

STPP Task Team Report

Final Report

May 30, 2003

Executive Summary

The Science, Technology, and Public Policy (STPP) Task Force recommends that the University of Michigan begin a phased approach to launching instructional and research activities in two key areas: (1) the application of scientific and technological knowledge to improve decision-making across a broad array of public sector domains (“science for policy”) and; (2) the shaping of government policies to ensure continuing progress in science and technology (“policy for science”). More specifically, we propose that the University develop instructional programs to provide disciplinary scientists (including those in traditional scientific and engineering disciplines as well as more cross-cutting fields such as medicine or public health) with a better understanding of the policy context into which science and technology often fit, and to provide social scientists (including those in traditional disciplines as well as those in professional schools such as public policy, law, and business) to better understand the relevance of science and technology to their work.

The uniqueness of the proposed program, especially in comparison to STPP programs at other universities, is based on our belief that a cross-disciplinary curriculum in STPP issues should augment solid, disciplinary degree programs rather than being taught through specific STPP degree programs. Since scientists often seek to influence public policy, and policy makers often need to deal with issues in science and technology, we believe that such cross-disciplinary training will enhance the careers and influence of both groups. The Task Force further believes that all instructional programs and scholarly efforts associated with STPP activities should be infused with rigor (e.g., economic analysis, scientific justification) and an understanding of the complex forces shaping public policy where science and technology issues are important.

To this end, we recommend that the University begin in Phase I with the development of courses in science, technology, and public policy, taught through the Ford School of Public Policy by current faculty members from the scientific and public policy disciplines. Although the highest priority should be given to developing courses at the graduate level, both the interest on the part of undergraduates and the opportunities for coordination with existing or proposed interdisciplinary programs

suggests that some attention also be given to undergraduate course development. In addition, we recommend that during Phase I the Vice President for Research form an advisory committee on science and technology policy, consisting of faculty members with ongoing roles in shaping national S&T policy, to assist the University in developing R&D strategies; create an ongoing database to inventory, monitor, and coordinate existing University faculty and program activities in the STPP area; and continue and possibly expand the Wiesner Lecture series into a University-wide seminar series on STPP. In Phase I, certain activities should begin in order to build a foundation for Phase II. These “early Phase II” activities include i) the identification of faculty leadership (which is absolutely crucial to the success of this endeavor) and ii) the formation of a faculty planning and implementation committee to guide and implement the development of the STPP program.

For Phase II we recommend that the University expand upon Phase I by developing a graduate course sequence, again taught through the Ford School, designed to augment existing graduate degree programs in the sciences, social sciences, and the professions to better enable those entering research, education, and professional practice to understand the role of policy in their fields, as well as to prepare those students with interests in careers that relate science and technology to policy development in the public and private sector. This will require the investment of adequate resources for program administration, and the selective hiring of new faculty with STPP interests as opportunities arise, both within the Ford School and other academic units associated with the program. We also recommend that the University consider the extension of this STPP course sequence to practicing professionals, possibly taught through an on-campus short course format (similar to the Business School’s Executive Management Education program), through courses offsite in Washington, D.C., or perhaps by offering professional fellowships through a model similar to the Knight-Wallace Journalism Fellows program. In addition, we recommend the development of STPP internship opportunities for graduate students. Finally, we recommend the University make a more concerted effort to assist faculty in the identification and pursuit of sponsored research support to establish major research centers in STPP areas.

The STPP Task Force recommends that the University not attempt to launch specific STPP degree programs at the undergraduate, M.S., and Ph.D. level at this time. Although several other institutions do have such programs, the Task Force favors the use of STPP course sequences designed to augment existing degree programs, recognized with a Rackham certificate or undergraduate minor concentration. This approach not only provides students with the flexibility of a more generally recognized

degree, but it better leverages the very considerable breadth and quality of the University's existing undergraduate and graduate degree programs, thereby affording a far greater number of students with the opportunities for enriching their studies with STPP training. We also believe it to be a far more timely and cost-effective approach to establishing the University as a national leader in STPP education and scholarship.

Introduction

Over the past several years there have been several discussions about the creation of an academic program in science, technology, and public policy (STPP)¹ at the University, similar to those at other peer institutions (e.g., Harvard, UC-Berkeley, MIT, Princeton, and Carnegie Mellon). Members of the University's faculty have long been involved in STPP activities at the state, federal, and international level, and several existing academic programs have both instructional and research programs that would relate well to an integrated STPP effort. Furthermore, over the years there have been efforts by individual faculty members to develop interdisciplinary courses on STPP topics (e.g., energy, global climate change, disarmament), including most recently the STPP course developed by Professor Homer Neal in the Physics Department for undergraduate and graduate students from both the sciences and public policy areas (see more on Neal Course in Appendix G).

To focus these discussions, the Provost and Vice President for Research launched several activities during the 2002-2003 academic year:

1. Using the Wiesner Lecture Series to invite to campus a number of national leaders in STP, including John Holdren (Harvard), Neal Lane (Rice, former White House Science Advisor), Jack Gibbons (Council on Economic Competitiveness, former White House Science Advisor), Lewis Branscomb (Harvard, former chair of the National Science Board), Congressman Vern Ehlers, and Frank von Hippel (Princeton) for formal lectures on particular STPP topics and to meet with University faculty and administrators to discuss the possibility of a Michigan program in this area.
2. Forming a discussion group of deans and executive officers to meet with the Wiesner Lecturers and to monitor ongoing efforts to develop recommendations concerning such programs.

¹ In this report we have intentionally chosen a broader term, "science, technology, and public policy (STPP)", rather than other possibilities such as science policy or science and technology policy commonly used for to describe such academic programs.

3. Forming as well a working STPP Task Team of faculty members, reflecting broad knowledge of science and technology policy at the national level and a range of academic disciplines at the University level.

This report represents the assessment, conclusions, and recommendations of the STPP Task Team.

The Charge

The charge to the STPP Task Team asked it to address the following questions.

1. Should the University of Michigan have a formal academic program in Science Public Policy? If so, why? If not, why not?
2. If the answer to the preceding question is in the affirmative, please develop strategies that respond to the following ancillary questions.
 - a. What should Michigan's area of focus be in this arena, in contrast with the science public policy programs at other institutions (MIT, Princeton, Cornell, RPI, Virginia Tech, Carnegie Mellon, George Washington, etc.)?
 - b. Should Michigan's program lead to a formal degree (M.S.? Ph.D.?), a Rackham certificate, or other? Which students would such a program be aimed at and how could these students use this program to advance their educational and career goals?
 - c. Which units or departments at Michigan should be involved in such a program? How should the program be administered; what level of resources would be needed to implement it, etc.?

The STPP Task Team was also asked to work closely with those schools and colleges of the University most likely to be associated with such a program.

Since its selection and charge in fall 2002, the STPP Task Team has met monthly as a group for discussions. It has also met with each visiting Wiesner Lecturer as well as others with useful perspectives on these issues. In addition, both members of the Task Team and staff (Lee Katterman, OVPR) have surveyed STPP programs at other universities and contacted individuals at the federal level to solicit their evaluation of such efforts. The activities of the Task Team have been coordinated with the ongoing discussions of the deans and executive officers.

A more detailed chronology of the STPP Task Teams activities is included in Appendix A, along with its membership.

The Importance of STPP Programs

Clearly science and technology are of great importance to a broad array of social, economic, and political issues arising in an ever more technology-dependent world. If better public policies with important science and technology content are to be designed and implemented, the basic requirement is an understanding of both the technical/scientific factors and the social, economic, and political factors relevant to the policy. Furthermore, the formulation and execution of effective public policies related to the investment in scientific research and technology development and deployment is similarly important.²

Here we should distinguish between the impact of scientific and technological issues on public policy in various areas, e.g., economic development, public health and environment, national security, and the development of public policies specific to science and technology, e.g. federal investment in basic research, regulatory policy, technology transfer. Although policy for science and technology does not rank high on most political agendas, most governments devote significant discretionary resources to building the capability of the national scientific enterprise. Furthermore, scientists, engineers, and physicians have a direct stake in this area of policy, which defines the conditions within which they conduct their professional lives. The STPP Task Force views both areas of “science and technology for policy” and “policy for science and technology” as appropriate for its consideration.

There is a third possible area, commonly referred to as “science, technology, and society” (STS), which concerns the study of science and technological issues by historians, sociologists, humanists, as well as interested members of the scientific community. We did not consider these topics, both because the University already has a program in these areas³, and because our concern was more with those programs more directly focused on the overlay between science/engineering, and social sciences/public policy.

² Lewis M. Branscomb and F. M. Sherer, “Science, Technology and Public Policy: A Program for the Center of science and International Affairs in Collaboration with the Center for Business and Government”, Kennedy School of Government, Harvard University, 1995

³ The UM Science, Technology and Society Program is a unit of the International Institute which offers a structured academic curriculum through which students can explore the social, cultural, ethical, and political dimensions of science, technology, and medicine. The STS Program currently offers an undergraduate minor through the Residential College and is exploring the possibility of establishing a Rackham Certificate program for graduate students. Appendix F lists STS course offerings.

The rationale for such programs generally can be captured by the following considerations:

- the mission of the university to educate an informed citizenry;
- the interest on the part of students in the interface between science and public policy;
- possible careers in areas of policy development where scientific and technological issues become important;
- the interest of faculty members in both teaching and research in STPP areas; and,
- the possibility that such a program might enhance the University's impact on state, national, and international policies.

Principal markets for graduate degrees with either STPP concentrations or certificates would include Congressional staff; federal administration offices such as OSTP, OMB and GAO, federal mission agencies such as NSF, NIH-HHS, NASA, DOE, DOD, EPA, FDA, USDA, and their state government counterparts; and a broad range of nongovernmental policy bodies such as the National Research Council (and the National Academy complex), environmental organizations, nonprofit foundations, and business and industry.

Moreover, there are nearly a million scientists and engineers engaged in national research activities, roughly 75% employed in industry, with the remainder in government agencies and universities⁴. Many of these professionals seek additional training in policy areas relevant to the conduct and management of research and development, the distinguishing economic characteristics and consequences of science and technology, and the broad policy framework within which science and technology activities occur.

As one of the world's leading research universities, Michigan has much to contribute in the STPP area. And, indeed, its faculty members, as individuals, have been quite influential in both "policy for S&T" and "S&T for policy" arenas. The University also has a significant number of opportunities for the focus of such a program that build on existing leadership:

Environmental policy and global climate change (SNRE, LS&A, Bus)
 Information technology (SOI, Law, Bus, Eng, Internet2)
 Life sciences (LSI, SNRE, Health Sciences)
 Energy (Phoenix Laboratory, Eng, SNRE, Bus)

⁴ The July 2002 InfoBrief published by the National Science Foundation estimates that 3.5 million individuals with B.S. degrees or higher were working as scientists and engineers in the United States in 1999

Yet, the STPP Task Force does not believe that the University has had the impact either in shaping public policy or contributing to national priorities it might have with a more coordinated and prominent effort in STPP.

There are many possibilities here. At the outset, the University might consider a more sustained effort to involve those faculty members with extensive experience and involvement in national policy development in advisory roles to the University leadership or as the nucleus of efforts (such as seminars or lecture series) to stimulate broader interest in STPP issues. Building on the foundation provided by key University programs such as the Ford School, the Institute for Social Research, the Life Sciences Institute, and other academic programs related to STPP, the University might develop course sequences that would provide interested students (and perhaps faculty members and practicing professionals) with the necessary knowledge and skills to influence public policy with science and technology, perhaps recognized by a graduate certificate. Going still further, the University might develop formal STPP degree programs at the graduate level, recruiting new faculty with strong research interests in these fields, and seeking (or reallocating) the necessary resources to support such programs.

Key Characteristics of Leading STPP Programs

Most STPP programs have been built by and enjoy the participation of experienced scientists with substantial experience in shaping federal policy. Furthermore, the core of successful STPP programs rests on faculty with sufficient training and research experience in science, mathematics, engineering, or the health sciences to bring that experience to bear on policy studies and practice. (See Appendix D for summaries of STPP programs.) As the Branscomb report notes, “No STPP program faculty can expect to represent all the areas of scientific expertise required to take on any policy issue that might arise. The scope of issues explored will have to be matched to the capability at hand. With scientists and engineers of broad experience in both performing and managing research, however, this constraint on scope need not be severe, because scientists with broad capabilities and experience in one area can rapidly gain a sufficiently sophisticated appreciation of the technical issues even in previously unfamiliar areas to make reasonably good assessments.”⁵

One of the common themes expressed by the outside visitors (Wiesner Lecturers and others) has been the difficulty of communicating the complexities of science and technology issues to decision-makers with limited background in these areas and even

⁵ Ibid.

more limited time. If we can assist students and faculty in ways of communicating to decision makers, this would be an important contribution to the nation while perhaps increasing the University's influence in policy circles.

Another theme stressed by several visitors was the importance of involving in such programs both science, engineering, and health sciences faculty with significant stature in the scientific community (e.g., members of the National Academies, service on major federal policy bodies) and social scientists with experience in public policy related to science-based issues.

All of the visitors stressed the importance of approaching STPP activities as highly interdisciplinary in nature, with an appropriate balance between faculty from the scientific disciplines and those from the social sciences and professions. In most cases, this cross-disciplinary nature was reflected in the joint appointments characterizing participating faculty members.

Markets, Incentives, Constraints, and Challenges

The focus of STPP programs should be on the educational and scholarly opportunities they offer to students and faculty. Since science and technology issues weigh so heavily in many areas of social, economic, and political policy development, one could well make the case for inclusion of STPP material in the curriculum provided for the public policy programs offered by the Ford School. One of our recommendations is that an effort be launched to develop just such courses by a cross-disciplinary team of faculty from scientific and policy disciplines. These courses could serve, not only students of the Ford School, but also those studying for other social science and professional degrees, such as law, business, economics, or political science.

One could also make a case for the importance of providing graduate students in science, engineering, and the health science professions with greater understanding of public policy processes and approaches. Many of these students both have interests in these areas and are likely to find themselves in roles at the interface between scientific and professional work and policy development. Scientists, engineers, and health professionals could benefit significantly in careers in research and professional practice from a greater awareness of economics, political science, law, and other disciplines relevant to public policy. Furthermore, some of our graduate students are interested in policy careers in government or the private sector where science and technology issues become important (e.g., national security, energy, environment, economic development).

Yet here we face a serious challenge, since the academic programs of many graduate students in the social sciences and professions as well as in science and engineering—or more specifically, their research obligations and the constraints placed upon their graduate research or teaching assistantships by faculty advisors and degree requirements—may not accommodate such additional coursework, despite the interest of the students themselves. Part of the challenge will be to educate faculty members about the enhanced marketability of their graduate students if their educations are broadened to include policy content. Overcoming this opposition will require identifying faculty advocates in the various departments who could encourage students into the program and could negotiate with advisors who are discouraging students.

The same resistance of faculty members to graduate student participation in STPP programs could also characterize their own involvement in STPP activities. Beyond the fact that there will be a limited set of faculty members with the interest, experience, or inclination to become involved in teaching or research in the STPP area, it is also the case that the reward structure of the University works against faculty involvement in such interdisciplinary instructional programs beyond their own disciplines. Fortunately, the experience of other institutions with leading STPP programs suggests that only a small cadre of interested, experienced (and distinguished) faculty members from the scientific and professional disciplines is required for programs to be successful. On the other hand, the involvement of at least one or two highly distinguished and respected scientists seems imperative for any new program to achieve credibility and visibility on campus.

Perhaps the most serious concern of the STPP Task Force involves the challenge of obtaining the support of senior academic administrators including department chairs, deans, and executive officers. The culture of the contemporary research university suggests that resources must usually be provided to launch such interdisciplinary programs that may be of University-wide interest but perhaps not high priority for particular academic units. During a time of particularly constrained resources, this "What's in it for me?" attitude may be difficult to counter.

Nevertheless, the STPP Task Force believes that building high quality instructional and research programs in science, technology, and public policy is not only very much in the interests of the University, its faculty, and its students, but could be viewed as a responsibility of a world-class research university. Without more formal efforts in these areas, Michigan falls short of providing the human and intellectual resources it is certainly capable of directing toward state, national, and global priorities in the policy arena.

Here, a further word about resources is important. While seed resources will likely be necessary (and might even be generated from external sponsors) to launch new instructional, research, and service activities in the STPP area, of far more importance is the development of sustainable financial models for these efforts. These resource issues suggest that any University effort be staged to explore first those options requiring modest investment (e.g., evolving the Wiesner Lecture series into an ICOS-like⁶ University-wide seminar on STPP issues or developing specific courses at the undergraduate or graduate level). At the next level would be the commitment of seed resources necessary to develop and implement targeted short courses or workshops for practicing professionals that would eventually become self-sustaining (e.g., for Congressional staffers or experienced scientists from industry).

The development of a multiple-course concentration for graduate students would require a considerably larger investment, since these would require not only the ongoing support of faculty teaching and program administration, but likely as well new faculty lines. Here one will face the difficult question as to whether such a graduate certificate program would attract new students and hence generate new tuition revenue, or whether it would compete with existing courses for the same graduate student population and resource base. While a program such as the one described here would provide benefits to students in existing degree-granting programs, it might extend their time to degree and thus limit new student enrollments.

The most resource-intensive initiatives would be those aimed at creating new degree programs at the M.S. or Ph.D. level in STPP similar to those offered at several other universities (e.g., Harvard, UC-Berkeley, CMU). As we will note later, the STPP Task Force recommends against such specific degree programs for pedagogical reasons as much as out of concern for resource requirements.

There are two additional issues of particular importance: The selection of a disciplinary home for STPP instructional programs, and the identification of academic leadership. Although interdisciplinary graduate programs such as STPP can be launched as a University-wide endeavor through an academic unit such as Rackham, over time they will only survive, much less thrive, if they have a home in a disciplinary school or college. At Michigan the logical academic unit for such efforts would appear to be the Ford School. Currently, the Ford School has a disciplinary focus on the social sciences related to public policy (although at least two faculty have interests that overlap with

⁶ The Intercollegiate Colloquium on Organizational Science (ICOS) provides a remarkably successful example of an interdisciplinary research seminar across several schools and colleges.

science policy); to initiate and house a STPP program, the Ford School must commit itself to attracting the participation of faculty from other academic and professional disciplines and may need to hire at least one faculty member who is centrally in the science policy area.

Finally, beyond ownership by a particular academic unit and the availability of adequate resources, the identification and commitment of both faculty leadership and participation presents the most significant challenge. Although the University has many faculty with both the scholarly and practical experience to contribute to a STPP program, the difficulty in enlisting the sustained faculty participation necessary for a successful instructional and research program should not be underestimated. The size and diversity of the University's faculty will pose a particular challenge to the identification of those with strong interests in and potential for participation in such a program.

Furthermore, program leadership is an equally critical issue. The experience at other institutions makes it apparent that the most successful programs have been launched and led by distinguished faculty members from the sciences with strong reputations in national policy development, e.g., Harvey Brooks (and later Lewis Branscomb) at Harvard, Granger Morgan at CMU, Wolfgang Panofsky at Stanford, John Holdren at UC Berkeley and now Harvard, Roger Revelle and Bill Nierenberg at Scripps and UCSD, and Donald Stokes at Princeton. The development of a successful STPP program at Michigan will almost certainly require similar leadership. If the University decides to proceed with the implementation of the recommendations of the STPP Task Force, it will need to move early to identify such leadership.

Recommendations

Proposed Objectives

The STPP Task Force recommends that the goals of any STPP activities conducted by the University should be, in priority order:

1. To provide students and faculty members across a broad range of academic and professional disciplines educational and research opportunities aimed at developing the knowledge and skills necessary to contribute to the development of public policy that reflects the enormous importance of science and technology in our contemporary world. In addition to providing a systematic introduction to the social sciences relevant to public policy, such instructional programs should aim at developing a deeper understanding of the nature of scientific and

- technological problems and opportunities, the methods used for analyzing scientific and technological issues and the limitations of those methods, and the dynamics of science and technology as they affect social, economic, and political issues at the national and international level.
2. To establish the University of Michigan as an intellectual center for research, teaching, and service at the interface of the study of science, technology, and public policy.
 3. To coordinate and facilitate the ongoing involvement of University of Michigan faculty and staff members in shaping science- and technology-dependent public policy at the state, national, and international levels, both to support their own public service activities and responsibilities, and to enhance the University's contributions in these areas.

Put another way, we see the University activities in the STPP area as spanning the traditional triad of education, research, and service:

- Education: Provide instructional opportunities (courses, certificate, degree programs) for graduate students, undergraduates, faculty members, and professionals.
- Research: Provide opportunities for faculty and students to conduct research on key STPP areas, drawing on the strengths of existing UM activities (e.g., Ford School, SNRE, S&T activities in schools and colleges, interdisciplinary research units such as ISR and LSI, and unique assets such as Internet2 and the Zell Institute).
- Service: Identify, coordinate, and support faculty public service activities in STPP with the aim of providing more such opportunities for University faculty and students and enhancing the University's contributions in the STPP area.

The STPP Task Force believes that any University activities in these areas should be characterized by rigorous intellectual content and methods. For example, it is clear that instructional programs in science and technology and public policy should be highly interdisciplinary. Efforts to teach students about the scientific issues underlying

policy are best provided by those trained in scientific and technological disciplines. Similarly, social scientists and others who can provide the theory behind policy development and implementation (e.g., political agents vs. bureaucrats, different theories of their objectives, the role and evolution of institutions, different notions of the “public good” and how these relate to what decision-makers actually are interested in) are important contributors to STPP programs.

While all instructional efforts should be characterized by rigor, it is also clear that students from different disciplines will require somewhat different approaches. For example, teaching policy-relevant topics to science students is likely to be more straightforward than teaching science to policy students. Policy has some principles that apply to any science topic in the policy realm. In contrast, a social science student who ends up working on issues related to NIH is likely to need a very different science background than one working on NASA issues.

However, the committee believes that these different needs should not be addressed separately. Rather, it is essential to approach the effort of course development and teaching as a joint effort. We must avoid any segregation between the natural and social scientists. They will need to work together and become more familiar with each other's methods, culture, and language. To be sure, involving both science and social science faculty in each course multiplies the effort and the cost. But the real world is a non-segregated arena, and the sooner we recognize and exploit the synergism that comes from mixing the cultures, the better. A UM program that addresses these dual needs effectively could be very special.

The STPP Task Force believes that it is more important that such a program aim not at specific scientific training for social science students, but rather deepen their appreciation for how scientists think (observation, hypothesis, theory, experimentation), the nature of scientific arguments (including the ability to distinguish between good and bad arguments), and the ability to communicate and work with scientists and technologists. Conversely, science students need to understand the thought structure and language of the policy world, including the ways in which policy makers deal with many objectives and constraints in addition to science and technology. Of course, such cross-disciplinary training is difficult to achieve through conventional courses alone. Some creativity will be required to develop experiences such as topic-focused workshops involving scientists and technologists with social scientists and policy students, or internships in policy roles as important components of such programs.

Here it is important to avoid envisioning the STPP curriculum at either the undergraduate or graduate level as simply cobbling together a menu of existing courses.

New programs generally require new courses that have a direct focus on the program goals. While existing courses have some relevance, they usually have some irrelevance as well, and can be an inefficient, lengthy pathway forward. New courses naturally require time and thought, and that is the justification for investment of funds or release time to faculty.

Proposed Staging of University Actions

We recommend that the University consider a sequence of staged activities in the STPP area, beginning first with efforts such as course development, seminars, and advisory bodies that marshal existing University capabilities, since these are not only somewhat less resource intensive, but they will provide valuable experience prior to launching major efforts such as curriculum development. Over the longer term, we recommend the University invest the resources to build leading instructional and research programs in STPP at the graduate level.

Phase I: Startup Efforts

A “Science and Technology Policy” Advisory Committee to the Vice-President for Research

The STPP Task Force believes that the University is not taking adequate advantage of the knowledge and influence of those faculty members with ongoing roles in national S&T policy development through service on federal advisory bodies or major study commissions (e.g., the National Academies). We recommend that the Vice-President for Research form a standing advisory committee that can help the University track and shape federal research policy. (The senior government relations staff members responsible for federal R&D activities should be a part of this group.)

Estimated Cost: Accommodated within existing OVPR budget.

An Ongoing Database on Faculty STPP Activities

We also recommend that the Vice-President create an ongoing process to identify, catalog, monitor, and help coordinate University faculty and program

activities in the STPP area, thereby better enabling the University to understand its resources and capabilities in these areas.

Estimated Cost: Minor addition to OVPR budget (~ \$10,000/y)

Continuation and Expansion of the Wiesner Lecture Series

We recommend that the University continue the Wiesner Lecture Series, expanded with the participation of University faculty members as lecturers, to raise the visibility of STPP issues to the University community. Over time, this effort might be expanded into a University-wide seminar series similar to the very successful ICOS (Interdisciplinary Committee on Organizational Studies) seminar series.

In a similar spirit, we recommend the development of a series of half-day focused scientific discussions on selected topics in STPP aimed at interested non-scientists. Examples might include global climate change, earthquake prediction, human cloning, and counter-terrorism. Such discussions would be aimed at drawing out the ways that scientists in different fields think about policy issues such as standards of evidence. These could serve as important elements of a curriculum for STPP students from both science and policy backgrounds. Here we have in mind inviting top-ranked scientists to discuss a key issue for a non-scientist audience with the aim of not only leading a discussion of the issue, but helping participants to understand the processes involved in scientific inquiry and to increase their ability to view scientific information critically. These workshops might also serve as a useful introduction to key scientific and technological questions for interested participants from beyond the campus such as entrepreneurs, journalists, and state government. Over time, one might be able to build an Industrial Affiliates program to support such STPP workshops.

Estimated Cost: Continuation of existing \$40,000/y budget, but repurposed to support half-day workshops in addition to formal lectures (~ \$10,000 each). To do this well will also require creating a group of individuals from across campus that feels ownership in planning these lectures and events with OVPR.

Development of Graduate Courses in STPP

We are convinced that the most significant impact would come from providing policy training to graduate students (and perhaps faculty) in the sciences as well as science training to students (and perhaps faculty) in the social sciences. Here the University should be training not only those students who might enter STPP activities, but also those intending to enter careers in research, education, and professional practice. At the outset, we recommend the University commit the (modest) resources required for the development and conduct and coordination of courses similar to Homer Neal's Physics course on science policy (see Appendix G). Here efforts should be made to develop and teach such courses with cross-disciplinary participation (both natural and social scientists) to graduate students from both scientific and policy disciplines. Such courses might be cross-listed within the Ford School, the Rackham interdisciplinary curriculum, and other schools and colleges, as appropriate. These courses might be oriented around a specific topic in which both science and social science faculty have conducted research, so that their different areas of expertise can be demonstrated in the context of one problem. A course co-taught by Henry Pollack on climate change might serve as a model as well. Faculty members committing to the development and teaching of such courses might be provided with courtesy (dry funds) appointments in the Ford School. During this first phase of course development, there should also be an effort to identify and publicize those existing courses in both science disciplines and policy programs that could be useful electives for students interested in STPP issues. At the same time, it will be useful in the long run if course development is done with an eye toward offering classes with some continuity and coherence of topics and ideas so that students may elect something that approximates a sequence of science policy courses even at this early stage of program development.

Estimated Cost: Roughly \$100,000 per course for course development (3 faculty at 25% release time), with subsequent teaching costs folded into base budgets (based on student enrollments)⁷. We recommend the development of 2 courses in first year, with subsequent course development arising as part of curriculum development for graduate concentration in Phase II (below). To give coherence to

⁷ The cost indicated can be considered an upper bound and would come down considerably if faculty "volunteers" could be found to develop some of the courses.

this course development, there needs to be one faculty member in charge of overseeing the development of such courses (including soliciting faculty from around campus to participate.) Ideally, such an individual would have at least a partial faculty line within the Ford School, and can work on developing support for such a program. If this faculty member teaches or co-teaches some of these courses, his or her cost may be part of the estimated cost estimate provided here.

Development of Undergraduate Courses in STPP

Although the Task Force believes that the development of graduate STPP courses and programs should receive the highest priority, there is considerable opportunity for stimulating and supporting similar instructional activities at the undergraduate level. Undergraduates have more flexibility in their schedules and are frequently eager to explore different subject areas. Furthermore, the opportunity for such courses or possibly even a minor concentration could provide a wonderful liberal arts experience, combining both the natural and social sciences. Here we may be able to combine forces with ongoing undergraduate programs that touch on science policy, such as the Program in the Environment or the proposed undergraduate minor in public policy.

Estimated Cost: Roughly \$60,000 per course (faculty release time), with the development of 2 courses recommended and folded into normal curriculum after development⁸. Again, someone would need to provide intellectual leadership to this undergraduate component as it develops.

Further Activities Recommended During Phase I

The identification of faculty leadership for STPP efforts is absolutely crucial to the success of this endeavor, and it something that must be addressed during Phase I. In addition to efforts by the Provost and the Vice President for Research to identify such leadership, the committee recommends that a faculty planning and implementation committee be formed to guide and implement the development of the STPP program.

⁸ Again, this can be thought of as an upper bound, as some faculty may have courses they wish to develop anyway, or may be able to adapt existing courses to make them appropriate for an STPP program.

Faculty STPP leadership, with input from the planning committee, can identify additional faculty participants, coordinate course development, and take on planning and conducting the Wiesner seminars-workshops. In addition, the STPP Task Force recommends that considerable effort be directed toward the development and submission of proposals for external sponsorship of both Phase I and Phase II activities. We believe that growth in the budgets of NIH and NSF may provide some opportunity for funding. Furthermore, several major foundations have possible interest in such programs (e.g., Sloan Foundation, Moore Foundation, Hewlett Foundation, Keck Foundation). Finally, the possibility of an Industrial Affiliates program to support the Wiesner Seminars should be explored. The proposed STPP Planning and Implementation Team (recommended below) could play these roles.

Estimated Cost: ~ \$30,000 per year for administration support and faculty release time (for proposal development).

Phase II: Program Development

Graduate Concentrations in STPP

Building on Phase I, the University should explore the development of a multi-course sequence in science, technology, and public policy that could augment traditional graduate programs for M.S., Ph.D., and professional degrees. We anticipate that such an STPP concentration would build on existing courses taught in the Ford School and elsewhere, augmented by the courses developed in Phase I of our recommendations. The completion of this STPP concentration should be recognized formally, whether through the awarding of a certificate from the Rackham School of Graduate Studies or some specific designation on the degree diploma. (This may not be necessary for students enrolled in policy degree programs such as the master of public policy offered by the Ford School.) Although it will be the task of a later planning committee to develop the details of both STPP courses and curriculum, a sample graduate curriculum might consist of the following courses for science students.

- A course on economic analysis and problem solving. (Students without any economics might need two courses in this area. Students with some

economics background can do this with one course.) The Ford School currently teaches both a two-course and one-course accelerated sequence of just this type for its policy students.)

- A course on political decision-making and the public policy process. (The Ford School also teaches a course like this that its students interested in domestic policy take as a required course.)
- A core course on STPP, similar to that taught by Homer Neal (See Appendix G for synopsis of Neal course). Such a course should talk about the unique challenges of policy debates involving scientifically technical issues, as well as the content of policy debates over science (i.e., it should cover both science for policy and policy for science.) It should include a variety of case studies, and require a term paper in which students, in teams involving both science and social science students, write their own case studies of an issue in their particular field of interest.
- Other courses in specific areas, such as health policy, environmental policy, life sciences policy, information policy, energy policy, engineering policy, etc. Some of these courses may be already available at the University; others may not. If we have faculty from a wide variety of backgrounds and units involved in leadership for the STPP program, these faculty would be the first likely teachers of a science policy course in their area.
- An internship requirement or option

For social science or professional students, a curriculum might include:

- a series of lectures or workshops on a range of science topics related to current controversies, such as the half-day workshops discussed above;
- a course in critical thinking about science, including topics such as the scientific method, standards of proof, hypothesis testing, and uncertainty in science; and,
- the interdisciplinary courses and internship opportunities discussed above for the science-based students.

Here we believe the key objective is to develop a rigorous, integrated sequence of course, seminars, and internship experiences with sufficient flexibility to accommodate students enrolled in graduate programs in the natural or social sciences, the applied sciences, or professional disciplines.

Estimated Cost: Course development: $\$100,000 \times 3 = \$300,000$

Program administration: \$50,000/y

Teaching costs: \$300,000/y (folded into existing budgets)

Additional faculty: 2 FTEs at \$150,000/y each

STPP Programs for Practicing Professionals

The STPP Task Force believes there may be an opportunity to develop a similar course sequence for practicing professionals (e.g., scientists and engineers moving into policy roles, government staff involving in STPP activities). Among the possibilities here would be intensive campus-based short courses similar to the Executive Management Education program of the Business School, a short course sequence offered in the Washington area, and a yearlong campus-based program similar to the Knight-Wallace Journalism Fellows program. Before launching any such program, there should be an extensive evaluation to assess market potential and existing competitors (e.g., AAAS, NAS, other universities).

Estimated Cost: Designed to be self-supporting (albeit with some program development investments)

Internship Programs

Many graduate students would be interested in opportunities for internship experiences with key policy bodies such as Congressional committees; administration agencies such as OSTP, OMB, NSF, NIH, EPA or DOE; or nongovernmental bodies such as National Academy complex or AAAS. The University has extensive experience with summer Washington internship experiences for and a proposal to establish a Washington, D.C. semester is soon to be forwarded to the central administration. A coordinated University effort for graduate students with STPP interests could be incorporated into the Washington Semester Program once it is established. Recent graduates and faculty may also find valuable opportunities with existing programs such as the AAAS Congressional Science Fellowships or White House Fellowships.

Estimated Cost: Internship experiences would be self-supporting

Administrative costs: \$30,000/y, assuming the internship program is placed in a unit that already runs an internship program.

A University Effort to Stimulate Faculty Research Activities in STPP

We recommend that the Vice President for Research, working with the Deans, make a concerted effort to interest and support faculty members in efforts to seek sponsored research support for major research centers in the STPP area. There are increasing signs of federal interest in such multidisciplinary efforts (e.g., counter-terrorism programs of the Homeland Security Agency, the Interagency Nanotechnology Initiative, and the Global Climate Change Initiative), and a more strategic effort by the University to identify possibilities, form multidisciplinary faculty teams to develop proposals, and provide startup support might have a significant payoff.

Estimated Cost: Accommodated within existing OVPR budget.

Summary of Phase I and II Costs

Phase I: Startup Effort

OVPR Advisory Committee:	No additional costs
Ongoing OVPR Database:	\$10,000/y
Wiesner Lecture Series/workshops:	Continue existing \$40,000/y budget
Graduate STPP Course Development:	Up to \$200,000 for development
Proposal Development (for several years)	\$30,000/y

Phase II: Program Development

Graduate Concentration in STPP:

Course development: Up to \$100,000 x 3 = \$300,000

Program administration: \$50,000/y

Teaching costs: \$300,000/y (folded into existing budgets)

Additional faculty: 2 FTEs at \$150,000/y each

Programs for Practicing Professionals: self-supporting

Internship: self-supporting, but \$30,000/y for admin. support

Phase III: Roads not taken...at least at the present time

Specific Graduate Degree Programs in STPP

The STPP Task Force recommends against the development of specific graduate degree programs in science, technology, and public policy at this time. Although several other institutions do have such programs at the M.S. and Ph.D. level, these are generally quite small, producing graduates with a relatively narrow focus on STPP careers. We believe that the University can far better leverage the considerable breadth, depth, diversity, and quality of our existing graduate programs, as well as our tradition of cross-disciplinary research and teaching, by developing STPP course sequences designed to augment existing degree programs, recognized with a graduate certification or some other type of diploma notation. This approach not only provides students with the flexibility of a more generally recognized degree, but would also provide a far greater number of students with the opportunities for enriching their studies with STPP training. We believe it to be a considerably more cost-effective approach to establishing the University as a national leader in STPP education and scholarship.

Next Steps

The highest priority recommendations of the STPP Task Force aim at developing STPP courses designed to augment existing graduate and professional degree programs using existing faculty and instructional programs within a staged (evolutionary) strategy. This curriculum could also serve as the basis of continuing education programs for practicing scientists and policy leaders in both the public and private sector. Although we do not view the development of STPP programs at the undergraduate level to be as urgent as those at the graduate level, there is a significant opportunity here as well to enrich the undergraduate curriculum with such interdisciplinary instruction.

We believe the University can most rapidly build nationally recognized research programs in STPP areas by better coordinating and supporting multidisciplinary efforts of its current faculty (although, of course, academic programs will continue to recruit outstanding faculty members with activities and interests in these areas, as they have in the past), augmented by occasional opportunistic hires in the STPP area. This same theme of better coordination of existing faculty interests and activities is also reflected in

our recommendations to establish a STPP advisory committee, a STPP inventory process, and a continuation and possible expansion of the Wiesner Lecture Series at the level of the Vice-President for Research.

We have chosen not to recommend specific areas of focus for the curriculum and faculty research in STPP at this time, since this will most appropriately evolve from the interests of the participating faculty members. As possible options, we might suggest for consideration:

- The role of science and technological innovation in economic development
- Environmental and regulatory policy
- Information technology
- Key policy areas affected by science and technology such as health care, energy, environment and global sustainability, homeland security, national defense, information and communications policies

A key element in moving forward with this strategy is to identify a core group of faculty leaders who are interested in helping develop an STPP program on campus, in potentially teaching in it with some regularity, and in helping advertise this program in their home departments and among science-based students. A sense of faculty ownership and commitment will be key to the success of the program. Particularly important here is the identification of leadership for the STPP program development effort, since the scientific reputation and policy experience of this individual will be key to establishing the credibility of the effort. There are several such individuals on the Michigan faculty who could play this leadership role.

Recognizing that any such instructional program will only survive and prosper in an existing academic unit, we recommend that the Ford School of Public Policy serve as the home base for such programs. However to reflect the highly interdisciplinary nature of the proposed STPP program, we recommend that courses be cross-listed where appropriate. It is easier to draw together a program that involves widely dispersed S&T programs (e.g., natural sciences, engineering, health sciences, environment) in the Ford School than to place such a program in one of these areas and hope that other areas will join in. In some sense, the Ford School is "neutral ground" and can attract involvement from all these places.

To facilitate this, we recommend that those senior faculty members from science, engineering, and the health sciences participating in the development and conduct of the STPP curriculum be given courtesy appointments in the Ford School during the period of their involvement. Since the interdisciplinary character of the instructional program will involve a number of schools across the University in addition to the Ford School

and Rackham (e.g., LS&A, the health science schools, Engineering, Business, Law, SNRE, Education, Information, etc.), we suggest that the Ford School might want to create a University-wide advisory committee for the STPP program.

Yet more will be needed. Here it is important to acknowledge that, although a number of Ford School faculty have strong interests in science and technology policy, there are currently no faculty affiliated with the Ford School who have the expertise to develop the science side of this program. If the Ford School is truly the home base, at least one or two tenure line faculty need at least part of their appointment based at the School in order to promote and build this program within the Ford School. Without this type of involvement, the current faculty of the School will continue to view science policy as an interesting topic but a low priority for the School. It seems a distance from the center focus of the Ford School at present, given the current faculty, and they are the ones who will need to vote on additional appointments.

As noted earlier, it is most likely that the leadership for the STPP program will be provided by a science faculty member with established reputation in scientific research and policy development. To build a critical mass of interest within the Ford School, this individual should be provided with a joint appointment and encouraged to work closely with any new faculty added to strengthen the STPP program.

The strategy we have recommended should require relatively modest resources during the Phase I startup period (e.g., for the support of the Wiesner seminar series, course development, and proposal development). However, as the University evolves toward the Phase II program development activities, more significant resources will be required. While the new faculty requirements would be modest (two or three faculty lines), there will be resources required to support curriculum development and teaching (particularly with team teaching models) by participating faculty members. Furthermore, there will be administrative costs for various elements of the program (e.g., organizing, promoting, and managing the graduate curriculum, administering possible internship programs, developing and administering grants, and developing a series of half day workshops). Although we believe that the STPP program we have recommended (e.g., graduate certificate concentrations with possible short-course and internship opportunities, interdisciplinary faculty research centers) can be sustained through traditional mechanisms (e.g., tuition attributed to the participating students, sponsored research grants), some startup funding will be needed during the development period. However, prior to committing resources to launch Phase II, a review of Phase I and a market analysis for the emerging UM program is appropriate.

Although we have not recommended it at the present time, the escalation of STPP instructional programs to the level of specific graduate degree programs would require considerable additional resources, including those required for new faculty. If such degree programs should become of interest to the University at some future date, we suspect that this would likely require rather substantial funding from external sources (e.g., an endowed program).

Should the University choose to proceed with elements of the recommended options, we recommend the appointment of a STPP Planning and Implementation Team, drawn from interested faculty members across the University, that would work closely with the Dean of the Ford School as well as with the Provost, Vice-President for Research, and other participating academic units to flesh out the details of the recommendation, launch and coordinate the Phase I activities, and develop proposals for external support. It would be useful if the faculty member(s) selected to lead the STPP were chair(s) of this planning effort.

Finally, as with any such effort to build quality academic programs, we also recommend that the Planning and Implementation Team develop appropriate metrics to measure progress toward key goals. Beyond the successful achievement of each approved element of the phased plan, the University should carefully monitor student and faculty involvement (e.g., student course elections, graduate certificate awards, placement of graduates, faculty participation in teaching and research, sponsored research volume, private support) in assessing progress. One might also attempt to measure the University's influence in key STPP areas through faculty participation on key policy bodies.

We have provided a possible timetable for the Phase I and Phase II activities in Figure 1.

Concluding Remarks

The STPP Task Force recommends that the University of Michigan begin a phased approach to launching educational and programs aimed at training disciplinary scientists (including both those in traditional scientific and engineering disciplines as well as more cross-cutting fields such as medicine or public health) to have a better understanding of the policy context into which science and technology often fits, and training social scientists (including both those in traditional disciplines as well as those professional schools such as public policy, law, and business) to understand the relevance of science and technology to their work. The instructional programs and

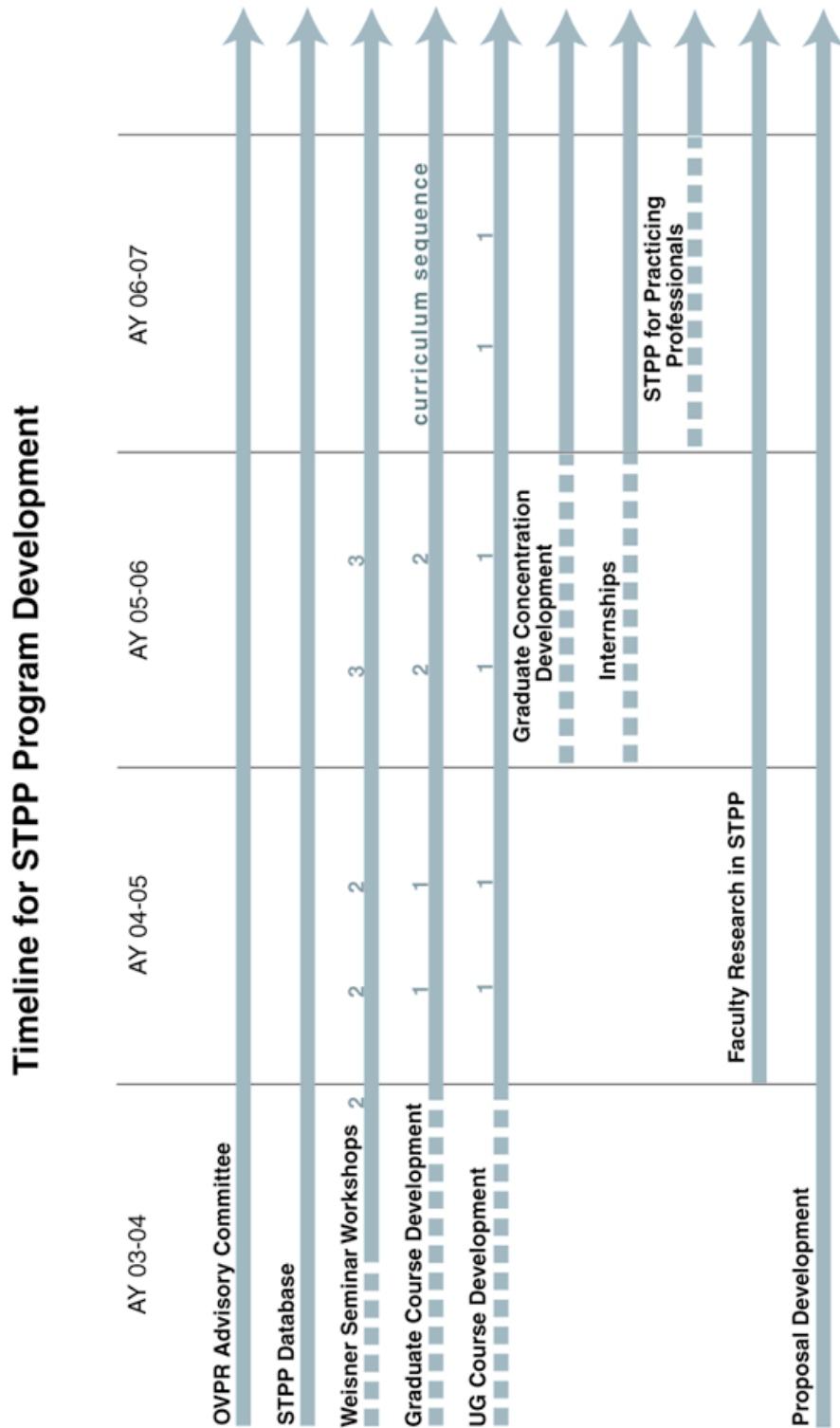
scholarly efforts associated with STPP activities should be infused with a rigorous analysis and understanding of the forces shaping public policy where science and technology issues are important.

It is our belief that the phased approach recommended in this report provides a cost-effective and timely strategy that not only responds to the very considerable opportunities for the University to build world-class programs in the STPP area, but does so within the very real financial constraints likely to be faced by the University for the foreseeable future. The key is to build such a program on the existing and rather considerable strengths of the University, both among the faculty, within existing degree programs in both the academic and professional disciplines, and a long tradition of cross-disciplinary instructional and scholarly activities.

The efforts to coordinate existing faculty interests, efforts, and expertise along with modest STPP course development at both the graduate and undergraduate level can begin immediately. We also believe that the effort to seek external funding could also commence rapidly. The phased approach recommended in this report seems the more realistic strategy for developing high quality STPP course sequences, taught within the Ford School and designed to augment existing graduate degrees in the sciences, social sciences, and the professions. When augmented by faculty efforts to build multidisciplinary sponsored research programs, coordinated and assisted by the central administration, this strategy could rapidly establish the University as a major contributor to the production of educated graduates, research, and service contributions in science, technology, and public policy.

Figure 1

A Proposed Timeline for the Phased Development of STPP Programs



Appendices

Appendix A: Committee Composition and Charge

Appendix B: Committee Meeting Activities

Appendix C: Visitors (e.g., Wiesner Lecturers)

Appendix D: Summary of Leading STPP Programs

Appendix E: Existing University of Michigan STPP Activities

Appendix F: Course list for Science, Technology & Society (STS) minor

Appendix G: Synopsis for Homer Neal course

Appendix H: Program for AAAS Colloquium on Science and Technology Policy
(4/10-11/2003)

Appendix A

Committee Composition and Charge

MEMORANDUM

TO: Task Team on Science, Technology and Policy

FROM: Fawwaz T. Ulaby,
Vice President for Research

Paul N. Courant
Executive Vice President for Academic Affairs and Provost

DATE: October 4, 2002

SUBJECT: Background and Task Team Charge

Background

Over the past few years there have been discussions about the possible need for a formal or integrated program in science policy at the University. Following the offering of a course by Homer Neal in the Physics Department in Fall 2000 (see attached description of the current course), we were encouraged to start examining the issues associated with the creation of a formal program. A discussion group, consisting of Homer Neal, Dean Rosina Bierbaum, and Dean Becky Blank, plus the Provost and Vice President for Research, met on several occasions and we decided on a two-pronged approach to collect the information required to make the necessary informed decisions about such a possible program.

- 1) To offer a series of public lectures on various aspects of science public policy to be delivered by nationally known speakers under the auspices of the "Jerome B. Wiesner Science and Technology Policy Lecture Series." OVPR, the Provost Office, and one or more School or College will sponsor each lecture in the series. The distinguished guest may also deliver additional lectures for the School or College co-sponsor, where appropriate.

Over the 2002-2003 academic year, we anticipate hosting 6-7 such lectures, with John P. Holdren as the first speaker in the series. Holdren is the Teresa and John Heinz Professor of Environmental Policy, and Director of the Program on Science, Technology, and Public Policy in the John F. Kennedy School of Government, and Professor of Environmental Science and Public Policy in the Department of Earth and Planetary Sciences, at Harvard University. He served on the President's Committee of Advisors on Science and Technology (PCAST) from 1994-2001, as well as other policy advisory positions. Holdren visited the campus on September 30-October 2, and delivered his lecture on October 2nd,

Task Team Members
 October 4, 2002
 Page Two

which also launched a College of Engineering conference on energy and environmental concerns.

- 2) To form a Task Team comprised of a few faculty members, each of whom has broad knowledge of public policy at the national level through their service on major advisory boards to federal agencies and the national academies. The Task Team will be chaired by James Duderstadt, and the committee will meet with all of the Wiesner series lecturers as the "fact-finding" part of its charge.

Task Team Charge

The charge to the Task Team is:

- 1) Should the University of Michigan have a formal academic program in Science Public Policy? If so, why? If not, why not?
- 2) If the answer to the preceding question is in the affirmative, please develop a strategy that responds to the following ancillary questions:
 - What should Michigan's area of focus be in this arena, in contrast with the science public policy programs at other institutions (MIT, Princeton, Cornell, RPI, Virginia Tech, Carnegie Mellon, George Washington, etc.)?
 - Should Michigan's program lead to a formal degree (M.S.? Ph.D.?), a Rackham certificate, or other? Which students would such a program be aimed at and how could these students use this program to advance their educational and career goals?
 - Which units or departments at Michigan should be involved in such a program? How should the program be administered, what level of resources will be needed to implement it, etc.?

The Task Team is asked to work closely with the schools and colleges that might be associated with such a program. The Team is further asked to report its conclusions by the end of March, 2003. The report will also be shared with the appropriate deans for their review and endorsement.

FTU:PNC/lc

Enclosure

Task Team on Science, Technology, and Policy
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Appendix B

Committee Meeting Activities

November 26, 2002

- First meeting committee; presentation of charge by Provost Courant and VP Ulaby

December 17, 2002

Reviewed issues related to establishment of policy program

February 11, 2003

- Discussion with Homer Neal about his science policy course
Report on origins and sources of support for UM programs that might provide a model for a science and technology program

March 12, 2003

- Discussion with Tobin Smith, former UM Federal Relations Officer for Research and Assistant Director of UM Washington Office
- Discussion of first draft of committee report

March 26, 2003

- Discussion of refinements to committee report

Appendix C

Visitors

Wiesner Lecturers

Neal Lane, November 6-7, 2003

Lewis Branscomb, January 14-15, 2003

John Gibbons, March 23-24, 2003

Frank von Hippel, April 8-9, 2003

Additional Meetings with

John Holdren, October 2, 2002

David Baltimore, February 20, 2003

Congressman Vern Ehlers, February 18, 2003

Richard Malow, March 14, 2003

Appendix D Summary of Leading STPP Programs

Adapted from STPP web pages and "AAAS Guide to Graduate Education in Science, Engineering and Public Policy" and the Program web sites, <http://www.aaas.org/spp/dspp/sepp/index.htm>

PROGRAMS IN SCIENCE AND TECHNOLOGY POLICY	
Harvard University, Science, Technology, and Public Policy Program, Belfer Center for Science and International Affairs, John F. Kennedy School of Government	Program teaching research focuses on Energy Technology Innovation, Nuclear Policy, Science, Technology, & Globalization, Policy for Innovation, Digital Government, Information, Technology, & Governance
The George Washington University, Elliot School of International Affairs, Science, Technology, and Public Policy Program	STEP students conduct coursework and dissertation research in the Schools' Center for International Science and Technology Policy and Space Policy Institute.
University of Minnesota, Hubert H. Humphrey Institute of Public Affairs, MS in Science, Technology, and Environmental Policy	Courses and programs offered through the Institute of Technology, the College of Biological Sciences, the Department of Applied Economics, and research centers and outreach programs in the Humphrey Institute.
Princeton University, Program in Science, Technology, and Environmental Policy	Based in the Woodrow Wilson School of Public and International Affairs with strong ties to the Environmental Institute and the Center for Energy and Environmental Studies.
Energy and Resources Group, University of California-Berkeley	An interdisciplinary unit established in 1973 that offers MS/MS/PhD degrees and conducts research into issues of energy, resources, development, human and biological diversity, and international security.
PUBLIC POLICY PROGRAMS	
George Mason University, School of Public Policy	Science and technology policy is one of five areas of concentration in the school.
Georgia Institute of Technology, School of Public Policy, School of History, Technology, and Society	Technology-intensive public policy focus in the School of Public Policy; history and sociology focus in the School of History, Technology and Society.
Rutgers, The State University of New Jersey, Department of Public Policy	Offers a concentration in science, technology and environmental politics.
ENGINEERING/PUBLIC POLICY PROGRAMS	
Carnegie-Mellon University, Department of Engineering and Public Policy	Undergraduate program established in 1970.
Massachusetts Institute of Technology, Technology and Policy Program	Program combines technical competency and policy; curriculum is the practical equivalent to dual MS degrees in engineering and in policy.

PROGRAMS IN SCIENCE AND TECHNOLOGY STUDIES	
Cornell University, Department of Science and Technology Studies	Interdisciplinary program; focus on understanding the nature of science and technology and the complex interactions between science, technology, society, and culture.
Rensselaer Polytechnic Institute (RPI), Department of Science and Technology Studies	Faculty from humanities and social sciences collaborate to understand science, technology, and society with emphasis on ethical values, policy dimensions, and the politics of technology design.
Virginia Tech, Graduate Program in Science and Technology Studies, Center for the Study of Science in Society	Interdisciplinary approach to the study of science, technology, and society within in a historical perspective

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John Holdren
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The Science, Technology, and Public Policy Program (STPP) engages in research, teaching, and outreach on how science and technology influence public policy; on how public policy influences the evolution of science and technology; on how the outcomes of these interactions affect well-being in the United States and worldwide; and on how the processes involved can be made more effective and their outcomes more beneficial.

STPP research addresses these issues using methods and insights drawn from the natural sciences, engineering, economics, political science, history, sociology, management, and law. Current research focuses include: the management of nuclear technology, materials, and wastes in both the civilian and military sectors; energy technology innovation and diffusion strategy for the challenges of the twenty-first century; the roles of scientific research and technological innovation in economic growth and development, environmental sustainability, and international security; and processes and mechanisms for science and technology advice to government.

Most of STPP's research activities are conducted jointly with sister programs in the Belfer Center – notably the Environment and Natural Resources Program (ENRP) and the International Security Program (ISP) – and/or with other Centers in the Kennedy School, such as the Center for Business and Government and the Center for International Development. STPP also benefits from research partnerships and interactions with other units of the Harvard campus (including especially the Department of Earth and Planetary Sciences, the Division of Engineering and Applied Science, and the University Center for the Environment), with other universities in the Cambridge area (MIT, Tufts) and across the nation (Berkeley, Carnegie-Mellon, Maryland, Princeton, Stanford), with the National Academies of Science and Engineering, and with collaborating institutions in China, India, and Japan.

The US Department of Energy, the Nuclear Threat Initiative, the Energy Foundation, the William and Flora Hewlett Foundation, the John D. and Catherine T. MacArthur Foundation, the David and Lucille Packard Foundation, and the Winslow Foundation sponsor the activities of STPP in research and outreach. Further support for STPP activities comes from endowment funds contributed by the IBM Corporation. I am grateful to all of these entities for their generous support.

In teaching, STPP oversees the Policy Area of Concentration (PAC) in Science, Technology, and Policy (STP) for the Kennedy School's Master of Public Policy Program. Courses offered for the STP PAC – such as STP100, Introduction to Science and Technology Policy, and STP312, Designing and Conducting Interdisciplinary Assessments for Policy – also attract students from

the Kennedy School's MPA and PhD programs, from Harvard's other schools and colleges, and from Brandeis, MIT, and Tufts. No PhD is offered in STP per se, but students admitted to the Kennedy School's PhD program in public policy may choose an STP focus and affiliate with one or more of the STPP research projects. These projects are also populated with PhD students from elsewhere at Harvard and from the other area universities.

STPP was founded in 1976 by Dr. Harvey Brooks, now Benjamin Pierce Professor of Technology and Public Policy Emeritus and widely recognized as the senior statesman of science and technology policy studies in the United States. Dr. Lewis Branscomb, formerly Chief Scientist at IBM and Director of the National Bureau of Standards and now Aetna Professor of Public Policy and Corporate Management Emeritus succeeded him as Director of STPP in 1986. Dr. John Holdren succeeded Dr. Branscomb as STPP Director in 1996.

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- Jean Camp
Assistant Professor of Public Policy
- Ashton B. Carter
Co-Director, Preventive Defense Project; Professor of Science and International Affairs
- Paul M. Doty
Director Emeritus, BCSIA; Mallinckrodt Professor of Biochemistry, Emeritus
- Jane Fountain
Associate Professor of Public Policy and Director of the National Center for Digital Government
- Jeffrey Frankel
James W. Harpel Professor of Capital Formation and Economic Growth
- David M. Hart
Associate Professor of Public Policy
- William Hogan
Lucius N. Littauer Professor of Public Policy and Administration
- John Holdren
STPP Director and Faculty Chair; Co-Principal Investigator, Managing the Atom Project; Teresa and John Heinz Professor of Environmental Policy
- Sheila Jasanoff
Professor of Science and Public Policy
- Calestous Juma
Professor of the Practice of International Development
- Henry Lee
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- Viktor Mayer-Schoenberger
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The Department of Science and Technology Studies (S&TS) is composed of scholars from a variety of disciplines who share an interest in understanding the nature of science and technology and the complex interactions between science, technology, society, and culture. Grounded primarily in the history, philosophy, sociology, and politics of science, the S&TS field is developing its own perspectives, questions, and research topics that can only be understood within an interdisciplinary framework. The origins of science and the development of scientific ideas, the cultural position of experimentation, the creation of scientific authority, the role of rhetoric in science, and the politics of scientific and technological decision-making are among the many topics actively explored by faculty and students. A considerable body of empirical research has focused upon scientific practice, scientific controversies, technology studies, science and technology policy, and responses to science and technology in diverse social forums.

Faculty Information

- Richard Boyd (Professor, Philosophy/S&TS)
- Peter Dear (Professor, History/S&TS)
- Michael A. Dennis (Assistant Professor, S&TS)
- Stephen Hilgartner (On Leave) (Associate Professor, STS)
- Ronald Kline (Associate Professor and Director of Graduate Studies, Electrical Engineering/S&TS)
- Bruce Lewenstein (Associate Professor, S&TS/Communication)
- Michael Lynch (Professor, S&TS)
- Helene Mialet (Assistant Professor, S&TS)
- Trevor Pinch (Chair/Professor, S&TS)
- Alison Power (Professor, Ecology and Evolutionary Biology/S&TS)
- Judith Reppy (Professor and Director of Undergraduate Studies, Peace Studies Program/S&TS)
- Margaret W. Rossiter (Professor, S&TS)
- L. Pearce Williams (Professor Emeritus, S&TS) Dept. of Science & Technology Studies

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The program integrates the theories, methods, and findings of the humanities and social sciences into a unified approach to understanding science, technology, and society. Faculty interests include the historical, political, economic, and sociocultural dimensions of our scientific and technological world. Emphasis is placed on ethical values, policy dimensions, and on the politics of technology design. The Department of Science and Technology Studies (STS) at Rensselaer is one of the few in the world that offers STS degrees from baccalaureate to doctoral levels. Founded in 1982, the Department reflects Rensselaer's commitment to the development of STS as a field of inquiry. The graduate program emphasizes the cultural, historical, economic, political, and social dimensions of scientific and technological society, with a focus on ethical and values issues.

Faculty Information

- Edward J. Woodhouse, Associate Professor, Ph.D., Yale, Political Science
- Sharon Anderson-Gold, Associate Professor, Ph.D. (Philosophy) New School, 1980.
- Atsushi Akera, Lecturer, Ph.D. (History and Sociology of Science) Pennsylvania, 1998.
- Steve Breyman, Associate Professor, Ph.D., (Political Science) UC-Santa Barbara
- Nancy D. Campbell, Assistant Professor, Ph.D., University of California Santa Cruz 1995
- Linnda Caporael, Professor, Ph.D., (Psychology) California-Santa Barbara
- P. Thomas Carroll, Ph.D. (History and Sociology of Science) Pennsylvania, 1982.
- Ron Eglash, Ph.D. (History of Consciousness) California, Santa Cruz, 1992.
- Kim Fortun, Associate Professor, Ph.D., (Anthropology) Rice
- Michael Fortun Assistant Professor, Ph.D. (History of Science) Harvard, 1993.
- Rayvon Fouche Assistant Professor, Ph.D. (STS) Cornell University, 1997.
- David Hess, Professor, Department Chair, Ph.D., Cornell, Anthropology
- Richard Jensen, Ph.D. (American Studies), Yale, 1966.
- Linda Layne, Professor, Graduate Program Director, Ph.D., (Anthropology) Princeton
- Thomas Lobe, Ph.D. (Political Science), Michigan, 1975.
- Thomas Phelan, Institute Historian; M.A. (English), College of Holy Cross, 1945.
- Sal Restivo, Professor, Ph.D., Michigan State, Sociology
- Langdon Winner, Professor, Ph.D., California-Berkeley, political science,

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Valerie Hardcastle, Director
 Barbara Allen, Ph.D., Associate Director, Graduate Program in STS

The Graduate Program in Science and Technology Studies (STS) at Virginia Tech was founded in 1986 to provide opportunities for students to pursue the M.S. and Ph.D. degrees. Both degree programs explore **interdisciplinary approaches to the study of science, technology, and society**. STS graduates emerge with an ability to identify and examine the conceptual and social dimensions of science and technology simultaneously and in historical perspective.

Faculty Information

The STS Teaching Faculty includes 26 faculty members from the four participating units and the Departments of Political Science and Teaching and Learning. An additional 13 faculty members participate by serving on graduate committees. A partial list of topics of interest to the faculty includes: 19th and 20th century evolutionary biology; anthropology of technology; bioethics; conceptual change in science; environmental policy and resource use; experimental inference; Hebraic scholarship in 17th century England; history of management and public policy; history of medicine and public health; history of science and public policy; legitimation of scientific knowledge; medieval cosmology, the relationship between scientific and theological change; social epistemology; technological controversies; philosophy of statistics; theories of heredity; universities and the scientific revolution.

- Barbara Allen, Assistant Professor and Director of Science & Technology Studies, Northern Virginia Campus
- Roger Ariew, Professor of Philosophy and Department Head
- Mark Barrow, Associate Professor of History
- Henry Bauer, Emeritus Professor of Chemistry and Science & Technology Studies, Emeritus Dean of Arts & Sciences
- Megan Boler, Assistant Professor of Teaching and Learning
- Daniel Breslau, Assistant Professor of Science & Technology Studies
- John Browder, Professor of Urban Affairs & Planning
- Richard Burian, Professor of Philosophy and Science & Technology Studies
- Daryl Chubin, Adjunct Professor of Science & Technology Studies, Northern Virginia Campus
- James Collier, Assistant Professor of English
- Eileen Crist, Assistant Professor of Science & Technology Studies
- Gary Downey, Associate Professor of Science & Technology Studies
- Mordechai Feingold, Professor of Science & Technology Studies
- Anne Fitzpatrick, Adjunct, Science & Technology Studies, Northern Virginia Campus
- Ellsworth Fuhrman, Professor of Science & Technology Studies and Sociology
- Jim Garrison, Professor of Teaching & Learning
- Charles M. Good, Professor of Geography

- Marjorie Grene, Honorary Distinguished Professor
- Saul Halfon, Assistant Professor of Science & Technology Studies
- Valerie Hardcastle, Director of Science & Technology Studies, Assoc Professor of Philosophy
- Scott Hauger, Adjunct Professor of Science & Technology Studies, N. Virginia Campus
- Bernice Hausman, Associate Professor of English
- Richard Hirsh, Professor of History
- Karen Hult, Professor of Political Science
- Kathleen Jones, Associate Professor of History
- Ann LaBerge, Associate Professor of Science & Technology Studies
- Muriel Lederman, Associate Professor of Molecular & Cellular Biology
- Timothy Luke, Professor of Political Science
- Deborah Mayo, Professor of Philosophy
- Martha McCaughey, Associate Professor of Women's Studies
- Harlan Miller, Professor of Philosophy
- Deborah Milly, Associate Professor of Political Science
- Margaret Murray, Professor of Mathematics
- Maria Papadakis, Associate Professor of Urban Affairs & Planning
- Laura Perini, Assistant Professor of Philosophy
- Joseph Pitt, Professor of Philosophy
- Duncan Porter, Professor of Biology
- Anita Puckett, Associate Professor of Appalachian Studies
- Barbara Reeves, Visiting Assistant Professor of Science & Technology Studies and Humanities
- Richard C. Rich, Research Interests: Professor and Department Chair of Political Science
- John Ryan, Professor and Chair of Sociology
- William Snizek, Professor of Sociology
- Liching Sung, Assistant Professor of Communication Studies
- Beverly Davenport Sypher, Professor of Communication Studies
- Howard Sypher, Professor and Chair of Communication Studies
- Doris Zallen, Professor of Science & Technology Studies
- Lee Zwanziger, Adjunct Professor of Science & Technology Studies, Northern Virginia Campus

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The George Washington University (GW) is one of the world's leading centers for graduate study of science, technology, and public policy issues. The Center for International Science and Technology Policy, which is part of GW's Elliott School of International Affairs, is the University's focal point for these activities. Since 1970, the university has offered a Master of Arts degree in Science, Technology, and Public Policy, and over the past three decades a number of doctoral students in Ph.D. programs such as public policy, political science, engineering administration, and other disciplines have chosen science, technology, and public policy as a focus for coursework and dissertation research. The Center carries out a variety of research projects, many of which are sponsored by government and nongovernment organizations, and students in the masters program often work as research assistants on these projects. The Space Policy Institute, a separately chartered research and policy program, is an integral element of the Center. The Space Policy Institute concentrates its research and teaching efforts on issues related to the U.S. and global space programs.

Faculty

- Nicholas S. Vonortas, Ph.D. Director, Center for International Science and Technology Policy, Associate Professor of Economics and International Affairs, and Director, Master of Arts program in Science, Technology, and Public Policy.
- Robert W. Rycroft, Ph.D. Associate Professor of Political Science and International Affairs.
- John M. Logsdon, Ph.D. Director, Space Policy Institute, and Professor of Political Science.
- Ray Williamson, Ph.D. Research Professor, Space Policy Institute.
- Henry Hertzfeld, JD, Ph.D. Senior Research Scientist, Space Policy Institute.
- David Roessner, Ph.D. Research Associate
- Alan Tonelson, Ph.D. Research Associate

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The Humphrey Institute of Public Affairs is a college within one of the nation's great public research universities. Students have access to a wide variety of courses and programs, including those of the Institute of Technology, the College of Biological Sciences, and the Department of Applied Economics. The Institute sponsors several related research centers and outreach programs as well as four graduate degree programs and several joint degrees. It offers multi-faceted opportunities for students to work with faculty and fellows who have international reputations as scholars, researchers, and professional practitioners. The Institute was established in 1977 as a tribute to Vice President and Senator Hubert H. Humphrey. As the direct descendant of the University's pioneering Public Administration Center (1936-68) and distinguished School of Public Affairs (1968-77), the Humphrey Institute represents over half a century of community service and academic achievement.

Faculty Information

Professor Sandra O. Archibald received her doctorate in agricultural economics from the University of California at Davis. She researches the social costs of technology and the design of effective environmental policy. Professor Archibald also holds an appointment in the Department of Agricultural and Applied Economics.

Professor Kenneth H. Keller, Charles M. Denny, Jr. Professor, received his doctorate in chemical engineering from Johns Hopkins University. His research examines domestic policy issues associated with developments in high technology medicine. He also studies the intersection of science and technology with international politics and economics. Professor Keller holds an appointment in the Department of Chemical Engineering and Materials Science as well.

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Princeton University's Program in Science, Technology and Environmental Policy (STEP) is based in the Woodrow Wilson School of Public and International Affairs with strong ties to the Princeton Environmental Institute and the Center for Energy and Environmental Studies. Many aspects of science and technology policy debates have been tackled with the tools of political and economic analysis that are the traditional strong suits of the Woodrow Wilson School (WWS). In addition to providing a systematic introduction to the field of policy analysis, the goal of the STEP program is to develop a deeper understanding of: (1.) the nature of scientific and technological problems and opportunities; (2.) the specialized methods used for analyzing scientific and technological issues; (3.) the dynamics of science and technology in relation to national and international institutions and organizations.

Increasing numbers of students in the School generally, and in the STEP program in particular, have a primary interest in environmental science and technology policy, including global climate change, negotiated environmental accords, biodiversity, environmental ethics, and the connection between the environment and development. The Program's ties with the Center of Domestic and Comparative Policy Studies, the Center for Energy and Environmental Studies, the Department of Ecology and Evolutionary Biology, the Geophysical Fluid Dynamics Laboratory, the Office of Population Research, and the Princeton Environmental Institute, facilitate research in these areas.

Faculty Information

- Denise L. Mauzerall (Ph.D. Harvard University, Atmospheric Chemistry), Assistant Professor of Public and International Affairs
- Frank N. von Hippel (Ph.D. Oxford, Physics), Professor of Public and International Affairs
- David F. Bradford (Ph.D. Stanford University, Economics), Professor of Economics and Public Affairs
- Burton H. Singer (Ph.D. Stanford, Statistics), Professor of Demography and Public Affairs
- Lee Silver, Professor of Molecular Biology
- Andrew Dobson, Professor of Ecology and Evolutionary Biology
- David S. Wilcove, Prof. of Public Affairs and Ecology and Evolutionary Biology

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Formally designated the Graduate Group in Energy and Resources, although "group" connotes something less formal than what actually exists. "Graduate Groups" at UCB are in fact interdisciplinary graduate departments with the same powers as ordinary departments to admit students and offer courses as well as to confer advanced degrees. Graduate Groups differ structurally from ordinary departments mainly in the composition of the faculty: most of the faculty members associated with Graduate Groups hold their main appointments in disciplinary or professional departments and participate in the activities of the Group only part-time. A few of the larger Groups, however, have "core" faculty appointments of their own in addition to "affiliated" departmental faculty members. ERG was the first Graduate Group at UCB to have core appointments.

ERG Mission: On an unprecedented scale, and as an unintended consequence of material consumption, technological innovation, and a growing population, the well being of human society is threatened by environmental degradation, inequity within and between nations, and long-term resource scarcity. Toward this end, research and teaching at ERG is systemic, strategic, and salient. Viewing society and the environment systemically and from an interdisciplinary perspective, we seek to comprehend the complex linkages between human actions and environmental responses, and to develop conceptual frameworks that respect actual system boundaries. A strategic focus to ERG's research is manifest in our emphasis on strengthening and augmenting analytical tools, questioning the assumptions underlying them, and scrutinizing the goals to which they are applied. ERG fosters research that is salient to public policy and equips students with the capacity to act upon this knowledge.

ERG traces its origins to the Committee on Energy and Resources, which was established in November 1972 under the chairmanship of electrical engineering professor C. K. Birdsall as an Advisory Committee to the Vice-Chancellor Mark N. Christensen. The Committee laid the groundwork for an interdisciplinary program of teaching and research in energy and resources and secured for this purpose the first regular faculty position in Berkeley's history to reside entirely in an interdisciplinary unit. John P. Holdren was appointed to fill that position, as Assistant Professor in the Energy and Resources Program, in summer 1973. The program attained degree-granting status as a Graduate Group in late 1974, and admitted its first graduate students in 1975. As of Spring 2002 more than two hundred fifty degrees have been awarded. The student population stands at about sixty.

ERG is administered by the Chair and Vice Chair, by other core and affiliated faculty and students who serve on the main administrative committees (Executive, Admissions and Financial Aid, Curriculum and Examinations, Publications, Computing, and Affirmative Action), and by the office staff. In the campus administrative structure, ERG reports to the Vice Provost for the Professional Schools and Colleges.

Faculty Information

The faculty of ERG currently consists of six core Professors of Energy and Resources (John Harte, Daniel Kammen, Catherine Koshland, Dick Norgaard, Isha Ray and Gene Rochlin), three professors emeriti (Mark Christensen, John Holdren and Jack Hollander), over one hundred affiliated faculty members holding appointments in a wide range of departments spanning all five colleges and four of the schools of the Berkeley campus, and a variable number of visiting professors, guest researchers, and postdoctoral fellows. The Chair of ERG is generally not a core professor but is drawn on a rotating basis from the affiliated faculty.

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Science and technology policy is one of five areas of concentration in the School of Public Policy at George Mason University. At present, there are roughly 20 students working on Ph.D.'s in the science and technology policy area within the school. The predominant focus of research has been on the broad area of technology policy and within that on the innovation of technology. The Ph.D. program, however, encourages academic exploration without prescribing preset areas of research.

All students with an interest in science and technology policy take a two-semester seminar sequence. The first semester is a readings seminar that provides a common literature and research foundation for all the students interested in the science and technology policy concentration. The second semester is a research seminar where the objective is to produce a publishable paper. Following this two semester sequence students can choose from a range of specialized seminars depending on their research interests. The program is structured so that the student can design her or his own program of research specialization. Should they so desire students have a range of opportunities to develop dissertations from work carried out with faculty who are involved with funded research.

Faculty Information

- Mark S. Addleson, Associate Professor
Ph.D., Witwatersrand; Philosophy of interpretive social theory
- Larry S. Bowen, University Professor of Education and Public Policy and Emeritus Dean, Ph.D., Ohio State, 1970. Education policy
- Timothy Conlan, Associate Professor of Government and Politics;
Ph.D., Harvard, 1981. Politics of federal mandates
- Stephen S. Fuller, Professor of Public Policy and Regional Development
Ph.D., Cornell, 1969. Regional economic development
- Thomas R. Gullledge, Professor of Public Policy and Operations Research
Ph.D., Clemson, 1981. Organizational informatics
- Kingsley E. Haynes, University Professor and Director, Institute of Public Policy
Ph.D., Johns Hopkins, 1970. Regional economic analysis
- Jack C. High, Professor of Economics and Social Learning
Ph.D., UCLA, 1980. Business and economic history
- Christopher T. Hill, Professor of Public Policy and Technology
Ph.D., Wisconsin-Madison, 1969. Federal science and technology policy
- Don E. Kash, John T. Hazel, Sr. and Ruth D. Hazel Professor of Public Policy
Ph.D., Iowa, 1963. Technology policy and technological innovation.
- Seymour Martin Lipset, Virginia E. Hazel and John T. Hazel, Jr. Prof. of Public Policy
Ph.D., Columbia, 1949. Culture and policy
- Stuart Malawer, Distinguished Service Professor of Law and International Trade and Director, Center for International Trade Policy
J.D., Cornell, 1967; Ph.D., Pennsylvania (international relations), 1976.

- Wayne D. Perry, Professor of Public Policy and Operations Research
Ph.D., Carnegie Mellon, 1975. Arms control policy
- James P. Pfiffner, Professor of Government and Politics
Ph.D., Wisconsin, 1975. The presidency, the management of public policy.
- Joseph A. Scimecca, Professor of Sociology
Ph.D., NYU, 1972. Problems in public education and conflict resolution.
- Edgar H. Sibley, University Professor
Sc.D., MIT, 1967. Policy and information technology
- Roger R. Stough, Northern Virginia Professor of Public Policy and Associate
Director, Institute of Public Policy
Ph.D., Johns Hopkins, 1978. Intelligent transportation systems.
- John N. Warfield, University Professor
Ph.D., Purdue, 1952. organizational design.

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The School of Public Policy was founded in 1991, focusing on technology-intensive public policy fields including science and technology policy, information and communication policy, environmental policy, and urban and regional economic development. Current students focus in one or more of these areas. The mission of the School is to conduct research on policy issues with significant scientific and technological content and to prepare students for jobs in government, non-profit organizations, consulting, and private sector firms concerned with public policy.

Faculty Information

- Susan E. Cozzens, Chair and Professor, PhD Columbia University, Sociology.
- Paul M. A. Baker, Associate Director of Technology Policy (GCA TT), PhD George Mason University, Public Policy.
- Richard Barke, Associate Professor, PhD University of Rochester, Political Science.
- Roberta Berry JD, in progress, Associate Professor, PhD University of Wisconsin, History and Philosophy of Science.
- Ann Bostrom, Associate Professor, PhD Carnegie Mellon University, Public Policy.
- Barry Bozeman, Professor, PhD Ohio State University, Political Science.
- Michael L. P. Elliot, Assistant Professor (Joint appointment with City Planning), PhD Massachusetts Institute of Technology, Urban and Regional Studies.
- Michael Farmer, Assistant Professor, PhD Ohio State University, Economics.
- John Havick, Associate Professor, PhD University of Iowa, Political Science.
- Jon Johnston, Assistant Professor, MA University of London, Philosophy.
- Gordon Kingsley, Assistant Professor, PhD Syracuse University, Public Administration.
- Hans Klein, Assistant Professor, PhD Massachusetts Institute of Technology, Political Science.
- Vedat Milor JD, Assistant Professor, PhD University of California, Berkeley, Sociology.
- Chris Nelson, Professor (Joint appointment with City Planning and International Affairs), PhD Portland State University, Urban Studies.
- Nancy Nersessian, Professor (Joint appointment with College of Computing), PhD Case Western Reserve University, Philosophy.
- Bryan Norton, Professor, PhD University of Michigan, Philosophy.
- Georgia Persons, Professor, PhD Massachusetts Institute of Technology, Political Science.
- Alan Porter, Emeritus Professor (Joint Appointment with Industrial and Systems Engineering), PhD University of California, Los Angeles, Psychology.
- Michael Rodgers, Research Professor (Joint Appointment with Civil and Environmental Engineering), PhD Georgia Institute of Technology.
- Juan Rogers, Assistant Professor, PhD Virginia Technic, Science and Technology.
- Sue V. Rosser, Professor (Joint Appointment with History, Technology and Society), PhD University of Wisconsin-Madison, Zoology.
- Bhaven Sampat, Assistant Professor, PhD Columbia University, Economics.
- David Sawicki, Professor (Joint Appointment with City Planning), PhD Cornell University, Urban and Regional Planning.
- Philip Shapira, Professor, University of California, PhD Berkeley, City and Regional Planning.
- Andrew Ward, Associate Professor, University of Kansas, PhD Philosophy.

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During 1988-1990, Georgia Tech's School of Social Sciences was divided into three distinct units -- the School of History, Technology, and Society (HTS), the School of International Affairs (INTA), and the School of Public Policy (SPP) - each of which would have the option of offering both undergraduate and graduate degrees. HTS developed curricula for both a B.S. degree in HTS and a M.S. and Ph.D. in History of Technology. The graduate degrees in History of Technology reflected a conscious choice not to create another Science and Technology Studies (STS) degree, but to establish a special niche in graduate education that would draw on the existing strengths of the HTS faculty. Subsequent hires have prompted us recently to refashion the graduate degree programs as History and Sociology of Technology and Science, with tracks in Sociology of Technology and Science and in Technology and Modern History

Faculty

- ELEANOR ALEXANDER (Assistant Professor; Ph.D., Brown University, 1996)
- MICHAEL ALLEN (Assistant Professor; Ph.D., University of Pennsylvania, 1995)
- RONALD H. BAYOR (Professor; Ph.D., University of Pennsylvania, 1970)
- ALICE BULLARD (Associate Professor; Ph.D., Berkeley, 1994)
- DOUGLAS FLAMMING (Associate Professor; Ph.D., Vanderbilt University, 1988)
- LAWRENCE FOSTER (Professor; Ph.D., University of Chicago, 1976)
- MARY FRANK FOX (Professor; Ph.D., University of Michigan, 1978)
- AUGUST GIEBELHAUS (Professor; Ph.D., University of Delaware, 1977)
- MAREN KLAWITER (Assistant Professor; Ph.D., Berkeley, 1999)
- KENNETH J. KNOESPEL (Professor; Ph.D., University of Chicago, 1982)
- JOHN KRIGE (Kranzberg Prof; Ph.D., Phys Chem, Pretoria, 1965; Ph.D, Phil, Sussex, 1979)
- HANCHAO LU (Professor; Ph.D., UCLA, 1991)
- ROBERT C. MCMATH (Professor and Vice Provost for Undergraduate Studies and Academic Affairs; Ph.D., University of North Carolina, 1972)
- GREGORY H. NOBLES (Professor; Ph.D., University of Michigan, 1979)
- WILLIE PEARSON, JR. (Professor and Chair; Ph.D., Southern Illinois University, 1981)
- SUE ROSSER (Professor and Dean of the Ivan Allen College; Ph.D., Wisconsin, 1973)
- JONATHAN SCHNEER (Professor; Ph.D., Columbia University, 1978)
- ANDREA TONE (Associate Professor; Ph.D., Emory University, 1992)
- JOHN LAWRENCE TONE (Associate Professor; Ph.D., Columbia University, 1990)
- STEVEN USSELMAN (Associate Professor; Ph.D., University of Delaware, 1985)
- STEVEN P. VALLAS (Associate Professor; Ph.D., Rutgers University, 1983)
- WILLIAM WINDERS (Visiting Assistant Professor; Ph.D., Emory University, 2001)

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The Bloustein School of Planning and Public Policy has a five-fold mission to: prepare students for careers in the public and private sector, teaching and research, and service; serve as a national and international locus of policy and planning scholarship; provide service to all levels of government; serve as a major public policy forum for the region and the nation; and serve as an intellectual center in the university for applied social science research and its public policy implications. The School houses the Department of Public Policy, as well as Departments of Urban Planning and of Urban Studies and Community Health. The Department offers a concentration in science, technology and environmental politics, and students may take advantage of related curricula in the other departments as well. The Department of Public Policy's curriculum is intense, its atmosphere intimate, and it offers a variety of extra-curricular experiences to supplement the educational experience.

Faculty Information

- Joel C. Cantor, Professor of Public Policy; Sc.D. Johns Hopkins, 1988.
- Robert A. Catlin, Professor of Public Policy, Edward J. Bloustein School of Planning and Public Policy. PhD, Claremont Graduate University, 1976, MSURP, Columbia University School of Architecture and Planning, 1972, BS, City and regional Planning, Illinois Institute of Technology, 1961.
- Henry A. Coleman, Associate Professor of Public Policy; Ph.D., Princeton, 1979.
- Jocelyn Elise Crowley, Assistant Professor of Public Policy; M.P.P., Georgetown University, 1994; Ph.D., M.I.T., 1999.
- Bari Anhalt Erlichson, Assistant Professor of Public Policy; M.A., Education, Stanford, 1994; Ph.D., Stanford, 1997.
- James J. Florio, University Professor of Public Policy; J.D., Rutgers School of Law-Camden, 1967.
- David H. Guston, Associate Professor of Public Policy; Ph.D., MIT, 1993.
- Alan Rosenthal, Professor of Public Policy; Ph.D., Princeton, 1961.
- John Spry, Assistant Professor of Public Policy; Ph.D., University of Rochester, 1999.
- Ruth Ann Stewart, Research Professor in Public Policy and the Center for Urban Policy Research; M.S.
- Carl E. Van Horn, Professor of Public Policy; Ph.D., Ohio State, 1976.
- Julie M. Whittaker, Assistant Professor of Public Policy; Ph.D. University of Wisconsin-Madison 1997.
- Cliff Zukin, Chair and Graduate Director and Professor of Public Policy; Ph.D., Ohio State, 1978.

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Carnegie Mellon's program in Engineering and Public Policy (EPP) was founded in 1970 at the undergraduate level to provide engineering students with the skills to understand and deal with problems in technology and policy. EPP is offered as a second major for engineering students. The first undergraduate EPP degree was conferred in 1973; EPP became a department in 1976 and was authorized to award Ph.D. degrees beginning in 1977. As of the summer of 1999, the department had granted about 537 double-major B.S. degrees and 101 Ph.D. degrees. Research in the department focuses on problems in energy and environmental systems; information and communication technology policy; risk analysis and communication; and technology policy and management (including technological innovation and R&D policy). Across these four focal areas, the department also addresses issues in technology and organizations and technology and economic development, focusing in particular on India and China. It frequently undertakes the development of new software tools for the support of policy analysis and research. And, it sometimes studies issues in arms control and defense policy.

Faculty Information

- Peter Adams: Assistant Professor, Engineering and Public Policy, and Civil and Environmental Engineering Ph.D. 2001, California Institute of Technology
- V.S. Arunachalam: Distinguished Service Professor, Engineering and Public Policy, Robotics Institute, and Materials Science and Engineering Ph.D. 1965 Jay Apt: Distinguished Service Professor, Engineering and Public Policy Ph.D. 1976, Massachusetts Institute of Technology
- Alfred Blumstein: J. Erik Jonsson University Professor of Urban Systems and Operations Research, The H. John Heinz III School of Public Policy and Management; Professor, Engineering and Public Policy Ph.D. 1960, Cornell University
- Kathleen M. Carley: Professor, Social and Decision Sciences, Engineering and Public Policy, and the H. John Heinz III School of Public Policy and Management. Ph.D. 1984, Harvard University
- Elizabeth Casman: Research Engineer, Engineering and Public Policy Ph.D. 1985, The Johns Hopkins University
- Wesley M. Cohen: Professor, Social and Decision Sciences, Engineering and Public Policy, and Heinz School of Policy and Management Ph.D. 1981, Yale University
- Jared Cohon: President, Carnegie Mellon University; Professor of Civil and Environmental Engineering, and Engineering and Public Policy Ph.D. 1973, MIT
- Cliff I. Davidson: Professor, Civil and Environmental Engineering, and Engineering and Public Policy; Director, Environmental Institute Ph.D. 1977, California Institute of Technology
- Otto Davis: William W. Cooper University Professor of Economics and Public Policy; Professor, Social and Decision Sciences, Engineering and Public Policy, and the H. John Heinz III School of Public Policy and Management Ph.D. 1960, University of Virginia
- Michael DeKay: Assistant Professor, Engineering and Public Policy, and H. John Heinz III School of Public Policy and Management Ph.D. 1994, University of Colorado
- Scott Farrow: Principal Research Engineer, Engineering and Public Policy; Director of the Center for the Study and Improvement of Regulation. Ph.D. 1983, Washington State University
- Paul S. Fischbeck: Associate Professor of Social and Decision Sciences, and Engineering and Public Policy Ph.D. 1990, Stanford University
- Baruch Fischhoff: University Professor, Engineering and Public Policy, and Social and Decision Sciences; Director, Center for Integrated Study of the Human Dimensions of Global Change Ph.D. 1975, The Hebrew University, Jerusalem, Israel

- H. Keith Florig: Senior Research Engineer, Engineering and Public Policy Ph.D. 1986, Carnegie Mellon
- Alex Hills: Distinguished Service Professor, Engineering and Public Policy and Computer Science Ph.D. 1979, Carnegie Mellon University
- David A. Hounshell: David M. Roderick Professor of Technology and Social Change; Professor of History, Social and Decision Sciences, and Engineering and Public Policy Ph.D. 1975, University of Delaware
- David Keith: Assistant Professor, Engineering and Public Policy Ph.D. 1991, MIT
- Lester B. Lave: University Professor; The Harry B. and James H. Higgins Professor of Economics and Finance; Professor, Engineering and Public Policy, and The H. John Heinz III School of Public Policy and Management; Ph.D. 1963, Harvard University
- Francis C. McMichael: Walter J. Blenko, Sr., Professor of Environmental Engineering; Professor of Civil and Environmental Engineering, and Engineering and Public Policy Ph.D. 1963, California Institute of Technology
- M. Granger Morgan: Lord Chair Professor in Engineering; Professor and Department Head, Engineering and Public Policy; Professor, Electrical and Computer Engineering, and The H. John Heinz III School of Public Policy and Management Ph.D. 1968, UC San Diego
- Indira Nair: Vice Provost of Education, Carnegie Mellon University; Professor, Engineering and Public Policy Ph.D. 1972, Northwestern University
- Spyros Pandis: Gerard G. Elia Professor of Engineering; Professor, Chemical Engineering, and Engineering and Public Policy Ph.D. 1991, California Institute of Technology
- Jon M. Peha: Associate Professor, Electrical and Computer Engineering, and Engineering and Public Policy Ph.D. 1991, Stanford University
- Henry R. Piehler: Professor, Materials Science and Engineering, Engineering and Public Policy, and Biomedical Engineering Sc.D. 1967, Massachusetts Institute of Technology
- Allen L. Robinson: Assistant Professor of Engineering and Public Policy, and Mechanical Engineering Ph.D. 1996, University of California at Berkeley
- Edward S. Rubin: The Alumni Professor of Environmental Engineering and Science; Professor, Engineering and Public Policy, and Mechanical Engineering; Director, Center for Energy and Environmental Studies Ph.D. 1969, Stanford University
- Marvin Sirbu: Professor, Engineering and Public Policy, Industrial Administration, and Electrical and Computer Engineering; Chairman, Executive Committee, Information Networking Institute Ph.D. 1973, Massachusetts Institute of Technology
- Mitchell J. Small: The H. John Heinz III Professor of Environmental Engineering; Professor and Associate Department Head for Graduate Affairs, Engineering and Public Policy; Professor, Civil and Environmental Engineering Ph.D. 1982, University of Michigan
- Joel A. Tarr: Richard S. Caliguiri Professor of Urban and Environmental History and Policy; Ph.D. 1963, Northwestern University
- Rahul Tongia: Research Engineer, Engineering and Public Policy Ph.D. 1998, Carnegie Mellon University
- Herbert L. Toor: Emeritus Mobay Professor, Chemical Engineering, and Engineering and Public Policy Ph.D. 1952, Northwestern University
- Robert M. White: University Professor, Electrical and Computer Engineering, and Engineering and Public Policy; Director of the Data Storage Systems Center Ph.D. 1964, Stanford University

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The Technology and Policy Program (TPP) was established in 1976. TPP stresses dual competency in a technical problem area and in the policy sciences. The basic curriculum is the practical equivalent to two master's degrees, one in engineering and the other in policy. Since 1998, TPP has been a core component of MIT's new 'super department,' the Engineering Systems Division, that joins senior faculty in Engineering (including 5 current or past heads of departments), in Management, and the Humanities.

Faculty Information

The core TPP faculty members are in the Engineering Systems Division. At any time about 40 different faculty members and senior researchers -- drawn from Engineering, Management and the Social Sciences -- work with TPP students on their theses. The faculty members represent a variety of research interests in policy issues and methodology. Major research themes focus on large-scale projects in automobile and aircraft manufacturing, information systems, environmental issues, new materials, transport and water resources, space, energy, and computers and communications, in addition to methodological interests in regulatory law and economics, decision strategies and industrial policy.

- Daniel Hastings, Chair; Professor of Aeronautics and Astronautics and Professor of Engineering Systems, and Director, Technology and Policy Program;
- Thomas Allen, Professor of Management
- Alice Amsden, Professor of Political Economy
- Nicholas Ashford, Professor of Technology & Policy
- Joel Clark, Professor of Materials Systems
- Richard de Neufville, Professor of Civil and Environmental Engineering and Engineering Systems
- Frank Field, Associate Director for Education, TPP, and Senior Research Engineer, Center for Technology, Policy, and Industrial Development
- Henry D. Jacoby, Professor of Management
- Thomas Kochan, Professor of Management
- Richard Lester, Professor of Nuclear Engineering and Director, Industrial Performance Center
- David Marks, Professor of Civil and Environmental Engineering and Director, Center for Environmental Initiatives
- David Mindell, Associate Professor of the History of Engineering and Manufacturing
- Ken Oye, Associate Professor of Political Science
- Michael Piore, Professor of Economics
- Merritt Roe Smith, Professor of the History of Technology, and Director of the Program in Science, Technology & Society
- Arthur Steinberg, Professor of Anthropology and Science and Technology Studies
- Joseph Sussman, Professor of Civil and Environmental Engineering and Engineering Systems
- Richard Tabors, Senior Lecturer, TPP

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The Center for the Study of Law, Science, and Technology, founded in 1984, is in its 17th year of operation at the Arizona State University College of Law. (Its predecessor, the Arizona Law and Technology Institute (ALTI), was founded in 1981.) Fourteen faculty members at the College of Law are currently Center Fellows. Their research interests ground the Center's claim that it is not only the oldest and largest, but also the most broadly encompassing Center of its kind in the nation. The curriculum of the College of Law reflects these encompassing research interests and attracts many law students to ASU who graduate with substantial knowledge in various Law, Science, and Technology subjects. Accordingly, a Graduate Certificate Program in Law, Science, and Technology, will commence in the 2002-2003 academic year.

Fourteen members of the College of Law faculty with scholarly interests in the Law's relationship to scientific and technical fields (and also, commonly, with scientific training that preceded their legal careers) are Faculty Fellows of the Center.

- Ira Mark Ellman
- Joseph M. Feller
- Robert A. Gorman
- Betsy J. Grey
- Owen D. Jones
- Dennis S. Karjala
- David H. Kaye
- Gary E. Marchant
- Jonathan Rose
- Michael Saks
- Ann M. Stanton
- Daniel S. Strouse
- Patricia D. White
- Laurence H. Winer

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Faculty Information

There are currently three full-time core faculty members and six affiliated faculty with the Center for Energy & Environmental Policy as well as several adjunct and research faculty. Their research interests include technology and society; energy, environment, and development; political economy; environmental planning; philosophy of science; energy and environmental policy; research methods; integrated resource planning; and economic analysis.

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The Science and Public Policy Program was established in 1970 as a center for interdisciplinary, policy-oriented research on issues involving science and technology and their effect on society. The program has dual roles of contributing to the policymaking process and responding to the intellectual challenge of understanding the relationship among science, technology, and society. Since its inception, the Program has focused primarily on policy issues related to energy, the environment, natural resources, and the use of scientific and technical information in the policy process. The interdisciplinary team approach to research used by the Program is designed to take advantage of the individual and collective knowledge of its members. Although the make-up of the team varies from project to project, the Program has a core faculty whose members hold joint appointments as research fellows and professors who teach in a variety of academic departments. Faculty associates and graduate students from across the university are appointed to the Program, as needed to foster research and work on specific research projects.

Faculty Information

The Program typically operates with three full-time, tenure-track or tenured faculty and as many as four faculty associates who receive support to work on specific research projects. The budget lines for the core faculty reside with the Program, and faculty members have joint appointments with their respective academic departments. Faculty members teach in their departments (one course per semester), serve on and direct student committees, and participate fully in other departmental activities. The specific substantive content of the Program's research is dictated, to a large degree, by current and emerging science, technology, and policy issues. Recent research has focused on policy issues related to public perceptions of environmental and health risks, corporate environmental management and green technological innovation, strategic policy innovation and social learning, life-cycle assessment of energy systems, alternative transportation fuels, solid waste management, and the use of scientific and technical information for environmental management. Current and recent faculty associated with the Program have represented aerospace and mechanical engineering, business strategy, chemical engineering, civil engineering and environmental science, geography, meteorology, political science, and anthropology.

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The Daniel J. Evans School of Public Affairs at the University of Washington holds the distinction of being the first school of public affairs founded in a public university. Established in 1962, it now ranks among the top 20 such schools in the nation. The Evans School counts among its graduates mayors, elected officials, public agency directors, policy and budget analysts, community organizers, policy advocates for environmental and social policy issues, media and press relations specialists, and nonprofit leaders and managers. The school reaches thousands of working professionals through executive programs, and vitally serves the region through its Institute for Public Policy and Management. Evans School programs are designed for present and future leaders of the public and nonprofit sectors. The core emphasizes broad-based public policy analysis and management knowledge, while students pursue one or more specialized policy fields known as Gateways. The Gateways integrate Evans School courses with offerings from such other UW schools and departments as Forestry, Social Work, Marine Affairs, Public Health, Education, Economics, International Studies, Urban Planning, Business and Law.

Faculty Information

The faculty includes scholars of national prominence in the areas of social welfare, religion and policy, higher education, environmental and risk assessment, nonprofit management, public ethics, international development, information policy, media and public policy, K-12 education reform, family and employment policy and public management. Faculty research has had a profound influence on public policy and management, and is used in public forums and the school's classrooms alike. Many faculty members consult for public and nonprofit organizations, testify on policy issues, participate in national conferences and serve on editorial boards of major journals.

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Founded in 1971, as the Interdepartmental Program in Technology and Human Affairs, and given departmental status in 1976, the Department was established to expose engineering students to issues associated with technology in society. In 1984, the Department was renamed Engineering and Policy. The department approaches problems from a foundation in the principles and methods of engineering and applied science, but also draws upon relevant expertise in the social, decision, and management sciences. The department is fundamentally interdisciplinary in character. This interdisciplinary nature mirrors the world in which many technical professionals work - they are often asked to solve problems that carry them to disciplines other than the one in which they focused their academic careers, and to disciplines besides science and engineering, such as economics and other social sciences, management, and law. The degree programs of this department give students special preparation for such problem-solving strategies. Teaching and research in the graduate degree programs focus on the following areas: Environmental Engineering and Management; Information Management; Science and Technology Policy; Management of Technology; Telecommunications Management.

Faculty Information

There are three full-time faculty members in the Department of Engineering and Policy. Over 60 faculty members have cooperative and affiliated relationships with the Department. The research interests of the faculty include: environmental planning and management, air and water pollution studies, optimal design of gas-solid catalytic reactors, environmental policy and regulation, science and technology policy, strategic management of information resources, technical communication, project management, organizational dynamics of technology assimilation, information engineering, telecommunications policy and regulation.

Appendix E

Existing University of Michigan STPP Activities

The University of Michigan has a large number of faculty members who have or do participate in aspects of the science and technology public policy process. In many cases, UM faculty members have or do serve on high-level advisory committees to federal agencies, the National Academies, and others. A few faculty members came to the UM after holding positions of influence in federal government. Several UM schools and programs have ties to the science and technology public policy process or to specific issues in this domain. This appendix provides a partial catalog of the faculty members and their activities as well as UM policy-related programs and courses.

Faculty members with past positions in Federal Agencies

National Science Board (James Duderstadt, Homer Neal, Gates)
Office of Science and Technology Policy (Rosina Birnbaum, Gilbert Omenn)
Office of Technology Assessment (Rosina Birnbaum)

Faculty members on National Academy of Science Advisory Committees (Based on 2000 survey conducted by OVPR)

- Deborah Loewenberg Ball, School of Education
Mathematical Sciences Education Board, NAS
- Lynn Conway, College of Engineering, EECS
Air Force Science and Technology Board, NAS
- James J. Duderstadt, College of Engineering, Millennium Project
Cmte on Science, Engineering, & Public Policy (COSEPUP)/NAS
- Rodney C. Ewing, College of Engineering, Nuclear Engineering
Radioactive Waste Management & Radiological Sciences, Bd on/NAS
- Lennard Fisk, College of Engineering, Atm, Oceanic & Space Science
Fusion Science Assessment Committee/NAS
Space Studies Board, Cmte on International Space Programs (CISP)
- Robert Groves, LSA-Sociology/Survey Research
Committee on National Statistics, NAS
- Alfred O. Hero, III, College of Engineering, EECS
US Nat'l Committee of Internat'l Union of Radio Science-"Signals and
Systems"/NAS
- Roderick J.A. Little, School of Public Health
Committee on National Statistics, NAS
- Samuel J. Meisels, School of Education
Cmte on Early Childhood Pedagogy; sub unit (BCSSB)/NAS
- Andrew F. Nagy, College of Engineering, Atm, Oceanic & Space Science
SSB, Cmte on Planetary and Lunar Exploration/NAS

- Annemarie S. Palincsar, School of Education
Cmte on Prevention of Reading Difficulties in Young Children/NAS
 - Christopher Ruf, College of Engineering
Committee on Radio Frequencies/Board on Physics and Astronomy/N
 - Arnold Sameroff, CHGD
Behavioral, Cognitive, Sensory Sciences, Board on (BCSSB)/ NAS
 - Thomas Senior, College of Engineering, EECS
International Union for Radio Science (URSI) Immediate Past President/NAS
 - Matthew D. Shapiro, Survey Research, Economics
Committee on National Statistics, NAS
 - Elizabeth Sulzby, School of Education
Cmte on Prevention of Reading Difficulties in Young Children/NAS
 - Peter A. Ward Medical School/Pathology
Institute for Laboratory Animal Research/NAS
- In addition, many more faculty have participated in the preparation of National Research Council studies

Policy areas and UM faculty who have been involved at the national level
(The committee recommends that OVPR expand this list during Phase I activities)

Science and Technology Policy

- NAS Committee on Science, Engineering, and Public Policy (COSEPUP)
Gilbert Omenn, James Duderstadt
- NASA Space Sciences Board - Tom Donahue
- National Science Foundation - Daniel Atkins

Environmental Policy

- Office of Science and Technology Policy - Rosina Birnbaum
- EPA - Linda Abriola, Walter Weber

Risk Assessment and Management

- DOD - Walter Weber
- EPA - Linda Abriola, Walter Weber

Health Policy

- Gilbert Omenn, Rhetaugh Dumas, Noreen Clark, Ada Sue Hinshaw, Rebecca Blank,
Mary Sue Coleman

Information Technology

- NSF - Dan Atkins
- PITAC - Doug Van Houweling
- Many faculty from School of Information, Law School, Business School, College of Engineering

Education Policy

- Department of Education - Annemarie Palincsar, Maris Vinovskis

UM faculty serving on Federal Advisory committees and boards
[printout from FACA database will be inserted]

Faculty members elected to National Academies

National Academy of Sciences

25 members

(13 active / 12 emeritus)

Richard D. Alexander *

Robert Axelrod**Hyman Bass**

Philip E. Converse *

Minor J. Coon * (IOM also)

H. Richard Crane *

Horace W. Davenport *

Thomas M. Donahue *

Lennard Fisk**Kent V. Flannery**

Ronald Freedman *

William Fulton

Stanley M. Garn *

F. W. Gehring *

Melvin Hochster**Martha Ludwig****Joyce Marcus****Vincent Massey****Rowena G. Matthews**

James N. Morgan *

Richard E. Nesbitt

J. Lawrence Oncley *

Edward E. Smith

Martinus J.G. Veltman *†

Henry T. Wright

* emeritus faculty

† foreign associate

Institute of Medicine

29 members

(25 active / 4 emeritus)

Bernard W. Agranoff**Huda Akil****Noreen M. Clark**

Minor J. Coon * (NAS also)

Rhetaugh G. Dumas *

Stefan S. Fajans *

Sherman A. James**Sid Gilman****David Ginsburg****Lazar J. Greenfield****Ada Sue Hinshaw****Julian T. Hoff****James S. House****James S. Jackson****Robert L. Kahn****George A. Kaplan****David E. Kuhl****Allen S. Lichter****Gilbert S. Omenn****Nancy E. Reame****Michael A. Savageau****Thomas L. Schwenk****Kenneth E. Warner****Peter A. Ward****Stanley J. Watson****Stephen J. Weiss****David R. Williams**

George D. Zuidema *

* emeritus faculty

† foreign associate

National Academy of Engineering

20 members

(14 active / 6 emeritus)

Linda M. Abriola**Don B. Chaffin**

Lynn A. Conway *

Stephen W. Director**James J. Duderstadt****Gerard M. Faeth**

Elmer G. Gilbert *

George I. Haddad

Robert D. Hanson *

Glenn F. Knoll**Ronald G. Larson****Emmett N. Leith****Gerard Mourou****Stephen M. Pollack**

Albert B. Schultz *

Chen-To Tai *

Fawwaz T. Ulaby**Walter J. Weber Jr.****Kensall D. Wise**

Richard D. Woods *

* emeritus faculty

† foreign associate

National Academy of Public Administration⁹

3 members

(2 active / 1 adjunct)

Catherine Ann Bertini **

Eddie Goldenberg**Sallyanne Payton**** Adjunct in Ford School

⁹ The National Academy of Public Administration (NAPA) is the preeminent organization dedicated to improving the performance of governance systems—the network of public institutions, nonprofit organizations, and private companies that share in the implementation of public policy. As an independent, nonprofit organization chartered by Congress, the Academy responds to specific requests from public agencies and non-government organizations. The Academy also promotes discourse on emerging trends in governance through its Standing Panels and with external funding.

Key programs at the UM with policy components

- Gerald R. Ford School of Public Policy
- Institute for Social Research
- School of Natural Resources and Environment
- Zell Institute for Entrepreneurial Studies
- Life Sciences Values and Society Program

Gerald R. Ford School of Public Policy

Coursework at the Ford School is interdisciplinary in nature, with a strong emphasis on analytic skills, and is designed to prepare the student to work effectively in the increasingly complex world of policy analysis and public management. The program also offers considerable flexibility for students to develop areas of specialization. In pursuing their specialties, students are able to draw upon the offerings of many other departments and programs at the University of Michigan.

Faculty

The faculty, most of whom have joint appointments in other academic departments, is among the finest in the nation, distinguished not only in academic research and teaching, but also in the practice of public policy. Many faculty members have had experience at the highest levels of national decision-making.

Degrees

Ford School training may lead to the following degrees:

- Master of Public Policy (MPP)
- Master of Public Administration (MPA)
- Accelerated Program (AB/MPP) for undergraduates
- PhD in Public Policy

The school also offers several joint programs:

- joint JD/MPP program with the Michigan Law School
- joint MBA/MPP program with the Michigan Business School
- joint MPH/MPP and MHSA/MPP programs with the U-M School of Public Health

A Ford School degree can also be pursued in conjunction with numerous other graduate degrees at the University of Michigan.

School of Natural Resources and Environment (SNRE)

Environmental Policy is one of the core areas of study at SNRE. This area of study focuses on the understanding and influencing political and administrative processes to create and implement public policies that promote sustainable use and stewardship of natural resources and environmental systems. Current faculty involved in Environmental Policy include

SNRE Faculty involved in Environmental Policy research

Rosina Marie Bierbaum, Ph.D.
Dean & Professor

Paul Mohai, Ph.D.
Assoc Prof

Jonathan W. Bulkley, Ph.D.
Professor

Michael R. Moore, Ph.D.
Assoc Prof

Donna L. Erickson, MLA
Assoc Prof

Thomas E. Princen, Ph.D.
Assoc Prof

Thomas N. Gladwin, Ph.D.
Professor

Barry G. Rabe, Ph.D.
Professor & Dir of PitE

Gloria E. Helfand, Ph.D.
Assoc Prof

Julia M. Wondolleck, Ph.D.
Assoc Prof

Maria Lemos, Ph.D.
Asst Prof

Steven L. Yaffee, Ph.D.
Professor

Dual and Joint Degree Program: Natural Resources & Environment and Public Policy (M.S. and M.P.P.)

The dual degree program confers the Master of Science (M.S.) degree from the School of Natural Resources and Environment and the Master of Public Policy (M.P.P.) degree from the School of Public Policy. The program provides students with the analytical skills, scientific foundation, and socio-behavioral understanding needed to become effective environmental and natural resources policy practitioners. The dual degree program produces graduates well trained in advanced analytic methods and policy processes, and well informed on the structure, functioning, and management of environmental problems.

Institute for Social Research

The University of Michigan Institute for Social Research (ISR) is one of the largest and oldest academic survey and social research organizations in the world. The ISR is dedicated to social science in the public interest. For more than 50 years, the ISR has

advanced public understanding of human behavior through empirical research of extraordinary depth and breadth. Representing the disciplines of psychology, political science, economics, anthropology and public health, ISR research scientists have directed some of the longest running and most widely cited and utilized studies in the nation.

Organizationally, the ISR is comprised of the following core activities.

Survey Research Center: From its inception in 1946, the ISR Survey Research Center has been a national and international leader in interdisciplinary social science research involving the collection and analysis of data from scientific sample surveys.

<http://www.isr.umich.edu/src/>

Research Center for Group Dynamics: Its mission is to enhance the understanding of human behavior in a social context, and its research programs range from achievement, aggression, and culture and cognition to evolution and human adaptation.

<http://www.rcgd.isr.umich.edu/>

Population Studies Center: One of the oldest population centers in the United States, it has a distinguished record in both domestic and international demographic and population research. <http://www.psc.isr.umich.edu/>

Center for Political Studies: An interdisciplinary and collaborative social science research unit of international scope, this Center analyzes individual political behavior and the role of institutions in contemporary society. <http://www.isr.umich.edu/cps/>

Inter-university Consortium for Political and Social Research: The world's largest computerized social science data archive, this ISR unit has over 500 member organizations around the globe.

Erb Environmental Management Institute

The Frederick A. and Barbara M. Erb Environmental Management Institute focuses the capabilities and resources of the University to create and support high-quality teaching and research in the field of environmental management. The Institute will attract and focus exceptional human talents and skills for the general purpose of understanding the roles and relationships among businesses, governments, and non-profit organizations as these interact and affect the environment in its many forms and will provide a highly visible setting and effective means to define, resolve, and seize complex and important environmental challenges and opportunities. The School of

Natural Resources and Environment and the Business School jointly sponsor the Institute.

Zell-Lurie Institute for Entrepreneurial Studies

In 1999, the University of Michigan Business School established the Samuel Zell and Robert H. Lurie Institute for Entrepreneurial Studies. The Institute is as an umbrella for existing and expanding efforts in entrepreneurship. Approximately sixteen faculty members, both academics and practitioners in the field of entrepreneurship, prepare students for turning knowledge into new venture success. In addition, the Institute offers symposia, internships, scholarships, alumni networks, curriculum development and other activities to advance the interests of the entrepreneurial community.

The Institute is dedicated to producing leadership in new business formation by providing world-class education and experience. The Institute seeks to advance entrepreneurial interests of the community by offering networking opportunities; contributing to local and national entrepreneurial efforts; advancing new venture development and supporting research in the area of entrepreneurship.

Life Sciences, Values and Society Program

The Life Sciences, Values and Society Program was created in May 2000 as one of three initial components of the Life Sciences Initiative. LSVSP has four objectives:

- **Education** – increasing knowledge among faculty, staff, students, and the community at large about advances in the life sciences and the social and value issues they raise;
- **Outreach** – engaging members of the university and larger community in issues of concern to our program;
- **Networking** – creating synergistic opportunities for faculty, staff, students, and members of the community to meet others with similar, or complementary interest; and
- **Service** – representing the LSVSP perspective through participation in various committees serving the University.

Appendix F
Course list for Science, Technology & Society (STS) minor

Core

RC SocSci 275, Social Dynamics of Science, Technology, and Medicine (offered each Winter semester)

Cognates

Biology 118

GeoSci 150

Physics 126

Research seminar

College Honors 370 (2 or 3) The Rhetoric of Evidence in Research

Physics 481 (3) Physics and National Science Policy (special research section of Physics 281)

History 396, 397 (4) Colloquium: Health and Medicine in US Culture since 1875 (and other colloquia as offered, if appropriate)

Residential College

RC EnvStudies 311 & 312 (4) Agriculture, Ecology, and Rural Communities (must be taken concurrently)

RC IDiv 405 (3 or 4) Senior Independent Study (must be taken with a member of the STS Program core faculty)

RC NatSci 415 (4) Science and Politics

RC SocSci 374 (4) Race, Gender and Empire in the Nuclear Age

RC SocSci 379 (4) (History 379/SI 528) History of Computers and Networks

RC SocSci 488 (4) Technology, Colonialism, and Development

Electives

Anthropology, Cultural

258 (3) Culture and Medicine

361 (4) Biology, Society, and Culture

416 (3) Global Health

444 (4) Medical Anthropology

Anthropology, Biological

360 (4) Race and Human Evolution

362 (3) Problems of Race

Biology

101 (4) Biology and Human Affairs

118 (4) AIDS and Other Health Crises

140 (4) Genetics and Society

498 (3) Ecology of Agroecosystem

Chemistry

120 (3) The History and Philosophy of Chemistry

College Honors

252 (3) Numbers and Reasons

English

415 (3) Interdisciplinary Approaches to Literature: Research and Technology in the Humanities

History

284 (3) Sickness and Health in Society, 1492 to Present
 285 (4) Science, Technology and Society: 1940 to the Present
 301 (3) Discovery of the Universe
 303 (?) Science, Technology and Defining the Human
 355 (4) Health and Illness in African Worlds (CAAS 355)
 366 (3) American Science / American Culture
 427 (3) Magic, Science and Religion in Early Modern England
 591 (3) Topics - (History 302)

Physics

281 (3) Physics and National Science Policy

Residential College Environmental Studies

270 (4) Our Common Future: Ecology, Economics & Ethics of Sustainable Development
 290 (2) The Science and Politics of Global Warming (SNRE 270)

Residential College InterDivisional

310 (4) Gender and Science
 330 (4) Information Technology and Global Politics
 430 (4) Perspectives on High Technology and Society

Residential College Natural Science

232 (4) History of Life
 250 (4) Ecology, Development, and Conservation in the New World Tropics (Taught in Spanish) (Environmental Studies 251)
 260 (4) Science and Societal Issues (Topics class)
 263 (4) Energy, Environment, and the City (Urban Planning 263, Physics 250)
 270 (4) New Biotechnology: Scientific, Social, and Historical Perspectives
 343 (4) Scientific Change

Residential College Social Science

382 (4) The History of Time

School of Natural Resources and the Environment

574 (3) Sustainable Energy Systems (Physics 419, RC NatSci 419, SPP 519)

University Courses

212 (3) Introduction to Global Change III: Studies of Global Sustainability

Appendix G
Description of Homer Neal's Science Policy Course

PHYSICS 281 / 481

A PHYSICS DEPARTMENT COURSE ON
NATIONAL SCIENCE POLICY

Science and technology represent one of the most powerful sets of tools possessed by society for advancing its health and economic welfare. The public controls, in large measure, what fraction of its resources are devoted to the education and training of scientists, the tools that scientists have for conducting their work, how the scientists may and may not use these tools, and how the products that emerge may be deployed. Thus, science and technology are strongly coupled to the public policies that govern them. The course described here is designed to explore the intricate link between science and technology and public policy.

A three-credit course entitled "Physics and National Science Policy" is being offered by the Department of Physics in Fall 2002. P481 and P281 are identical courses, except that the former can carry graduate credit and requires student to complete a special independent research project. The courses will be taught by Professor Homer A. Neal, who has contributed significantly to the development of current U.S. national science policy at its interface to higher education. He has also been involved with issues of national science policy and industrial research and development, in specifying the role of national laboratories, and in creating structures to increase the public's understanding of science. There will be several guest lectures given by current active participants in the national science policy arena.

The course will aim to provide all students with an overview of the issues that are relevant to the national science policy. It is expected that the course would be especially of interest to students planning policy careers in federal and state R/D agencies, in higher education, in R/D management in industry, and in non-profit institutions that support research and development. Moreover, students who intend to pursue careers strictly confined to disciplinary research may also find the course useful in providing the context within which their research will be supported.

SOME TOPICS TO BE COVERED IN THE COURSE

Organization of the federal government relevant to US science and technology
 The partnership between research universities and the federal government
 Role of industry and national laboratories in research and development
 The grand challenges: Transportation - Energy - Environment - Health - Information Technology
 Controversies related to global warming, human cloning and little science vs. big science
 International aspects of science
 Mathematics, science and engineering education
 Scientific ethics
 The future of research universities
 Undergraduate education and research
 The role of university R/D in defense and homeland security

Appendix H
Program for AAAS Colloquium on Science and Technology Policy
(4/10-11/2003)

[Included as separate PDF file, AppendixH.pdf]