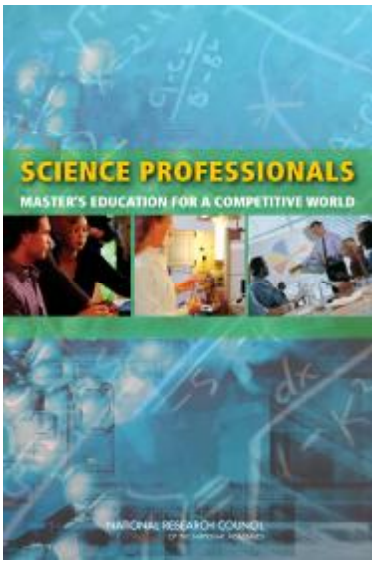
THE NATIONAL ACADEMIES
REPORT IN BRIEF



SCIENCE PROFESSIONALS

MASTER'S EDUCATION FOR A COMPETITIVE WORLD (2008)

The vitality and competitiveness of the U.S. economy is due in large measure to our nation's investment over five decades in research and higher education, yielding a steady stream of scientific and technical innovations. The growth of research capacity and productivity in Europe and Asia, though—developing like a "Silent Sputnik"-- —is challenging U.S. technological leadership. The master's-trained segment of the science workforce is pivotal to U.S. innovation and competitive success. Strengthened master's education in the natural sciences will produce professionals who bring scientific knowledge and also anticipate, adapt, learn, and lead where and when needed in industry, government and non-profit organizations.

Exciting experiments in master's education over the last decade—the Master of Biosciences (MBS) program at the Keck Graduate Institute of Applied Life Sciences and the Professional Science Master's (PSM) initiative seeded by the Alfred P. Sloan Foundation—have shown that graduate education in these fields can prepare professionals with both scientific knowledge and workplace skills for the practical application of that knowledge—that is, a new kind of scientist with multidisciplinary skills and experiences. Endorsing this approach, the America COMPETES Act of 2007 authorized the National Science Foundation (NSF) to create a new program of grants to four-year institutions for the creation or expansion of professional science master's (PSM) programs.

The time is right to accelerate and spread nationally the development of professional science master's degrees that are interdisciplinary in character, strongly emphasize effective communication and problem solving, and provide an understanding of entrepreneurial skills and technical innovation. Graduates of PSM programs are in demand by banks, insurance and financial companies needing financial mathematicians; a maturing biotechnology industry needing middle managers with advanced scientific knowledge and broader business skills; computer services corporations that require technical employees with business and customer skills; and state and federal agencies needing science- and technology-savvy staff with interdisciplinary training.

KEY FINDINGS

*Professional master's programs in the natural sciences provide tailored, cost-effective, and attractive education which includes advanced education in the sciences, interdisciplinary training, hands-on experiential learning, training in communication, teamwork, and project management, education in legal, regulatory, and ethical issues, and strong links with employers.

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*PSM degrees do not replace classical master's degrees. They appeal to students who typically do not pursue doctoral education but seek career advancement, look to gain a competitive edge, or want to refine skills in order to reenter the workforce. PSM and MBS graduates become process managers, investment analysts, patent examiners, S&T acquisition managers, and forensic scientists.

*Salary and placement data for PSM and MBS graduates indicate strong and growing current demand for master's level science professionals. Although we cannot precisely project future demand, we believe that the demand for these programs will continue to grow.

RECOMMENDATIONS

The federal government should expand the PSM program authorized in the COMPETES Act beyond NSF to all other major federal science agencies. Each agency program should include competitive grants to four-year higher education institutions for new PSM programs and National Innovation Scholarships to provide need-based aid for U.S. citizens to enroll in PSM programs. It is critical that Congress appropriate funds for this multi-agency program beginning in fiscal year 2009 and at an appropriate level.

State governments should provide funding for the creation and expansion of PSM programs to target particular state and regional economic development needs, including creating and managing science-and technology-based industries in their states.

Philanthropic institutions should continue to play a role in creating and sustaining professional science master's degree programs by providing matching funds for federal grants, student financial aid, and seed money for the establishment of new programs in a specific field or in support of a specific industry.

Professional societies in the natural sciences and **industry associations** in high technology or science-based industries should include the PSM in their goals for higher education in their field, including specific actions to help create and sustain PSM programs and other innovations.

Higher education institutions should continue to innovate in and support the development of master's degree programs in the natural sciences that provide students with deep, often interdisciplinary, scientific knowledge as well as opportunities to develop professional skills through courses, summer internships, and business- or government-sponsored projects providing workplace experience. Incentives for faculty to participate in these efforts are critical.

Higher education institutions should work as partners with employers to create and sustain PSM programs. External employer advisory councils provide substantive, real-time input and practical assistance with curriculum development, mentoring, marketing, employer-sponsored projects, internships, hiring for graduates, and financial support. Institutions should also provide outreach to students, informing undergraduate students and potential graduate students of professional science master's degree opportunities.

Employers in the for-profit, nonprofit, and government sectors should partner with higher education institutions to create and sustain PSM programs, participating on employer advisory councils and inviting program representatives to speak at local or regional business gatherings. They should broaden their recruiting beyond traditional sources to hire graduates from these new programs. Federal agencies need procurement officers, acquisition officials, project and program managers and senior executives who understand the latest in technology when they make important investment decisions.

Students in professional science master's degree programs should take full advantage of internships and industry-sponsored team projects. Alumni should provide the programs from which they graduated with links to and resources from their current employers, who can assist with mentoring, internship opportunities, and information about employment.

For More Information

Copies of this report are available from the National Academy Press; call (800)624-6242 or visit the NAP website at www.nap.edu. For additional information, contact Dr. Peter Henderson (phenders@nas.edu).