Professional Science Master's 101
A Technical Workshop
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What is a Professional Science Master's Degree?

A degree that:

- Prepares graduates for work—outside academia—involved in active science.
- Combines technical competencies with workforce skills, e.g. management, policy, communications, or law.
- Leads to a wider variety of career options than provided by traditional graduate programs.

Rationale Behind the Development of the PSM

- Landscape of graduate education is changing
- Growth is occurring in the professional fields at the master's level
- Workforce growth is occurring in non-academic sectors
- BA insufficient for science career…..PhD too long, with uncertain prospects…..Need for an alternative path to a science career
- Competitiveness – local, regional, and global economy

Why a Professional Science Master's Degree (PSM)?

U.S. Graduate Education Faces an Odd Gap

- Strong: Bachelors, PhDs in science
- But BA/BS insufficient for science career..
- …PhD too long, with uncertain prospects
- Attractiveness of PhD path declining?
  - ~21% of majors to graduate programs
- But no alternative path to science career
- Faculty view: value PhD, not masters.

Employers Views: Very Different

- PhDs yes, but not in large numbers
- Do want strong science skills, PLUS…
  - Interdisciplinary teamwork, flexibility
  - Project management
  - Computational skills
  - Communication ability
  - Basic business skills

Workforce Projections

- Many expect demand for graduate skills
- Ramp-ups in competition: China, India
- Globalizing, off-shoring, rapid change
- Needed: more flexibility, nimbleness in graduate science education

Differences vs Other Degrees

- More science (or mathematics) than MBA
- More informatics/computation than science degree
- More professional skills (business, law, communication) than doctoral program
- Connections with potential employers
- Project or team experience vs. thesis: real world experience

How is the Professional Science Master's (PSM) Degree Unique?

- Developed in concert with industry and designed to dovetail into present and future vocational opportunities.
- Based on analysis of demand for graduates, including collection of information about non-academic employment opportunities from potential employers.

Features of Professional Master's Programs

- Admit to a terminal master’s-degree program
- Offer skills-based courses (e.g. marketing, management, statistics)
- Emphasize writing and communication skills
- Require final project or team experience
- Have employer/industry advisory board
- Require students to participate in employer-based internship

Features of Professional Master's Programs, cont.

- Have program faculty with experience in non-academic employment
- Offer students opportunities to participate in off-campus activities
- Seek and promote potential careers for graduates
- Assist with placement & track careers of graduates
- Continual evaluation and program redesign

Other Features (in some PSM programs)

- Focus on innovation
- Some include ethics, decision-making, public policy
- Focus on cutting-edge industries: computational linguistics, security, games & animation, entertainment
- Lectures/seminars on entrepreneurship
- Case studies tailor-made for PSM students

Who Are PSM Programs For?

Students who want to work in:

- Non-academic sectors
- Interdisciplinary careers
- Team oriented environments
- Managerial or other professional level positions
- Emerging areas of science and scientific discovery

Students who are:

- Seeking career advancement in government, industry, and technology,
- Looking to gain a competitive edge in the job market,
- Re-entering the workforce looking to refine professional and technical skills,
- Seeking career growth

Typical PSM Degree Requirements

- Developed in consultation with employer/industry advisory board
- Two-year graduate degrees: 36 credits
- Science/math: all at graduate-level
- Plus cross-disciplinary courses common
- Plus team/individual projects (not thesis)
- Plus business or policy course(s)
- Plus internship with science employer

Many Employers Helping

- Advise PSM faculty
- Mentor PSM students
- Tuition for employees
- Internships
- Prospective employers
- Champions re: regional economic development

~100 degrees, ~50 institutions, ~20 states

- Math – Financial, Industrial, Computational Sciences, Statistics for Entrepreneurship, or for Environmental Decision Making
- Physics – with Business Applications, Physics of Modeling, Industrial Physics, for Entrepreneurship
- Biological Sciences – Bioinformatics, Biotechnology, Applied BioSciences
- Computational Biology, Computational Chemistry
- Forensics
- Bioanalytical Chemistry, Biomolecular Chemistry
- Geographical Information Systems

Who Hires PSM Graduates?

Applied Biosciences

- Eli Lilly
- 3-Dimension Pharmaceuticals (J&J)
- The Institute for Human Genome Therapy
- Health Sciences, Inc.
- Glaxo SmithKline
- Purdue Pharma
- Novartis
- Texas Department of Public Safety
- Johnson & Johnson

Who Hires PSM Graduates?

Financial, Industrial Math & Statistics

- First Federal Bank
- Digital Credit Co.
- Putnam Investments
- Watson-Wyatt
- Chevron
- Lockheed-Martin
- G.E. Capital
- Department of Agriculture
- American Automobile Association

Salary Ranges for PSM Graduates

- **Private Industry** - $55,000 - $62,000
  - Boeing, Chevron, Novartis, Lockheed-Martin, G.E. Capital, Raytheon, Pfizer, Glaxo Smith-Kline
- **Government** - $45,000 - $55,000
  - NASA, EPA, USDA, National Center for Food Safety, Mich Council of Governments
- **Nonprofits** - $45,000 - $55,000
  - Mayo Clinic, Institute Human Genome Therapy, IIT Research Institute, Institute for Pollution Control

The CGS/Sloan PSM Initiative

- The CGS project consolidates multiple PSM activities under the CGS umbrella.
- Goal: “The institutionalization and promotion of the PSM degree as a regular feature of graduate education.”
- We expect to achieve the following objectives:
  - Continuation and improvement of existing PSM programs

The CGS/Sloan PSM Initiative (continued)

- Significant increase in the number of students enrolled in all PSM programs
- Expansion of funding by NSF and other agencies to include PSM programs
- Increase in the number and variety of employment sector champions of the PSM.

CGS Project Staff

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