Hidden but not Silent

John Rigden's article in the September 1997 issue of *The Industrial Physicist* (pp. 52-53) performed an important service for the physics community. In it, Rigden coined the term "hidden physicist" and described the concept in a way that resonated with many TIP readers. His article initiated a dialogue on this timely topic and prompted nearly 30 letters from hidden physicists, each of whom made thoughtful comments and raised important issues. Many of us learned a great deal from this exchange of eloquently expressed ideas, and an analysis of those letters has identified some interesting themes in the discussion, and a striking omission.

Many physicists pursue a traditional research career that involves adding to their knowledge base, typically in a university setting. However, as Rigden pointedly reminded us, "traditional" is not synonymous with the "norm." Tens of thousands of physicists do productive and intellectually challenging work in industry and throughout the economy, yet their expertise typically is kept hidden behind a variety of title aliases.

Job titles and job descriptions reflect what people do, their level of responsibility, and their years of experience. The private sector hides most physicists behind job titles such as engineer (usually with an adjective such as design, process, mechanical, or aerospace), technical staff member, and any number of scientist titles.

Readers responding to Rigden's article attested to the rich diversity of the careers they have pursued, and the professional challenges and intellectual stimulation of their work. Most, but not all, believed that physics provided a strong foundation on which they built their careers. Several readers noted that as their careers evolved, they have held many different positions. Indeed, although many people change jobs during their working lives, physicists—more than those trained in other disciplines—seem able to change their field of employment more readily in response to either evolving interests or in reaction to exciting new areas that have emerged.

Although people with physics degrees work under a remarkable array of different titles, rarely are they identified as physicists or—perhaps more important—thought of as physicists. Many letter writers were unhappy with their job titles because these titles fail to identify what physicists know or their capabilities. In this vein, a few respondents indicated that they preferred the label scientist, which implied "a higher level of understanding" than the other job titles they had held.

There were, however, a few dissenting opinions. One reader said, "It doesn't hurt my feelings if physicist is not in my job title. Being unemployed is much, much worse." Another reader said, "It's the background that physics education provides that counts, not the title." Finally, another hidden physicist wrote, "Job titles never concern me as long as I know who I am."

Are they different?

What is it that physicists do that distinguishes them from people trained in other disciplines?

Almost all letter writers agreed with one of Rigden's basic points: physicists think differently from those trained in other fields. Many of the letters indicated that physicists possess a "knowledge of basic physics principles," have highly developed "problem-solving skills," the "ability to synthesize concepts from seemingly disparate pieces of information," and can "pick up on things faster" in today's volatile work environment. As one hidden physicist wrote, "Even though I work in a field other than that traditionally defined as physics, I use my physics training every day." Their combination of skills and knowledge allows physicists to "bring new ideas into the workplace" and results in "a more fundamental understanding of the possibilities of solutions."

In describing the value of a physics background, several readers made invidious comparisons, intentionally or unintentionally, between hidden physicists and people trained in other disciplines. In reaction to these comments, one reader wrote, "I can't imagine how anyone could believe that physicists in general are smarter or better trained than engineers (or chemists or whatever)." Along similar lines, another hidden physicist noted that the essential point is "not whether physicists are better, but that they are different" and that they approach applied challenges differently than do engineers and others. From this perspective, physicists provide an especially important asset in multidisciplinary teams.

Is it real?

Do hidden physicists face real obstacles, or are they simply complaining about too little recognition?

TIP readers were quite clear that hidden physicists face more than the cognitive dissonance of training in one field and being treated like a practitioner of another. Most hidden physicists who wrote to TIP expressed concern about the perception of employers that a physics education does not have high utility in the workplace and, thus, a B.S. in physics can be a handicap to securing one's first job. Consider these three comments: "I was hired in spite of the fact that I had a degree in physics because I had prior electronics experience." "My training in physics was never considered relevant beyond the fact that I had a degree." "I am having a hard time finding an employer who believes that I could be useful."

As a corollary to this issue, employers often believe that their companies' products and services have no discernible physics component. "My boss always assumed that physics wasn't relevant to what I was doing for him," one physicist wrote. And another noted: "Every time I talk with somebody in a company, he/she tells me the company doesn't have anything to do with physics." This attitude becomes an obstacle for both recent degree recipients looking for their first position and experienced individuals attempting to change employers or career fields.

We do need to recognize, however, that some people educated in physics intentionally do not identify themselves as physicists and, for a variety of reasons, do not think of themselves as physicists.

Some TIP readers proposed educating employers and co-workers about the rele-

vance and utility in the workplace of knowing basic physics principles and the problem-solving skills and other attributes commonly possessed by physics-educated workers. As one reader stated, "All of us with physics degrees should promote the discipline throughout industry."

It is essential, however, to sound a cautionary note regarding this recommendation. It seems reasonable to suggest that physicists come out of hiding and identify the value of physics whenever the opportunity arises. But this should be done by noting the important contributions that physicists have made and are capable of making, rather than by proclaiming their superiority. Physicists need to walk a fine line between pride and self-confidence on one side, and arrogance and a condescending attitude on the other. This is a difficult problem, that's true, but fortunately physicists take pride in solving difficult problems.

Another theme sounded was that hidden physicists need to interact and communicate better with their human resources staff, as these people are often the gatekeepers for resumes received by the company. As two readers stated: "The human resources group does not understand the value of a physics degree." "Over the years, I have forgotten how many times I heard personnel officers explain that they only hire engineers."

Several readers suggested solutions that included curriculum change. Applied-physics degree programs that carry the designator of an applied area of specialization (optics, acoustics, instrumentation, computation, or electronics, for example) "would greatly help physicists to get their foot in the door." But at least one academic has stopped fighting, and says: "We have given up trying to sell the B.S. in physics even though everyone here agrees that the training one gets is excellent. We have replaced our traditional physics major with an engineering physics major."

Most physics bachelors go on to earn graduate degrees, and often in other fields. Similarly, about one in five physics bachelors graduates with a double major. One reader stated, "In retrospect, I should have gotten the B.S. in physics, but then immediately enrolled in an engineering program." It would be helpful to explore further the value of physics as the foundation for advanced education across a spectrum of different disciplines as well as a discussion of the pros and cons of acquiring bachelor's degrees in two or more fields.

In attempting to identify the major themes expressed in the letters received by TIP, I noticed one point strikingly—and inexplicably—absent from the discussion. Specifically, none of the physicists discussed whether *they* give special consideration to physics-educated job applicants. This is a curious omission in light of the likelihood that more than 1,000 TIP readers probably participated in the hiring of a bachelors-degree holder into a technical position within the past year.

Here is a recent letter from another reader:

After my Ph.D. in nuclear physics, I was hired by a big German measurement technology company as a "software engineer"—one of the classical positions for hidden physicists in the industry. My broad education in physics served me well in a field dominated by engineers. As many physicists do, I consider measurement technology to be applied physics. Our software products for the industrial world have to solve problems encountered in any large physics experiment. Today, I am head of the instrumentation software department that I created. To unveil the hidden physicist, I have three suggestions:

1. Tell the people that you are a physicist.

2. Hire physicists. If a physicist is able to do the job, promote physicists.

3. Talk about physics and its excitement. During a business trip, while riding the train, I discussed modern physics with my boss, who is an engineer. After some time, we even talked about superstrings and cosmology.

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