though he says, "I thought he was getting better." In Takahashi's view, Eisenberger "likes to handle [global] problems ... not as a scientist but as a politician."

Ironically, Columbia provost Jonathan Cole expressed confidence in Eisenberger's leadership in a letter to staff last December, saying that despite "bumps ... in the road," the institute was "making excellent progress." Some colleagues agree. Eisenberger "did an excellent, courageous job under difficult circumstances," says Columbia mathematician and economist Graciela Chichilnisky.

Eisenberger did not return repeated calls from *Science*. But in his resignation statement last month, he cited "differences on matters of principle and how best to proceed with the growth of the Institute, and more recently my personal health."

Crow's most pressing task will be to bring some equanimity to the institute. Crow could not be reached for comment, but Takahashi says one big issue is whether the Earth Institute and LDEO directorships, both of which were held by Eisenberger, should be offered to two people instead.

"The Earth Institute is a great idea," says Broecker. "It's just got to be done in the right way." Few would disagree—especially if somebody can figure out just what the right way is. **–CONSTANCE HOLDEN**

JAPAN

New Career Path Seen For Young Scientists

Four years ago, Japan set out a 5-year plan to create 10,000 postdoctorate positions to provide more opportunities for younger researchers. The government will meet its goal this year, ahead of schedule. That success, however, leads to the next challenge: how to find jobs for these scientists at a time when public payrolls are being reduced. The answer, according to a government advisory committee, is to loosen up the research tenure system, which traditionally bestows lifetime appointments, by offering fixed-term positions to both "superpostdocs" and more established researchers. In exchange for giving up job security, the researchers would receive greater freedom to explore their ideas. "It would be a new career path for researchers in Japan," says Ken-ichi Arai, director of the University of Tokyo's Institute of Medical Science and a member of the committee, which last week submitted its report to the Science and Technology Agency.

Young scientists typically begin their careers as lecturers or researchers, advance to associate professors or group leaders, and eventually become professors or heads of research departments. Although they have a job for life, they achieve full independence only after reaching the top of the administrative ladder. The committee's recommendations envision an alternative starting point with much more autonomy: superpostdocs for younger researchers who have finished one postdoctorate position and are ready to work on their own.

The committee—which was asked to reconcile the need for more research positions with growing political pressure to help close a budget deficit by reducing the number of public employees—says such flexibility also should extend up the career ladder. It is recommending that fixed-term independent researcher positions be created for senior people capable of directing a team. The committee hopes that these positions, filled through an open competition, will appeal to scientists who want to switch from a traditional career track. The trade-off for this impermanence, says Yuji Kamiya, a plant scientist at the Institute of Physical and Chemical Research (RIKEN) and a member of the committee, would be "more money and more freedom." Those who have completed a superpostdoc or a term as an independent researcher would be free to seek tenured positions at national universities or laboratories.

One model for such an arrangement exists at RIKEN, whose status as an independent research entity gives it greater flexibility than national institutes in personnel matters. Hitoshi Okamoto, a developmental biologist working with zebrafish, gave up a tenured position at the private Keio University for a position at RIKEN's Brain Science Institute. Okamoto says the level of financial support made it "a great chance." And he is confident that his productivity will win him a renewal of his current 5-year term. "I think a lot of Japanese young people would be willing to apply for those positions," he says.

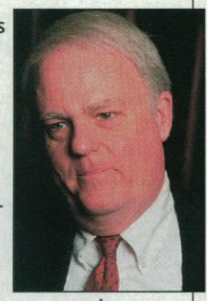
Miho Ohsugi, a postdoc in

CREDITS: (TOP TO BOTTOM) SAM KITTNER; D. NORMILE

Super idea? Miho Ohsugi says she likes the flexibility of a "superpostdoc" slot with a fixed term.

ScienceScope

Neutron Bomb The $1.3 billion Spallation Neutron Source (SNS) is facing fresh troubles in Congress. Last week, Representative James Sensenbrenner (R–WI) (below), chair of the House Science Committee, recommended wiping out next year's $214 million allotment for the high-profile Department of Energy (DOE) project, which aims to create powerful neutron pulses for studying atomic structure and the physics of materials. The recommendation follows several critical reviews of SNS management, including Sensenbrenner's own fact-finding mission last month to the Oak Ridge National Laboratory in Tennessee, where DOE hopes to build the project by 2005.



Sensenbrenner had a few kind words, giving Energy officials high marks for hiring physicist David Moncton last month to oversee the project (*Science*, 5 March, p. 1425). And if Congress were to hold up next year's funding, the legislator says, money could be restored after DOE produces a solid cost estimate and revised timetable. It could be months, however, before Congress decides whether SNS's ailments deserve Sensenbrenner's harsh prescription.

Fruit Fly Nanny Got some extra lab space and the desire to coddle a few thousand jars' worth of flies? Consider becoming the next curator of the *Drosophila* Species Center, a collection of 265 species of fruit flies. We aren't talking about your average *Drosophila melanogaster*, the workhorse of molecular genetics. Rather, the 1400 strains range from Mexican cactus-eaters to flies with a taste for only select Hawaiian fruits. No comparable collection exists for studying how species arise, says evolutionary biologist Jerry Coyne of the University of Chicago: "It would be a terrible loss to evolutionary biology if that collection were shut down."

Heeding such warnings, the National Science Foundation (NSF) is soliciting proposals for a new manager to take the reins in 2001 from Bowling Green State University's biology department, which no longer does much fruit fly work. Disabuse yourself of the idea that curating means laying out fly chow and cleaning jars now and then. The job requires "somebody really punctilious" to maintain stocks at proper temperatures and humidities and with special diets, Coyne says. Still interested? Send an application to NSF by 6 July.

Still, the idea that the stratosphere may influence the troposphere is "picking up momentum," says meteorologist Marvin Geller of the State University of New York, Stony Brook. If the history of sun-climate relations is any guide, it's got a long way to go.

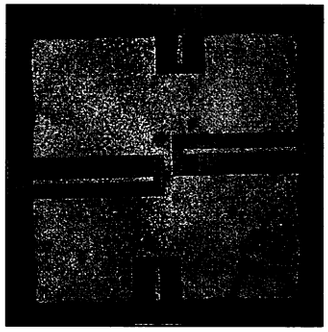
–RICHARD A. KERR

ACOUSTICS

Miniaturizing the Mike, In Silicon

The microphone is being reincarnated in silicon. At a recent meeting* in Berlin, several groups reported progress in converting the standard elements of a microphone—a vibrating membrane that picks up the sound and circuits that convert the vibration into an electrical signal—into structures on a silicon chip. Silicon microphones may not yet be as sensitive as conventional microphones, but they will be robust and cheap. "You can make thousands of them on a wafer," says physicist Gerhard Sessler of the Technical University of Darmstadt in Germany. "It is the coming thing," adds acoustic engineer Allan Pierce of Boston University in Massachusetts.

Most silicon microphones still rely on vibrating membranes to capture sound, but these membranes are micromachined from silicon and measure just 1 millimeter or so on a side and a micrometer thick. In the type of silicon mike that is closest to commercial production, known as a condenser microphone, the membrane is positioned next to a charged electrode. Together, the electrode and membrane form a capacitor, a structure that can store charge. Its capacitance, or ability to hold charge, depends on the distance between electrode and membrane. As the membrane vibrates in response to sound, the distance changes and so does the capacitance, creating an electrical signal in a circuit connected to the device.



Talk to me. Vibrations of a millimeter-square silicon membrane (orange) stimulate an electrical signal via four piezoresistors (dark orange).

CREDITS: (TOP TO BOTTOM) SAM KITTNER; GERHARD SESSLER/TECHNICAL UNIVERSITY OF DARMSTADT

In a variation on this theme, the field-effect microphone, the membrane is given an electric charge and positioned near a semiconductor channel that separates two contacts. The channel's ability to carry current varies in an electric field; as the membrane vibrates, it subjects the channel to a varying electric field, modulating the amount of current flowing through it.

In early prototypes of condenser and field-effect microphones, the membrane was etched out of one chip and the other part of the device was built on another, and the two were pressed together. At the meeting, Sessler reported a new technique for creating the whole device on a single chip. "On the chip you deposit a so-called 'sacrificial layer' … and on top of that layer you deposit the membrane," he says. Chemically etching away the sacrificial layer leaves a free-floating membrane anchored to the chip at its edges.

Other presentations described microphones in which piezoelectric and piezoresistive materials are deposited on top of the silicon membrane. These materials generate a current or a change in resistance, respectively, in response to changes in pressure. The result is a varying electrical signal as the membrane flexes in response to sound waves.

A few microphone designs presented at the meeting translate the vibration into an optical signal rather than an electronic one. The advantage of these designs, explains Sessler, is that optical signals don't interfere with each other via magnetic fields, so large numbers of optical mikes can be packed close together. The optical output can also travel long distances through optical fibers without degrading. "You don't have to preamplify directly at the microphone," says Sessler.

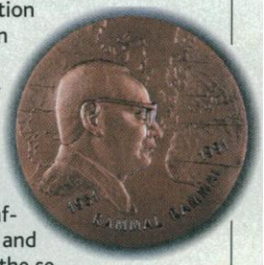
In one such device, developed by Sessler's group, the vibration of the membrane deforms an optical waveguide, altering its ability to transmit light. Two other designs pick up vibrations by bouncing a laser off a silicon membrane and recording variations in the reflected signal—a scaled-down version of a Cold War eavesdropping technique that picks up conversations that are taking place inside a room by playing a laser beam off a window. Pierce and his team at Boston have created small portable arrays of over 10,000 tiny microphones of this design connected to a small display device. The result is an acoustic imaging system, which can reconstruct the shape of objects by detecting differences in the arrival time of reflected sound pulses. The team is now developing an "artificial eye" for use underwater that would send out ultrasound pulses and detect reflected waves to distinguish objects as small as 1 millimeter.

One of the new designs even shuns the traditional membrane. Jörg Sennheiser of Sennheiser Electronic Corp. in Wedemark,

* The Joint 137th Meeting of the Acoustical Society of America and the 2nd Convention of the European Acoustics Association Integrating the 25th German Acoustics DAGA Conference, Berlin, 14–19 March.

ScienceScope

Too Hot to Handle Cowed by a heated dispute, the French Physical Society (SFP) announced last week that it will no longer sponsor an award named after the late Lebanese physicist Rammal Rammal. The medal honors talented physicists who foster scientific cooperation among Mediterranean countries. But SFP officers last month nullified a jury vote that had tapped Israeli physicist Daniel Amit for the 1998 prize. Their decision came after Lebanese officials and academics protested the selection, even though Amit is an outspoken critic of Israel's occupation of southern Lebanon (*Science*, 5 March, p. 1422).



On 31 March the SFP's executive board went further, voting to sever its ties to the medal altogether. Despite the "generous aim" of a prize it has sponsored since 1993, the SFP is "incapable of handling" the type of controversy that dogged last year's pick, the board stated. The medal's originator, French physicist Gérard Toulouse, says he's consulting with Rammal's family about how to continue the prize. Toulouse says he would have preferred a more courageous stand from SFP leaders: "Any sensible member of the scientific community would have felt that the SFP [officers] should resign and the Rammal medal should stay."

Ready to Fuse Physicists are gearing up for another attempt to tame the wild horse of the energy frontier. In February, researchers produced "first plasma" at the National Spherical Torus Experiment (NSTX), a $24 million facility at the Princeton Plasma Physics Laboratory in New Jersey that will explore how to sustain the sun-hot plasma needed to fuse hydrogen atoms. Magnetic fields in the device are supposed to shape the plasma into a spherical torus—a sphere with a hole through its center.

Princeton researchers are now analyzing results from the test run in preparation for the machine's first full-scale research campaign, due to begin in July. A team from 14 U.S. institutions and Japan, Russia, and Great Britain will focus on "discovering whether the machine works the way the theoretical calculations said it would," says NSTX project director Masayuiki Ono. It could take a year, he says, "to bring it to full capability."

Contributors: David Malakoff, Jocelyn Kaiser, Michael Balter