



SCIENCE & TECHNOLOGY IN CONGRESS

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MARCH
2000

IT Research Bill Passes House

The House of Representatives passed H.R. 2086 by voice vote on February 15, paving the way for a near doubling of federal funds for information technology (IT) research over the next five years. The Networking and Information Technology Research and Development Act (NITRD), was introduced by the House Science Committee last session, and authorizes a total of \$6.9 billion for fiscal years (FY) 2000 through 2004 for IT-related research across seven civilian agencies. The National Science Foundation (NSF) would be the lead agency and beneficiary of a \$3.34 billion allocation over five years for basic research into high-end computing, creation of terascale computing capabilities, and education and training grants. In a press conference following the floor vote, Science Committee Chairman Rep. F. James Sensenbrenner, Jr. (R-WI) stated, "Today's House passage marks a great investment in the future and a strong commitment to strengthening the scientific enterprise."

Information technology has been a priority with the Administration as well, which proposed in-

creased funding through an initiative entitled "Information Technology for the Twenty-First Century" in FY 2000. The White House IT research and development (R&D) initiative remains a priority and received a budget request of \$2.27 billion for FY 2001 to support programs in both defense and civilian agencies. This amplified interest on both ends of Pennsylvania Avenue is due in large part to a 1998 report from the President's Information Technology Advisory Committee (PITAC). The PITAC report considered information technology a key factor for future economic growth, and found that federal R&D funding was inadequate and focused on short-term rather than long-term, high-risk research.

The House Science Committee's NITRD and the Administration's IT R&D plans both focus on research and education, and it appears that the two branches are cooperating in pushing the legislation through Congress this year. The only significant departure that will need to be addressed by the

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Clinton Prohibits Genetic Discrimination

On February 8, before a packed audience comprised of government employees, scientists, and policy makers at the American Association for the Advancement of Science (AAAS), President Clinton signed an Executive Order (EO) that would prohibit federal employees from being discriminated against based on genetic information. Clinton remarked in his opening statement, "We are here today... to make sure that the age of discovery can continue to reflect our most cherished values. ...First and foremost, we must protect our citizens' privacy – the bulwark of personal liberty, the safeguard of individual creativity." The President praised the exciting frontier of genomic research and its potential promises, but underscored the heavy responsibilities that greater knowledge will place on society. He closed his remarks by challenging Congress to pass legislation that would provide similar protections to citizens in the private-sector.

Joining Clinton at the ceremony were Dr. Neal Lane, the President's Science Advisor, Dr. Francis Collins, Director of the National Human Genome

Research Institute, Dr. Shirley Malcom, Director of AAAS' Education and Human Resources Directorate, and Representatives Louise Slaughter (D-NY), Fred Upton (R-MI), and Greg Ganske (R-IA). Rep. Slaughter is a strong supporter of increased protection against genetic discrimination, and introduced a bill last session that would prohibit

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Battle Over Stem Cell Research Continues

The National Institutes of Health (NIH) closed its public comment period over its proposed guidelines for the conduct of research utilizing human embryonic stem cells. The draft NIH guidelines endorse federally funded research utilizing stem cells with the condition that the extraction of the stem cells is done strictly in the private sector. Not surprisingly, the controversy over whether federal funds should be allowed to support research using these cells still continues and battle lines have been drawn for what should be a hot debate over the remaining session.

In the Senate chamber, Senators Arlen Specter (R-PA) and Tom Harkin (D-IA) introduced legislation (S. 2015) that supports using federal funds both for research using stem cells as well as its extraction. Senators Specter and Harkin are the Chairman and Ranking Member, respectively, of the Labor, Health and Human Services, and Education Appropriation Subcommittee that funds NIH, and are strong supporters of biomedical research. The Senators had scheduled an appropriations hearing in late February on the topic of the NIH guidelines, but cancelled it at the last minute. To date the hearing has not been rescheduled.

On the opposite side of the debate is Sen. Sam Brownback (R-KS) who submitted a letter to NIH requesting that the institute withdraw the proposed guidelines. The letter was cosigned by 19 others and includes such heavyweights as Senate Majority Leader Trent Lott (R-MS), and Senators Don Nickles (R-OK), Pete Domenici (R-NM), John McCain (R-AZ) and Jesse Helms (R-SC). They view the research as unethical and the NIH interpretation to be in violation of a 1995 ban that prohibits federally funded research using human embryos.

In the House chamber, Representatives Carolyn Maloney (D-NY) and Constance Morella (R-MD) introduced a resolution (H.Res. 414) stating "that the House of Representatives supports Federal funding directed toward human pluripotent stem cell research". The resolution also notes that federal funds are crucial in order to exploit fully this area of research and that the NIH interpretation does not violate the ban on federal funding of human embryo research. H. Res. 414 has no other cosponsors to date.

Opposing this view is Rep. Jay Dickey (R-AK), the original author of the 1995 human embryo ban. His position is that the original language, part of the Labor, Health and Human Services, and Education appropriations bill, does extend to stem cells. Last year, Rep. Dickey unsuccessfully attempted to incorporate additional language in the appropri-

tions bill that would extend the prohibition to both human embryos and to embryonic stem cells.

The Clinton Administration supports the NIH interpretation of the law governing human embryonic stem cells and saw no reason to change the regulatory structure since the stem cells will not be obtained with the use of federal funds. In response to the revised interpretation of the law, however, the White House requested that the National Bioethics Advisory Commission (NBAC) craft guiding principles for research involving stem cells. NBAC submitted its recommendations to the White House in early September supporting a broader view of what would be appropriate for the federal government to support. The group stated that "we believe that it is ethically acceptable for the federal government to finance research that both derives cells lines from embryos remaining after infertility treatments and that uses those cell lines."

NIH released its draft guidelines at the end of the year, after reviewing the NBAC recommendations, and though it mirrors many aspects of their report it does not support the use of federal funds to derive or extract stem cells from human embryos. This is an important distinction, as it places the responsibility of extraction in the private sector, mainly through firms involved in fertilization research and services. NIH must now review all the comments received, both positive and negative, and either request an additional public comment period or incorporate the comments into a final set of guidelines for publication in the Federal Register. ■

Science & Technology in Congress (ISSN# 1096-0406) is published by the Center for Science, Technology, and Congress at the American Association for the Advancement of Science (AAAS). It is distributed eight times per year: February through August and October. Issue Updates are published periodically to supplement the bulletin.

AAAS is a non-profit, non-partisan organization. Since it was founded in 1848, AAAS has been dedicated to the advancement of scientific knowledge for the good of society as a whole. Comments and suggestions on the bulletin and information on upcoming congressional science and technology activities are welcome. This bulletin has not been reviewed or endorsed by the AAAS Board or Council.

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NNSA Starts Up as Richardson & Congress Clash



Energy Secretary Bill Richardson officially announced the formation of the National Nuclear Security Administration (NNSA) and settled on Gen. John A. Gordon as his choice to head the new agency. Richardson and Congress, however, continue to clash over aspects of his implementation of the reorganization bill signed into law last fall.

On March 1, the NNSA officially opened for business shifting 2,013 Department of Energy (DOE) employees to the new agency. Shortly thereafter, Richardson announced that he would ask President Clinton to nominate Gordon for the position of Under Secretary for Nuclear Security and Director of NNSA. Gordon is currently the Deputy Director of the Central Intelligence Agency (CIA).

Several members of the Special Oversight Panel on Department of Energy Reorganization attacked Richardson's plan for the NNSA at a March 2 hearing before the House Armed Services Committee. The new agency, which houses DOE's nuclear weapons programs, is designed to strengthen security at the national labs by clarifying lines of authority and accountability. Richardson has been critical of certain parts of the reorganization bill, though, contending that they do more to confuse than clarify. The panel members continued to criticize Richardson's decision to appoint several DOE officials to serve concurrently at NNSA and contended that these so-called "dual-hats" violate the reorganization law. Richardson disputed this claim and criticized the bill's limitations on his ability to exercise authority over the new agency.

Members of the oversight panel at the hearing echoed criticisms set forth in their written assessment of Richardson's implementation plan. The oversight panel's report states that the agency's implementation plan "overemphasizes DOE control over the NNSA, undermines the semi-autonomy of the NNSA, and would violate key provisions of" the reorganization bill. It says that dual-hatting is "clearly in violation" of the law and that the plan "explicitly sustains current reporting relationships ... [that have] generated redundant and confusing lines of authority in the past."

Richardson's critics also drew on testimony delivered earlier in the day by the General Accounting Office (GAO) and Congressional Research Service (CRS), that lent support to these claims. According to GAO, the plan "does little to address" DOE's "dysfunctional structure, with unclear chains of command among headquarters, field offices, and contractors." Further, the dual-hats are "contrary to the legislative intent behind the creation of NNSA as a separate entity within DOE." In a legal evaluation, meanwhile, CRS states that the plan's "apparent disregard of the statutory pro-

visions delineating certain limitations on the Secretary's direct authority over NNSA officers and employees could arguably be characterized as contrary to the letter and intent of the legislation."

Rep. Duncan Hunter (R-CA) was the first to attack Richardson and defended the approach Congress took in the reorganization law. He argued that a military-type chain of command that would force the Secretary to operate through the NNSA director and keep NNSA separate from the rest of DOE is the only way to ensure that the disarray that plagued the investigation of Wen Ho Lee does not resurface. He said that the legislative changes Richardson has proposed would undermine this type of structure. "At the same time that you're supporting the nomination of Mr. Gordon," he said, "you're taking all his power away?"

But Richardson denied that he was attempting to undermine NNSA's autonomy or Gen. Gordon's authority and defended his implementation plan as legal and appropriate. He said his proposed changes to the law were necessary if he is to be held accountable for the new agency, and he emphasized that only 18 out of 2,013 NNSA employees are dual-hatted, though that includes several key officials, such as the security and counterintelligence chiefs. With regard to the NNSA security structure, he said, "I want to make this efficient, and as rapidly as possible."

Acrimony between Richardson and the Republicans on the oversight panel surfaced repeatedly during the hearing. When Hunter asked whether Richardson felt obligated to follow the intent of the law, Richardson implied that he did not. "We had a version [of the reorganization] in the Senate that we believed was acceptable to us," he said, but the version that was ultimately signed into law was developed by a conference committee behind closed doors. Rep. Mac Thornberry (R-TX), the chair of the panel, brought up the GAO and CRS testimony, to which Richardson replied indignantly, "I have yet to find the GAO to say something positive about anything." Many of the Democrats present came to Richardson's defense. Rep. John M. Spratt, Jr., (D-SC), the only oversight panel member that did not sign the panel's report, said the selection of Gen. Gordon overshadows "petty" concerns about dual-hatting 18 employees.

After working with Congress primarily on security issues for the past year, Richardson would clearly like to shift the focus back toward the scientific research taking place at the DOE weapons labs. After spending the balance of their time in recent months on security issues, DOE officials should now

DOE, continued page 5



White House was an amendment introduced by Rep. Michael Capuano (D-MA) on the House floor that boosted funding for NSF by decreasing funds to the Department of Energy (DOE). It is not likely that the Administration will succeed in restoring IT funds for DOE, in light of the fact that Congress drastically cut the budget request to the beleaguered agency last year.

The NITRD bill would support funding for long-term research in networking capabilities and software development to improve reliability and security. In addition, language in the bill would authorize research grants in these fields to support Information Technology Research Centers, or “groups of six or more researchers collaborating across engineering disciplines on large-scale long-term research projects”. The legislation also authorizes \$313 million over five years towards the development of terascale (five trillion operations per second) computing capabilities. NITRD also provides funds to NSF to support higher education in IT-related fields, provides internship grants to private sector companies, funds research to develop educational materials for elementary and secondary schools, and requires NSF to conduct an evaluation of foreign encryption technologies. It also requests that the National Academy of Sciences conduct a study of privacy technologies, standards and policies with respect to the Internet.

Other agencies to receive five-year funding through H.R. 2086 include the National Aeronautics and Space Administration (\$1.03 billion), the National Institutes of Health (\$1.2 billion), DOE (\$607 million), the Environmental Protection Agency (\$22.3 million), the National Institute of Standards and Technology (\$62 million), and the National Oceanic and Atmospheric Administration (\$72 million).

H.R. 2086 has been referred to the Senate Commerce, Science and Transportation Committee chaired by Sen. John McCain (R-AZ). Sen. Bill Frist (R-TN), Chairman of the Committee’s Science, Technology and Space Subcommittee, introduced his own IT research bill a couple of weeks before the House passed the NITRD bill. The “Next Generation Internet 2000” bill (S. 2046) also provides funding for high-end computing research, and education and training programs, but only through the inter-agency Next Generation Internet (NGI) program. Both the House and Senate bills reflect a growing belief that our nation’s IT capabilities must evolve in parallel with economic opportunity. At a recent hearing, Sen. Frist stated, “As we marvel about the revolutionary advances of the Internet and its ability to improve our daily lives, we often forget that the Internet is reaching its maximum potential be-

cause of the constraints on its speed, reliability, accessibility, and versatility.” While the ideology behind the two authorization bills may be the same, the manners in which they tackle the issue differ.

The Frist bill allocates funds through FY 2003 and includes language that would carve out funding to support rural infrastructure in states that participate in NSF’s Experimental Program to Stimulate Competitive Research (EPSCoR). EPSCoR states generally do not receive significant amounts of federal R&D funding, and the language in the bill is intended to reduce the cost of accessing the Internet in geographically remote regions. Sensenbrenner’s bill, on the other hand, provides funding through FY 2004 and would allocate all research grants on a competitive basis. President Clinton’s Science Advisor Dr. Neal Lane stated at a Senate hearing that while S. 2046 was an important first step, any financial set asides may not be considered appropriate. Dr. Lane also took exception to language in the bill that would require the National Academy of Sciences to conduct a study on unequal access to Internet-related technologies by rural and low-income Americans. Lane noted that the study would be duplicative of “Digital Divide” efforts already underway by the Department of Commerce and PITAC.

It is uncertain at this time whether both committees will attempt to dovetail the two bills or try to push their selective approaches through Congress. The two committees have differed in other legislative vehicles in the past, most notably the “Federal Research Investment Act” (S. 296) to double federal R&D funds to civilian agencies over a ten year period. Though the Senate has successfully passed the bill two years in a row, the House Science Committee has not pushed for a similar vehicle and focused instead on NITRD. ■

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“tilt it back to science,” he said. “There is no longer a culture of lax security. That has ended.”

The oversight panel offered unanimous praise for the selection of Gordon as NNSA head. Gordon served with the National Security Council, at the Department of Defense, and as a physicist at Sandia National Laboratories before becoming the country’s second ranking intelligence official. The White House has also announced that Madelyn R. Creedon will be nominated for the position of Deputy Administrator for Defense Programs, a key position at NNSA responsible for overseeing nuclear weapons research, development, and production programs. Creedon is currently Counsel for the Minority Staff of the Senate Committee on Armed Services and was

formerly the Associate Deputy Secretary of Energy for National Security Programs.

Richardson announced the selection of Gordon after reaching agreement with Sen. Pete V. Domenici (R-NM) on a legislative change that would allow the chief of the new agency to serve a three-year term. Domenici, who played a major role in crafting the reorganization law, called Gordon “a great choice.” According to Richardson, the appointment has been placed on a “fast-track,” which means that President Clinton plans to officially nominate him soon. Once he does, Gordon will need to be confirmed by the Senate before taking over. ■



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health insurance companies from denying coverage and private-sector firms from using genetic information in a discriminatory fashion.

The new EO would prohibit all executive branch departments and agencies from discriminating against new applicants or firing existing employees based on genetic information. In addition, it states that the federal government cannot require an employee to submit to a genetic test and if an employee voluntarily takes a test, the information must remain confidential. An exception to the rules is when a present medical condition or a potential predisposition would prevent an employee or applicant from performing his or her job. The Equal Employment Opportunity Commission (EEOC), which helped prepare the EO language, will be responsible for coordinating the implementation of the new policy but each department and agency will be required to designate an official responsible for carrying it out.

Research advances now allow individuals to be tested for a variety of inherited genetic mutations that can reveal whether one is predisposed to developing a disease (e.g., breast cancer) or is a carrier of a hereditary disease (cystic fibrosis). This knowledge, however, carries both promise and risk. People who have tested positive for a genetic disposition would be able to make informed decisions with respect to preventive treatment and counseling. However, a positive test does not guarantee that the

individual will develop the associated disease in the future, and insurance companies might deny coverage if given access to a person’s test results. Dr. Collins testified last year that one of the reasons for low enrollment numbers in clinical trials for the breast cancer gene was that women were worried that their insurance companies would indeed deny coverage. Lower participation rates in clinical trials means that methods for improving genetic research and testing will be hampered.

Though some states such as California and New York have passed laws prohibiting insurance discrimination on the basis of genetic tests, there is currently no federal law providing protection at the national level. Last session, Rep. Slaughter introduced the Genetic Nondiscrimination in Health Insurance and Employment Act of 1999 (H.R. 2457) that would offer such protections to individual citizens and expand it to include places of employment. Sen. Thomas Daschle (D-SD) also introduced a companion bill (S. 1322), but there was no movement on either legislative vehicle. Rep. Slaughter is trying to resurrect interest in her legislation and requested hearings on the subject. Majority leaders, however, have placed medical confidentiality as a higher priority on their legislative agenda and are unlikely to address the topic of genetic discrimination until a consensus is reached on privacy of individual medical records. ■

Your Genes, Your Choices

Describes the Human Genome Project, the science behind it, and the ethical, legal, and social issues that are raised by it. Available on the AAAS website in both html and Adobe PDF format at ehrweb.aaas.org/ehr/books/index.html.



Status of Major Legislation

CYBER SECURITY

GOVERNMENT INFORMATION SECURITY ACT OF 1999

S. 1993

Introduced by Sen. Fred Thompson (R-TN). A bill to reform government information security by strengthening information security practices throughout the federal government. 11/19/99 Read twice and referred to the Committee on Governmental Affairs. 3/2/00 Committee on Governmental Affairs. Hearings held.

S. 2092

Introduced by Sen. Charles E. Schumer (D-NY). A bill to amend title 18, United States Code, to modify authorities relating to the use of pen registers and trap and trace devices, to modify provisions relating to fraud and related activities in connection with computers, and for other purposes. 2/24/00 Read twice and referred to the Committee on the Judiciary.

INFORMATION TECHNOLOGY

NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT ACT

H.R. 2086

Introduced by Rep. F. James Sensenbrenner, Jr., (R-WI). A bill to authorize funding for networking and information technology research and development for fiscal years 2000 through 2004, and for other purposes. 2/15/00 Passed House by voice vote. 2/22/00 Received in the Senate and Read twice and referred to the Committee on Commerce, Science, and Transportation.

NEXT GENERATION INTERNET 2000

S. 2046

Introduced by Sen. Bill Frist (R-TN). A bill to reauthorize the Next Generation Internet Act, and for other purposes. 2/9/00 Read twice and referred to the Committee on Commerce, Science, and Transportation.

EDUCATION

AMERICAN'S MATH AND SCIENCE EXCELLENCE ACT

S. 2067

Introduced by Sen. Bill Frist (R-TN). A bill to provide education and training for the information age. 2/10/00 Read twice and referred to the Committee on Health, Education, Labor, and Pensions.

H.R. 3702

Introduced by Thomas H. Allen (D-ME). A bill to ensure excellent recruitment and training of math and

science teachers at institutions of higher education. 2/29/00 Referred to the House Committee on Education and the Workforce.

STEM CELL RESEARCH

STEM CELL RESEARCH ACT OF 2000

S. 2015

Introduced by Sen. Arlen Specter (R-PA). A bill to amend the Public Health Service Act to provide for research with respect to human embryonic stem cells. 1/31/00 Read twice and referred to the Committee on Health, Education, Labor, and Pensions.

H.RES. 414

Introduced by Rep. Carolyn B. Maloney (D-NY). Expressing the sense of the House of Representatives supporting federal funding directed toward human pluripotent stem cell research to further research into Parkinson's disease and other medical conditions. 2/2/00 Referred to the House Committee on Commerce. 2/4/00 Referred to the Subcommittee on Health and Environment.

GENETICS

GENETIC NONDISCRIMINATION IN HEALTH INSURANCE AND EMPLOYMENT ACT OF 1999

H.R. 2457

Introduced by Rep. Louise Slaughter (D-NY). A bill to prohibit health insurance and employment discrimination against individuals and their family members on the basis of predictive genetic information or genetic services. 7/1/99 Referred to House Commerce. 7/30/99 Referred to the Subcommittee on Health and Environment. 7/1/99 Referred to House Ways and Means. 7/1/99 Referred to House Education and the Workforce. 8/6/99 Referred to the Subcommittee on Employer-Employee Relations. *See also companion bill S. 1322.*

BIOTECHNOLOGY

GENETICALLY ENGINEERED FOOD RIGHT TO KNOW ACT

H.R. 3377

Introduced by Rep. Dennis J. Kucinich (D-OH). A bill to amend the Federal Food, Drug, and Cosmetic Act, the Federal Meat Inspection Act, and the Poultry Products Inspection Act to require that food that contains a genetically engineered material, or that is produced with a genetically engineered material, be labeled accordingly. 11/16/99 Referred to House Agriculture. 11/16/99 Referred to House Commerce. 11/30/99 Referred to the Subcommittee on Health and Environment. *See also companion bill S. 2080.*

Reports and Publications

GENERAL ACCOUNTING OFFICE

Copies of GAO Publications are available by calling 202/512-6000 or via the Internet at <http://www.gao.gov>.

Human Capital: Key Principles From Nine Private Sector Organizations (GAO/GGD-00-28). This report discusses how agency plans to strategically manage their people or human capital have been notably absent from their annual performance plans. It identifies common principles that underlie the human capital strategies and practices of nine private sector organizations and provides case illustrations that offer practical examples for federal agencies to consider.

Computer Security: FAA Needs to Improve Controls Over Use of Foreign Nationals to Remediate and Review Software (GAO/AIMD-00-55). This report investigates the use of foreign nationals for Y2K remediation at the Federal Aviation Administration (FAA). It found that of 153 mission critical FAA systems that were remediated, 15 had foreign involvement, but that FAA did not perform background searches or checks on all of its contractor employees, as required by its policy.

Department of Energy: Views on DOE's Plan to Establish the National Nuclear Security Administration (T-RCED-00-113). This report finds that the NNSA Implementation Plan establishes a framework for the creation of the new agency, but that it is not a detailed roadmap that would position NNSA to correct DOE's longstanding problems. The Implementation Plan simply transfers many of DOE's historic shortcomings to NNSA. In particular, NNSA's organizational structure does not establish clear lines of authority, the agency is taking a "business as usual" approach to planning, programming, budgeting and securing skilled technical staff, and NNSA and DOE have duplicative and overlapping functions.

Information Security: Fundamental Weaknesses Place EPA Data and Operations at Risk (T-AIMD-00-97). This report is the result of a review of information security at the Environmental Protection Agency (EPA). It found serious and pervasive problems that essentially render EPA's agency-wide information security program ineffective.

Critical Infrastructure Protection: Comments on the National Plan for Information Systems Protection (T-AIMD-00-72). This report finds that the plan is an important and positive step forward toward building a cyber defense. It identifies risks associated with our nation's dependence on computer networks and recognizes the need for the federal government to take the lead in addressing risks and to serve as a model for information security. The report, however, recommends that the plan should place more emphasis on providing agencies with incentives and tools to imple-

ment comprehensive computer security programs, as opposed to its current strong emphasis on implementing intrusion detection capabilities.

NATIONAL ACADEMY OF SCIENCES, NATIONAL ACADEMY OF ENGINEERING, INSTITUTE OF MEDICINE, NATIONAL RESEARCH COUNCIL

Government offices may obtain single complimentary copies by calling the Office of Congressional and Government Affairs at 202/334-1513. Others may order copies from the National Academy Press by calling 800/624-6242 or via the Internet at <http://www.nap.edu>.

To Err Is Human: Building a Safer Health System (ISBN: 0-309-06837-1). Experts estimate that at least 120,000 people die in any given year from medical errors that occur in hospitals. This book sets forth a national agenda—with state and local implications—for reducing medical errors and improving patient safety through the design of a safer health system. It includes statistics of medical errors and examines how the forces of legislation, regulation, and market activity influence quality of care.

Research Management and Peer Review in the U.S. Environmental Protection Agency (ISBN: 0-309-06552-6). This book assesses the EPA's research and development program structure, peer review and laboratory site review procedures, long-term research program, and procedures for research staff career development and performance evaluation.

Seeing into the Earth: Noninvasive Characterization of the Shallow Subsurface (ISBN: 0-309-06359-0). This book examines why noninvasive characterization of the environment is important and how improved methods can be developed and disseminated. It addresses issues from both the commercial and public perspectives, makes recommendations for linking this technique with cost savings, and outlines ways that practitioners can make the best use of the best methods.

The Door in the Dream: Conversations with Eminent Women in Science (ISBN: 0-309-06568-2). This book provides personal stories of the select few women scientists who have achieved the honor of election to the prestigious National Academy of Sciences. Its intimate portraits offer widely different insights about how being female affects one's career.

The Future Role of Pesticides (ISBN: 0-309-06526-7). This book explores the role of chemical pesticides in the decade ahead and identifies the most promising opportunities for increasing the benefits and reducing the risks of pesticide use. The book offers guidance on how to assess pest control strategies and includes recommendations for R&D, and program and policy initiatives.



HEARD OFF THE HILL



Crocs in the Desert? Hard to believe, perhaps, but a team of scientists from Bonn discovered a colony of crocodiles in an underground pond while studying reptiles in the middle of the Sahara. The pond, which was only about 60 feet wide, was home to four six-foot long African Nile crocodiles. Remarkably, the colony has survived in isolation from other crocs ever since the Sahara was transformed from fertile land into desert roughly 10,000 years ago. Having spent so much time isolated from the rest of their species, the animals may serve as a model for how a new species is formed. *Science*, February 18, 2000.

Eros. About 152 million miles from Earth, NASA's NEAR space probe has moved into orbit around the asteroid Eros. Launched to learn more about the composition and formation of the solar system, NEAR is the first NASA spacecraft ever to orbit such an asteroid. Shaped more or less like a potato with dimensions 21 x 8 x 8 miles, Eros is considered typical of the roughly 800 known near-Earth asteroids. Gravity is so much weaker on Eros than on Earth, that a 100-pound object on Earth would weigh just 1 ounce on Eros. The gravity field is strong enough, however, to hold NEAR in orbit 124 miles from the asteroid's cen-

ter. The probe will gradually descend until it is about 1,600 feet above the surface. Over the next year, scientists hope to learn about many aspects of Eros, including its mass, shape, surface characteristics, mineral composition, and magnetic field. *NASA*, March 3, 2000.

Black Holes. Black holes present a difficult challenge for astronomers. These remnants of old, burned out stars are so dense that no light can escape from them, and astronomers can only infer their existence by the hot gasses that spiral in toward them. These gasses can be difficult to observe, so researchers would like to create a model of a black hole here on Earth. Recently, two scientists devised a way of doing just that. New technologies can slow light down to just a few feet per second in certain types of matter. If a vortex of such a material could be created that spins faster than light travels inside it, an object would be created from which no light would be able to escape—exactly the situation that occurs with a black hole. Such a model could provide researchers with new ways of studying general relativity, and possibly even quantum gravity—gravity at the scale of small particles. *American Institute of Physics*, January 27, 2000.



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