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The Professional Science Master's Degree at Twenty

By Sheila Tobias and Linda Strausbaugh

Twenty years ago, in the midst of much handwringing about a surfeit of PhDs in science and mathematics, many of them unable to get jobs in the Academy, *Rethinking Science as a Career* (Tobias, Chubin, & Aylesworth, 1995) sounded both the alarm and the opportunity. Undergraduates have too little expertise, the authors documented in their

far-reaching report on what business and the nonprofit sectors were seeking in employees. PhDs may have too much.

The recognition of this qualification gap provided the opening for an altogether new kind of master's degree, the Professional Science Master's (PSM) degree, a destination degree for those students who wanted careers in STEM (science, technol-

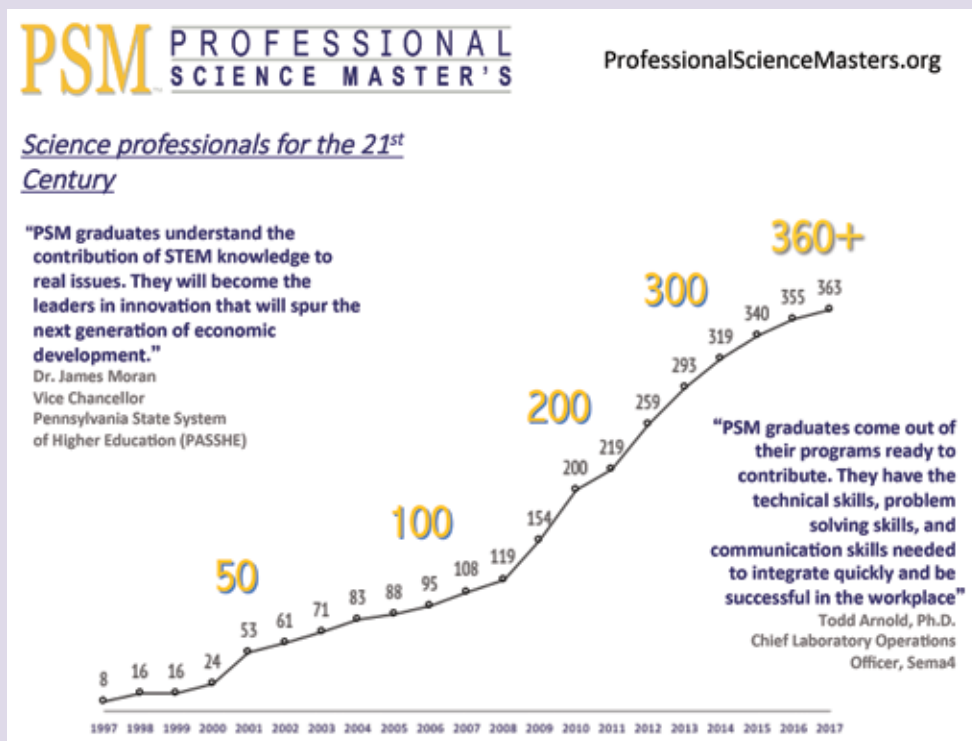
ogy, engineering, and mathematics) fields but might not be interested in pursuing the traditional PhD route. The Alfred P. Sloan Foundation took note and initiated funding in 1997 for a hardy band of innovators, first in the PhD-granting universities (where the master's in science/mathematics was often awarded to a "failed" PhD candidate) and, within 5 years, under the aegis of the Council of Graduate Schools, in master's-granting institutions.

Today the PSM degree is offered in more than 355 programs at more than 160 U.S. colleges and universities (see the growth graph in Figure 1). Recent years have seen the PSM concept expand internationally to Australia, South Korea, and the United Kingdom. The PSM has remained remarkably adaptable and responsive both to the *jobs* that today's science majors are going to fill tomorrow and the strategies that best prepare graduates for those new careers.

In those 20 years, PSM programs continued to grow in number and evolve in disciplinary focus. They currently include some

FIGURE 1

Growth in the number of Professional Science Master's Programs from 1997 to 2017. Illustration provided by Ray Hoobler (University of Utah, NPSMA) and Sheila Tobias.



of the most contemporary scientific fields that are in demand (see Figure 2). The numbers of PSM degree programs grew in expanding employment sectors such as biotechnology, biomedical and pharmaceutical sciences, energy, and environmental and ocean sciences. Programs in newly emerging disciplines such as data analytics, cybersecurity, genomics, nanotechnology, and remote sensing are also now available. There are thousands of PSM students enrolled at any one time and tens of thousands of graduates holding well-paid jobs.

In the success of the PSM degree, its programs' directors discovered a deep pool of domestic students who wanted to continue graduate-level education in science and pursue STEM employment, but hadn't known how. So, why should an instructor and adviser of STEM undergraduates recommend the PSM degree to some students?

First, every PSM-branded program keeps abreast of workforce demands through an external or employer advisory board.

Second, the PSM student undertakes formal training in career-specific transferable skills, such as communications, business fundamentals, management, teamwork, ethics, data analytics, and others as appropriate.

Third, all PSM students are experiential learners having an immersion in the workplace through internships, industry projects, or other capstone experiences.

Simply stated, in its drive to make graduates competitive in the high-technology workforce, the PSM movement has been on the leading edge of educational innovation.

How is this vast and ever-changing PSM movement managed? There is a Commission on Affiliation of PSM

Programs that administers affiliation of degree programs and a National Professional Science Master's Association (NPSMA) that offers services to member individuals and institutions. They also cooperate in supporting the website: professionalsciencemasters.org. Advisers and their students can learn more about the PSM at the site and use its program locator to find degree programs by discipline, university, or state. For faculty and administrators interested in starting new PSM programs at their institutions, they can learn more about the procedure for affiliation. In November 2017, the NPSMA celebrated the 20th anniversary of the founding of the first PSM program at its national conference in Phoenix, Arizona, with the theme "Build, Grow and Sustain."

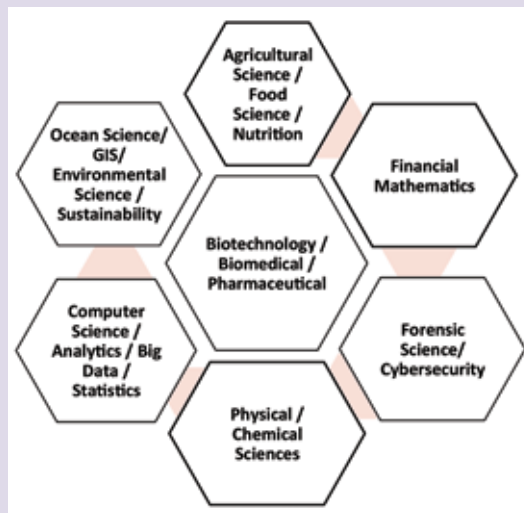
There is every reason to believe that colleges and universities will continue to respond to newly emerging STEM workforce needs at the graduate level. The PSM will continue to grow. According to the Commission on Affiliation of PSM Programs, 80 new programs were created over the past 3 years. This degree is here to stay. ■

Reference

Tobias, S., Chubin, D. E., & Aylesworth, K. (1995). *Rethinking science as a career: Perceptions and realities in the physical sciences*. Tucson, AZ: Research Corporation.

FIGURE 2

PSM degree programs include many in-demand and emerging STEM fields. Illustration provided by Courtney Thornton (North Carolina State University, NPSMA).



For more information

About the PSM and NPSMA, visit: <https://www.professionalsciencemasters.org/>

About how you and your students can find a program, visit: <https://www.professionalsciencemasters.org/program-locator>

About how you may create a PSM program at your university, visit: <https://www.professionalsciencemasters.org/new-affiliation-and-affiliation-review>

Sheila Tobias (sheilax@sheilatobias.com) is an author, consultant, and founding member of the national Professional Science Master's (PSM) movement and **Linda Strausbaugh** (Linda.Strausbaugh@uconn.edu) is the former Director of the Applied Genomics PSM Program at the University of Connecticut and the current Director of Strategic Initiatives for the National Professional Science Master's Association.