

Finding one's place in physics

I read with great interest Steven Weinberg's inspirational sermon "To the Postdocs," which appeared in the March 2007 issue of *PHYSICS TODAY* (page 58). Weinberg is an honored Nobel Prize winner and a well-known elder statesman of physics. His main message was that each generation envies the previous one because, in hindsight, the actual physics problems to be solved by earlier generations seem less challenging than those of today. Weinberg provides badly needed perspective in correcting that view; he notes that the physics problems facing each generation are equally challenging and that the present postdoctoral cohort should therefore not envy Weinberg's cohort.

But if Weinberg wants to help the younger generation, he is barking up the wrong tree. The most serious challenge facing today's doctoral graduate is not the daunting nature of physics problems, all of which will eventually be solved. Rather, it is the poor prospects for advancement in the scientific world.

Today's postdocs have every reason to be envious of Weinberg's generation. That earlier crop were virtually guaranteed faculty positions, usually achieved tenure within five years after graduation, and suffered far less competition for research grants. All of that is indisputable.

Now let's continue to be frank and admit that early advancement for Weinberg's generation had little to do with the ability to solve physics problems; those new junior faculty members had

simply studied the right subjects in the right places at the right time and were hired. The milieu of yesteryear contrasts starkly with today's situation, with one notable exception: Early advancement still has little to do with intellect. Anecdotal reports, the only type available, suggest that those who advance the fastest today are those who studied the right field of physics in the right university under the right supervisor at the right time (or those who simply committed fraud to enhance publication). Consider, for example, the professorship prospects of a candidate who holds an in-demand doctorate in bioinformatics from a famous Ivy League school, compared with those of a candidate who holds one of many, many redundant doctorates in particle physics from a huge state university.

Although hard numbers are few, they imply an appalling situation. For example, the same issue of *PHYSICS TODAY* (March 2007, page 34) reports that fully two-thirds of recent physics doctoral graduates become postdocs. That is hardly the kind of news to trumpet to the heavens, as it undoubtedly reflects an inability to land faculty positions. Meanwhile, the surge of new PhDs continues unabated, and journals call for yet higher undergraduate enrollment.

All those factors are part of the perpetual illusion of personnel shortfalls that leads to what Donald Kennedy, former editor-in-chief of *Science*, and his coauthors called "supply without demand."¹ Hence, ultimately, Weinberg's well-phrased advice is irrelevant. Contrary to what he asserts, many in the current crop of postdocs are at the end of their research careers, not at the beginning. Of course, the world is always a hopeful place when viewed through rose-colored glasses.

Reference

1. D. Kennedy, J. Austin, K. Urquhart, C. Taylor, *Science* 303, 1105 (2004).

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After Isaac Newton announced the law of universal gravitation, John Milton expressed the idea, which Steven

Weinberg describes in his Opinion piece, as "so easy it seemed / Once found, which yet unfound most would have thought / Impossible!"

Unlike physicists of the late 1800s, who thought that all that was left was measuring the constants to another significant figure, we still have much "impossible" to be done.

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Weinberg replies: I am grateful to Lance Nizami and Elroy LaCasce for their comments. My essay and the talk on which it was based dealt only with the problems confronting young theorists today and in the past in doing their research, but perhaps I should add a few words on the problems that physicists face and have faced in seeking an academic career.

It never has been easy. In the 1950s, as now, physics doctoral graduates generally started as postdocs, hoping to move on to a tenure-track position at a good university. Only one assistant professorship was opening up in the physics department at Columbia University when I was a postdoc there. I didn't get it, and went off to the Berkeley Radiation Laboratory for a second postdoc job. It was no injustice that Columbia chose my friend, the late Gary Feinberg, rather than me; at that time, he had done more important research.

In my experience, now as in the past, young theorists who write interesting papers on important subjects generally do wind up with good academic jobs. Graduate work in a first-rate physics department certainly helps one to get started in research, but the important thing is the research you do, not the university that grants your PhD. Physics departments do unfortunately produce many doctoral graduates who will not find success in their research, but this is because we have no way to tell in advance who can do good work after they leave graduate school. The process may seem callous, but how can we tell a young physicist not to try?

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