Prof, students not demoralized

I am writing to correct a statement attributed to me in a news story in PHYSICS TODAY (January 2010, page 18). I would never have said that I and my students "no longer feel 'demoralized.'" This is wrong on two counts. First, I have always sheltered my students from worrying about grant funding, so they would never have known to feel demoralized. I take pride in the knowledge that for more than two decades I have been able to provide ample funding for my group members so that they can concentrate on learning and research rather than worrying about raising money. Second, what I actually said was that the physical sciences and engineering communities no longer feel demoralized. I personally have not felt demoralized, but I know plenty of scientists who have, and I was attempting to speak on their behalf.

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Teaching teachers and reaching students

Having spent two years of my physics graduate study as an instructor for Columbia University's Science Honors Program, I share Daniel Kleppner's enthusiasm for programs that give undergraduate and graduate students of the physical sciences the opportunity to teach in an engaging and creative manner (PHYSICS TODAY, October 2009, page 8). It was both a fortifying experience and tremendous fun to share with high-school students my takes on special relativity, quantum mechanics, and biophysics. However, neither the Science Honors Program nor Teaching Opportunities in Physical Science (TOPS), the MIT program discussed by Kleppner, is fostering science instruction where the nation needs it most.

Last year and this final year of my graduate study, as part of a Columbia Fellowship (LEEFS; http://leefs.ei.columbia.edu) under NSF's Graduate STEM Fellows in K–12 Education program (GK–12) at Columbia, I have had the opportunity to work with a seventh-grade math teacher at a Title I (economically disadvantaged) public school in Brooklyn, New York. Once a week we develop a lesson that presents a current microbiology research topic in the language of the seventh-grade math curriculum. This experience has proved far more challenging than my experience with the Science Honors Program; it has also proved crucial. High-school students attracted to Columbia's or MIT's elite science enrichment programs are already on their way to success, whereas many economically disadvantaged public-school students are convinced early on that college, let alone a career in the sciences, is not an option for them. Furthermore, teaching students in their own classrooms rather than on college campuses or in museums is a critically important experience for undergraduate or graduate students who are seriously considering a teaching career.

Science education in the US faces a crisis that goes beyond the lack of qualified high-school physics teachers. Although I and my co-fellows would agree that the solution is far from clear, I am convinced that NSF's GK–12 and similar programs are a step in the right direction.

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Kleppner replies: I greatly admire Andrew Mugler's efforts to foster science instruction in disadvantaged public schools, surely one of the toughest challenges a science teacher can face. However, he slightly misconstrues the goal of TOPS. Its primary goal is to encourage undergraduate physics majors to pursue careers in pre-college teaching. Teaching teachers to teach requires students to be taught, and to provide those we organized the TOPS high-school physics workshop. Although the workshop provides an enriching experience for its high-school participants, its rationale is to provide an enriching teaching experience for our TOPS undergraduates.

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Correction

July 2009, page 49 — Equation 5, the normal distribution function, should be written as

$$f(x,n) = \frac{1}{\sqrt{2\pi n\sigma^2}}\, e^{-(x-n\mu)^2/2n\sigma^2}.$$

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