says Landweber.

"It is the world champion so far," says Adleman, who, along with other biochemists and computer scientists, is trying to make a molecular computer do a problem that a human can't do in a reasonable amount of time. "[Landweber] has got the inside track for trying to reach that milestone first."

To develop practical nucleic-acid computers, however, scientists will have to clear some major hurdles, such as figuring out how to correct errors and how to produce and handle large volumes of nucleic acid. Kasparov has no reason yet to feel threatened by beakers of glop, but Adleman is hopeful that nucleic-acid computers will be more than mere curiosities. "Here's nature's toolbox, a bunch of little tools that are dirt cheap; you can buy a DNA strand for 100 femtocents," he says. "Here's a great set of tools, we know they can do lots—let's build cool things!" –CHARLES SEIFE

SCIENTIFIC MISCONDUCT

Fired Researcher Is Rehired and Refired

A bitter and long-running dispute at the University of Arizona (UA) over the firing of a senior biomedical researcher for scientific misconduct has taken a strange new turn. On 4 February, UA president Peter Likins reinstated the researcher he had fired 19 months ago—former Regents Professor Marguerite Kay, an expert on the immune system and Alzheimer's disease. But, on the same day, Likins notified Kay that she was being dismissed again and he barred her from the campus, citing a policy that permits him to exile a faculty member whose presence is deemed "likely to constitute a substantial interference with the orderly functioning of the university. ..." Likins gave the same reasons as before: A faculty panel ruled in 1998 that Kay had engaged in scientific misconduct and neglected her duties as a professor (*Science*, 5 November 1999, p. 1076).

No reprieve. Marguerite Kay has been barred from the UA campus.

CREDIT: C. RICHARDS

This bizarre twist is the result of a judge's rulings last year that the university had acted in an "arbitrary and capricious" manner in firing Kay without a regular personnel hearing, and that she was wrongly denied full legal representation in a misconduct hearing. Likins informed Kay she had a right to appeal the redismissal, which would presumably trigger a personnel hearing.

Kay's supporters on the faculty were outraged by these moves. Two lawyers on the faculty senate immediately objected that Likins had violated Kay's rights and, thereby, the rights of all tenured faculty members. Attorneys Roy Spece Jr. and Andrew Silverman read a protest note during a senate meeting on 7 February in which they urged Likins to redo the entire investigation against Kay. The findings of misconduct against her, they argued, were rendered "null and void" by the court rulings. Judge Stephen Villarreal of the state court for Pima County found that the faculty-run hearing that investigated and condemned Kay's research in 1998 was deficient because Kay's attorney was not permitted to speak during the proceedings (*Science*, 26 November 1999, p. 1657). As a result, "the only proper way to proceed is to return to the very beginning and to do it right this time," said Spece and Silverman.

Likins clearly isn't interested in doing that. In a memo to department heads on 4 February, he noted that the court "did not make any determination regarding the substantive basis for the decision to dismiss Dr. Kay." And he said that the work of several faculty committees that investigated the case "will be respected." Likins declined to comment, according to university spokesperson Sharon Kha, because university rules forbid public discussion of personnel matters. Kha said she was limited to stating that Kay is once again on the faculty—nothing more.

Kay also could not be reached for comment. But her attorney in Tucson, Don Awerkamp, predicted that the decision not to redo the investigation from the top but to rely on the disputed misconduct investigation of 1998 will waste time and "cost hundreds of thousands of dollars more in litigation expenses."

On Kay's behalf, Awerkamp filed suit against the university in December, demanding $3 million for breach of contract. The suit also seeks additional damages for violation of Kay's rights to due process in job termination, and for pain and suffering and other harms. Included in the list of defendants are the university's board of regents, Likins, the chief counsel, the former research administrator, the oncologist who chaired the panel that investigated Kay, and two other faculty members who stepped for-

ScienceScope

Do It Again Expanding overcrowded labs and replacing aging equipment are likely to top the list of priorities in Japan's next 5-year science plan. This month a subgroup of the Council for Science and Technology, the nation's highest science advisory body, is finishing up reports on the nation's research needs, in anticipation of a formal request from the prime minister for a detailed plan covering the 5-year period beginning in April 2001.

Lab overcrowding has become "a big problem" as science funding has boomed, says Hiroo Imura, a former president of Kyoto University. Imura chairs the policy committee, whose panels also highlighted the need to attract more non-Japanese researchers and award more competitive grants.

The previous plan, Japan's first, included an ambitious 17 trillion yen ($162 billion) spending goal that the government achieved through a combination of regular and supplemental budgets. A sluggish economy may preclude repeating that sharp increase, says Hiroyuki Yoshikawa, a former University of Tokyo president and council member. But political support for science is so strong, he believes, that "even if the economy worsens, [budgets] won't decrease."

Quantum Leap The U.S. military plans to spend $15 million to nurture the fledgling field of quantum teleportation, which seeks to harness the bizarre behavior of atomic particles to process information at breathtaking speeds (*Science*, 23 October 1998, p. 637). The technique allows scientists to transfer a quantum-mechanical property, such as spin or polarization, from one particle—a photon or an atom, for instance—to another, even if the two are separated by millions of kilometers.

Three academic teams—based at the California Institute of Technology, the Massachusetts Institute of Technology, and the University of California, Los Angeles—will each get about $1 million a year over the next 5 years from a coalition of defense funders to work on different aspects of quantum communication. The Caltech team, for instance, will work on error correction methods, while MIT and UCLA will tackle optical fiber and memory problems.

The teams "fit very nicely together," says physicist Henry Everitt, who heads the effort for the Army Research Organization.

Contributors: Elizabeth Pennisi, Jeffrey Mervis, Dennis Normile, David Malakoff

ward to support the allegations of misconduct.

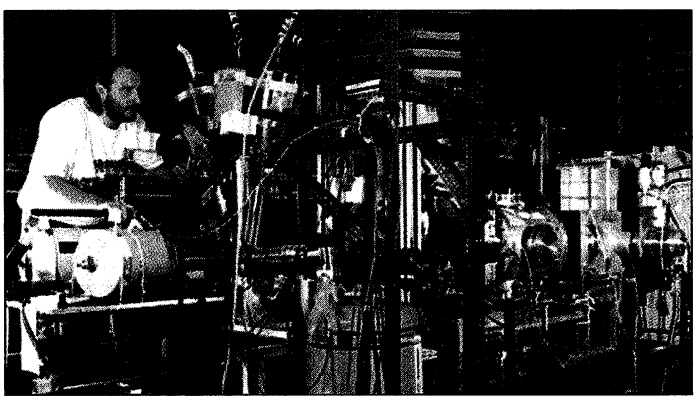
Kay is willing to settle out of court, Awerkamp says, but so far the university has made "no formal response" to the breach of contract claim, although it has offered her back pay to the day of her first firing. "We will be back in court," he predicts.

–ELIOT MARSHALL

NUCLEAR PHYSICS

Double Magic for New Nickel Nucleus

In what you might call a smashing success, physicists have chiseled out an atomic nucleus laden with a record eight more protons than neutrons. The new nucleus, nickel-48, self-destructs in a fraction of a second, but it may help researchers study a form of radioactive decay that they have long sought but not yet observed.



Nickel and time. Nuclear physicist Bertram Blank spent 10 years searching for proton-laden nickel-48.

As with fraternity brothers in a phone booth, you can cram only so many protons into a nucleus. There, protons and neutrons stick to one another with a peculiar pull called the strong force. But the like-charged protons also push against one another with an electric force. If the protons outnumber the uncharged neutrons by too wide a margin, the electric force wins out and the nucleus falls apart. That's why almost every atomic nucleus in nature has more neutrons than protons.

But proton-rich nuclei can stabilize themselves by playing a shell game. Like the electrons buzzing around in their orbital shells, the protons and neutrons in the nucleus pile into distinct nuclear shells. And just as elements with full electron shells are inert, nuclei with full nuclear shells tend to be more stable. So nuclei that are "doubly magic"—that possess a full shell of neutrons and a full shell of protons—may be stable, even if the protons outnumber the neutrons. Knowing this, nuclear physicist Bertram Blank and his team at the Grand Accélérateur National d'Ions Lourds in Caen, France, spent the last 10 years hunting for nickel-48, a doubly magic nucleus with 28 protons but only 20 neutrons.

To make the novel nucleus, the researchers smashed a high-energy beam of naturally occurring nickel-58 nuclei (28 protons and 30 neutrons) into a nickel-58 target. The collision knocked bits and pieces off the passing particles, producing a shower of odd nuclei. The team measured the charge and mass of every one with a sophisticated spectrometer. After sifting through millions of nuclei, they found four nickel-48 nuclei, as the researchers report in the 7 February *Physical Review Letters*.

The barely stable nucleus is a prime candidate for two-proton decay, a form of nuclear decay that until now has been strictly theoretical, says P. Gregers Hansen, a nuclear physicist at Michigan State University in East Lansing. Because of peculiarities of the strong force, nickel-48 cannot eject one proton, but it might just spit out two at once, thereby emitting a kind of radiation that has never been detected. "It's wonderful to know [nickel-48] exists," Hansen says. "Someday we may do some experiments with it."

–ADRIAN CHO

EPIDEMIOLOGY

U.K. Plans Major Medical DNA Database

Following the examples of Iceland, Sweden, and Estonia, the United Kingdom is drawing up plans to create a national database linking the DNA of 500,000 of its citizens to their medical records and lifestyle details. Its main goal is to tease apart the genetic and environmental components of conditions such as cardiovascular disease and cancer and, eventually, to come up with new drugs to treat—or even prevent—these conditions. An expert panel is currently hammering out a strategy for setting up the database and is due to report its recommendations next month.

Dubbed the U.K. Population Biomedical Collection, the database is a joint project of Britain's two principal supporters of biomedical research, the government-funded Medical Research Council (MRC) and the Wellcome Trust, a charitable foundation, in collaboration with the National Health Service. "It's basically a very large-scale epidemiological study," says Tom Meade, director of the MRC Epidemiology and Medical Care Unit, who also heads the MRC/Wellcome working group convened last May to look into the feasibility of the project. Although the working group has found few major technical stumbling blocks, it is taking a cautious approach to such issues as personal privacy and consent, following the outcry that greeted the setting up of the Icelandic database.

In Iceland, the database project was initiated by a private company, deCODE Genetics. Once the project won parliamentary approval in 1998, deCODE could gain access to the medical records of Icelandic citizens who did not opt out of the scheme (*Science*, 1 January 1999, p. 13). Researchers and civil liberties campaigners protested deCODE's monopoly of the data and expressed concern about informed consent procedures and patient confidentiality.

Meade stresses that the U.K. collection will have several fundamental differences from the Icelandic scheme. "Instead of being run by a commercial company, the MRC and the Wellcome Trust are independent research organizations," he says, adding that the British database would be based "entirely on an opt-in approach; participation would be completely voluntary." After getting patients' consent, physicians would gather information about their social status and lifestyle—such as dietary habits, smoking, and exercise—and take blood to obtain DNA samples. The patients would then have regular checkups, and their medical records in the database would be updated.

Many working details, such as who should have access to the data or have rights to the intellectual property contained in it or drugs derived from it, are yet to be worked out, Meade says. Meanwhile, the MRC and the Wellcome Trust are consulting widely "to gather information about how the public feels" about such a medical database, says Ify Uwechue, a Wellcome spokesperson. Sue Mayer, director of the pressure group GeneWatch U.K., says such a study is essential. "Before steaming ahead, we need to have rules and guidelines in place and a proper public debate about such urgent issues as privacy, consent, and access," she says. Mayer predicts that a medical data bank "is going to be a very sensitive issue in the United Kingdom."

Nevertheless, Meade is optimistic that "if we can make it very clear why we do it and what the tremendous potential benefits will be, most people will find [the database] acceptable." If they succeed in getting their message across, Meade adds, the database could be up and running as early as next year.

–MICHAEL HAGMANN

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