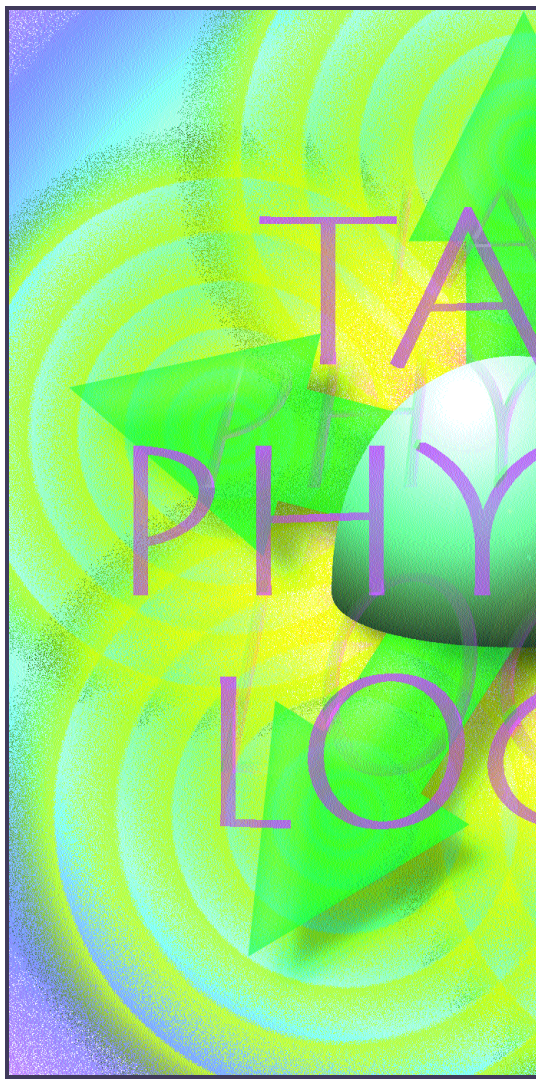
Take Physics Local

At the end of this century, three factors have shifted the paradigm connecting physics to society—the end of the Cold War, the emergence of the life sciences, and global economic competition. Before this shift, physics stood central among the sciences in its political power and budgetary demands, which stemmed from its roles in fighting the Cold War and maintaining U.S. world economic dominance. Now the world is quite different, and the physics community is challenged to find a new niche in society. Industrial physicists are gaining increased recognition from their employers and colleagues for their invaluable contributions to the high-tech economy. They are also stepping up to a new role as the connection between physics and society.

The challenge for the physics community to find a new niche represents a typical round-peg/square-hole problem, whereby physicists, particularly those in academia, cling to old concepts of their profession while the world around them has slowly morphed. No longer can the typical physicist expect to build a career around science performed at the behest of a federal agency in order to meet national needs. Yet, as these round-peg physicists struggle to conform to this new era, there is—and has been for generations—a large cadre of square-peg physicists who survive by evolving with their working environment. Of course, I am referring to industrial physicists.

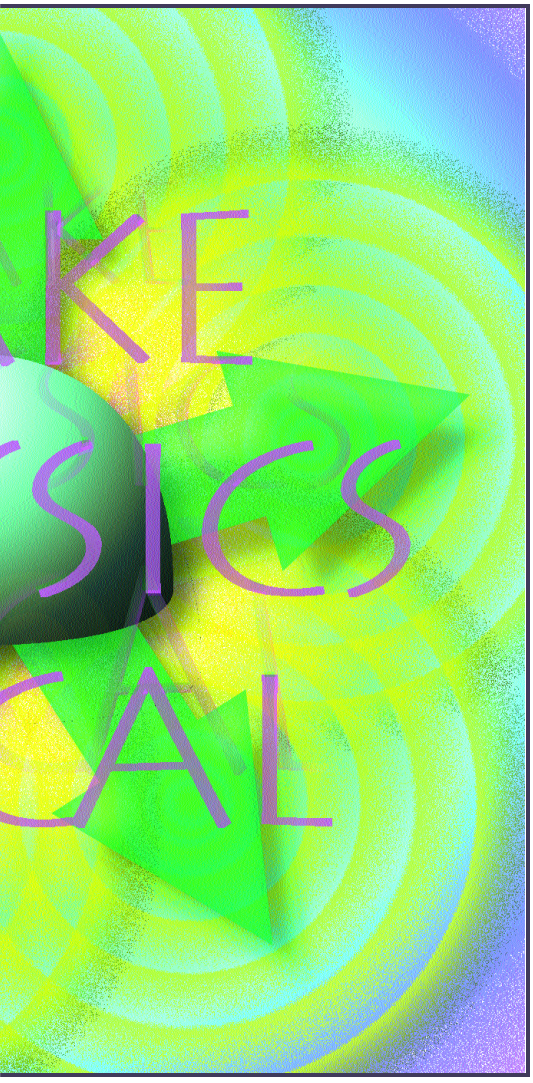
Physicists, as a group, must become sufficiently flexible professionally to keep up with the needs and pace of a changing society. What the physics community needs is a new way of thinking about why physics is important, how students are trained, and where many physicists and physics departments should focus their attention.

One approach to this problem is to consider what, in general, industrial physicists do as professionals. One answer is that industrial physicists apply their problem-solving expertise and physical insight to meet the goals of an organization that produces a product, provides a paycheck, and is an integral part of the local community. As such, industrial physicists concentrate on needs directly related to the health of their companies and, more broadly, to those of the communities in which the companies reside. This role stands in contrast to the physics done via the largess of the federal government, which typically aims at addressing national goals. Industrial physicists, therefore, *take physics local*.



Take Physics Local, a new outreach program of the American Institute of Physics, is a useful concept for thinking about the role of physics in today's society because it focuses the mind closer to home and to natural bases of support for the profession. For physics departments, it offers a new universe of opportunities for faculty and stu-

dents. Indeed, for many departments, Take Physics Local provides a paradigm that can ensure the long-term health of the department. Conversely, for industrial physicists and their employers, Take Physics Local offers an opportunity to connect with physics departments as sources of bright young industrial physicists, R&D expertise, and continuing-education opportunities.


Steve Black

Take Physics Local, as a paradigm for strategic planning by physics departments and for student professional development, rests on five interconnected hallmarks. Understanding these five metrics of achievement and what is meant by "local" are key to grasping the potential of Take Physics Local and its benefits to students, industry, and the physics departments.

The hallmarks

Physics departments that take physics local are characterized by five hallmarks:

1. Professional-development opportunities for faculty and students at all levels.
2. Continuing relations with alumni.
3. Interaction with local industry and/or other community groups.
4. Research serving local needs.
5. A reward structure for faculty that encourages development of the first four hallmarks above.

Central to Take Physics Local is the recognition that departmental success and sustenance come from outreach to people and organizations off-campus. Business and engineering schools have long exploited this strategy. Indeed, the hallmarks of Take Physics Local also characterize most business or engineering schools because these organizations live and die by their relationships with the outside world.

The local environment

The *local* in Take Physics Local does not imply that the paradigm is limited to physics departments in areas with a large industrial base, nor is local limited to a school's immediate vicinity or region. Instead, the local environment of any physics department is defined by two factors: the general area that students come from, and where students go after graduation. Accordingly, the local environments of urban state universities, regional state universities, private liberal arts colleges, and major research universities are all distinct. For example, students in an urban state university typically come from the greater metropolitan area and stay in the area after graduation to enter the workforce. Many are employed while in school. In contrast, students in a research university tend to come from all over the country and scatter upon graduation. Many graduates enter the workforce, but physicists from research universities are more likely to go on to graduate or professional school.

In thinking about local environments,

alumni outreach provides the key to understanding what local means. One can visualize a department's local environment by imagining a bungee cord attached to each alumnus. The area spanned by all those extended bungees gives a rough picture of the physics department's range of contacts and influence. Through continued outreach to those alumni, the department has access to information and opportunities in a variety of industries and environments. So for some schools, local covers a small region; for others, local is essentially national in scale.

The industry connection

In this new era, Take Physics Local is a paradigm for physics department health based on reconnecting physics to the needs of the society it serves, which are different from those of a decade ago. The emphasis on industrial outreach is strong but not singular; any group with scientific or technical challenges can benefit from physics-based problem solving. Nonetheless, in our high-tech economy, the industrial connection ranks as paramount. Furthermore, industry has a role to play in establishing the synergy with physics departments that lies at the heart of Take Physics Local. Industry can benefit from Take Physics Local by influencing student education; helping to increase student preparedness for work in industry; bringing faculty and students in-house to assist with research, innovation, and problem solving; and gaining access to future staff through internships, coops, or externships.

Industry can realize these benefits by initiating new connections or strengthening existing ties with physics departments. Often, the most effective strategy is for a company to make the first contact with a physics department. Although the success of Take Physics Local requires department cooperation, academic physicists often are reluctant to make entree into the world of private industry, which may seem rather foreign to them.

Industry's initiatives toward physics departments can take several forms, including the donation of surplus equipment, which often retains teaching and scientific value even though its industrial lifetime has ended. In addition, industry can add value to this contribution by training faculty and students to use the donated items. Similarly, industry and a physics department can benefit greatly from the interaction growing out of a course or seminar on the physics behind a company's business. Also, creating internships, externships, or coop positions for physicists can prove to be a mutual benefit. This strategy is particularly important because it creates a human and intellectual bond between a physics department and the companies providing the opportunities. Finally, department chairs who are fighting inertia in their efforts to Take Physics Local could use a strong-voiced ally from the outside who can attest to the merits of the chair's initiative and the importance of physics to local industry.

Take Physics Local is designed to reconnect physics to society by simultaneously addressing the professional development needs of physics students and the workforce and technical needs of industry. The needs of these two groups overlap, but the connection will not be made unless physics departments take the initiative to rethink the way they train physics students, and unless they become cognizant of, and act on, the opportunities that exist for physics locally. Physics departments are the catalyst in this model, and although companies could wait for physics departments to respond, industry could benefit greatly and enhance its competitive edge by making the first contact.

Success would be measured by a broad sense of the importance of physics and physicists, not only to the advancement of science, but to economic and societal growth. The goal of Take Physics Local is to shift the paradigm connecting physics to society in robust ways that evolve as society evolves. The role of physics and its benefits to industry cannot be overlooked in achieving this goal. Ω

BIOGRAPHY

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