Member Spotlight

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A discussion about the future of science careers with Paula Stephan

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Professor Paula Stephan, a member of AAAS, studies how economic forces influence academic science (Image: Georgia State University, Meg Buscema)

Are we training too many science Ph.D.s or too few? What are the career prospects like for current graduate students and postdocs? AAAS member and professor of economics Paula Stephan, Ph.D. will speak about these issues during the upcoming AAAS 2013 annual meeting in Boston.

Professor Stephan studies how economic forces influence academic science and recently wrote a book on the subject, entitled How Economics Shapes Science. At the Boston meeting, she will be part of a session called Preparing Our Future Scientific Work Force to Ensure the Success of Science, which will be held on Friday, February 5th from 1 to 2:30 pm.

Below is an email interview with Dr. Stephan that examines some of the issues she will discuss during her AAAS meeting presentation.

AAAS Member Central: The title of your talk at the upcoming AAAS meeting is "Where Are They Going? Economic Trends of the Scientific Work Force." Can you briefly preview your talk? In particular, what are these trends and are they getting better or worse for current trainees?
Paula Stephan Ph.D, Professor of Economics, Georgia State University:

- The number of PhDs awarded in the biomedical sciences has almost doubled since 1990; the number in engineering has also almost doubled. Other fields, with the exception of math and computer science, have been quite flat.
- Less than 60 percent of individuals trained in the biomedical sciences are working in jobs that are closely related to their field of training.
- In most fields a tenure-track position is now the "alternative career path."
- In the biomedical sciences, the largest growth in jobs has occurred in the non-academic, non-research sector.
- There has been a significant decline in recent years in the percent of doctoral recipients who have a definite commitment for employment or postdoctoral study at the time they receive their PhD, and this trend accelerated after the 2008 recession.
- The percent of PhDs with postdoctoral plans increased after the 2008 recession. In engineering the increase was especially noticeable, going from 30 percent in 2008 to 45 percent in 2010.

Note: trends got worse after 2008, especially for new PhDs.

AAAS Member Central: When you researched your book "How Economics Shapes Science" was there anything that really surprised you about how incentives influence the work that scientists do? Did you see any large differences among different scientific disciplines?
Stephan: The biggest surprise is that concerns about the job market prospects of PhDs in the biomedical sciences have been raised for over 35 years. As early as 1976, for example, a NRSA report concluded "that a slower rate of growth in labor force in these fields [biomedical sciences] was advisable." In terms of differences in fields, Henry Saurermann and I find little evidence that there is a relationship between financial motives and patenting among life scientists. But there is a relationship in other fields.

AAAS Member Central: Do you think we are training too many or too few science PhDs? We know that for several science disciplines there are many more PhDs trained than available academic positions—yet I read recently that the unemployment rate is something around 2% for PhDs. If only about 15% of PhDs go on to tenure track jobs and 2% are unemployed, what's the story with the other 83%?
Stephan: It is important to realize that when it comes to highly trained persons the unemployment rate is a poor indicator of career outcomes. So we should not focus on that measure. The more important issue is whether the highly trained can get the type of job they trained for and are looking for. And when it comes to this measure, there is considerable evidence that in certain fields we are training more people than there are available research positions for, both in and out of academe, as well as non-research positions that use their

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- Workforce Development (125)
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- Communicating Science (192)
- Biology (168)
- Chemistry (34)
- Earth Sciences (34)
- Engineering (50)
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skills. This is particularly true in the biomedical sciences where the number of individuals trained is highly responsive to growth in the NIH budget, not to long-term job outcomes. This is a structural problem. In engineering there currently also appears to be a mismatch between the number trained and the number of positions that utilize their skills. However, the situation in engineering is more related to macro economic conditions and is less structural.

AAAS Member Central: You were a member of the NIH's Biomedical Workforce Task Force, which released its recommendations for how to create a more sustainable workforce last June. The recommendations included shortening both grad student and postdoctoral training, increasing training for non-academic careers (as well as tracking career outcomes), decreasing support of trainees from research grants, and increasing staff scientist positions. In December, Dr. Sally Rockey, Deputy Director for Extramural Research at the NIH, announced on the RockTalk Blog that the NIH plans to implement some of these changes by increasing independence awards and postdoc starting salaries, as well as by launching enhanced career programs for trainees. What do you think of these changes?
Stephan: I was a member of the workforce modeling subcommittee and am definitely in favor of these changes. However, I was disappointed that NIH did not choose to implement the two most radical proposals made by the full committee: limit the amount of salary that could be written off a grant and shift funds from GRA (graduate research assistant) positions to training grants.

AAAS Member Central: What can graduate programs, institutions, funding agencies, and individuals do to change the incentive structure of academic science and help make academic science a more sustainable career path?
Stephan: Here's my list:

- Discourage overreliance on graduate students and postdocs by raising salaries and benefits, thereby making costs reflect their social cost;
- Reallocate within NIH funds available for training grants and increase the indirect rate on training grants, thereby making training grants more attractive;
- Require departments to post placement information online;
- Provide information regarding different career paths early in the graduate training experience; don't wait for career counseling until the postdoc!
- Encourage internships during graduate school experience;
- Encourage institutions/provide incentives for institutions to create more staff scientists positions;
- Limit amount of salary charged off grants, thereby diminishing demand for graduate students and postdocs;
- Lessen coupling between research and training: Effective training requires a research environment but effective research does not require a training environment.

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