

"The Entangled Dance of Physics." Until then, I had considered myself to be a failed physicist.

I graduated with a bachelor's degree in physics in 1978. Through the middle of my sophomore year, my education was an uphill struggle. Then that summer it was as if a switch had been thrown and suddenly it all became clear. For the rest of my time in college, I was like a kid with unlimited funds in the candy store of physics. The sheer elegance of the science was breathtaking.

I had intended to go on to get a doctorate. I was not brilliant, but I was competent and did extremely well on the Graduate Record Exams. However, one day fate sent to the campus a US Navy recruiter who insisted on paying for my drinks at the campus pub. One thing led to another and I became a naval officer in submarines for the next six years. After that, a family, children, and the need for a steady job led me to a commercial nuclear power plant not too far from New York City, where I have been ever since.

I have done many things in nuclear power, and for the past few years I've been an instructor, teaching those who manipulate the controls how and why the plants work as they do. A necessary and important job, but not the one I trained for so long ago. I have regretted that diversion from physics for nearly 30 years. Benka's article, though, made me reexamine things in a different light. I am in fact still a physicist, but simply in another application. For just an instant as I read the article, I was once more a kid in the candy store, surrounded by the elegance and breathtaking beauty of physics. Thank you for that moment.

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At the beginning of "The Entangled Dance of Physics," Steve Benka mentions the media coverage that breakthroughs in physics receive and then goes on to say that physics "is grossly undervalued." I could not agree more.

After obtaining a degree in physics, I began a balancing act of pursuing a PhD in geology and working part-time at a geophysical consulting company. This combination seemed natural to me, since my thesis had involved signal processing for ground-penetrating radar and validating techniques borrowed from a related discipline, seismic prospecting.

Even though I originally thought these were the best options for someone with my background, I soon began to

think otherwise. Every time I was introduced, my name was followed by a proud "He's a physicist, you know." Then the person introducing me would always go on to say that "nevertheless," I had a background in geophysics.

In industry, being a physicist seemed to convey an image of someone with a deep understanding of grand unified theories (to which I make no claim) but with almost no practical experience. At one time, a coworker suggested to me that it would be easier for me to secure a position if I introduced myself as a geophysicist.

Within academia, I have never felt displaced for being "simply" a physicist. I have been invited to, and even received grants from, societies covering areas from granular materials to biophysics and geology.

I must disagree with Benka on one point: I believe research scientists tend to be more open-minded than people working in industry. Unfortunately, I think a few isolationists in academia are the ones who have been the source of the misperception.

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The important and interesting questions Steve Benka asks can be addressed to different audiences. We teach a university course for nonscience students, even physics-fearful students, exclusively from material in the daily newspapers, so we explicitly demonstrate that physics is all around us. The course is very successful, making physics interesting and even fun, and often results in discussions that combine several areas of physics, technology, politics, and money.

Recent discussions in the 25-student class have covered polonium-210, including nuclear physics, alpha decay, dose, half-life, isotopes, and some history of the Curie family; archaeology with neutrons and x rays; fission of uranium-235 and plutonium-239 in regard to the North Korean nuclear test blast; and the 2006 Nobel Prize in Physics, which involved NASA's *Cosmic Background Explorer* satellite, blackbody radiation, quantum history, and microwaves. We discussed women in physics, such as Lise Meitner, Emma Noether, and Gail Hanson; shock therapy, including the Nernst potential and electrical pulses; and waves on strings and standing waves in pianos in Mozart's time. All these topics were gleaned from local newspapers and the *New York Times*.

A further benefit to teaching from the headlines is that students can see a physicist think out loud about physics, tell stories, brush away a small effect, approximate wildly to get a simple result, and generally behave the way a physicist behaves. Halfway through the semester, the students seek out and interview a person in the physics department and write up the interview as a newspaper article, a particularly easy form of publication. A couple of weeks later, the class goes to Fermilab to interview a physicist, engineer, or student. As a result of the exercises, these first-year students develop a deep sense of ownership in actually talking to a physicist and writing up an interview on his or her life and work. The course is taught in combination with first-year English composition and therefore involves many writing assignments, including a physics journal and an opinion piece. In the writing workshops and on the overnight trip to Fermilab, the students get to know each other well. A pleasant result is that they perform better when their peers are also friends, and they find, almost without exception, that physics is interesting and accessible.

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Benka replies: Jeffrey Marke, Charles Hayes, and José Flores have graciously shared their stories, for which I thank them. It is healthy for more physicists working in the private sector to do likewise, especially with students and faculty at their local institutions of higher learning. The latest statistics available from the American Institute of Physics (<http://www.aip.org/statistics>) indicate that US physics and astronomy departments currently have about 9000 full-time-equivalent faculty, 14 000 graduate students, and 2000 postdocs. We can do the math: Five years from now, most of those faculty will still be where they are today, while most of the students and postdocs will need to find rewarding positions elsewhere. With a cadre of industrial-strength physicists guiding the way into the private sector, a new world of job options will open up.

If I read Joost Mertens's letter correctly, he seems to draw a sharp separation between physics at universities and "normal" nonacademic physics, with only the latter being concerned with "the objects and materials of the everyday world" while the former