unveiled a hastily written outline for the new $37 billion antiterrorism agency that made vague references to various government research and development (R&D) programs (*Science*, 14 June, p. 1944). Two weeks later, when White House officials delivered a more detailed legislative proposal to Congress, they had dropped controversial ideas such as stuffing the Department of Energy's Lawrence Livermore National Laboratory in California into the proposed department. And more changes are likely. "This is very much a work in progress," acknowledges White House science adviser John Marburger.

Both the White House plan—and an alternate blueprint put forward by Senator Joseph Lieberman (D–CT)—include plenty of provisions that make researchers nervous. Many biomedical scientists, for instance, oppose giving an agency with a strong focus on border security control over bioterror research, response, and regulatory programs that are now at the National Institutes of Health (NIH) and the Centers for Disease Control and Prevention (CDC). "I'm skeptical that such an odd coupling will work," Tara O'Toole, head of the Johns Hopkins Center for Civilian Biodefense Strategies in Baltimore, Maryland, told the House Energy and Commerce Committee. "It is a very tall order to ask a single agency to develop national security strategy and … create a sophisticated R&D capability."

Others questioned how the new agency would manage research. Both Lieberman and the White House have presented plans that are "unworkable," science policy guru Lewis Branscomb of Harvard University told the Senate Government Affairs Committee. He was particularly skeptical of Lieberman's idea for a multiagency committee to dole out DHS science funding. "I have never seen an interagency committee in the federal government capable of administering anything," said the one-time head of the National Bureau of Standards.

Legislators seemed to relish such blunt talk. Lieberman said he was already thinking about reworking his bill's R&D provisions to accommodate SARPA—a Security Advanced Research Projects Agency modeled after the Pentagon's agile Defense Advanced Research Projects Agency. And Representative Sherwood Boehlert (R–NY), chair of the House Science Committee, said that critics have convinced him that the White House proposal "simply does not give R&D a high enough profile." Boehlert is especially keen for the agency's research portfolio to be directed by a single manager, an idea backed by a new report from a panel that Branscomb co-chaired (*Science*, 28 June, p. 2311).

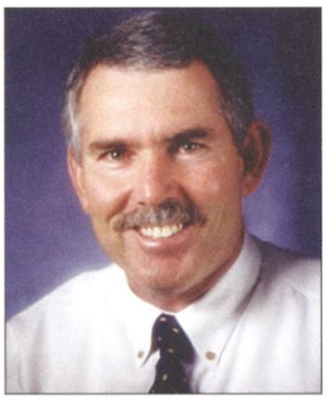
All these ideas will go into the congressional blender, which is expected to spit out a final plan before the end of the year.

–DAVID MALAKOFF

GENOMICS CENTERS

Disease Gene Research Heats Up in the Desert

A new genomics complex with big ambitions got a boost on 26 June when Arizona lured geneticist Jeffrey Trent, scientific director of the National Human Genome Research Institute (NHGRI), back home. Earlier this month, the Phoenix area landed a genomics center that will identify genes active in cancerous tissue. Now, Trent has announced that he will leave NHGRI to head a complementary, newly formed research institute aimed at turning such data into treatments.



Sunny future. Geneticist Jeffrey Trent and two research institutes are setting up shop in Phoenix.

The Translational Genomics Research Institute (TGRI) was formed to provide the research base needed to convince Trent, a senior science adviser of the nonprofit International Genomics Consortium (IGC), to locate the consortium in the Phoenix area. IGC's goal is to determine patterns of gene expression in cancer tissue and put that information in the public domain. Biomedical researchers could then use the information to identify specific cancer-causing genes and ultimately develop drug therapies targeting those genes.

IGC, now located in Scottsdale, Arizona, had been courted by cities with strong biomedical research institutions, including Atlanta and Houston. To get IGC to Arizona, the governor, the city of Phoenix, and private donors put together a start-up package of $92 million for TGRI and persuaded Trent to head it. Arizona had an advantage: Trent grew up in Phoenix, got his Ph.D. at the University of Arizona in Tucson, and once worked at UA's Arizona Cancer Center.

Trent says the new institute will be freestanding but have ties to the state's universities, much like the Fred Hutchinson Cancer Research Center in Seattle or the Salk Institute for Biological Studies in La Jolla, California. Although Trent is the only scientist

ScienceScope

Cloning Indecision President George W. Bush's advisory Council on Bioethics is expected to offer its first thoughts on human cloning later this month—but the outcome has been the focus of extensive behind-the-scenes wrangling this week. A majority of the 18-member group, which began meeting early this year (*Science*, 25 January, p. 601), appears to oppose the complete ban on "research cloning" advocated by Bush and the panel's leader, Leon Kass of the University of Chicago, an informal *Science* survey suggests. But a majority of the panel appeared headed for a controversial compromise: a recommendation to ban reproductive cloning and a 4-year moratorium on research involving cloned embryos, to allow for further public debate and for the government to enact regulations.

Some panel members, however, fear that the group's backing of a moratorium might be a ploy to stall the research altogether and does not reflect the sizable minority on the panel that supports research cloning. "A moratorium is a de facto ban," says one panelist. "If the headline is, 'Bush Committee Bans Cloning,' that's wrong," says another.

In the last-minute maneuvering, at least two panelists have switched positions since the last public meeting, and the issue is generating tension and uncertainty within the council. As *Science* went to press, one panel member said: "Things are shifting around even now."

Indian Ousters The government's leading advocate for reforming India's animal-care facilities, Maneka Gandhi, has lost her Cabinet post after a public feud with the health minister, who was also dropped. Ironically, the reshuffling comes on the eve of a new system to accredit animal facilities, a key element in Gandhi's campaign to reform the country's 600 animal houses.

Indian Prime Minister A. B. Vajpayee had privately scolded Gandhi, who chairs a government animal welfare committee, and health chief C. P. Thakur for fighting over who should operate the accreditation system. That job has been assigned to the Department of Science and Technology.

"Thakur was asked to resign for underperformance, and Gandhi for overperformance," says S. Chinny Krishna, vice chair of India's Animal Welfare Board, who applauded Gandhi's efforts. Although her firing is a "setback … the momentum has been built."

CREDITS: (TOP TO BOTTOM) ALPERN LEHMAN/TGRI; P. BAGLA

on board now, the ambitious timetable laid out for the new institute calls for hiring 15 to 25 research staff in the first 100 days and 100 researchers by the end of the first year. "The goal is to put together a collection of individual scientists who have an interest in as quickly as possible moving from targets to treatments," he says. The institute will initially focus on melanoma and pancreatic cancer and then expand to other diseases, including diabetes.

Francis Collins, director of NHGRI, says, "The opportunities in translational research are incredibly broad right now, and entities such as TGRI will play a critical role in that future." **–MARI N. JENSEN**

Mari N. Jensen is a science writer in Tucson, Arizona.

CONDENSED-MATTER PHYSICS

Spintronics Innovation Bids to Bolster Bits

By just about any measure, technologists pushing to cram more data onto computers' magnetic hard disks have been on a roll. Over the past 4 decades, companies have gone from storing a few thousand bits of data per square inch of disk space (the standard industry measure) to tens of billions of bits in the same space today. That's driven the cost of storing each bit down by orders of magnitude, savings that have fueled the explosive growth of the Web, among other things. Now, a team of researchers at the State University of New York, Buffalo, reports an innovation that could keep the data-density gains rolling in for years to come.

In the 1 July issue of *Physical Review B*, materials scientists Harsh Deep Chopra and Susan Hua report passing electrons through a cluster of magnetic atoms that bridge two magnetic wires. When the magnetic orientation of those electrons, also known as their spin, is the same as the magnetic orientation of the two wires, the electrons travel effortlessly through the cluster, a phenomenon known as ballistic magnetoresistance (BMR). But when the magnetic orientations of the wires point in opposite directions, electrons moving through the cluster from one wire to the other must quickly flip their spin. Because that's hard to do in the nanosized clusters, Chopra and Hua found that the measured electrical resistance jumped over 3000%, the largest such effect ever seen (see figure).

A related effect, known as giant magnetoresistance, forms the basis for the magnetic read heads found in nearly all computer hard-disk drives. As a read head moves above bits of magnetic data, changes in the magnetic orientation of those bits alters the electrical resistance of electrons flowing through the sensor, translating the magnetic data into a stream of electrical pulses.

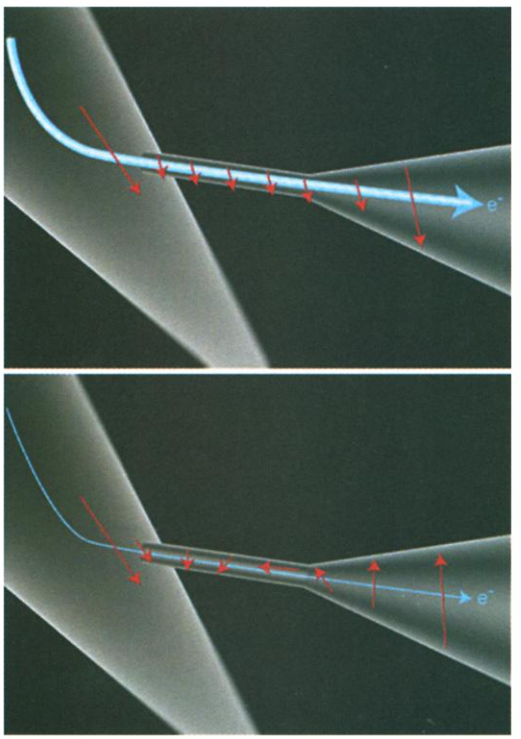
Those changes in magnetic orientation produce only about a 100% change in resistance in the read head. The larger BMR effect could lead to smaller and more sensitive read heads capable of reading smaller magnetic bits. And that, in turn, could allow diskmakers to boost the storage density of disk drives to a staggering 1 trillion bits per square inch.

"This is a great discovery," says William Egelhoff Jr., a physical chemist at the National Institute of Standards and Technology in Gaithersburg, Maryland. "It's exactly what the disk-drive industry needs if it wants to maintain the growth rates in data-storage density."

Chopra and Hua weren't the first to spot BMR. Nicolás García and colleagues at the Consejo Superior de Investigaciones Científicas in Madrid, Spain, first described the effect in 1999. At the time, they saw only a 200% change in resistance, a number they have subsequently raised to 700%. García's team produced the effect by positioning two magnetic wires close to each other in the shape of a "T." They then used standard techniques to deposit magnetic atoms from a solution, forming a nanobridge between the two wires. Egelhoff says that García's team has done beautiful work in demonstrating the effect, but he says that their technique for making the bridges is "somewhat crude."

That's where Chopra and Hua come in. Before depositing the metal bridge, they sharpened the tip of the wire, bisecting the top portion of the "T" to form an ultrafine point just 40 nanometers across. That allowed the bridge to meet the wire at a single, well-formed contact. Just why that should produce a higher magnetoresistance effect remains unclear, however.

Whatever the mechanism, Egelhoff notes that there is still a long way to go before the effect has a shot at revolutionizing data storage. Most important, he says, researchers must still learn to harness BMR to create magnetic read-head sensors. He is collaborating with García's team on the initial steps needed to do just that, a goal that Chopra's team is pursuing as well. If successful, the technique could extend conventional disk-drive technologies to storage densities that some labs are pursuing by much riskier, more exotic approaches. **–ROBERT F. SERVICE**



Tough going. Electrons breeze between two wires with the same magnetic orientation (*top*) but face resistance when the orientation of one is reversed (*bottom*).

ILLUSTRATION: C. SLAYDEN

MALARIA

Ecologists See Flaws in Transgenic Mosquito

WAGENINGEN, THE NETHERLANDS—If a small band of molecular biologists has its way, the next few years might bring field tests of "designer mosquitoes," genetically modified so that they are unable to transmit diseases such as malaria. The goal would be to replace the natural mosquito populations ravaging developing countries. But at a workshop here last week,* 20 of the world's leading mosquito ecologists said, "Not so fast." Although lab science might be thriving, they said, huge ecological questions remain—and it's time funding agencies, which have enthusiastically endorsed the transgenic mosquito plan, started devoting attention and money to answering them.

Gathering in this Dutch university town, the group outlined a sweeping ecological research agenda, ranging from baseline population genetics to an emergency plan in case the transgenic critters run amok. Many of these issues have been deferred or overlooked by the molecular biologists developing the disease-fighting mosquitoes, said meeting organizer Thomas Scott of the University of California, Davis.

At least five U.S. and three European research groups are working on transgenic mosquitoes, with support from the U.S. National Institute of Allergy and Infectious Diseases (NIAID), the World Health Organization (WHO), and the MacArthur Foundation. After a slow start, the field took off

* "The Ecology of Transgenic Mosquitoes," Wageningen University and Research Centre, 26–29 June.