PROPOSAL FOR NEW PROFESSIONAL SCIENCE MASTER’S (PSM) TRACK IN
BIOSCIENCE RESEARCH AND HEALTH POLICY

Submitted by

Dr. Janet Braam, Chair of Biochemistry and Cell Biology
Dr. Daniel Carson, Dean, Wiess School of Natural Sciences,
and
The PSM Faculty Oversight Committee, represented by
Dr. Barry Dunning, Dr. Kathy Ensor and Dr. Dale Sawyer

In collaboration with
Dr. Kirstin Matthews, Fellow, James A. Baker III Institute for Public Policy

Overview:

The concept of the Professional Science Master’s (PSM) programs is to provide students with a wider range of science-based career opportunities. Students take advanced science courses together with business, ethics, and communication classes and acquire practical experience in the form of an internship. Rice University’s PSM program currently offers interdisciplinary degrees in three areas: Environmental Analysis and Decision Making, Subsurface Geoscience, and Nanoscale Physics. This proposal seeks the approval to expand the existing program with a new track that will train students in science and technology policy with the intent of creating a new option for students interested in government, industry, non-profit organizations as well as academic institutions.

The existing Rice PSM degrees equip students with the skills needed to connect advanced scientific concepts in a business or governmental setting. Students are educated in the scientific approach to problems, while simultaneously being trained in vital business concepts, policy and ethics issues, verbal and written communication, and rounding out their education with advanced practical training in the field of their interest. This unique combination of an interdisciplinary curriculum and hands-on experience enables students to move seamlessly into the scientific/technical workforce. Expanding the existing program with a Bioscience Research and Health Policy track will give students the opportunity to deepen their scientific knowledge and to pursue research on domestic and foreign health policy issues with the goal of bridging the gap between the theory and practice of public policy related to science research and health issues. In close collaboration with the James A. Baker III Institute for Public Policy, the students’ coursework will provide them with research and study skills enabling them to analyze health and research policy formulation and execution as well as determine appropriate policy recommendations for policy impacting science (such as funding levels) as well as science impacting policy.
For this new program track, we decided to start with a focus on Bioscience Research and Health Policy in collaboration with institutions in the Texas Medical Center. By concentrating on one particular policy topic instead of attempting to address the extreme width and breadth of science and technology policy, we hope to provide the students with the skills necessary to develop health policy. We plan to broaden this track by adding new focus areas such as climate change, energy and emerging technologies in the future.

**Brief History of the existing PSM program:**

The Sloan Foundation provided support to develop the three Professional Science Master’s tracks at Rice University in 2001. In order to be recognized by the Council of Graduate Schools as a “PSM” program, a certain set of criteria has to be met. The course content has to be composed of at least 4 – 6 courses in science, technology, engineering, mathematical or computational sciences and statistics, together with a professional skills component, in our case business, policy, and communication training, and the required internship.

The required advanced “disciplinary” courses provide students with a solid foundation in their chosen field together with practical experience and training in the use of computers for modeling and other applications. Students also take a number of elective courses tailored to their specific interests. The three track options included in the Rice PSM program are listed below with a brief summary of their objectives:

**Environmental Analysis and Decision Making:** This interdisciplinary degree focuses on the quantitative and analytical aspects of environmental studies. It aims to teach quantitative skills such as statistics, remote sensing, data analysis, and modeling, in addition to laboratory and computer skills, which will give students the ability to anticipate problems, not just solve them. The degree includes focus areas in Environmental Sustainability, Management and Policy, and Quantitative Decision Making. Graduates will have the skills and knowledge to pursue careers with environmental consulting firms, energy production companies, engineering companies, government agencies and environmental think tanks.

**Subsurface Geoscience:** This track is designed for students who would like to become proficient in applying geological knowledge and geophysical methods to find and develop reserves of oil and natural gas. The program prepares students to be "explorationists," with strong skills in using seismic and other geophysical methods along with geological principles to find oil and natural gas. Students can also choose to be trained to become technical experts in aspects of exploration seismology. With Rice located in the center of the oil and gas industry, graduates have a wide range of opportunities to pursue careers related to the petro-chemical industry.

**Nanoscale Physics:** This program prepares students for a career in nanoscience by combining a strong component in quantum theory, which governs the behavior of systems at the nanoscale, with the study of practical nano- and meso-scale devices. This
provides the student with the knowledge required to successfully navigate the emerging fields of nanoscale science and nanotechnology. In addition, a year-long course in methods of experimental physics is offered to ensure that students obtain the advanced practical skills valuable to the nanotechnology industry. Rice is a well-established leader for nanotechnology, with researchers active in many areas allowing students to pursue interdisciplinary studies in a variety of nanoscale science areas including carbon nanotubes, nanoshells, nano-based materials, and nano-biology.

The Rice PSM program has been very well received by students, their enthusiasm for it being demonstrated by the fact that, since inception of our program, only five students enrolled have left the program. The primary reason for their withdrawal was their acceptance into PhD programs with a stipend. Three students have withdrawn during the semester due to financial difficulties. Otherwise, all students have finished the course work and graduated successfully. We have an excellent history of placing students in internships and jobs after graduation, in fact 99% of the students found employment within 4 - 6 months after graduation.

The enrollment statistics for the various PSM tracks are presented in Table I below:

Table I: Comprehensive Enrollment Statistics for Fiscal Year F02 – F10:
New Students enrolled per year:

<table>
<thead>
<tr>
<th>TRACK</th>
<th>F02</th>
<th>F03</th>
<th>F04</th>
<th>F05</th>
<th>F06</th>
<th>F07</th>
<th>F08</th>
<th>F09</th>
<th>F10</th>
<th>TOTAL</th>
<th>GRADUATES</th>
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<tr>
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<td>6</td>
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<td>3</td>
<td>3</td>
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<td>5</td>
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<td>6</td>
<td>38</td>
<td>26</td>
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<td>2</td>
<td>1</td>
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<td>4</td>
<td>5</td>
<td>8</td>
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<tr>
<td>Nanoscale Physics (NP)</td>
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<td>0</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>25</td>
<td>14</td>
</tr>
<tr>
<td>Enrollment Total</td>
<td>3</td>
<td>10</td>
<td>6</td>
<td>8</td>
<td>8</td>
<td>12</td>
<td>14</td>
<td>17</td>
<td>22</td>
<td>100</td>
<td>56</td>
</tr>
</tbody>
</table>

Further Application Statistics can be found under APPENDIX I

Graduation Rate
As the above table shows, we have had 26 graduates from our EADM track, 16 from our SG track and 14 from our NP track. All full-time students have taken 21 months, i.e. 3 semesters plus an internship to complete the degrees. Part-time students usually take 2 or 3 extra semesters until completion.

Job Placement:
All our graduates have found jobs within 4 - 6 months of graduation from Rice. (See APPENDIX II, Graduation History: Listing of graduates, graduation years and hiring companies)
Interdisciplinary Nature of the PSM Program:

Departments at Rice University involved with the PSM program tracks are Physics, Statistics, Civil and Environmental Engineering, Earth Science and Ecology. Due to this interdisciplinary nature and the flexibility of the PSM Program it has had an excellent record in student success. Students have access to a broad range of existing graduate courses offered in many departments, and are able to target their own specific interests and goals through the careful choice of elective courses.

Furthermore, the PSM Program Director, Dagmar Beck, has established a strong student support structure. Students have access to workshops and events organized by the Center for Career Development, activities offered by individual departments, and regular luncheons with faculty to increase interactions. In addition, students receive individual communication training and support from the PSM Communication faculty assigned to help them with their communication needs. PSM students are encouraged to engage in projects/activities offered across campus and disciplines.

Overview of Program Requirements:
The PSM degree requires completion of at least 40 semester hours of graduate study of which 30 hours must be taken at Rice. The requirements are broken into three general areas:

• Science Courses
  Each degree track requires a unique set of science courses that provide students with advanced science expertise beyond the bachelor’s level. This science core expertise allows students the deeper technical understanding which is needed by industry and government organizations. Students supplement these foundation courses by choosing electives in line with their areas of interest. For a detailed list of course requirements, see our web site at www.profms.rice.edu

• Internship
  A three- to six-month internship with a company, government agency or national laboratory is required. At the completion of this internship, students must report on their internship project both in writing and orally. These presentations form an important component of the overall degree program.

• Cohort Courses
  The cohort courses provide the additional skills students need for a non-academic career. Students increase their knowledge of business, management, ethics and communication by completing the following courses:
  • Management for Science and Engineering: This course is designed to give students insights into how technology-oriented firms manage intellectual property, marketing, organizational behavior, strategy, accounting, and finance.
• **Science and Technology Policy and Ethics:** This course provides students with a broader understanding of the ways politics, policy, and ethics interact with the world of business, science and technology.

• **Professional Science Master’s Seminar:** This weekly seminar serves to provide students with exposure to local industry leaders. Students also get the opportunity to meet industry leaders who speak about their own career development and decisions. The exposure to corporate guest speakers and participation in career-related activities, allows the students to further their knowledge in their respective concentrations, and to get the chance to develop vital networking skills. The seminar also offers communication training segments throughout the semester.

**Typical Curriculum** for this 21-months program requiring approx. 40 credit hours:
(Example from the Nanoscale Physics track)

Specific core requirements for the PSM in Nanoscale Physics include:
PHY 533 Nanostructure and Nanotechnology I (F)
PHY 537 Methods of Experimental Physics I (F)
PHY 539 Characterization and Fabrication (TBA)
PHY 534 Nanostructure and Nanotechnology II (S)
PHY 538 Methods of Experimental Physics II (S)
PHY 416 Computational Physics (S)

Required Cohort Courses:
NSCI 610 Management for Science and Engineering (F)
NSCI 501 Professional Master’s Seminar (F, S)
NSCI 512 Professional Master’s Project (F, S)
NSCI 511 Science and Technology Policy (S)

Four Elective Courses, two of which must be science or engineering 500 level or above and an internship.
Details on Proposed New Program Track:

**BIOSCIENCE RESEARCH AND HEALTH POLICY**

The purpose of this proposal is to introduce a new track into our program to focus on training students in Bioscience research and health policy with the intent of creating new options for science students interested in working in government as well as governmental relations positions in non-profit organizations, industry and academic institutions.

There is a critical need for well-trained health policy professionals interested in seeking solutions to problems affecting human health. The Bioscience Research and Health Policy track is geared to help individuals increase their knowledge of Biosciences while exposing them to public policy. The program includes advanced biology classes as well as introduces students to economics, public policy, and public health disciplines, which impact health and Bioscience research policy. Our program focuses on training health policy analysts providing them with the tools to face the complex challenges inherent in the US Bioscience research, public health, healthcare systems and health-related industry.

Through the development of their writing, research, and analytical and communication skills, graduates of this program can have a profound impact on the policies, regulations, and laws governing the health of populations within the United States, especially in an era of healthcare reform in this county.

The program will be done as a collaboration between the Wiess School of Natural Sciences and the James A. Baker III Institute for Public Policy. Students in the science and technology policy track will participate not only in deepening their scientific knowledge with coursework but also will pursue research on domestic and foreign policy issues with the goal of bridging the gap between the theory and practice of public policy. In collaboration with the Baker Institute, students will have the opportunity to interact with experts from academia, government, the media, business, and non-governmental and private organizations. The Baker Institute is known for its scholarly research on science and technology policy issues, but it also hosts multiple events and conferences each year on topics ranging from stem cell research, the role of scientists in public policy, and computer and technology security. In 2009-10, the Baker Institute hosted events on national health care reform; geopolitics and energy policy; science education; the Israeli-Palestinian peace process; stem cell policy. A list of recent events can be found under [www.bakerinstitute.org](http://www.bakerinstitute.org).

**Student Learning Objectives of BIOSCIENCE RESEARCH AND HEALTH POLICY track:**

The guiding educational principles for this track will be

- To equip students with advanced Bioscience skills
• To achieve dual professional competency in science and policy analysis and development
• To teach quantitative skills and data analysis
• To equip students with leadership, communication and research skills to conduct independent studies enabling them to understand and formulate public policy recommendations
• To gain exposure in a real life experience in technology policy development by participating in an internship
• To train students how to integrate their science knowledge into creating better policies and practices

Educational Objective:

This program will give students a deep background in science complemented by courses in sociology, economics and policy studies to foster their understanding of the role of science in policy making and the role of public policy in science. Their coursework will provide them with research and study skills enabling them to develop specific policy recommendations, and they will also receive the tool-set to become knowledgeable in the formulation and execution of public policy. Their direct access with the Baker Institute will allow them to work closely with policy scholars as well as meet with many of the leaders in science and technology policy.

Track Requirements:
The PSM Bioscience Research and Health Policy degree will require a minimum of 42 credit hours, not including the internship:

Bioscience courses – 12 hrs
Statistics, Policy, and Economics courses – 12 hrs
Cohort courses and internship – 9 hrs
Elective courses – 9 hrs
Total – 42 hrs

Recommended Background:
Applicants for the Professional Master’s in Bioscience Research and Health Policy must have:

- B.S. or B.A. degree in a biology or related science field with a strong background in biology
- Completed course work in biology, chemistry, calculus, and statistics
- Scores from the general Graduate Record Examination (GRE)
- Good critical thinking and communication skills
- Completed course work in introductory economics is preferred

Along the same framework of the existing tracks, this new master’s degree will consist of the following courses:
Cohort Courses:

A. An overview course in Science and Technology Policy. This course is evolving from an existing course: NSCI 511 Science and Policy and Ethics, which is currently being updated and revised by Kirstin Matthews. This 3-credit hour course has been offered by various lecturers since establishment of the three existing PSM tracks. Therefore, funding is in place for this teaching assignment and no new outside resources are required. The course goals are to:

- Explore processes how policy is conceived, influenced and established.
- Review the US science and technology R&D system, budget process and the institutions involved.
- Explore how government policies and regulations impact science, research and development, and business.
- Examine key regulatory agencies involved in different areas of science.
- Discuss the mechanisms for researching policy and policy-making authorities.

B. One Cohort Management Course and one Seminar: (already in place within existing programs related to business/management):

NSCI 610 Management in Science and Engineering (F) (1 credit hour)
NSCI 501 Professional Master’s Seminar (F, S) [required for two semesters, 1 credit hour each]
Plus NSCI 512 Internship Project (1 credit hour) which allows faculty to grade the internship reports and presentation.

Note: Resources for these courses are already in place; faculty has been teaching the management course and the PSM Program Director has been hosting the seminar inviting guest speakers to campus since inception of the program.

Four Bioscience Classes: The Bioscience courses give in-depth instruction in specialized areas of Bioscience. Four courses are required to obtain a broad understanding of diverse areas of cutting edge Bioscience research. (*Courses marked with asterisks are offered as 300-level courses that will include graduate level writing and analysis to qualify as a 500-level graduate course.)

- BIOC 524* Microbiology and Biotechnology
- BIOC 563* Endocrinology
- BIOC 572* Immunology
- BIOC 585* Fundamentals of Cellular, Molecular, and Integrative Neuroscience
- BIOC 525 Plant Molecular Genetics and Development
- BIOC 544 Developmental Biology
- BIOC 545 Advanced Molecular Biology and Genetics
- BIOC 550 Virology
- BIOC 560 Cancer Biology
**Four Statistics, Economics, and Policy Courses:** The analytical competency requirement provides career-enhancing, marketable skills in policy analysis, economics and statistics. Students will take courses from groups A, B and C as indicated below:

*A – One Statistics Course*
STAT 385 or 453 Methods of Data Analysis  
STAT 684 Environmental Risk Assessment and Human Health

*B - One Economics Course*
ECON 446 Applied Econometrics  
ECON 450 World Economy and Social Development  
ECON 481 Health Economics

*C - Two Policy Courses*
SOCI 514 Science at Risk – Out of the lab and into the society  
POST 430 Shaping of Health Policy  
HEAL 498 Disparities in Health in America  
PHIL 336 Medical Ethics

**Three Elective Courses:** The electives reflect individual academic interests and career goals. Any course from the above list of Bioscience courses can be taken as an elective, provided it was not taken as a required course. In addition, the following classes qualify as elective classes:

ANTH 381 Medical Anthropology  
ECON 450 World Economy and Social Development  
GHLT 462 Global Health Design Challenges  
HEAL 407 Epidemiology  
HI 5324 Nanomedicine in Healthcare  
MGMT 678 U.S. Healthcare Management  
MGMT 961 Business Law  
SOSC 420 Health Care: Competition and Managed Care  
STAT 684 Environmental Risk Assessment and Human Health  
GS 120254 Cell and Sysems Physiology  
GS 120043 Principles of Pathology  
…and others…

**A 3 – 6 months internship:** Practical experience is offered via a 3 – 6 month work immersion. The internship will be under the guidance of a host company, government agency, or non-profit organization. A summary of the internship project is required in both oral and written form as part of the Professional Master’s Seminar.

The faculty advisor will work with students to make sure they adhere to Rice regulations for graduate degrees that require students to take at least 15 credit hours at the graduate level.
5th Year Master's Degree Option for Rice Undergraduate Students:
In line with the 5th year option available for the SG and NP degree students, Rice undergrad students could apply to the PSM Program track in their junior year and, if accepted, could take courses towards the master's degree in their senior year, and would finish up with one more year of course work and the internship.

Rice undergraduates will work closely with their PSM advisor to determine courses available to them and relevant to their career goals. Outside of courses offered at Rice, they will have the option to choose up to two courses available from the UT Grad School of Biomedical Science in the Medical Center. These courses are listed in our curriculum under electives courses.

Faculty members advising students of this new track include:

Dr. Janet Braam  Chair of Biochemistry and Cell Biology
Dr. E. Ecklund  Professor, Sociology
Dr. Kathy Ensor  Chair of Statistics
Dr. M. El Gamal  Chair of Economics
Dr. Kirstin Matthews  Fellow for science and technology policy at the Baker Institute and lecturer of NSCI 511

Existing PSM Oversight Committee:

Dr. Daniel D. Carson, Dean of School of Natural Sciences, Professor of Biochemistry and Cell Biology
Dr. Evan Siemann, Professor and Chair of Department of Ecology and Evolutionary Biology
Dr. Kathy Ensor, Professor and Chair of Department of Statistics
Dr. Dan Cohan and Dr. Qilin Li, CEVE Professors
Dr. Barry Dunning, Professor and Chair of Department of Physics & Astronomy
Dr. Doug Natelson, Professor, Physics and Astronomy
Dr. Alan Levander, Professor and Chair of Department of Earth Science
Dr. Dale Sawyer, Professor, Earth Science

Dagmar Beck:  PSM Program Director

Addition to existing OSC Faculty:

Dr. Janet Braam, Chair of Biochemistry and Cell Biology
Dr. Kirstin Matthews, Fellow at Baker Institute for Public Policy
### PSM Board of Affiliates:

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<th>Company</th>
<th>Name</th>
<th>Position</th>
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<td>Baker Hughes, Inc.</td>
<td>Roderick A. Larson</td>
<td>Gulf Coast Area Manager</td>
</tr>
<tr>
<td>Chevron/Texaco</td>
<td>Dr. Don Paul</td>
<td>VP/Chief Technology Officer, retired '07</td>
</tr>
<tr>
<td>Chevron ETC</td>
<td>Dr. Robert Sandilos</td>
<td>Government Relations Officer</td>
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<tr>
<td>Colorado Schools of Mines</td>
<td>Dr. Ken Larner</td>
<td>Emeritus Member</td>
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<td>Dr. Diana McSherry</td>
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<td>Principal Consultant</td>
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<td>Rick Bost</td>
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<td>Dr. Thomas McHugh</td>
<td>Vice President</td>
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<td>Dr. Ray Johnson</td>
<td>VP and Chief Technology Officer</td>
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<td>Marathon Oil</td>
<td>Dr. Martha Barnes</td>
<td>Senior Geologist</td>
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<td>VP of External Relations, retired '04</td>
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<td>Andre Erlich</td>
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<td>Dr. Brian Clark</td>
<td>Schlumberger Fellow, VP &amp; Director of Research</td>
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<td>University of Nevada</td>
<td>Dr. James Taranik</td>
<td>Regents Professor and Arthur Brant Chair of Geophysics</td>
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14 COURSES REQUIRED: (min. of 42 credit hours)

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<tr>
<th>3 cohort courses</th>
<th>Course #</th>
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<td>NSCI</td>
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<td>Science and Technology Policy and Ethics (S)</td>
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<td>NSCI</td>
<td>610</td>
<td>Management for Science and Engineer (F)</td>
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<td>NSCI</td>
<td>512</td>
<td>Internship Project (not a course)</td>
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<td>NSCI</td>
<td>501</td>
<td>Master Seminar incl. communication training (F,S)</td>
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Choose 1 STAT Course:

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<th>Biostatistics (S)</th>
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<tr>
<td>STAT</td>
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<td>Environmental Risk Assessment and Human Health (F)</td>
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Choose 2 Policy and 1 Economics Course:

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<td>World Economy and Social Development (S)</td>
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<td>ECON</td>
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<td>Health Economics (F,S)</td>
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<td>HEAL</td>
<td>498</td>
<td>Disparities in Health in America (F)</td>
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<td>PHIL</td>
<td>336</td>
<td>Medical Ethics (S)</td>
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<td>POST</td>
<td>430</td>
<td>Shaping of Health Policy (F)</td>
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<tr>
<td>SOCI</td>
<td>514</td>
<td>Science at Risk- Out of the lab and into public sphere (F)</td>
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Choose 4 Science Classes

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<th>BIOC</th>
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<th>Cellular, Molecular, and Integrative Neuroscience (F)</th>
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<td>BIOC</td>
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<td>Microbiology and Biotechnology (S)</td>
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<td>525</td>
<td>Plant Molecular Genetics and Development (F)</td>
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<td>BIOC</td>
<td>545</td>
<td>Advanced Molecular Biology and Genetics (F)</td>
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<td>BIOC</td>
<td>550</td>
<td>Virology (F)</td>
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<td>BIOC</td>
<td>563</td>
<td>Endocrinology (S)</td>
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<td>BIOC</td>
<td>572</td>
<td>Immunology (S/F)</td>
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<td>BIOC</td>
<td>544</td>
<td>Developmental Biology (S)</td>
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<td>BIOC</td>
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<td>Cancer Biology (S)</td>
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3 Elective Courses

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<td>Global Health Design Challenges (S)</td>
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<td>Epidemiology (F)</td>
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<td>SOSC</td>
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<td>Health Care: Competition and Managed Care (F)</td>
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<td>MGMT</td>
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<td>Business Law (F)</td>
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<td>U.S. Healthcare Management</td>
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<td>STAT</td>
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<td>Environmental Risk Assessment and Human Health (F)</td>
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The following courses are recommended to fill deficiencies

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<th>Course Code</th>
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<td>BIOC 344</td>
<td>Molecular Biology and Genetics (S)</td>
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<td>BIOC 301</td>
<td>Biochemistry (F)</td>
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<tr>
<td>BIOC 341</td>
<td>Cell Biology (F)</td>
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**HI = UT School of Biomedical Informatics**  
http://www.uthouston.edu/sbmi

*GS* = UT Graduate School of Biomedical Sciences  
http://www.uthouston.edu/gsbs/

* Note: Agreements have been made with the Office of the Dean of Academic Affairs at UT Grad School of Biomedical Sciences and the Academic Affairs office at UT School of Biomedical Informatics to collaborate with Rice University in allowing us to list a few of their courses as part of our electives. Academic Calendars have been compared and time/date of course offerings are compatible with our schedule.

No new faculty needs to be hired to support this new track. Existing workload for faculty involved in teaching courses of this track will not be impacted as numbers of enrollment in the new track will be capped.

**Educational Pathway:** Demonstration on how the curriculum can be completed in 21 months:

**Sample curriculum:**

**YEAR 1**

**Fall Semester** (13 Credit Hours)

<table>
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<th>Course Code</th>
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<td>Virology (3)</td>
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<td>SOCI 514</td>
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<td>POST 430</td>
<td>Shaping of Health Policy (3)</td>
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<td>NSCI 610</td>
<td>Management in Science and Engineering (3)</td>
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<tr>
<td>NSCI 501</td>
<td>Professional Master's Seminar (1)</td>
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Spring Semester (16 Credit Hours)

1 Elective (3)
ECON 446  Applied Econometrics (3)
BIOC 560  Cancer Biology (3)
NSCI 501  Professional Master's Seminar (1)
BIOC 524  Microbiology & Biotechnology (3)
NSCI 511  Science and Technology Policy & Ethics (3)

Summer

NSCI 510  Industrial or Academic Internship

YEAR 2 / Fall Semester

NSCI 510  Industrial or Academic Internship (continued)

Spring Semester (13 Credit Hours)

NSCI 512  Internship Project (1)
BIOC 572  Immunology (3)
STAT 453  Biostatistics (3)
ECON 438  Business, Law and Economics (3)
PHIL 336  Medical Ethics (3)

Total of 42 Credit Hours

See Text for General Announcements attached under Appendix VI

Assessment and Oversight of the Program

Outside of the periodic review process under SACS (Southern Associations of Colleges and Schools) which all programs at Rice are assessed by, the PSM (Professional Science Master’s) Program has several mechanisms implemented to review its performance related to educational goals, student satisfaction, internship outcome, communication and business skills improvements:

- Overview by Faculty: Oversight Committee meetings are scheduled twice a year to discuss educational outcome of courses, student issues and performance, curriculum and course issues.
- Students are encouraged to meet with advisor faculty on a regular basis
- Internship Overview: Internship projects are approved by faculty members and, combined with performance evaluations of students during their internships, provide an assessment of the quality and effectiveness of this program element. Evaluation of
Internship projects occur by a mixed internal and external panel consisting of science and communication faculty providing assessment of value of the student's experiences and accomplishments during their coursework and their internship. This panel grades and evaluates the internship reports and presentations.

- Communication Assessment: Communication skills are assessed at the beginning of the study course of each student via an assessment workshop. Results from the workshop are evaluated on an individual basis resulting in individualized recommendations by faculty. Students are monitored and mentored during their studies to ensure improvements of their communication skills.
- Annual Review of program and outcomes by Board of Affiliates
- Student Feedback: Interim and final student surveys to evaluate the quality of the program and its faculty.

See Curriculum Map attached under Appendix III

Program Management and Administrative Procedures

The Program Director in collaboration with all other parties involved in the Rice PSM Program has successfully managed the existing program tracks over the last 8 years. We anticipate no problems in the management of the new track or in accommodating an overall increase in student numbers. The program has established strong interdisciplinary cooperation between the departments and set a model of management starting with recruitment, admission and enrollment, to student interactions and advising. We have excellent interactions with corporations and receive assistance with placement for internships and job positions. The involved personnel meet throughout each semester to review the ongoing process, and makes necessary adjustments or changes when needed to ensure that students are successful and reach their goals.

Organization: The PSM Program is based in the School of Natural Sciences. The Dean of Natural Sciences, Dr. Daniel D. Carson, supervises program related activities. The Program Director, Dagmar Beck, and her assistant, Emalie Thok, collaborate with the Oversight Committee Faculty and the Board of Affiliates to run this program. The Rice’s Center of Career Development assists when needed.

The duties of the Program Director include:

- Manage the budget
- Coordinate all activities with relevant departments
- Oversee student recruitment and selection for the Program
- Monitor the students during course work and internships to ensure a successful completion
- Foster and nurture connections between all involved academic officials
- Maintain and expand existing ties with industries contacts
- Coordinate with the PI and Faculty Coordinators on a regular basis
- Act as mentor and counsel to all PSM students
Enrollment for the new track are envisioned at 5–10 students in the first years of program availability. As described above, the Program Director will oversee the admission process, arrange for faculty advisors, monitor student progress and communicate with students and faculty throughout the two years of students’ presence at Rice. Additional monitoring and assessing has been described on pages 12/13 above.

**Oversight Committee:** Faculty involved in the PSM Program teaching PSM related courses, are familiar with the program, and have a good rapport with the students serving as advisors to the PSM students. The committee consists of two professors from Civil and Environmental Engineering department, one from the Statistics department, and one from the Ecology department; two from the Physics and Astronomy department, and two from Earth Science (see faculty listing on page 9). We will be expanded the existing Oversight Committee by faculty members from the department of Biochemistry and Biology.

**Board of Affiliates:** The Board of Affiliates is a group consists of 15 representatives from industry, such as Schlumberger, Lockheed Martin, GSI Environmental, Chevron, and others (See List of Board Members on page 10). They act as an advisory board and meet annually to review the progress of the PSM program. Board members also assist with mentoring of the students, providing feedback on industry trends, and giving advice on other key issues. The existing membership will be expanded by representatives from government, medical organizations, and industry who will support and advise the new Bioscience Research and Health track.

**Resources:** Financial resources are in place to maintain this track. No extensive library and information resources will be required for this track. No new physical facilities or classrooms are required to support this program. There is no need to hire extra staff. The impact of the new track on the existing tracks will be positive as new students will cohort with existing students creating a larger and more integrated PSM student body on campus.

The PSM program has not only financially supported faculty directly involved in the tracks, but has also supported lecturers of required courses, and has distributed monies to the departments directly involved with the tracks. We are committed to continue this support in the future.

**PSM Program Budget** see APPENDIX IV

**Institutional Commitment:** The existing program is well established within the Wiess School of Natural Sciences and has fostered close cooperation between various schools and departments on campus. The program has established an ongoing working relationship with the various departments and faculty involved in providing the courses for the tracks, but also is supported by the Center of Career Development. As mentioned earlier, the program has also financial remunerated faculty and departments involved in each track. The program is recognized within the highest levels of the university, and will continue to support its efforts. Furthermore, the program has
established ongoing relationships with local industry representatives and municipal organizations seeking involvement with the university.

The new track enjoys not only fullest support and commitment from several fellows and members of the Baker Institute for Public Policy, for example, Dr. Neal Lane (a recommendation letter is attached), but also has the full support of the faculty involved in teaching courses related to the new science policy study area. Support letters for academia, corporations and government organizations are attached (see APPENDIX VII.)

**Similar programs in the U.S.**

The new **Bioscience Research and Health Policy track** competes with a few existing programs in the U.S. at this time such as Johns Hopkins, Harvard and Columbia who are the few programs which “Master of Public Health” designated degrees. *(see Appendix V)*

There are some programs in Science and Technology Policy offered for example at MIT, Carnegie Mellon, Stanford and Princeton. However, these programs have a stronger focus on public policy making, energy and environmental policy-making.

These programs are all based on the underlying assumption that certain classes of social problems cannot be fully appreciated, much less effectively addressed without a subtle understanding of the problem’s scientific and technical dimensions, as well as the classical aspects and notions of policy. Classical science and engineering education yields professional ill-equipped for these problems, the mission is therefore, to educate scientists and engineers in responsible leadership of technology development by implementing policies for the benefit of humanity.

As an example, we have received feedback from the previously mentioned program offered at Johns Hopkins University in existence since 1993. They average 20 students per year. So far, they have had 100% placement with most students going to organizations in the Baltimore/ DC area. Some are being placed at Centers for Medicaid/Medicare or Health Resources and Services Administration (both government agencies) each year, some have accepted international placement, for example with the World Health Organization, and other have gone to the private sector.

**Professional prospects and work applications for graduates of the program:**

When developing this new program track, government and medical agencies, and corporations with government relations departments were contacted to get feedback on industry interest in a program like the new policy track.

The Bioscience Research and Health Policy track targets science students interested in working in public and science policy positions in non-profit organizations, government, industry governmental relations positions, medical and pharmaceutical companies, and
academic institutions. Graduates from similar programs nationwide pursue careers as health policy analysts, legislative affairs specialists, lobbyists, public affairs experts and health policy consultants. Some have found management positions in government agencies, research and professional organizations, advocacy groups, think tanks, science and technology oriented publications and other organizations concerned with scientific and technological policy.

Positive feedback was received from all companies contacted and support to offer internships has been expressed by:
Mark Moreno, VP of Governmental Relations at MD Anderson Cancer Center,
Sallie Keller, new director of the Science and Technology Policy Institute in Washington, D.C.;
Victoria Knudson, Associated Dean of Academic Affairs at UT Graduate School of Biomedical Science at Houston;
Todd Johnson, PI and Co-Director, AHRQ Training Program in Patient Safety and Quality,
Robert Vogler, Associated Dean of Academic Affairs at UT School of Health Information Sciences at Houston.

Internship positions are available across the health policy spectrum in both the public and private sectors. Program graduates in similar programs have pursued careers as health policy analysts, legislative affairs specialists, lobbyists, public affairs experts and health policy consultants. Many careers of graduates, for example from the program at Johns Hopkins, lead into senior management and executive positions in the health policy arena. Internship and full-time position providers have been:
- Kaiser Family Foundation
- Robert Wood Johnson Foundation
- Lewin Consulting
- American Medical Association
- Food and Water Watch
- Center for Medical Technology Policy
- Centers for Medicare and Medicaid Services
- Missouri Foundation for Health
- National Institute of Health
- Avalere Consulting
- Families USA
- Government Accountability Office, and other government offices
- Centers for Disease Control
- New York Academy of Medicine
- National Business Group on Health
- Office of the National Coordinator for Health Information Technology
- The American Cancer Society
- The City of New York Mayor's Office
- The Urban Institute
- Texas Medical Center
Financial Resources and Launch of new Track:

We presently have enough funds from overall PSM revenues to carry out this new track. Depending of the approval by the Faculty Senate, we aim at establishing this program track in time for Fall 2011 allowing us to recruit and attract top students and compete with the mentioned programs in the field nationally. A marketing plan/ad campaign schedule is in place for the existing tracks which will include the new track once it is approved. Brochures will be developed and a special marketing plan will be developed to get the word out to potential prospects for this track on a short notice. Announcement will be made nationwide through our membership with the National Professional Science Master’s Association and Council of Graduate Schools.

Distribution of Funds

Funds resulting from income from this particular track will be disbursed to the involved departments, i.e., offering core courses, on a student participation model. Faculty joining the Oversight Committee and acting as advisors to the new students will receive funds on an annual basis to support their efforts and offer an incentive for their participation.

Conclusion

In 2012, Rice will celebrate its centennial. As Rice enters its second century, it has developed a vision that includes an expansion in size to realize more fully its ambition to be an institution of national and international distinction which attracts the very best students and researchers from around the globe. The PSM Program’s goals are aligned well with Rice’s overall goals of engaging better with the City of Houston; creating partnerships with local industry and organizations; strengthening graduate programs; fostering collaborative relationships with other institutions; increasing investment in interdisciplinary endeavors; and investing in professional programs. The PMS program is integral to these goals and has already greatly contributed towards achieving them.

List of all Attachments:

Appendix I: Application/Enrollment Statistics
Appendix II: Graduation/Job Placement History
Appendix III: Curriculum Map
Appendix IV: PSM Program Budget 2011
Appendix V: List of similar policy programs (John Hopkins, Harvard School of Public Health, Columbia University, Mailman School of Public Health)
Appendix VI: Text for General Announcements
Appendix VII: Support letters
RICE FACULTY SENATE

PROPOSAL FOR NEW PSM TRACK
IN
BIOSCIENCE RESEARCH AND HEALTH POLICY

APPENDIX I

Enrollment Statistics for the three existing PSM tracks
APPENDIX I:

Enrollment Statistics for the three existing PSM tracks:

Table I: Application Statistics for all Three Existing Tracks for F02 – F10

<table>
<thead>
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As of 7/20/10

Note: Table reflects the total number of students actually enrolled in all three tracks per year specified (under column: Total Acceptance).

Minority Enrollment:

Our program has been successful to attract female students to these degree programs in STEM related fields. 45% of our graduates over the last 8 years have been female.

The incoming class of 22 students for Fall 2010/Spring 2011 included 9 female students.
RICE FACULTY SENATE

PROPOSAL FOR NEW PSM TRACK
IN
BIOSCIENCE RESEARCH AND HEALTH POLICY

APPENDIX II

PSM Program Tracks’ Internship and Employment History
## SUBSURFACE GEOSCIENCE TRACK

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RICE FACULTY SENATE

PROPOSAL FOR NEW PSM TRACK IN BIOSCIENCE RESEARCH AND HEALTH POLICY

APPENDIX III

Curriculum Mapping
<table>
<thead>
<tr>
<th>Unit Name:</th>
<th>Professional Master's Program in Natural Sciences</th>
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</thead>
<tbody>
<tr>
<td>Contact Name:</td>
<td>Dagmar Beck</td>
</tr>
<tr>
<td>Contact Email Address:</td>
<td><a href="mailto:dbeck@rice.edu">dbeck@rice.edu</a></td>
</tr>
<tr>
<td>Unit Mission Statement</td>
<td>The goal of the Professional Master's Program at Rice University is the integration of an interdisciplinary course of study with shared practical experiences, and the enhancement of student's science background with key skills in management, communications, policy, and ethics.</td>
</tr>
</tbody>
</table>

| Institute Mission Statement | The mission of Rice University, shaped largely by its founder and the first president, is to provide an unsurpassed undergraduate education in science, engineering, the arts, humanities, and social sciences; to produce internationally distinguished scholarship and research and excellent graduate education in carefully focused areas; to ensure that such an education remains affordable; to maintain the distinctive character of a community of learning that is relatively small in scale; and to serve the continuing educational needs of the larger community. |

| Degree Name: | M.S. In Bioscience Research and Health Policy |
| General goals: | This program will give students a deep background in science complemented by courses in sociology, economics and political science to foster their understanding of the role of science in policy making and the role of public policy in science. Their coursework will provide them with research and study skills enabling them to develop specific policy recommendations, and they will also receive the tool-set to become knowledgeable in the formulation and execution of public policy. Their direct access with the Baker Institute will allow them to work closely with policy scholars as well as meet with many of the leaders in science and technology policy. |

<table>
<thead>
<tr>
<th>Educational Outcome by Graduation</th>
<th>Methods to achieve goal</th>
<th>Assessment Methods and Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>To equip students with advanced Bioscience science skills</td>
<td>Curriculum requires completion of 4 Science Classes with the request that students take at least one course from each sub-category: Molecular Biology, Physiology, and Cell Biology</td>
<td>Oversight Committee meetings serve to discuss educational outcome of courses, student issues and performance, curriculum and course issues</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Educational Outcome by Graduation</th>
<th>Methods to achieve goal</th>
<th>Assessment Methods and Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student will select a course from each group with one or two additional courses from their interest area.</td>
<td>Faculty/student meetings will ensure guidance of student within his/her interest area</td>
<td>Interim and Final Student Surveys (including feedback on quality/content of courses, and attainment of program objectives)</td>
</tr>
<tr>
<td>To achieve dual professional competency in science and policy analysis and development</td>
<td>Courses in sociology, economics and political science to foster their understanding of the role of science in policy making and the role of public policy in science</td>
<td>Collaborations and feedback from Baker Fellows, internship providers and advisor faculty will allow evaluation of students progress.</td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td>To teach quantitative skills and data analysis</td>
<td>Students are required to take a course in data analysis offered by the Statistics department</td>
<td>Course faculty will assess performance of students by grading and feedback to Program Director.</td>
</tr>
<tr>
<td>To gain exposure in a real life experience in technology policy development</td>
<td>Participating in a required internship</td>
<td>Internship needs faculty approval through the Internship Definition Document. Internship offers practical application of methods learned. Performance of student is being evaluated on a regular basis by internship provider. Forms and time schedules are being provided. Internship providers and interns submit an Interim and Final Evaluation report to Program Director giving feedback on progress of internship. Frequent communication between program and organization/supervisor are maintained during the internship. Evaluation of Internship project presentation by a mixed internal and external panel provides assessment of value of the student's experiences and accomplishments during the internship. Assessment methods consist of a) Internship report, b) interim and c) final internship provider (company) evaluation, and d) interim and e)final student evaluations reviewed by faculty</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Educational Outcome by Graduation</th>
<th>Methods to achieve goal</th>
<th>Assessment Methods and Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop students’ written, oral and visual communication strategies to enable them to bridge the gaps between science, business and government</td>
<td>The program has two communication faculty assessing communication skills when students enter Rice's program. They provide feedback to each student and to the group as a whole via weekly seminars. Students receive individual guidance by communication faculty to improve writing and presenting skills.</td>
<td>Presentation is given to a mixed audience of business representatives, faculty members and students, and graded by all faculty present.</td>
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<tr>
<td>To equip students with leadership, communication and research skills to conduct independent studies enabling them to understand, and formulate public policy recommendations</td>
<td>Coursework will provide them with research and study skills enabling them to develop specific policy recommendations</td>
<td>Two internship reports are required, one written for a business audience and one written for a technical audience. Reports are evaluated by faculty advisor and PSM Communication faculty.</td>
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</table>
To train students how to integrate their science knowledge into creating better policies and practices

<table>
<thead>
<tr>
<th>Participating in an internship - students will intern with an organization and get the opportunity to apply knowledge acquired during their coursework at Rice. They will also receive the opportunity to build the tool-set to become knowledgeable in the formulation and execution of public policy. Their direct access with the Baker Institute will allow them to work closely with policy scholars as well as meet with many of the leaders in science and technology policy. Students attend a Science and Technology Policy and Ethics course taught by a fellow of the Baker Institute. This course will explore processes how policy is conceived, influenced and established. Review the US science and technology R&amp;D system, budget process and the institutions involved. Explore how government policies and regulations impact science, research and development, and business. Examine key regulatory agencies involved in different areas of science. Discuss the mechanisms for researching policy and policy-making authorities.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSM Communication Faculty offers practice and coaching sessions to improve presentation and communication skills. Master Seminar offers exposure to communication topics. Short writing tasks are required. Collaboration with scholars will provide guidance for the students. Policy papers, presentations and team projects will be evaluate by Baker Fellow.</td>
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### Educational Outcome by Graduation

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<th>Build business and management skills to be effective within an environment of a business or organization</th>
<th>Methods to achieve goal</th>
<th>Assessment Methods and Criteria</th>
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<td>Students attend the cohort course Management for Scientist and Engineers. This course is for science and engineering graduate students who want to understand the basics of management in new and/or small technology based businesses. The concepts covered will provide an overview of management particularly relevant to students who are interested in careers in technology or entrepreneurial ventures NSCI 610/ENGI 610 is team taught to provide insight into how technology oriented firms manage people, projects, accounting, marketing, strategy, intellectual property, organizations and entrepreneurship.</td>
<td>Students are exposed to teamwork projects, give presentations, undertake case studies, participate in case discussions and experiential exercises and receive regular peer review. A variety of methods will be used to explain the concepts and practices of management including; readings, case discussions, exercises, guest speakers, two written assignments and a leadership movie.</td>
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| Achieve professional standards and ethics | Students attend a Science and Technology Policy and Ethics course taught by a fellow of the Baker Institute. This course will explore processes how policy is conceived, influenced and established. Explore how government policies and regulations impact science, research and development, and business. | Internship providers will offer written feedback on student's performance and business and ethical acumen during and after internship. Student will submit an internship report at the end of the internship covering internship project, research, policy and business related experiences during the internship. |

| Examine key regulatory agencies involved in different areas of science, to broaden awareness of regulatory agencies' activities and goals. | |

---
Discuss the mechanisms for researching policy and policy-making authorities.

Class discussion and presentations will allow faculty to assess performance of students.
RICE FACULTY SENATE

PROPOSAL FOR NEW PSM TRACK
IN
BIOSCIENCE RESEARCH AND HEALTH POLICY

APPENDIX IV

PSM Program Budget
Dear Dan:

The Board of Trustees of William Marsh Rice University has approved the budget for the fiscal year 2010-2011 (July 1, 2010 through June 30, 2011). The President has allocated the funds shown below to your department.

---

### Budget Office

Dean Daniel D. Carson  
Professional Masters  
RICE UNIVERSITY

July 1, 2010

---

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<th>FY 2011 Budget</th>
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<th>Restricted Endowments Funds</th>
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EXPLANATION FOR BUDGET:

(a) Faculty salaries include salaries paid to lecturers of cohort courses and partial salary support for some required track courses

(b) Supplies and expenses include advertising expenses, business Meetings, delivery and phone services, computer equipment, course development, dues and membership fees, entertainment expenses, printing and publication costs, promotional items, office supplies, S&E return to PSM faculty, reduction in base to Rice/NSCI, and others.

(c) Revenue is based on minimum of 17 students enrolled in the program
RICE FACULTY SENATE

PROPOSAL FOR NEW PSM TRACK
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APPENDIX V

Similar Programs at other Universities
Appendix V: Similar Programs at other Universities

Johns Hopkins Bloomberg School of Public Health

MHS in Health Policy
Curriculum 2009 F10
First Year - First Term
140.621 Statistical Methods in Public Health I (4)
340.601 Principles of Epidemiology (5)
308.867 MHS Seminar in Health Policy (1)
313.642 Introduction to Microeconomics (3)
300.711 Health Policy I: Social and Economic Determinants of Health (3)
300.840 Special Studies and Research with Dr. Thomas LaVeist (1)
xxx.xxx Academic ethics module (n/c)
xxx.xxx Introduction to On-line Learning (n/c)

Second Term

140.622 Statistical Methods in Public Health II (4)
300.651 Introduction to the US Healthcare System (4)
308.867 MHS Seminar in Health Policy (1)
313.641 Health Economics (4)
300.712 Health Policy II: Public Health Policy Formation (3)
300.840 Special Studies and Research with Dr. Shannon Frattaroli (1)

Third Term

140.623 Statistical Methods in Public Health III (4)
308.867 MHS Seminar in Health Policy (1)
306.650 Public Health and the Law (3)
180.629 Environmental and Occupational Health Law and Policy (4)
300.713 Health Policy III: Research and Evaluation Methods for Health Policy (4)

Fourth Term

300.714 Health Policy IV: Health Policy Analysis and Synthesis (3)
300.840 Special Studies and Research with Dr. Lisa Dubay (1)
301.645 Health Advocacy (3)

Students choose their remaining elective course work in consultation with their advisors.

Second Year

Each term of the second year, students must register for the course MHS Field Placement in Health Policy, 308.810, for 16 credits.

(Information as of August 2009 )
Director
Lisa Dubay, PhD, ScM
For information: e-mail sent 8-27-10
Assistant director
Ms. Christine King
453 Hampton House
410-614-1535
chking@jhsph.edu
Harvard School of Public Health

Master of Science in Health Policy and Management

For more information about HPM Degree Programs, please contact:

Anne Occhipinti
Director of Academic Programs and Student Services
Phone: 617-432-4511
Email: aocchipi@hsph.harvard.edu

<table>
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<tr>
<th>Summary of HPM SM2 Degree Requirements</th>
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<td>School-wide core requirements*</td>
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<td>Biostatistics</td>
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<td>Epidemiology</td>
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<td>Environmental Health</td>
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<tr>
<td>Social and Behavioral Sciences</td>
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<td>Department requirements</td>
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<td>Ethics</td>
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<td>Economics</td>
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<tr>
<td>Applied research and practice</td>
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<td>Summer internship</td>
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<tr>
<td>Track requirements: See pages 12-18</td>
</tr>
<tr>
<td>Electives</td>
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<td>Total Requirements</td>
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*ID 338, Foundations in Public Health (10 credits) may be substituted for the separate school-wide core requirements.
Columbia University
Mailman School of Public Health
M.S. in Health Policy

Source URL: http://www.mailman.columbia.edu/academic-departments/health-policy/academic-programs/policy-track/course-requirements

Links:

Health Policy & Management

Rachel Sabb
Full-time and COTJ Programs
212-305-1844
rs2512@columbia.edu

Course Requirements

Fall 2009  
- P6530 Issues & Approaches to Health Policy  
- P6103 Biostatistics  
(15 points)  
- P6503 Health Economics  
- P8531 Seminar in Health Policy and Analysis  
- P6400 Introduction to Epidemiology  
- Optional writing workshop

Spring 2010  
- P6508 Health Policy and the Political System*  
- P8502 Research Methods  
(15 points)  
- P8582 Program Evaluation  
- P8548 Public Health Law or P6529 Law of Health Care Administration  
- P8541 Cost Benefit Analysis (1.5 credits)  
- Health policy selective (1.5 credits)  
- Optional Strategic Communications course

Summer  
Practicum

Fall 2010  
- P8581 Practicum Seminar  
- P6300 Environmental Sciences  
(15 points)  
- P8590 Policy Workshop  
- P8557 Managerial and Organizational Behavior or P8558 Strategic Management**  
- Policy electives (3 points) selected from 1.5-3 credit courses.
RICE FACULTY SENATE

PROPOSAL FOR NEW PSM TRACK
IN
BIOSCIENCE RESEARCH AND HEALTH POLICY

APPENDIX VI

Draft Text for Rice General Announcements
Appendix VI: General Announcements

Proposed text for requirements to appear in the General Announcements (this is similar to but slightly different from the narrative of the requirements offered above):

Professional Master’s Degree in Bioscience Research and Health Policy
The Wiess School of Natural Science

Degrees offered: MS
Rice University is offering this new degree for the first time in 2011. This degree is geared to train students in bioscience research and health policy with the intent of creating new options for science students interested in working in government as well as governmental relations positions in non-profit organizations, industry and academic institutions. As an interdisciplinary program it aims to equip students with advanced bioscience science skills; to teach quantitative skills and data analysis; to equip students with communication and research skills to conduct independent studies enabling them to understand, and formulate public policy recommendations; and to train students how to integrate their science knowledge into creating better policies and practices.

This degree is one of four tracks in the professional master’s program at Rice housed in the Wiess School of Natural Sciences. These master’s degrees are designed for students seeking to gain further scientific core expertise coupled with enhanced management and communication skills. These degrees instill a level of scholastic proficiency that exceeds that of the bachelor’s level, and they create the cross-functional aptitudes needed in modern industry and government. This program will give students an advanced background in science complemented by courses in sociology, economics and policy studies to foster their understanding of the role of science in policy making and the role of public policy in science. Their coursework will provide them with research and study skills enabling them to develop specific policy recommendations, and they will also receive the tool-set to become knowledgeable in the formulation and execution of public policy. Their direct access to the Baker Institute will allow them to work closely with policy scholars as well as meet with many of the leaders in science and technology policy.

Students receiving the PSM in Biosciences Research and Health Policy degree will be able to enter into governmental positions, work in non-governmental agencies, medical and pharmaceutical companies, and serve as governmental relations officers for companies or universities with a vested science interest.

Degree Requirements for MS in Biosciences Research and Health Policy
In addition to the core science courses, students are required to complete a 3-to-6-month internship and take a set of cohort courses focusing on business and communications. At the conclusion of their internship, students must present a summary of their internship project in both oral and written form as part of the professional master’s seminar.
Part-time students who already work in their area of study may fulfill the internship requirements by working on an approved project with their current employer. For general university requirements for graduate study, see page x, and also see Professional Degrees, page xx.

**Admission**
Admission to graduate study in Biosciences Research and Health Policy is open to qualified students holding a bachelor’s degree in biology or a related field that includes completed course work in biology, chemistry, calculus and statistics. Scores from the general Graduate Record Examination (GRE), good critical thinking and communication skills and completed course work in introductory economics is preferred. Department faculty evaluate the previous academic record and credentials of each applicant individually and make admission decisions.

**Four Bioscience Classes:** The Bioscience courses give in-depth instruction in specialized areas of Bioscience. Four courses are required to obtain a broad understanding of diverse areas of cutting edge Bioscience research.

- **BIOC 524** Microbiology and Biotechnology
- **BIOC 563** Endocrinology
- **BIOC 572** Immunology
- **BIOC 585** Fundamentals of Cellular, Molecular, and Integrative Neuroscience
- **BIOC 525** Plant Molecular Genetics and Development
- **BIOC 544** Developmental Biology
- **BIOC 545** Advanced Molecular Biology and Genetics
- **BIOC 550** Virology
- **BIOC 560** Cancer Biology

**Four Statistics, Economics, and Policy Courses:** The analytical competency requirement provides career-enhancing, marketable skills in policy analysis, economics and statistics. Students will take courses from groups A, B and C as indicated below:

**A – One Statistics Course**
- **STAT 385** or **453** Methods of Data Analysis
- **STAT 684** Environmental Risk Assessment and Human Health

**B - One Economics Course**
- **ECON 446** Applied Econometrics
- **ECON 450** World Economy and Social Development
- **ECON 481** Health Economics

**C - Two Policy Courses**
- **SOCI 514** Science at Risk – Out of the lab and into the society
- **POST 430** Shaping of Health Policy
- **HEAL 498** Disparities in Health in America
- **PHIL 336** Medical Ethics
**Three Elective Courses:** The electives reflect individual academic interests and career goals. Any course from the above list of Bioscience courses can be taken as an elective, provided it was not taken as a required course. In addition, the following classes qualify as elective classes:

- ANTH 381 Medical Anthropology
- ECON 450 World Economy and Social Development
- GHLT 462 Global Health Design Challenges
- HEAL 407 Epidemiology
- HI 5324 Nanomedicine in Healthcare
- MGMT 678 U.S. Healthcare Management
- MGMT 961 Business Law
- SOSC 420 Health Care: Competition and Managed Care
- STAT 684 Environmental Risk Assessment and Human Health
- GS 120254 Cell and Systems Physiology
- GS 120043 Principles of Pathology
- And others…

**A 3 – 6 months internship:** Practical experience is offered via a 3 – 6 month work immersion. The internship will be under the guidance of a host company, government agency, or non-profit organization. A summary of the internship project is required in both oral and written form as part of the Professional Master’s Seminar.
RICE FACULTY SENATE

PROPOSAL FOR NEW PSM TRACK
IN
BIOSCIENCE RESEARCH AND HEALTH POLICY

APPENDIX VII

Support Letters
October 1, 2010

Dr. Dagmar Beck, Program Director
Professional Science Master's Program
Rice University – MS 103
Houston, TX

Dear Dr. Beck,

We at the University of Texas Graduate School of Biomedical Sciences (GSBS) at Houston are pleased to participate in your Professional Science Master's Program in Science and Technology in Biomedical Research and Health Policy. We are willing to provide the opportunity for students in this Program to take a selection of GSBS courses. In particular, courses identified as of interest to your students are:

GS040203 Experimental Genetics
GS040073 Developmental Biology
GS040063 Cancer Biology
GS120043 Molecular and Cellular Pathology of Human Diseases

We note that the students will participate in these courses in a manner consistent with the Gulf Coast Consortium Memorandum of Understanding. In particular, the students must obtain the consent of the coordinator of the GSBS course prior to registration, and the students must not enroll in more than a total of 12 hours of GSBS courses during their pursuit of the master's degree.

I do understand from you that GSBS students may take Rice University courses offered in the Professional master’s Program, even if they are not formally enrolled in the Program.

I wish you all the best in launching this new program.

Regards,

George M. Stancel, Ph.D.
Dean

Peter J. Davies, M.D., Ph.D.
Provost & Executive Vice President
for Research, UTHealth

Cc: Ms. Kathy Rodgers
August 31, 2010

MEMORANDUM

TO: Graduate Council

FROM: Dan Carson, Ph.D.,
Dean, Wiess School of Natural Sciences

SUBJECT: Science and Technology Policy Program

It is my great pleasure to provide my support for the establishment of a Science and Technology Policy Program as an offering through our Professional Science Master’s program. Dagmar Beck has discussed this program with me and worked with key faculty members on campus to develop this timely graduate track which I think will be quite successful. I hope we will see the inaugural offering of this program in the very near future.

Sincerely,

Daniel Carson, Ph.D.,
Schlumberger Chair of Advanced Studies
and Research
Dear Dagmar,

This letter serves to indicate BCB support for your proposed Professional Science Master’s track in Science and Technology Policy focused on Biomedical Research and Health. I think this is a wonderful initiative with high value for expanding career options for biologists and training biologists to bring their expertise to government and governmental relations.

BCB is pleased to have some of our courses included as options for your program and we are happy to work with you in any way we can to facilitate this education initiative.

Sincerely,

Janet Braam
MEMORANDUM

December 1, 2009

To: Dagmar Beck

From: Lyn Ragsdale

Re: Support of Science Policy Master’s Program

I have read the materials provided regarding the proposed Science and Technology Policy Master’s Program and wish to indicate my support for the proposal. This is a rich interdisciplinary program that will attract students from various disciplines in the Sciences and perhaps even the Social Sciences. It is well-balanced and provides students numerous opportunities to understand connections among science, politics, public policy making, and the crafting of real world solutions to problems at the nexus of science and government. It also offers a strong tie to the Baker Institute. I urge its adoption into the curriculum.
Memorandum

To: Whom It May Concern
From: Mahmoud El-Gamal, Chair of Economics
Ref: Letter of Support for New Track In Professional Masters Track

I write this letter in support of the proposed Professional Science Master's track in Science & Technology Policy focused on Biomedical Research and Health. This proposed track is another welcome step in creating interdisciplinary programs between Rice and the Medical Center schools, and the Department of Economics is happy to be participating in this program, albeit in a modest way. The program requires students to take one economics course, and students can select from a menu of three courses that we have taught on a regular basis in recent years. Therefore, we do not anticipate any logistics problem to prevent our envisioned participation in this program from materializing and continuing.
September 30, 2010

Dear Committee Chair,

I am writing a letter in support of the addition of a new track in Biomedical Research and Health Policy to the existing Professional Master’s Program. This program would represent a further step in creating interdisciplinary programs and initiatives within Rice and between Rice and the Medical Center schools. As a member of the sociology faculty I would be pleased to participate in the program by creating a graduate student track for my Science At Risk: Out of the Lab and Into the Society course, which could serve as one of the required courses for this new initiative.

Sincerely,

Elaine Howard Ecklund

Assistant Professor of Sociology
Director, Religion and Public Life Program
Institute for Urban Research
Rice Scholar, James A. Baker III Institute for Public Policy
Rice University
Sociology Department, MS-28
P.O. Box 1892
Houston, TX 77251-1892
Phone: 713-348-6761
Email: ehe@rice.edu
Ms. Dagmar Beck  
Director  
Professional Science Masters Program  
Rice University  
Houston, Texas

Dear Ms. Beck:

I strongly support the creation of a professional science masters in science and technology policy at Rice University. My experience in Washington as the director of the National Science Foundation, 1993 to 1998, and science advisor to President Clinton, 1998 to 2001, convinced me that there is a desperate need for professionals with a strong science background working in public policy at all levels of government, federal, state and local. Science impacts public policy in all important areas and is directly impacted by policies created at the local, state, and national levels. Funding and regulation of science, technology, engineering and math (STEM) education have a major influence on the quality of the science and engineering workforce. Science is also critically needed to inform policies in areas such as energy and climate change, threat to the environment, and biological pandemics, to name a few. Sound policy making depends on the policy makers having access to current understanding of the science and technological capability. Thus, men and women who understand science and technology are vital to the policy making process at all levels in government. The need is particularly acute in Congress and the State Legislatures. While scientists are often called on to testify at hearings, that is no substitute for having technically competent staff and officials who interact with the creation of policies daily. And since government policies influence the business world, companies need employees who understand the technical issues as well as the policy making process.

The proposed master’s track at Rice University will help fill this need. Students seeking this degree will have access to advanced science and engineering courses. In addition, they will take courses in economics, ethics, sociology, and political science, which will help them learn how engage in the political process and, thus, hit the ground running in whatever policy arena they choose. Furthermore, the internship opportunities available in the S&T Policy Program and other programs of the Baker Institute as well as in Rice’s research labs will help the students get a balanced perspective of science, engineering and technology. I believe graduates of this program will be able to easily find employment in industry, non-profit groups, academia, and in government.

Sincerely,

[Signature]

Neal Lane, Ph.D.  
Senior Fellow, Baker Institute  
Malcolm Gillis University Professor,  
Rice University
October 27, 2009

Ms. Dagmar Beck
Director
Professional Science Masters Program
Rice University
Houston, Texas

Dear Ms. Beck:

I am writing this letter to provide my support and encouragement for the creation of a new professional science masters degree in science and technology policy at Rice University. Students with a background in science as well as policy are needed in Washington D.C., as well as in state governments and local communities.

I write this recommendation based on my experience in science policy in Washington D.C. from 1993 to present. From 1993 to 2005, I served as the president of the National Academy of Science. In this capacity, I helped lead the National Research Council in the creation of many science policy assessments and recommendations. The valuable skills of our staff with various science and policy backgrounds were essential to our success and the success of our reports. In 2008, I accepted the position as the editor-in-chief of Science magazine. Here again, the accomplishment of the magazine’s news and policy reporting is directly linked to talented individuals with experience and backgrounds in the sciences.

I believe that the proposed master’s track in science and technology policy will fill a need for talented individuals working in public policy with a science background. In addition, the students will have the opportunity to work with the Science and Technology Policy Program at the James A. Baker III Institute for Public Policy, and in particular with Neal Lane and Kirstin Matthews. This association will provide them with extraordinary access to top scientists and science policy scholars, as well as to the many international leaders who visit the Baker Institute each year. I believe that the graduates of this program will be able to easily find employment in industry, non-profit groups, academia, and in government.

Sincerely,

Bruce M. Alberts
Professor Emeritus, Biochemistry and Biophysics
Editor-in-Chief,
October 25, 2009

Dagmar Beck  
Program Director  
Professional Science Master’s Program  
Rice University  
Houston, TX

Dear Ms. Beck,

The National Professional Science Master’s Association (NPSMA) is pleased to endorse the new Science & Technology Policy track within Rice University’s Professional Science Master’s program in Natural Sciences. We believe this to be a strong initiative submitted to the National Science Foundation in response to its Science Master’s Program grant solicitation.

The NPSMA is the national association that advocates and promotes Professional Science Master’s degree programs and our constituents include all key PSM degree program stakeholders. It is our view that this proposed program offers a unique opportunity for students to pursue careers in government, government relations in nonprofits, industry, as well as academia.

The program will provide students with a strong core in science, quantitative skills, communications, and policy. Importantly, the collaboration with the James A. Baker, III Institute of Public Policy will expose students to experts in government, media, industry, and academia. This combination will create Science Master’s graduates with a unique and strong skill set in science technology and public policy.

Sincerely,

Stephen J. Lemire

Stephen Lemire  
Executive Director, NPSMA  
100 Institute Road  
Worcester, MA 01609  
(508) 831-4996  
slemire@npsma.org; www.npsma.org