

New Einsteins need positive environment, independent spirit

After reading the letters about Lee Smolin's "Why No 'New Einstein'?" (PHYSICS TODAY, June 2005, page 56; January 2006, page 13), I could not help but relive my undergraduate and graduate experiences at Columbia University from 1968 to 1978. As one of the few black and Hispanic people with a PhD in theoretical physics from that institution, I hope my observations expand the argument about creativity and the perception of it, particularly regarding minorities and how they are perceived by others.

Many academic institutions judge a student's ability solely on the course-work performance. At Columbia, if you were not straight-A material, you were nothing—a candidate for experimental physics, if you were lucky. This expectation of academic perfection sidestepped the fact that one could be both an adequate student and a superb researcher. The nurturing of creative intellects is not based on just acquiring knowledge but also on knowing how to ask questions, being mindful of assumptions, and being flexible to alternative possibilities.

Mentoring—nurturing the young mind, channeling it in a manner most conducive to its natural evolution—establishes a much-needed personal connection and interest between the mentor and mentee. There is no greater inspiration than to see how research really gets done, how scientists think and make discoveries. It is important to appreciate that a published paper in no way represents how the knowledge required to write it was obtained, including all the alluring false paths followed in the pursuit. Mentoring, though, is at the mercy of academic and cultural prejudices.

Letters and opinions are encouraged and should be sent to Letters, PHYSICS TODAY, American Center for Physics, One Physics Ellipse, College Park, MD 20740-3842 or by e-mail to ptletter@aip.org (using your surname as "Subject"). Please include your affiliation, mailing address, and daytime phone number. We reserve the right to edit submissions.

Both undergraduate and graduate schools were nightmares for me. I could not understand why some of my peers experienced no problems in being channeled toward the "better" theoretical physics faculty, even though I could not find any convincing intellectual superiority in them. What was the faculty's excuse? Was I perceived as an independent thinker, not a proper fit with their particular research methodology? If so, that perception demonstrates a serious intolerance for creativity.

On one occasion, after working out some results on singular Lagrangians and seeking faculty assistance in getting the work published, I was told, "You will have to do everything yourself." On another occasion, after falling in love with string theory and wanting to pursue it as a thesis topic, I was told that no one at Columbia was working on strings. Imagine my sense of betrayal when, six months later, one faculty member published a paper on strings.

Eventually, I was given a thesis problem of my liking, and I convinced one of my advisers that my approach to it was better than the one laid out for me. Overnight, I went from being an intellectual pariah to a "newly discovered" talent. My professors' sudden interest in me in those last few months would have served me much better had it been demonstrated many years earlier.

Creativity and success in physics demand that one develop the professional social skills to learn not just from papers but from other human beings. Successful intelligent people pick their problems carefully and are unrelenting in finding answers. These characteristics are best developed through human interactions and intervention.

I know that many white students experienced similar problems. They did not deserve the intellectual hazing any more than I did. If academia is seriously interested in fostering more Einsteins, then we should start with Humanity 101 and treat everyone with the understanding that any human mind is a terrible thing to waste.

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Lee Smolin's piece "Why No 'New Einstein'?" certainly raised a variety of reactions. I agree with Smolin that scientific progress in physics is hindered by current US hiring and funding practices. A number of the letters published in the January 2006 issue rallied around this idea. However, I was surprised that no one mentioned how those practices become a cycle that squelches creative scientific ideas not only of faculty but also of graduate students.

Many promising physics graduate students I knew were shut out of following their dreams of PhDs in physics, even though they were creative and intelligent problem solvers. Most are no longer working in physics. Could one of those students have been another Einstein? We'll never know.

I have read numerous articles in PHYSICS TODAY about the woes of low undergraduate and graduate enrollment in physics. As Smolin says, the situation is created by physics faculty and by the culture that has developed in physics departments.

The letter from Peter Thejll nearly hit the problem on the head, I believe. He wrote that physics PhD students in Denmark "are generally treated like employees." If you read the obituaries in PHYSICS TODAY, you will notice that many of the older physicists earned their PhDs less than 5 years after their bachelor's degrees. But today's PhD candidates aren't nearly that lucky. They are looking at a sentence of 7 to 10 years as physics graduate students. They are a source of cheap labor, and they need to remain in their advisers' and departments' good graces so they can complete their long-sought-after PhDs. Even if these students are retained, how much creativity has been crushed out of them as they have learned how to play the game of survival in academia? And if they become faculty members, do they perpetuate the cycle for their own survival?

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The article "Why No 'New Einstein'?" and the ensuing letters perhaps raise a