SCI-FUN, UNIVERSITY OF EDINBURGH

SCIENCE ROAD SHOW: The University of Edinburgh takes science demonstrations to schools around Scotland, aiming both to capture kids' imaginations and to give university students a taste of teaching. Here, flame height corresponds to pressure in a standing sound wave.

graduate education. So says the Institute of Physics (IOP) in a report released last month on undergraduate physics in the UK, *Physics—Building a Flourishing Future.*

The facts are grim: Many UK physics schoolteachers are not trained in physics; undergraduate students lack the math skills they need for physics; and more than 10 university physics departments have folded in the past decade.

All that despite job options for physics graduates in, for example, financial analysis, engineering, environmental science, energy technology, and intellectual property law. Employers told the IOP that they seek physics graduates for their problem-solving skills and their "ability to argue on [their] feet," but that they'd like to see better communicating skills and teamwork.

Because of its findings, the IOP will look into developing teaching materials to help university physics departments catch students up in math, and it's calling for departments to partner with schools to sow seeds of scientific curiosity in the young. Such activities go on already, of course, but the idea is to increase their impact. Says Derek Raine, an astrophysicist at the University of Leicester, "They're the sort of things that happen once everyone sees everyone else is doing it. They're given status by IOP promoting them."

The report also says the government should recognize market forces and pay physics teachers more. The government knows there is a crisis in secondary schools—some have even taken to recruiting teachers from abroad. "They're hearing this for the *n*th time," says IOP President Peter Williams. "We hope to get their attention that, in physics, it's particularly acute."

The IOP vows to push for recognition of the MPhys—a combined bachelor's/master's degree that takes just four years to complete—within the emerging Bologna framework of mutually compatible higher-education systems in Europe (see PHYSICS TODAY, May 2001, page 21).

The number of physics majors has remained flat over the past 15 years, while total university enrollment has skyrocketed. Physics should cast a wider net by offering new interdisciplinary degrees that cross with chemistry, computer sciences, and other fields, the report says. Such degrees could feed the job pipeline, help stop more departments from closing, and attract students who like physics but are weak in math. "Within the context that up to half the population goes into higher education, we should look at physics as part of the general culture, not just as training for professional physicists," says Raine. "We should also question why the gender balance and ethnic mix of physics students is unrepresentative."

By and large, physicists who have read the report say it holds no real surprises. They applaud the idea of creating new degrees, though they wonder where the additional cash and staff to do that will come from. And they are skeptical that the government will cough up enough funding to improve conditions for teachers so that the profession can compete with the more lucrative careers available to physicists. The IOP report calls for a study leading to specific recommendations by next year as to what sorts of new degrees to launch, who should pay for them, and where they should be offered. And, says Williams, the IOP will evaluate the costs involved in rejuvenating the teaching pool. "We can't keep hemorrhaging as far as our secondary schools are concerned. Something must be done."

TONI FEDER

Science Teacher Initiative Launched

In an effort to create more and better-prepared K–12 science teachers from the ranks of college physics and physical science students, a partnership of physics organizations, backed by federal grants totaling more than $6 million, has established the Physics Teacher Education Coalition, or PhysTEC.

"We want to create a new generation of elementary and secondary science teachers," said Fred Stein, one of PhysTEC's principal investigators and the director of education and outreach for the American Physical Society. "We need teachers who know physics and who love it."

The program, developed by APS, the American Institute of Physics (AIP), and the American Association of Physics Teachers (AAPT), received a five-year, $5.76 million grant from NSF in August, and a $498 000 grant in September from the US Department of Education's Fund for the Improvement of Postsecondary Education (FIPSE). Most of the funding will be awarded to six colleges and universities that have agreed to improve their science preparation of future teachers.

The schools are Ball State University in Indiana, Oregon State University, the University of Arizona, Western Michigan University, Xavier University of Louisiana, and the University of Arkansas. One of the goals of PhysTEC, Stein said, is to encourage collaboration between the faculty in the physics and education departments to produce a coherent program.

PhysTEC began as an idea that grew out of a meeting in early 1999 of APS, AIP, and AAPT staff members concerned about education, Stein said. "Their governing boards passed a joint statement urging the physics community to take a more active role in improving the pre-service education of physics and other science teachers." The statement reflected the recommendations in several studies, including recent reports by the National Research Council and the National Commission on Mathematics and Science Teaching for the 21st Century, for programs to better prepare future science teachers.

After the physics organizations issued their joint statement, APS Executive Officer Judy Franz thought, "you can put that on your Web site and just forget about it, or you can do something." She knew a program to improve science teacher

education would have to be a collaborative effort, she said, and getting education and physics faculty members to work together would be critically important. "Physics departments and education departments have traditionally had trouble working together and, as a result, physics courses are not designed for teachers and education courses for science teachers are taken out of context."

Franz was in the process of hiring a new education and outreach director, and Stein was one of the candidates. "He had run a statewide collaborative program on teacher education through Colorado State University, so he had the right kind of experience to develop this program." Franz hired Stein, and a management team including Jack Hehn of AIP and John Layman and Warren Hein of AAPT was formed.

PhysTEC's goal, Stein said, is to create "better-prepared science teachers who are committed to student-centered, inquiry-based, hands-on approaches to teaching from the moment they hit the classroom. Teachers tend to teach the way they were taught, and we need to break that cycle and create a new model."

"Our vision is that, as a result of this program, all students will choose to take at least one physics course before they graduate from high school," Stein said.

JIM DAWSON

NEWS NOTES

Software pro leads Bell Labs. The appointment of Jeffrey Jaffe to replace William Brinkman as Bell Labs research vice president is in line with the redefinition of parent company Lucent Technologies. In the wake of recent financial losses, Lucent is narrowing its focus to Internet infrastructure and wireless technology. (See PHYSICS TODAY, October 2001, page 26.)

Jaffe took the reins on 1 October. His specialty is developing software and bringing it to market. Before joining Lucent in 2000, where he has been involved in commercializing new technologies, Jaffe worked at IBM for 16 years. He has also advised the US government on Internet issues, including serving in 1997 on an advisory committee to President Bill Clinton's Commission for Critical Infrastructure Protection.

LUCENT TECHNOLOGIES

JAFFE

Brinkman had been at Bell Labs since 1966, except for a three-year stint at Sandia National Laboratories in Albuquerque, New Mexico. He will continue to serve as an adviser to Bell Labs, and in January he begins a term as president of the American Physical Society.

UK research council chiefs. John O'Reilly is the new head of the Engineering and Physical Sciences Research Council, which, with an annual budget of £467 million ($677 million), is the largest of seven UK research funding agencies. Before moving to the EPSRC, O'Reilly headed the department of electronics and electrical engineering at University College, London. He began his four-year term last month, succeeding Richard Brook, who is now director of the Leverhulme Trust, a private foundation that funds research using income largely from its shares in Unilever PLC.

EPSRC

O'REILLY

BBSRC

GOODFELLOW

The Biotechnology and Biological Sciences Research Council, which funds some multidisciplinary research involving UK physicists, is also getting a new chief executive officer. In January, Julia Goodfellow, currently head of the University of London's school of crystallography at Birkbeck College, will become the first woman to hold the job. She will replace Ray Baker. The BBSRC has an annual budget of £250 million.

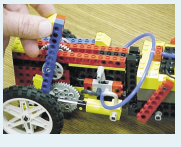
Researchers innovate in education. Physicists appear to be taking a leading role in improving science education: They won three of seven NSF Director's Awards for Distinguished Teaching Scholars. The new awards recognize contributions in research and teaching, and each comes with $300 000 over four years for awardees to pursue activities aimed at promoting science and engineering education for both majors and nonmajors.

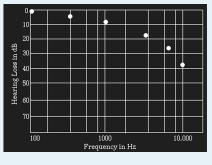
Eric Mazur, a condensed matter physicist at Harvard University, will use his award to expand materials for his popular peer-instruction method. Eugene Stanley of Boston University, known for his research on complex systems, will explore means to bring forefront research into introductory science courses. Carl Wieman, an atomic physicist at the University of Colorado at Boulder and one of this year's Nobel Prize winners, aims to

Web Watch

http://www.physics.fsu.edu/~users/rikvold/info/legostuff.html

Per Arne Rikvold is a theorist who studies materials and condensed matter at Florida State University. "Just for fun," as he puts it, he has developed **Some Physics Projects with LEGO**. The projects, which he describes on his Web page, involve using LEGO® pieces to build steam-powered cars and robots.



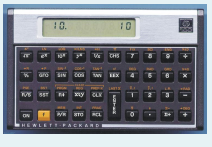


http://www.neurophys.wisc.edu/animations

The department of neurophysiology at the University of Wisconsin–Madison has produced a set of audio files that demonstrate what it's like to hear the world (actually, Garrison Keillor) with damaged cochleas. The files are available on a Web page that also offers **Animations of Processes within the Ear.**

http://www.hpmuseum.org

David Hicks's fascination for Hewlett-Packard calculators began in 1972 when he was 13 years old. It has continued ever since. In 1995, he began building **The Museum of HP Calculators**, a Web site that describes HP calculators in exhaustive, loving detail.



To suggest topics or sites for Web Watch, please e-mail us at ptwww@aip.org.

Compiled by **CHARLES DAY**