Health

CAAS 483/5xx : Gender, Poverty, Medicine

HMP 615 : Introduction to Public Health Policy

HMP 618 : Tobacco From Seedling to Social Policy

HMP 625 : Health and Health Systems in the Developing World

HMP 653 : Law and Public Health

HMP 684 : The Politics of Health Care Policy

HMP 685 : The Politics of Health Policy

HMP 693 : Mental Health Policy in the United States

PUBPOL 655 : Energy in World Politics (NEW)

SOC 475 : Introduction to Medical Sociology

SOC 575 : Sociology of Health and Aging

WOMENSTD 400 : Women's Reproductive Health

*HMP 695 : Public health Policy Issues in Women's Health Information Law

General Science/Technology Policy

ANTHRCL 625 : Anthropological Approaches to Property and Property Rights

CSIS 647 : Strategy for Technology Commercialization

HISTORY 619 : Knowledge/Power/Practice in Science, Technology, & Medicine

HISTORY 629 : Technology and Nature in Africa (NEW)

HISTORY 796 : Knowledge and Practice

IOE 438 : Occupational Safety Management

IOE 522 : Theories of Administration

*ChemE 597 : Regulatory Issues for Scientists, Engineers and Managers

PUBPOL 654 : Science, Technology, and International Affairs

PUBPOL 564 : Government Regulation of Industry and Environment

PUBPOL 757 : National Science Policy

For more information, please see our website:

www.stpp.fordschool.umich.edu
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