

doesn't occur to them that they were hired to make money for the company." One way to get students thinking about the bottom line is through internships, an important component of the professional master's curriculum. Students at Arizona, for example, could be placed with a company in Tucson's burgeoning optics industry, and Shupe expects many graduates to end up at the same companies where they intern.

MSU's professional master's is designed for "people who aren't interested in spending their lives doing basic research but who want to do a bit more physics and are impatient to get into the industrial world at a high level," says Phillip Duxbury, who is overseeing the new physics degree. The curriculum offers two concentrations: One introduces the characterization and fabrication techniques used in commercial R&D labs, and the other focuses on computation. In addition, students will take a ten-weekend workshop on business fundamentals, such as accounting and patent law.

The idea behind the Wisconsin program is to familiarize students with remote sensing technology, and then show them how to apply those techniques to environmental problems in transportation, land use, and other areas, explains Olsen. Many places are seeking that kind of expertise, from satellite manufacturers, to developers of image processing software, to utility companies, he adds. In fact, two companies have already expressed an interest in hiring graduates, although the first class won't enroll until this fall.

At USC, a pair of courses, in complex systems and computational methods in physics, have been specifically developed for the new master's curriculum, which also includes course work in the business school. Bozler says that in designing the new degree, "We asked [employers], 'Well, why do you hire physicists?' The answer was their ability to organize disparate information and develop models of all sorts, and to do something that's predictive with those models." Bozler hopes that a few of the professional master's students will go on to the PhD. "The biggest concern [among faculty] was that we not do anything to jeopardize our PhD program," by siphoning off students or resources, Bozler says. "I think we were able to convince them that it's not a zero-sum game, that this could actually increase the flow of good students through the department."

Hopes and hurdles

Recruiting students to the new, untested programs may take some doing. The drastic drop-off in physics bachelor's degree recipients in recent years

APS Time Line Celebrates a Century of Physics

High schools around the country—8000 and counting—have received this time line, a wall chart entitled *A Century of Physics*. Unveiled at the American Physical Society's 100th birthday meeting in Atlanta this past March, the time line highlights physicists and their discoveries over the past century, as well as some of the applications spawned by scientific advances.

Five color-coded themes thread across the time line's eleven panels: discoveries in physics at the cosmic (blue), human (pink), and atomic (green) scales; technological advances (red); and interfaces of physics with biology and medicine (yellow).



AMOS CHAN

Peppered throughout the time line are historical nuggets. For example, the time line notes that around when quarks and cosmic background radiation were discovered, the Vietnam War was "tearing at the fabric of America" and the Beatles "were conquering the world."

APS teamed up with Lucent Technologies, the Department of Energy, the National Science Foundation, and United Parcel Service to offer every US high school a gift of the time line, along with a teacher's guide (paid for by the Richard Lounsbery Foundation). The team has also sent free copies to all of the nation's universities, two- and four-year colleges, and science museums. A Web version (supported in part by IBM), which APS plans to continue to expand and update, can be found at <http://www.timeline.aps.org>. And copies of the time line can be ordered for \$35 each (\$80 for overseas delivery) on the Web at <http://www.aps.org/timeline/main-order.html>.

means there is already fierce competition for students among the existing graduate programs. "They're trying to snap up every undergrad they can," notes Bozler. "They're thinking in terms of staffing their own PhD programs, and not thinking too much about alternatives." The new programs are therefore looking to draw students from other disciplines, "who may not have thought of applied physics as a career," says Arizona's Shupe.

It's also not clear who will pay for tuition. Law and business schools expect their students to shoulder the cost of their educations, but will science students, who traditionally enjoy full support, do the same? At USC, Michigan State, and Arizona, the first few classes will be offered teaching assistantships, until some other kind of support—corporate-funded grants, for instance—can be worked out. The Wisconsin program plans to recruit mid-career professionals, who may be in a better position to pay, or whose employers may foot the bill.

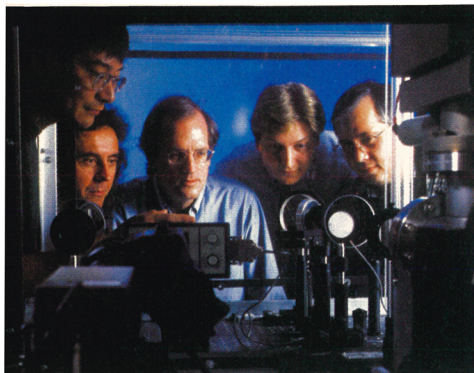
As Duxbury sees it, the professional master's will ultimately be judged by "what kind of jobs the students get and how quickly they move up, how happy they are with those jobs, and how happy their employers are with them." In the longer term, Tobias hopes that "by supplying industry with such versatile people, they'll say, 'We want more people like that.' It's the reverse of the usual demand-supply equation. That's my theory at least, and only time will tell."

JEAN KUMAGAI

Duke Laser Lab Gets New Director

On 1 May, Glenn Edwards became head of Duke University's Free Electron Laser Laboratory. Edwards's most immediate goal "is to get light out of the pipe again," he says, referring to the lab's infrared free electron laser, which has been down for about a year.

The lab was founded in 1988 by John Madey, the inventor of the free



GLENN EDWARDS (center) joins colleagues at the Duke University Free Electron Laser Laboratory.

electron laser. Madey's tenure at Duke proved rocky, with squabbles over lab management and planning, and he was eventually removed as director. He left in late 1997, and is now setting up a free electron laser facility at the University of Hawaii at Manoa. Meanwhile, lawsuits filed against Duke and some individuals regarding patent infringement, age discrimination, and

equipment ownership, among other things, are still pending. Robert Guenther served as the Duke lab's interim director until Edwards came on board.

Edwards holds a bachelor's degree in mathematics and a PhD in physics from the University of Maryland. He moved to Duke from Vanderbilt University, where he had been director of the Free Electron Laser Center. His research is on the vibrational dynamics of biological macromolecules.

The Duke lab has, in addition to the infrared free electron laser (tunable in the range 2–8 μm), one of the world's few ultraviolet free electron lasers (200–700 nm). The UV laser is scheduled to be upgraded later this year with a magnetic undulator designed to produce tunable, coherent, circularly polarized extreme-UV radiation. And this past March, a new facility was opened for experiments in the lab's key research areas: biomedicine, biology, chemistry, surface physics, and nuclear physics (which will use tunable gamma rays produced by Compton backscattering with the UV free electron laser).

TONI FEDER

A Physicist Writes Mysteries about a Physicist Who Solves Mysteries

A good physicist is a lot like a clever detective. And nowhere more so than in the work of physicist-writer Camille Minichino, whose "periodic table" series of mystery novels features a physicist-sleuth and plots rich with scientific intrigue.

The series' down-to-earth heroine is Gloria Lamerino, a recently retired researcher who moves back to her hometown of Revere, Massachusetts, and soon finds herself helping the local police department with murder investigations that involve science. And you'd be surprised how often her services are required. Each new case centers around an element in the periodic table. In the series' third volume, *The Lithium Murder*, released last month by William Morrow, Lamerino is called in after a janitor at a nearby university laboratory is found slain, and questions arise about the lab's secretive lithium battery project. It's giving nothing away to say that Lamerino eventually cracks the case, making full use of her scientist's curiosity and know-how and basic common sense.

As it happens, Minichino shares many of her character's interests and



MINICHINO

attributes: Both are PhD physicists who specialized in crystal spectroscopy, both grew up in Revere and cherish their Italian-American roots, both wear funky jewelry and refuse to dye their graying hair. "My friends think we're identical, but there is an important difference," Minichino notes. "Whereas Gloria has dedicated herself to research, with few friends and hobbies, I haven't done my life that way. In writing that character, I got to fulfill my other dream, to be a physics researcher and make a contribution through physics alone."

Minichino earned her doctorate from Fordham University in 1968 and then taught at Boston's Emmanuel College. In 1975, she moved to Lawrence Livermore National Laboratory, where she initially did high-temperature, high-pressure measurements of tungsten, tantalum, and other metals, and later worked on safeguards studies for nuclear power plants. These days, Minichino writes and edits technical reports for the lab, runs a science literacy class for nontechnical staff members, and also teaches physics, history and philosophy of science, and fiction writing at nearby colleges.

What drew Minichino to mystery writing was her long-standing interest in making science accessible to the public. "That's always in the back of my mind, no matter what I'm doing," she says. "I think everyone should know basic science, and so I've aimed my books at a broad audience." Sprinkled throughout her novels are anecdotes about important scientists and readable explanations of superconductivity, toxic waste disposal, and how research is funded and commercialized. "I love it when readers tell me that they learned some science and it was fun," Minichino says.

As much as possible, she draws from real life. The series' second volume, for example, pivots around the controversial sale of the federal government's helium reserve; there's even a quote from the American Physical Society's 1995 statement on the matter: "Some people think that science isn't political, but it is. I want people to understand that science is a human endeavor—it's part of our culture and our history."

She also aims to portray scientists realistically. "This idea that scientists are set apart as almost a separate species is just wrong," Minichino says. Although they all exhibit a certain braininess and occasionally sport lab coats, her scientists display a refreshingly human range of qualities, including arrogance, ambition, charm, lechery, and deceit. Gloria Lamerino may be an avid reader of *PHYSICS TODAY*, but she's also a lover of classical music and cannoli.

With *The Beryllium Murder* due out next spring, Minichino is at work on the next in the series. The closed system of the mystery novel is ideal for applying one's problem solving skills, she notes. "It's a little corner of the universe that's very neat. Everything wraps up at the end, unlike real life and real physics." JEAN KUMAGAI

Tenure Is As Tenure Does

Getting tenure isn't as great as one might expect, and not getting it isn't as grim as one might fear, according to a report published last fall in the *Journal of Personality and Social Psychology*.

To investigate how well people predict their own emotional responses, Harvard University psychologist Daniel Gilbert and colleagues used the tenure decision and other events such as getting news of a child's death or being turned down for a coveted job.

On the tenure issue, the researchers canvassed all faculty members in the arts and sciences (except psychology)