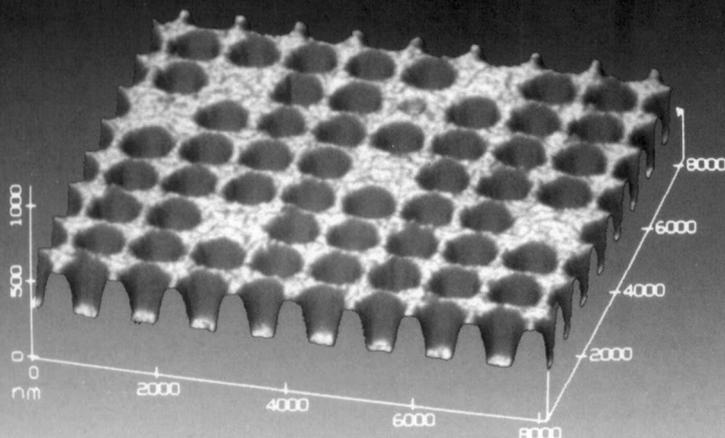


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3-D NanoScope STM Image of a Laser-Formed Microencoder: Data pits and blanks can be seen as well as a partially-formed pit near the top center. Scan by Matthew Thompson, Digital Instruments.

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NMAB Names New Chairman, Members

James C. Williams was appointed as the new chairman of the National Materials Advisory Board. Williams, the general manager of General Electric's Materials Technology Laboratories in Cincinnati, Ohio, succeeds Bernard H. Kear of Rutgers University, who continues on the Board as past chairman.

Six new members were also appointed to the Board: Robert R. Beebe, Homestake Mining Company; Robert E. Green Jr., Johns Hopkins University; Frank E. Jamerison, General Motors Research Laboratories; Ronald M. Latanision, Massachusetts Institute of Technology; William D. Nix, Stanford University; and Earl R. Thompson, United Technologies Research Center. Two members have been reappointed for additional three-year terms: Norbert S. Baer, New York University; and Frank W. Crossman, Lockheed Missiles & Space Company.

The NMAB is a unit of the National Research Council and functions within the Council's Commission on Engineering and Technical Systems. The Board is concerned with the entire life cycle of materials from their origin at the resource level through their useful application and eventual disposal or reclamation. Through working groups of experts, NMAB provides a mechanism to define materials problems, issues and opportunities, to suggest solutions, and to stimulate action.

Administration's FY 1991 Budget Focuses on Science and Math Education

President Bush's FY 1991 budget pays increased attention to science, mathematics, and engineering education. The proposed 26% increase brings the total to \$1 billion for direct spending in this area.

Programs targeted for increases include teacher training and curriculum development, and funding for fellowships and other forms of support provided indirectly through research grants. Federal agencies involved in such programs include the National Science Foundation (see related article in this section), Department of Education, Department of Energy, and NASA.

While the Department of Education's budget increases only 2%, to a total of \$24.6 billion, the Eisenhower Mathematics and Science program gets a 69% boost. The program, which provides funds to states to develop and implement improved programs for teaching mathematics and sci-

ence, will receive \$230 million, up \$94 million over 1990. The Bush administration has also directed the Office of Science and Technology Policy to explore ways the NSF and the Department of Education can better coordinate their activities in science, mathematics, and engineering education.

NASA will increase its educational activities budget about 21% to \$51 million. NASA supports such programs as the "Spacemobile" presentation to elementary and secondary schools, teacher workshops and internships at NASA research centers, grants for undergraduate and graduate student research, and special efforts to ensure minority participation in science and engineering education.

The Department of Energy's budget for educational activities is \$25 million, up 47%. In addition to research fellowships for university students and faculty, DOE is beginning a new program in collaboration with the private sector, which will train high school faculty at national laboratories in state-of-the-art science. DOE's total budget for science and technology goes from \$2.1 billion to \$2.3 billion, including \$318 million for the Super Collider.

NSF Notes

FY 1991 Budget Request Up 14.4%

NSF's \$2.38 billion budget request for fiscal year 1991 is 14.4% above the FY 1990 appropriation of \$2.08 billion. Increased funding has been directed toward two strategic elements in education and research:

1. Strengthening the research base and improving academic research equipment and facilities. The \$1.81 billion request for FY 1991 reflects an 11% increase over FY 1990.

2. Developing human resources, broadening participation, and improving science and engineering education at all levels from kindergarten through postdoctoral training. The request for these programs, \$463 million, is an increase of 30% over FY 1990.

Support for research and facilities accounts for over 70% of NSF's FY 1991 request, and continued growth is requested for several forefront, high-priority areas, including materials research. Cited as reasons for targeting these areas were the growing complexity and multidisciplinary nature of today's research problems, and the benefits of coordinated research, shared data, and collaborative relationships, which can span agency and national borders. Funding for a second class of 10-12 Science and Technology Research Centers, deferred from FY 1990, is also requested.

Of the \$463 million slated for education and human resources development, \$335 million is for education activities and \$128 million for other human resource development activities, such as awards to new investigators, and studies and analyses. The requested increase for pre-college programs is 17.8%, while a 48% increase (to a total of \$134 million) is slated for undergraduate research and education programs. The college-level budget features the following components:

- Redesign of curricula to encompass introductory science mathematics and engineering courses in all NSF activities,
- Establishment of engineering coalitions to focus on comprehensive engineering curriculum reform, and
- An increase in the number of Career Access Centers to 16 to lead more talented minority and female students into science, mathematics and engineering.

Several new and enhanced programs are proposed to address the need for scientists and engineers trained across traditional disciplinary boundaries. The Research Training Group awards, for example, will support new or significantly enhanced multidisciplinary training programs at PhD granting institutions. The Presidential Young Investigators program will support an additional 200 awards, for a total of 950.

Funding for special programs for minority institutions and minority, female and disabled students is slated to increase 48.5% over FY 1990 to \$94 million in FY 1991. Two new programs are proposed to assist under-represented groups: Alliances for Minority Participation to help students complete baccalaureates and successfully transfer to graduate schools, and Faculty Awards for Women to recognize exemplary scientists and engineers.

Five Industry/University Cooperative Research Centers Established

During their first year of operation, five research centers in California, Georgia, Maryland, Rhode Island, and Washington will each receive between \$50,000 and \$100,000 under the NSF's Industry/University Cooperative Research Centers Program. NSF support for four additional years depends on the progress of the centers and the availability of funds.

Areas of study at the new centers include thin-film technology, the management of information systems and technologies, and strategies for designing electronic circuits and systems.

- The new centers are as follows:
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Circuits and Systems at the University of California at San Diego and San Diego State University;

- Center for Information Management Research at the Georgia Institute of Technology;

- Center for Computer-Aided Life Cycle Engineering at the University of Maryland;

- Center for Thin-Film and Interface Research, established jointly by Brown University and the University of Rhode Island; and

- Center for Design of Analog-Digital Integrated Circuits, a joint endeavor by Washington State University and the University of Washington in Seattle.

To receive NSF support, centers must have at least \$300,000 from industry and also some state or university funding. The centers are expected to become self-sufficient through industry and state support after five years of NSF sponsorship. In recent years, funding from industry and state sources has averaged more than 10 times NSF support. NSF currently supports 41 centers.

NATO Postdoctoral Fellowships Announced

Fifty-five NSF-NATO fellowships were awarded to young U.S. scientists and engineers for full-time postdoctoral study and research at institutions and laboratories in other NATO countries. This year's fellows will travel to Belgium, Canada, England, France, the Netherlands, Scotland, and West Germany.

In commenting on NATO's goal to promote closer and lasting scientific research collaboration among alliance members, Bassam Z. Shakhshiri, NSF assistant director for science and engineering education, cited the results of an NSF survey of 1960-1986 fellows. The survey showed that 77%, or 432 out of 559 fellows, maintained contact with their overseas associates long after completion of their fellowship tenure.

This year's deadline to apply for NSF-NATO postdoctoral fellowships will be at the beginning of November. Application guidelines will be available at the beginning of September 1990. For information contact the National Science Foundation, 1800 G Street NW, Washington, DC 20550; telephone (202) 357-7856.

EPSCoR Grants Go to Five States

Arkansas, Maine, Montana, South Carolina, and West Virginia will each receive grants ranging from \$895,000 to \$1,200,000 over a two-year period to strengthen academic departments and support research improvement activities. The grants are being made through NSF's Experimental

Program to Stimulate Competitive Research.

Begun in 1978, the EPSCoR program is designed to improve the quality of science and engineering research and increase the number of scientists and engineers able to compete successfully for other federal funding. NSF currently targets 16 states and Puerto Rico as eligible to compete for EPSCoR grants.

According to Richard Anderson, one of its program managers, EPSCoR is meant to be a catalyst for long-term improvements in research and education, and collaboration with industry is encouraged. "The program's success," says Anderson, "is most evident on the individual investigator level, where, for example 86% of the investigators now have funding for their projects." In addition, he said, institutions in Mississippi and Montana successfully competed for Engineering Research Center awards.

A new round of competition among the 17 current participants will begin in 1991 for three years of additional funding. For information contact the National Science Foundation, Division of Research Initiation and Improvement, Room 1225, 1800 G Street NW, Washington, DC 20550; telephone (202) 357-7456.

Women and Minorities Remain Under-Represented in Science and Engineering

Despite rapid growth in the past 10 years, women, blacks, and Hispanics continue to be under-represented in science and engineering fields compared with their representation in the overall U.S. workplace, says an NSF report titled *Women and Minorities in Science and Engineering*.

Employment of women in science and engineering increased by 258% between 1978 and 1988, compared with an 87% increase for men. But even though women make up 45% of the total U.S. workforce, said the report, they account for only 16% of the nation's science and engineering workforce.

The report's figures also show that in 1988 blacks accounted for 2.6% (139,000) of employed scientists and engineers. Up from 1.8% in 1978, this figure is still lower than the representation of blacks in total U.S. employment in 1988 (10%) and as employed professional and related workers (7%).

The complete report (NSF 90-301) is available from the Scientific and Technical Personnel Studies Group, Division of Science Resources Studies, National Science Foundation, 1800 G Street NW, Room L-611, Washington, DC 20550; telephone (202) 634-4664.

DOE Notes

Steuer Heads Fusion Policy Advisory Committee

H. Guyford Steuer, foreign secretary (retired) of the National Academy of Engineering, will chair a 19-member independent Fusion Policy Advisory Committee whose report will provide advice on how to structure DOE's magnetic and inertial confinement fusion programs. The committee will also review a draft policy statement that calls for a competition between the two approaches and will either support the strategy, modify it, or provide a new approach.

The committee intends its recommended fusion policy to span such aspects as objectives for the programs, a strategy, the development path, major decision points, the role of international collaboration, and funding levels. The committee will also address such issues as the balance of research activities within the programs, the timing of experiments to test the burning of plasma fuel, the International Thermonuclear Experimental Reactor (ITER), and the development of laser technologies.

An interim report is due in July 1990 and the final report by the end of September 1990. The committee's meetings will be published and announced in the *Federal Register*.

Editor's Note: For information about DOE's magnetic fusion energy program, the ITER, and materials-related issues, see the series of articles on fusion materials in the July 1989 MRS BULLETIN.

Uranium Enrichment Plan Sent to Congress

Secretary of Energy James D. Watkins submitted to Congress the Department of Energy's plan for the development and deployment of the Atomic Vapor Laser Isotope Separation (AVLIS) technology, a highly advanced uranium enrichment process. Expected to enrich uranium at about half the cost of existing enrichment technologies, AVLIS uses lasers to selectively ionize U²³⁵ atoms in vaporized uranium and then magnetically separate them from the U²³⁸ atoms.

The plan identifies the steps necessary to demonstrate the AVLIS technology at plant scale by September 1992 and to provide strong industrial involvement for the transition to commercial application. Because industrialization of AVLIS technology is a major initiative, an industrial access program will be established this year. Competitive selection of a commercial deployment contractor is planned for 1991. □