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**WASHINGTON NEWS  
FROM THE FEDERATION OF MATERIALS SOCIETIES**

**JULY 2006**

**APPROPRIATIONS FOLLOW COMPETITIVENESS AGENDA**

Ever since President Bush identified research and development and STEM education as cornerstones of his American Competitiveness Initiative (ACI), the question in Washington has been whether Congress would actually fund the increases in programs. Through the initial process, the answer appears to be yes. Authorization bills – which say what “ought” to happen, as in the bill passed in 2002 to double the budget for the National Science Foundation – often do not get translated into appropriations bills, which actually provide hard dollars. This year, however, the House has fully funded the ACI components of the Department of Energy, National Science Foundation, and the National Institute for Standards and Technology. The Senate Appropriations Committee bill reported out on July 13 was even more generous.

The Senate committee report, which in the legislative process is an important mandate to the agencies, supports the thrust of the President’s American Competitiveness Initiative but says the ACI is too narrowly defined. In addition to the increased research investments at NSF, NIST, and the Office of Science at the Department of Energy, the committee recommends that ACI should include educational programs at NSF and the technology outreach programs at NIST and NASA. “For the ACI to be a truly transformative endeavor, it must bring to bear the full resources available for promoting competitiveness,” according to the report.

The report singles out NSF programs, noting that the ACI “funding levels anticipated for NSF will certainly provide the vital funding that will broaden the Nation’s understanding in fundamental science disciplines. However, the Committee feels that the ACI neglects the education work NSF does in support of research across the country. Broadening participation to underrepresented groups, such as women and minorities, in the sciences will only further the goals of the ACI...”

In other programs, the report recommends the full funding level requested for the National Nanotechnology Initiative, and encourages NSF “to make sure that public misconceptions of this field are minimized.” It also notes that the NSF Office of International Science and Engineering (OISE) “has worked to ensure that U.S. researchers are involved with leading research across the globe. As research becomes more collaborative – with partnerships reaching across nations – the work of this office identifying research opportunities around the globe will grow.”

## **DOE SCIENCE FUNDING LOOKS GOOD**

After years of flat or declining funding, the Department of Energy's Office of Science is faring very well so far in the budget process for Fiscal Year 2007. The committee report accompanying the Energy and Water Appropriations bill passed by the House "recognizes that funding a significant increase for the Office of Science required some difficult choices regarding other DOE programs." The report states that "the Committee supports the Secretary's judgment that robust funding for the basic research mission of the Department represents the best long-term use of the Department's constrained resources, and the best long-term investment for the economic future of the country." Noting that the appropriations bill significantly reduces the number of "earmarks" or special one-time projects, the Committee praises the Office of Science because it "took seriously the Congressional direction to prepare laboratory business plans and five-year budget plans, and these plans give added credibility and context to the FY 2007 budget request."

In other DOE action, Dr. Raymond L. Orbach was sworn in as the first Under Secretary for Science, a new position created by the Energy Policy Act of 2005. Dr. Orbach, a condensed matter physicist and former Chancellor of the University of California-Riverside, has been Director of the Office of Science since March 2002. Energy Secretary Samuel W. Bodman said after the swearing-in ceremony, "Today marks an important occasion...for this department, as we elevate our science mission. As the primary supporter of physical science research in the country and home to ten national laboratories, the Department of Energy's Office of Science provides the nation and the world untold promise for discovery. As Undersecretary for Science, (Dr. Orbach) will be tasked with the department's implementation of the President's bold new initiative...The American Competitiveness Initiative will help us expand the United States' leadership in math and science and will allow us to continue to grow our nation's economy."

## **NSF REORGANIZES ENGINEERING DIRECTORATE**

Effective October 1, 2006, the Engineering Directorate (ENG) of the National Science Foundation will put in place a new organizational structure which will, according to a "Dear Colleague" letter from the Acting Assistant Director, "further enhance agility within disciplines, broaden multidisciplinary research, and enable discovery at the frontiers of engineering." The new structure consolidates ENG's five current disciplinary divisions into three, and establishes three crosscutting units:

- The division of Chemical and Transport Systems and the division of Bioengineering and Environmental Systems will merge to form the division of Chemical, Bioengineering, Environmental and Transport Systems. The new division will support research and education in chemical, environmental, and bioengineering, and in areas that involve the transformation and/or transport of matter and energy by chemical, thermal, or mechanical means.

- The divisions of Civil and Mechanical Systems and Design and Manufacturing Innovation will merge to form the division of Civil, Mechanical and Manufacturing Innovation.
- The division of Electrical and Communications Systems will add cyber systems to its portfolio to become the division of Electrical, Communications and Cyber Systems.
- The office of Engineering Education and Centers will provide more emphasis on its role as a crosscutting division, to “enable the continual evolution of the engineering education and research enterprise at U.S. universities.”
- The Office of Industrial Innovation, which houses SBIR/STTR, will broaden to include new partnerships, and become the division of Industrial Innovation and Partnerships.
- A crosscutting Office of Emerging Frontiers in Research and Innovation (EFRI) will be added, reporting directly to the Office of the Assistant Director for Engineering. According to the announcement letter, “EFRI will recommend, prioritize, and fund interdisciplinary initiatives... These investments will represent transformative opportunities, potentially leading to: new research areas for NSF, ENG, and other agencies; new industries or capabilities that result in a leadership position for the country; and/or significant progress on a recognized national need or grand challenge.”

Further information is available at <http://www.nsf.gov/dir/index.jsp?org=ENG>

## **NEW STUDENT GRANTS PROGRAM**

Beginning July 1, students may apply for grants under two new programs at the Department of Education geared to math, science and foreign languages. Under the Academic Competitiveness program, grants will be awarded to rising college freshmen and sophomores who are eligible for Pell grants and who have completed a rigorous high school curriculum as defined by their states and recognized by the Secretary of Education. In addition, the National Science and Mathematics Access to Retain Talent (SMART) program provides Pell-grant eligible college juniors and seniors who are studying designated fields in math, science, technology or “critical” languages with up to \$4,000. Details are available at <http://www.ed.gov/news/pressreleases/2006/06/06292006a.html>

## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

**JUNE 2006**

#### **INNOVATION BILLS MOVING IN HOUSE**

The House Science Committee reported out two bills which address the education and workforce segments of the President's American Competitiveness Initiative. After fact-finding hearings earlier this year, the Republicans on the committee had introduced their legislative package as three bills. Weeks of negotiation led to the full Committee's unanimous action on June 7 approving a consolidation of the bills into two measures which incorporated proposals by the panel's Democratic members. H.R.5356, the Early Career Research Act, authorizes programs at the National Science Foundation and the Department of Energy's Office of Science to provide grants to researchers just starting their careers to conduct high-risk, high-return research. The bill also expands an NSF program that helps universities acquire high-tech equipment to be shared by researchers and students from various fields. H.R.5358, the Science and Mathematics Education for Competitiveness Act, would address science, math and engineering education at all levels, from K-12 through graduate school. The committee report notes that "rather than create a slate of new programs, H.R.5358 builds upon and expands existing programs at NSF, several of which the Committee wrote into law as part of the 2002 NSF reauthorization act." Building on existing programs rather than creating new ones is a calculated effort to assuage the House leadership, which is on record as being disinclined to bring to the floor any "new" spending priorities.

The Federation of Materials Societies, along with other technical societies, corporations, and universities, sent letters to House Speaker Hastert and Majority Leader Boehner urging them to schedule time for floor debate and votes. "We applaud the President and members of Congress who have brought these issues to the forefront of national attention. Just as the discovery of new materials and innovative ways to use them and more traditional materials are a vital enabler of technological progress, so too are development of the human resources of scientists and engineers," the FMS letter concluded.

#### **SENATE COMPETITIVENESS BILL DRAWS ADMINISTRATION CONCERN**

Taking a more aggressive tack, the Senate Commerce Committee approved a bill which actually creates new programs which go beyond the President's American Competitiveness Initiative. S.2802 would establish a President's Council on Innovation and Competitiveness charged with developing an agenda for promoting innovation in the public and private sectors. It would authorize the President's request for increased

funding for the National Science Foundation, and would authorize NSF grants to community colleges for new technical apprenticeship and mentoring programs for women high school, college and graduate students. Moving beyond the Administration's request, the bill would require NASA to establish an executive council with oversight over distribution and management of basic research activities, and an institute to manage the agency's aeronautical research programs. New R&D and education programs also would be created in the National Oceanic and Atmospheric Administration (NOAA). John Marburger, Director of the White House Office of Science and Technology Policy, wrote to the Committee expressing concern that the bill's new programs either duplicate existing programs or "put the government in the position of competing with private investment," and that the bill contains "excessive" authorization levels.

### **NSF FARES WELL, NIST A MIXED BAG IN HOUSE BILL**

The House Appropriations Committee on June 20 reported out the Science, State, Justice and Commerce appropriations bill with full funding of the President's American Competitiveness Initiative for the National Science Foundation. NSF would receive \$6 billion, an increase of \$439 million above FY 2006. Of that total, \$4.6 billion would go to research, and \$832.4 million to science education. In the same bill, the Committee provides \$627 million for NIST, nearly 16 percent lower than NIST's FY 2006 spending level. NIST's core laboratory programs would receive significant increases, as called for in the President's initiative, but funding would decline for the Hollings Manufacturing Extension Program (MEP) and would be zeroed out for the Advanced Technology Program (ATP). Every year, the Bush Administration proposes to terminate the ATP and just as reliably Congress reinserts some funding for the program. How that scenario plays out this year remains to be seen.

In its report accompanying the bill, the Appropriations Committee said that the American Competitiveness Initiative funds will focus on "physical science research and standards that will foster innovation. Specifically, funding is recommended for the following activities: (1) enhancing NIST's national research facilities, including support for the Center for Nanoscale Science and Technology and the Center for Neutron Research; (2) furthering the work of NIST's laboratories and technical programs, including support for developing a robust hydrogen economy, ...creating manufacturing innovation through supply chain integration, building the infrastructure for innovation through quantum information science developments, furthering structural safety from hurricanes, fires and earthquakes, and developing the next generation of materials; and (3) opening markets for American workers and exporters through development of international standards and innovation, including support for developments in measurement science and enhancements in bioimaging, cybersecurity, and biometric identification technologies."

## **DOE SCIENCE FUNDING LOOKS GOOD**

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## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

**MAY 2006**

#### **COMPETITIVENESS ON THE FAST TRACK**

Congressional and Administration backers of the President's American Competitiveness Initiative (ACI) and related proposals have been saying for months that this year is crucial to the future of significant investments in research and development and science and engineering education – that the President has gone out on a limb for funding in these areas in the face of political pressure to keep overall spending down and the momentum will be lost if significant legislation is not passed before the end of this session of Congress in December. In the Senate, hearings are continuing on several combinations of bills which have over two-thirds of the Senators as cosponsors. In the House, a burst of activity in May began a push to pass competitiveness bills before the Independence Day recess the first week in July.

#### **FOCUS IS ON HOUSE SCIENCE COMMITTEE**

The centerpiece of House action will be three bills introduced on May 11, based on recommendations for improving science, engineering, technology and math (STEM) education heard in several House Science Committee hearings earlier this year. The bills are sponsored by relatively unknown Reps. Joe Schwarz (R-MI) and Michael McCaul (R-TX) with Science Committee Chairman Sherwood Boehlert (R-NY), Co-Chairman Ralph Hall (R-TX), and the chairs of all the Science Subcommittees as original cosponsors. The plan is to marry the Republican bills with similar proposals by Science Committee ranking minority member Bart Gordon (D-TN) and other legislation coming out of the House Committee on Education and Labor. Collectively, the Science Committee bills would strengthen and expand existing K-12 and undergraduate education programs at the National Science Foundation and the Department of Energy, and would strengthen and expand programs at the two agencies that fund innovative research by new faculty.

The *Science and Mathematics Education for Competitiveness Act* (H.R.5358) by Rep. Schwarz would expand the Robert Noyce Teacher Scholarship Program, the Math and Science Partnership Program, and the Science, Technology, Engineering and Mathematics Talent Expansion Program (STEP) at NSF. It would ensure that funding for the Integrative Graduate Education and Research Traineeship (IGERT) program grows as NSF's budget increases, and would establish a program to fund NSF Centers for

Undergraduate Education in Science, Mathematics and Engineering to improve the quality of teaching and curricula in undergraduate classes in STEM fields. It also would authorize summer institutes for middle school teachers and other education programs through the national labs at DOE.

The *Early Career Research Act* (H.R.5356) by Rep. McCaul would ensure that NSF's program to help fund young faculty increases as the NSF budget grows by setting aside 3.5 percent of the agency's research funding for that purpose. NSF would provide grants of at least \$80,000 for up to five years to help researchers establish a lab and pursue high-risk research in emerging fields.

The *Research for Competitiveness Act* (H.R.5357), also by Rep. McCaul, would fund early career researchers but at the same time encourage them to seek funds from industry. Under the program, NSF and DOE would offer \$50,000 grants for up to five years, and make an additional \$50,000 available provided the researcher raises one-to-one matching funds from private industry for the proposed research. A similar program was in place at NSF in the 1980's.

## **DOE FUNDING ADVANCES IN THE HOUSE**

As the appropriations cycle begins in earnest, the House passed the Energy-Water appropriations bill which includes full funding for the Department of Energy components of the American Competitiveness Initiative proposed by President Bush. DOE Office of Science funding would increase to a total of \$4.132 billion. In addition, the bill supports the President's proposed Advanced Energy Initiative by increasing funding for a variety of clean energy technologies including biomass, hydrogen, solar, wind, and clean coal. The President commended the House and urged the Senate to follow suit, saying "This bill marks a critical first step toward realizing my American Competitiveness Initiative, ... working to keep our economy the most competitive in the world. This bill also will support my Advanced Energy Initiative and help make America more secure and less dependent on foreign sources of energy."

In separate action, the House overwhelmingly passed the H-Prize Act of 2006, which would establish a national prize competition to encourage the development of breakthrough technologies that would enable a hydrogen economy. The H-Prize, modeled after the Ansari X Prize which spurred the first privately funded suborbital human spaceflight last year, would offer prizes in three categories: Technological Advancements (four prizes of up to \$1 million awarded biennially in the categories of hydrogen production, storage, distribution and utilization); Prototypes (one prize of up to \$4 million awarded biennially that forces working hydrogen vehicle prototypes to meet ambitious performance goals); and Transformational Technologies (one grand prize consisting of a \$10 million cash award, funded in whole or in part by federal contribution). Calling hydrogen "the Holy Grail of transportation fuels," House Science Committee Chairman Sherwood Boehlert (R-NY) said that "prizes are a logical way to get as many people

working on hydrogen in as many ways as possible. This is a useful supplement to our ongoing DOE research and development programs.” Immediately after House passage, an H-prize bill was introduced in the Senate.

## **ENERGY SECURITY IS FOCUS IN SENATE**

Saying that “to be effective in responding to our current energy crisis, we must be focused, we must be realistic, and we must be bipartisan,” Senators Jeff Bingaman (D-NM), Joe Lieberman (D-CT), Evan Bayh (D-IN), Norm Coleman (R-MN) and Lincoln Chafee (R-RI) have introduced the Enhanced Energy Security Act of 2006. The bill includes initiatives to speed the development of new vehicle technologies such as plug-in hybrids and the use of light weight materials in vehicles; expand DOE loan guarantees and competitive grants to automakers and parts manufacturers to convert existing plants or to build new facilities for manufacturing fuel-efficient vehicles and vehicle components; provide funding for alternative fueling stations, and incentives for the production of cellulosic ethanol.

## **INDUSTRY FUNDING OF CAMPUS RESEARCH CONTINUES TO DECLINE**

Industry support of science and engineering research and development on college campuses fell in FY 2004 for the third year in a row, according to a new National Science Foundation survey. While private investment fell 2.6 percent that year, federal government investment rose 10.7 percent. Industry’s share of academic R&D support in FY 2004 equaled its share in FY 1983. According to the NSF survey, corporations continue to fund the bulk of R&D in the U.S. – mostly in their own laboratories. But on campuses, the federal government underwrote 64 percent of the research and development projects during the survey year, investing the most in biological and medical sciences. The report is available at <http://www.nsf.gov/statistics/infbrief/nsf06315/>

## **“DEEMED EXPORTS” TO BE STUDIED BEFORE REVISION OF REGULATIONS**

Responding to concerns raised by universities, national labs, industries, the National Academies and key members of Congress, the Department of Commerce has pulled back from implementing controversial regulations on “deemed exports” recommended last year by its Inspector General. In the meantime, it will establish a Deemed Export Advisory Committee to evaluate current policies and to recommend further steps.

The controversy arose when, almost exactly a year ago, the Commerce Department issued an advanced notice of proposed rulemaking which essentially would have required U.S. universities and federal laboratories to file a deemed export license if a foreign national uses any piece of equipment that falls under the Commerce Control Listing even in the

conduct of fundamental research. “Our principal concern with your proposed rulemaking is the negative impact it could have on the ability of universities to attract the best and brightest foreign nationals in basic research, and thus, its potential negative impact on the quality or quantity of basic research produced by universities,” wrote Senators Lamar Alexander (R-TN) and Jeff Bingaman (D-NM). The Presidents of the National Academies said, “We believe the rule changes that are being recommended...will serve to weaken both national security and the economic competitiveness of the United States. The impact will likely be to dramatically hinder American scientific, engineering and health care research and innovation, factors that have been so vital to our quality of life.”

Reacting to the news of establishment of the Advisory Committee, the Association of American Universities pointed out that the original recommendations, which it said amounted to hanging a “Top International Talent not Welcome” sign on university laboratories, would have been counter to President Bush’s declared priority on keeping universities’ ability to attract the best talent from abroad.

## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

APRIL 2006

#### CRUCIAL TIMES FOR S&T BUDGET

At our press time, the various proposals for increased federal funding for research and development and science and technology education were moving forward, but the proof will be in the numbers that emerge from the appropriations committees in the coming months. As has been the case all year, the Senate is farther along on the road to enacting the President's American Competitiveness Initiative (ACI) and the related "PACE" and "National Innovation Act" bills, with the Department of Energy portion of the PACE package already reported out of committee and awaiting floor action. In the House, the Science Committee is close to considering legislation being developed by retiring Chairman Sherwood Boehlert (R-NY). In an unusual move, Rep. Boehlert testified before the House Appropriations Subcommittee on Science, State, Justice and Commerce in April, telling the appropriators, "You have a unique opportunity this year to set the nation on a path that will keep us competitive and prosperous in the decades ahead... (F)or the United States to remain competitive, we must increase our investment in research and education. To put it more colloquially, we can pay now, or we will pay later." He called for complete funding of the ACI, including doubling the budgets for the National Science Foundation and the laboratory and construction accounts at NIST (he also supports doubling for DOE's Office of Science, but that agency does not fall under the jurisdiction of this appropriations subcommittee). "Anything less than full funding this year will make that doubling highly unlikely, both politically and fiscally," he warned. Beyond full funding for the President's initiative, Chairman Boehlert also asked for additional funds for the Education and Human Resources Directorate at NSF, the Manufacturing Extension Program at NIST, and the Science Mission Directorate at NASA.

#### PRESIDENT URGED TO GET INVOLVED

A large coalition of technical societies, universities, corporations and technical societies – including the Federation of Materials Societies and several of its members – has sent a letter to President Bush urging him to keep working with House Republican leaders to secure funding for his American Competitiveness Initiative. In particular, the group is concerned that the budget resolution being considered by the House does not assume full funding for the basic research called for in the ACI. "If appropriators followed this guidance it would be very difficult to support basic research in the physical sciences and engineering," the letter points out. "We believe this would be a strategic error on the part

of America. We urge you to continue your efforts to achieve full funding of the ACI's basic research and education."

## **COMMITTEE FOCUSES ON K-12 STEM EDUCATION**

For the first time in history, the heads of five federal agencies with science, technology, engineering and math (STEM) education programs testified together before the House Science Committee on March 30, contributing to development of the Committee's legislative proposals to implement President Bush's American Competitiveness Initiative. Last year, Congress created the Academic Competitiveness Council (ACC) to "identify all federal education programs with a math or science focus, determine the effectiveness of each program, identify areas of overlap, and recommend ways to efficiently integrate and coordinate in the future." Commenting on the initial work of the ACC, Education Secretary Margaret Spellings said that while there are "a thousand flowers blooming" throughout the federal government, there are also "a few weeds." Also testifying at the hearing were the directors of the National Science Foundation, the Office of Science at the Department of Energy, NASA, and the National Oceanic and Atmospheric Administration.

The Research Subcommittee of the House Science Committee also heard testimony this spring from witnesses who said that improving undergraduate STEM education is key to improving science and math education at the K-12 level. While most of their comments and recommendations were focused on how to better prepare K-12 teachers, the witnesses also discussed the importance of educating undergraduates in STEM fields for graduate education that leads to careers as researchers and for the increasing number of employment opportunities that require expertise in science, math or technology. Dr. Carl Weiman, a Nobel laureate in physics and Distinguished Professor of Physics at the University of Colorado at Boulder, noted that "science majors are not being created in college through educating students to the utility and intellectual challenges and rewards of science. Instead, successful science majors are primarily those few students that...manage to survive their undergraduate science education."

## **"H-PRIZE" PROPOSED TO SPUR TRANSITION TO HYDROGEN ECONOMY**

When Congress returns from the Easter recess, the House Science Committee will hold a hearing on H.R. 5143, a bill introduced by Science Research Subcommittee Chairman Bob Inglis (R-SC) which would create an "H-Prize" to provide monetary incentives to help spur the technological breakthroughs necessary for the transition to a hydrogen economy. Modeled after the Ansari X-Prize awarded for entrepreneurial space flight, the three-category H-Prize would be awarded for:

- Technological advancements – four \$1 million prizes awarded annually in the categories of hydrogen production, storage, distribution and utilization;

- Prototypes – one \$4 million prize awarded every other year for the creation of a working hydrogen vehicle prototype;
- Transformation technologies – a maximum \$100 million prize (\$10 million in cash and up to \$90 million in matching funds for private capital – awarded for changes in hydrogen technologies that meet or exceed objective criteria in production and distribution to the consumer

The bill was introduced with 14 cosponsors.

### **NIST TO BUILD INFRASTRUCTURE FOR NANOMANUFACTURING**

With a great deal of fanfare tying into the President's American Competitiveness Initiative, Secretary of Commerce Carlos Gutierrez announced the launch of a state-of-the-art center for collaborative nanotechnology research at NIST. The mission of the new multidisciplinary Center for Nanoscale Science and Technology (CNST) is "to enable science and industry by providing essential measurement methods, instrumentation, and standards to support all phases of nanotechnology development from discovery to production. Comprised of both a research arm and a nanofabrication facility (Nanofab), CNST aims to partner with industrial, academic, and government organizations to solve nanoscale measurement problems that impede the fruitful implementation of nanotechnology." CNST's first research programs will be in nanofabrication, scanning tunneling microscopy, nanomagnetism, and simulation and modeling of nanostructures in macroscopic environments. Additional research programs will be undertaken over the next two years "in response to perceived needs." CNST's Nanofab will make available advanced e-beam lithography tools and advanced measurement and characterization instruments, and users will have access to the measurement expertise available in the NIST laboratories. It is expected that the CNST Nanofab will be available to outside users by late this year. Further information is available at <http://cnst.nist.gov>

### **NSF ANNOUNCES SUBMISSION WINDOW FOR UNSOLICITED PROPOSALS**

The Division of Materials Research in the Directorate for Mathematical and Physical Sciences at the National Science Foundation will accept unsolicited proposals only during a submission window beginning the third Monday in September and ending the first Friday in November. The following types of requests are not subject to the submission window restrictions:

- Small Grants for Exploratory Research or proposals for workshops or conferences may be submitted at any time during the year;
- Supplements to existing grants to fund Research Experiences for Undergraduates (REU), Research Experiences for Teachers (RET), Creativity Extensions, or

supplement requests for any other purpose, may be submitted at any time during the year;

- Proposals to the DMR National Facilities Program.

Further information is available at <http://www.nsf.gov/materials>

## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

MARCH 7, 2006

#### COMPETITIVENESS BANDWAGON GAINS MOMENTUM

“Innovation” and “Competitiveness” are the new buzzwords in Washington, with Congress and the Administration continuing to propose new initiatives in the face of tight budget realities. One addition is a House Republican leadership package, entitled the “Innovation and Competitiveness Act” (H.R. 4845) by Rep. Bob Goodlatte (R-VA), chairman of the Republican High Tech Task Force, and publicly backed by Speaker Hastert and Majority Leader Boehner. Unlike the PACE and NIA bills in the Senate, the Goodlatte bill includes tort reform, tax and other proposals which do not track closely with many of the recent reports on the U.S. innovation predicament. House Science Committee Chairman Sherwood Boehlert (R-NY), who will carry the brunt of the burden of pushing such legislation through the House, welcomed the leadership’s interest but made clear that his committee is proceeding on its own. As he said at the press conference announcing the leadership package, “This..is a fine complement to the spending and programmatic aspects of the President’s American Competitiveness Initiative, but...it is no substitute for them.” The Science Committee is developing legislation that would implement the President’s plan, but Chairman Boehlert cautioned that “we are still doing our homework.” In a package of bills he hopes to report out by the end of May, the Chairman plans to include “authorizing the 10-year investment plan proposed by the President, setting aside funds for transformational research and young researchers, and directing some research funds to topics of national priority, including energy research. The Committee will...develop legislation to increase the nation’s focus on science and math education at the K-12 and undergraduate levels and to bolster education programs within our agencies.”

In the Senate, meanwhile, the Energy and Natural Resources Committee has reported out the energy-related bill in the PACE package, and Senator John Ensign (R-NV) has reintroduced the National Innovation Initiative provisions which fall under the Commerce Committee’s jurisdiction to enable them to move more smoothly through the committee process. An unexpected push is coming from Senator Edward Kennedy (D-MA), ranking minority member of the Senate Health, Education, Labor and Pensions (HELP) Committee. His bill, the “Right TRACK Act” (The Right Time to Reinvest in America’s Competitiveness) would authorize:

- A 10-percent annual increase over seven years in research and development at the National Institutes of Health, the National Science Foundation, and NASA, basic

research at the Department of Energy's Office of Science, and basic (6.1) and applied (6.2) research at the Department of Defense;

- Increased funding for the National Science Foundation's Math and Science Partnership program and the Teacher Institutes for the 21<sup>st</sup> Century program;
- A new "Contract for College Opportunity" grant program;
- Teacher Education Assistance for College and Higher Education (TEACH) grants;
- Increased federal student loan forgiveness for teachers of math, science, engineering and critical foreign languages who teach in high-poverty schools;
- Increased study abroad and foreign language study opportunities for students; and
- New summer institutes to help teachers integrate international content into their curricula and improve their knowledge and teaching of foreign languages and cultures.

And Senator Rick Santorum (R-PA) has introduced the SEEK Act (Securing Excellence in Education for our Kids in Math and Science). The bill echoes many of the themes in President Bush's competitiveness initiative, including expanding access to Advanced Placement coursework in high schools along with providing grants, tax relief and other incentives to university students and companies to increase the number of qualified science and math teachers.

## **BUDGET REALITIES**

While the climate has never been better for innovation and competitiveness legislation, budget constraints will come into play. The outlook is good for authorizing legislation – basically saying, this is the policy of the country in regard to research and education – but the crunch will come in the appropriations process – actually meting out the money. In the House, for example, virtually all non-defense research funding is handled in a subcommittee that also includes the Departments of State and Justice. Even within the science portfolio, there will be competing pushes for NASA and NOAA against the NSF and NIST budgets. As one veteran observer said this month, "hurricane season is coming, and NOAA needs money to predict its severity; NASA is glamorous and means jobs."

## **NASA BUDGET PRIORITIES DEBATED**

The House Science Committee held hearings this month to highlight Congressional concerns over the priorities in the Administration's proposed budget for NASA. Retiring Committee Chairman Sherwood Boehlert (R-NY), a long-time champion of NASA science programs, said "I see science as the most successful aspect of NASA, one that expands the human mind, excites students, pushes technology, provides vital information about our own planet, and helps make the U.S. a world leader." Witnesses at the hearing, including the chairmen of various decadal studies at NASA, agreed that if NASA does not get more money for science than proposed, then NASA should first preserve smaller scientific missions and research funding rather than setting aside funds for large, flagship missions.

## **CLARIFICATION URGED FOR RESEARCHER VISAS**

Four higher education associations have urged the U.S. Citizenship and Immigration Services to issue guidance to regional service centers clarifying the rules for considering visa petitions for outstanding professors and researchers, and to allow previously denied petitions to be reopened. Some regional offices are denying universities' immigrant petitions for outstanding professors or researchers on the basis that these individuals do not qualify as permanent university employees. According to the associations, these decisions "will lead to the inability of our institutions to recruit and retain the most outstanding and highly regarded scholars and scientists around the world."

## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

FEBRUARY 2006

#### PRESIDENT DISCOVERS S&T

President Bush's American Competitiveness Initiative (ACI), emphasized in his State of the Union address, subsequent high-profile speeches, and the proposed FY 2007 budget, is being welcomed with cautious optimism by the science and technology community in Washington. Clearly pressures for reduction of the federal deficit and reinstatement of many social programs proposed for budget cuts will be vying for public and Congressional attention along with the proposed long-term doubling of key research budgets and boosts to science and math education. But the burgeoning number of Senators and Representatives signing on to legislation in the innovation arena coupled with the fact that, as one veteran S&T advocate put it, "the White House finally learned to use the words technology, education, and competitiveness in the same sentence," means that the competition for funding will be on more of a level playing field. A word of warning from a Congressional staffer: "Failure is not an option" for the S&T community this year – the President has made the ACI a priority and if scientists and engineers fail to rally enough support for its basic objectives to pass, the opportunity could be lost for years to come.

#### AMERICAN COMPETITIVENESS INITIATIVE

The centerpiece of the American Competitiveness Initiative is the proposed doubling, over 10 years, of the budgets of the National Science Foundation, the Office of Science in the Department of Energy, and the laboratory programs of the National Institute of Standards and Technology. Basic and applied research in the Department of Defense also is slated for an increase over last year's request. The President also is proposing to make the R&D tax credit permanent – the single costliest component of the ACI, and the one which may be the first to fall. Finally, the ACI includes new programs in the Department of Education to expand advanced placement programs, establish an adjunct teacher corps and provide additional incentives for existing and potential teachers of math and science, and identify and disseminate teaching tools for K-12 students through a new National Math Panel patterned after the existing National Reading Panel. The ACI also sustains the Math and Science Partnerships program, continuing the Bush Administration's pattern of providing most of the funding to the Department of Education at the expense of the MSP program in NSF.

## OVERALL BUDGET CONTEXT

One consideration to keep in mind when reading reports on proposed budgets is that the Administration keys its recommendations to last year's proposals – not to the amount finally appropriated by Congress and signed by the President. A preliminary overview by the American Association for the Advancement of Science (AAAS), widely recognized both on and off Capital Hill as the most definitive analysis of R&D budgets, shows that the proposed federal R&D portfolio in FY 2007 is \$137.0 billion, 1.9 percent above FY 2006 appropriated spending levels, shy of the 2.2 percent increase needed to keep pace with expected inflation. Within that increase, according to AAAS, “development would be the clear winner...In real terms, the federal research portfolio would fall nearly 6 percent.” Eliminating Congressional earmarks – funds for specific projects inserted into appropriations bills – is a major effort of the Administration. Earmarking is also a target of the rush in the House and Senate to try to restore and image of Congressional in the wake of the Abramoff scandals.

## AGENCY OVERVIEWS

- **National Science Foundation** – would increase 7.9 percent, to \$6,020.2 million. Mathematical and Physical Sciences, which includes most materials research, would increase 6.0 percent, or \$64.9 million to \$1,150.3 million. The Division of Materials Research would increase 6.0 percent or \$14.5 million from \$242.9 million to \$257.5 million.
- **Department of Energy** – DOE Office of Science would increase 14 percent to \$3.8 billion. The largest programs would all receive increases of 8 percent or more, including double-digit percentage increases for nuclear physics, computing research, several large facilities, and the core life sciences research portfolio. On the other hand, high energy physics, fusion, and biological and environmental research would decline. Outside the Office of Science, DOE's energy R&D is slated for an 8.1 percent increase reflecting large investments in hydrogen, nuclear energy, fuel cells and coal. DOE would spend \$288 million in the Hydrogen Fuel Initiative to develop technologies for hydrogen-powered cars. Nuclear energy and solar energy R&D also would increase dramatically.
- **National Institute of Standards and Technology** -- core programs are a large feature of the President's American Competitiveness Initiative. Intramural research would increase by 18 percent to \$484 million, while construction funding for NIST research facilities would climb 42 percent. Once again, however, the Administration is proposing to eliminate the Advanced Technology Program (ATP) and significantly cut the Manufacturing Extension Partnership Program.

## **OTHER CROSS-CUTTING INITIATIVES**

According to the President's budget documents, the **Networking and Information Technology R&D** program (NITRD) would increase 9 percent over FY 2006, to \$2.7 billion, with a major focus on high-end computing. The **National Nanotechnology Initiative** shows an \$813 million increase, to \$1.2 billion, but that level is lower than the \$1.3 billion actual FY 2006 level which includes Congressional earmarks.

## **CONGRESS FLOCKS TO INNOVATION LEGISLATION**

Momentum is building rapidly in the Senate, and beginning in the House, to enact legislation that addresses the President's competitiveness initiative and the recommendations of recent reports focusing on American innovation and competitiveness. With the introduction of the PACE Acts (Protecting America's Competitive Edge) and the National Innovation Act (NIA), the Senate is poised to hold many committee hearings and possibly have legislation ready for floor action by early summer. The NIA boasts more than a quarter of the Senate as cosponsors with Senators John Ensign (R-NV) and Joseph Lieberman (D-CT), while the three PACE bills each have over 60 cosponsors with Senators Lamar Alexander (R-TN), Jeff Bingaman (D-NM), Pete Domenici (R-NM) and Barbara Mikulski (D-MD). While there are differences among the bills, the intent of the Senators and their staffs is to meld them into a series of proposals that will address education issues at the K-12 level, through community colleges, undergraduate and graduate schools; double funding for the National Science Foundation and focus increased funding and leadership roles in the Department of Energy; expand the R&D tax credit; and establish a President's Council on Innovation. The cosponsors of the bills are almost evenly divided among Republicans and Democrats, which will help build consensus and speed passage. The situation in the House is more clearly delineated along party lines, with Democrats pushing an initiative announced with great fanfare late last year by Minority Leader Nancy Pelosi (D-CA) and Republicans preparing their own bills to be publicly backed by the Speaker.

## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

JANUARY 5, 2006

#### FEDERAL RESEARCH INVESTMENT CONTINUES DOWNWARD TREND

The final appropriations for FY 2006 show an estimated \$134.8 billion research and development portfolio, a record high and an increase of 1.7 percent over F&Y 2005. But 97 percent of the funding goes to defense weapons development and human space exploration technologies. Otherwise, federal spending on R&D programs will fall nearly 2 percent after adjustment for inflation, according to the American Association for the Advancement of Science, whose analysis is recognized as authoritative by experts both on and off the Hill. The AAAS analysis also concludes that federal research investments are shrinking as a share of the U.S. economy, even as other nations are increasing their investments. “Despite an increasingly technology-based economy and a growing recognition among policymakers that federal research investments are the seed corn for future technology-based innovations,” according to AAAS, “the U.S. government research investment has failed to match the new realities and has also failed to match the competition. While the European Union goal of boosting its government research investments by 2010 may not be met, Asian nations are dramatically increasing their government research investments: both China and South Korea, for example, are boosting government research by 10 percent or more annually.” Full information on final FY 2006 funding levels and program details for individual agencies are available at [www.aaas.org/spp/rd/](http://www.aaas.org/spp/rd/)

#### SKEPTICISM ON NEED FOR NEW EDUCATION COMMISSION

The National Science Board of the National Science Foundation is considering creation of a new commission to make recommendations on improving U.S. science, technology, engineering and math (STEM) education. At the first of three public hearings, held in conjunction with the House Science Committee, the reaction was mixed at best. Science Committee Chairman Sherwood Boehlert (R-NY), ranking minority member Bart Gordon (D-TN) and Subcommittee Chairman Vern Ehlers (R-MI) all expressed skepticism that a new commission would come up with any different conclusions than those reached by many others over the past 20 years. Instead, they and other Congressmen suggested, any new commission should focus on clarifying the role of NSF in K-16 education. Other witnesses focused on the need for improved teacher training. The National Science Board plans further public hearings this year in Boulder, CO, and in Los Angeles.

## **A NEW REGULATORY FRAMEWORK FOR NANOTECH?**

The Woodrow Wilson International Center has released a report by Terry Davies, former Assistant Administrator of the Environmental Protection Agency, which calls for a new regulatory approach to nanotechnology. David Rejeski, director of the Wilson Center's Project on Emerging Nanotechnologies, said that "if nanotechnology is to succeed, there needs to be a dialogue around the proactive approach Davies suggests. Government, business and citizen groups need to exchange views and discuss options to assure the American public that as nanotechnology matures, any adverse health and environmental effects will be identified and prevented or controlled." Davies' report concludes that nanotechnology is difficult to address using existing regulations such as OSHA, FDA, and major environmental laws such as the Clean Air Act, Clean Water Act, Toxic Substances Control Act, and Resource Conservation and Recovery Act. Therefore, a new law may be required to manage potential risks of nanotechnology. The law would require manufacturers to submit a sustainability plan which would show that the nanotech product will not present an "unacceptable" risk. Davies acknowledges that "the political obstacles to passing new legislation are very large." The report also describes several mechanisms to encourage beneficial applications of nanotechnology, including research, tax breaks, acquisition programs, and regulatory incentives. It then outlines institutional needs in four areas: international harmonization, foresight capability, research on adverse health and environmental effects, and public participation. The report is available for downloading at [www.wilsoncenter.org/events/docs/EffectsNanotechFINAL.pdf](http://www.wilsoncenter.org/events/docs/EffectsNanotechFINAL.pdf)

## **NEW GOVERNMENT WEBSITES LAUNCHED**

The latest version of Science.gov has been launched to allow more refined queries for searches of federal science databases. Science.gov 3.0 introduces "MetaRank" which uses a sophisticated method for ranking science queries by searching bibliographic information such as title, author, date, abstract or other keyword identifiers. It also offers enhanced Boolean search capability, improved fielded searching, intuitive site navigation and early viewing of results while the database and Web site searches continue in real time. Science.gov is the gateway to S&T information from 17 organizations across 12 federal science agencies. A single query searches across 30 databases and 1,800 Web sites. Science.gov is hosted by the Department of Energy's Office of Scientific and Technical Information. It is part of the updated DOE website, [www.energy.gov](http://www.energy.gov) which was officially launched on January 5. According to Secretary of Energy Samuel W. Bodman, "The refurbished site allows for easier navigation by organizing content into easy-to-use categories, such as educational resources for parents, teachers and students. Additionally, energy.gov highlights new state-by-state information ... (and) also links users to the latest news on the activities of the department and its national labs and sites across the country."

## **NANOTECHNOLOGY SAFETY TO BE ASSESSED**

The National Institute for Occupational Safety and Health (NIOSH) is forming an interdisciplinary field team of researchers to partner with employers and others in conducting field studies to observe and assess occupational health and safety practices in facilities where nanotechnology processes and applications are used. The field team will assess and obtain insight on materials, processes, current and potential worker exposure, work practices, control procedures, and medical monitoring in operations where nanomaterials are developed or utilized. The findings will be used to periodically update “Approaches to Safe Nanotechnology,” an interim guidance document which can be viewed at [www.cdc.gov/niosh/topics/nanotech](http://www.cdc.gov/niosh/topics/nanotech)

## **SURVEY SHOWS INCREASE IN TECH TRANSFER**

The Association of University Technology Managers has released its 14<sup>th</sup> annual U.S. Licensing Survey. It shows that nearly 25 percent more new companies based on academic research were launched in FY 2004 than a year earlier. According to AUTM, “this accomplishment reverses two consecutive years of declines in 2002 and 2003, when the economic climate made it more difficult to secure early-stage funding.” The survey also shows that research funding at U.S. institutions was up 7.1 percent compared with FY 2003. Invention disclosures among U.S. institutions increased to 16, 871 while patents issued decreased 6.4 percent to 3,680. In FY 2004, 462 new companies based on academic discovery began operations in North America, with 74.5 percent in the originating institution’s home state. A summary and information on ordering the full survey is available at [www.autm.net](http://www.autm.net)

## **S&E DOCTORATES UP, BUT STILL BELOW PEAK**

A new survey released by the National Science Foundation on behalf of itself, the National Institutes of Health, Department of Education, Department of Agriculture, National Endowment for the Humanities, and NASA shows that the number of Ph.D. degrees granted in science and engineering fields increased in the 2004 academic year for the second year in a row. The 26,275 degrees are still below the 1998 peak of 27,728. The report cautions that there is not yet sufficient evidence to determine if the increase is a new trend. “Materials/Metallurgical Engineering” increased from 474 new doctoral degrees in 2003 to 509 in 2004 (there is no breakout for materials science). Biological sciences was the only S&E field to issue more doctorates than ever before. Physical sciences, psychology and engineering were still well below their historical peaks, with doctorates in physics declining nearly 20 percent in the last 10 years. According to the survey, over 50 percent of earned doctorates in several S&E fields went to non-U.S. citizens in 2004. See the survey summary at [www.nsf.gov/statistics/infbrief/nsf06301/](http://www.nsf.gov/statistics/infbrief/nsf06301/)

## **NEW SCIENCE AND SECURITY PANEL**

The National Academies ad hoc Committee on a New Government-University Partnership for Science and Security convened in January, and plans to hold three regional meetings and a final convocation later in the year. The panel will address issues such as the application of the USA Patriot Act to universities, the impact of export controls on university research, and sensitive but unclassified research. Details are available at [www.nas.edu/weber.nsf/CommitteeDisplay/STLP-Q-02-04-A/](http://www.nas.edu/weber.nsf/CommitteeDisplay/STLP-Q-02-04-A/)



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## WASHINGTON NEWS FROM THE FEDERATION OF MATERIALS SOCIETIES November 5, 2004

### LAME-DUCK CONGRESSIONAL SESSION SHORT AND SWEET

The unusual post-election session, necessitated by Congress' failure to reach agreement on all appropriations bills before the targeted adjournment back in October, focuses on the remaining spending bills and a few other non-controversial items. The leadership of both parties in the respective houses will be set by early December, but the make-up of House and Senate committees will not be finalized until the 109<sup>th</sup> Congress convenes in January.

### S&T EMPHASIZED IN FINAL DEFENSE AUTHORIZATION

Just before the election, President Bush signed the FY 2005 Defense Authorization Act. It calls for an additional \$640 million for defense science and technology programs above the Administration's request for \$10.6 billion. The add-on includes \$70 million for basic research programs, and the House-Senate conference report states that "The conferees expect to see an increased commitment by the Department to robustly fund S&T in the fiscal year 2006 budget, along with an appropriate balance within the accounts that acknowledges the importance of long-term research in an era of immediate and pressing needs." The bill also includes \$2.5 million for a new program called the Science Mathematics and Research Transformation Defense Scholarship Demonstration Program (SMART). This would provide scholarships to students seeking a bachelor's or advanced degree in science and engineering disciplines critical to national security in exchange for a period of employment with the Department of Defense.

### SCIENCE COMMITTEE FOCUSES ON CYBER ISSUES

In the final days of the 108<sup>th</sup> Congress, high-performance computing legislation makes its way to the President's desk for an expected signature. H.R. 4516, the Department of Energy High-End Computing Revitalization Act of 2004, would establish a research and development program within DOE to develop more advanced computers. The bill also would authorize DOE to establish supercomputer user facilities that would be available for use to U.S. researchers on a competitive, peer-reviewed basis.

On another front, the House version of comprehensive intelligence reform legislation would elevate the status of cyber security in the Department of Homeland Security by establishing an Assistant Secretary for Cyber Security in the Information Analysis and Infrastructure Protection directorate. At our press time, the intelligence bill was still tied up in House-Senate conference committee deliberations.

### INSTRUMENTATION FOR MATERIALS RESEARCH

The National Science Foundation is soliciting proposals for its Instrumentation for Materials Research – Major Instrumentation Projects. NSF intends to support the design and construction of a variety of mid-scale instruments, including but not limited to beamlines, high-field magnets, detectors, and preparation environments at major US facilities. Some of these instruments may be developed in partnership with other federal agencies. Priority will be given to those proposals which involve students in the design and construction of the instruments. According to NSF, the program will:

- Help address the urgent need to increase the number and quality of mid-scale instruments available to the entire US research community in materials and related areas of science and engineering;
- Enable the training of the next generation of instrument scientists and engineers
- Enable existing instruments to be upgraded as new technology becomes available; and
- Optimize the choice of instruments built by picking the most mature projects for construction.

The solicitation is published at <http://www.nsf.gov/pubs/2005/nsf05513/>

## **MATH AND SCIENCE PARTNERSHIPS TO FOCUS ON TEACHERS**

The National Science Foundation has announced that seven new Institute Partnerships: Teacher Institutes for the 21<sup>st</sup> Century will be formed as a result of five-year grants made to universities in the third year of competition for NSF's Math and Science Partnership (MSP) program. The new institutes represent an investment of more than \$31 million over five years. The awards will be directed to disciplinary faculty of higher learning institutions to work with experienced teachers of math and the sciences. NSF also announced five large Targeted Partnerships with grants amounting to a combined \$60 million over five years, aimed at improving math and science performance in nationwide classrooms. Details are available at <http://www.nsf.gov/od/lpa/>

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## WASHINGTON NEWS FROM THE FEDERATION OF MATERIALS SOCIETIES October 8, 2004

### CONGRESS LURCHES TOWARD YEAR-END

Having missed the start of the fiscal year on October 1, then a pre-election target date of October 8, the House and Senate left themselves little time to campaign and virtually assured a “lame-duck” session in late November. The President signed a continuing resolution, a temporary appropriations bill extending funding unsigned appropriations bills at FY 2004 levels through November 20. During the lame-duck session, most of the remaining bills are expected to be wrapped up in an omnibus appropriation, which probably will net out to little change in spending over this year’s levels. In general, the bills approved so far by the House would keep the federal investment in non-defense, non-homeland security R&D flat funded, while the Senate Appropriations Committee has been somewhat more generous to the National Science Foundation, NASA, the Department of Commerce’s NIST and ATP programs, and others.

### DEFENSE AUTHORIZATION ADVANCES

According to Congressional budget procedures, authorization bills are supposed to be passed before appropriations bills, to give guidance to spending decisions on specific programs. This year, the appropriations bill for the Department of Defense was passed and signed into law over the summer, while the authorization bill emerged from a House-Senate conference committee just prior to adjournment for the election campaigns. Advocates from the science and engineering community were cautiously pleased with the result, since the \$11.2 billion authorized for the DOD science and technology program brings it closer to the goal of three percent of total defense program spending established in Defense Guidance documents. The conference agreement includes funding for basic research, applied research, and advanced technology development in each of the services, and \$5 billion for Defense-wide science and technology. The conferees commended the Department for “mobilizing the capabilities of the science and technology community in transitioning advanced technologies for support of operations in Iraq, Afghanistan, and elsewhere in the Global War on Terrorism.” The conferees endorsed the need for “robust science and technology funding in future budgets and continued emphasis on the development, recruitment, and retention of the skilled scientists and engineers necessary to ensuring the U.S. military’s technological edge.”

### S&T WORKFORCE DATA

The ranking Democrat on the House Science Committee, Rep. Bart Gordon (D-TN), has urged the White House to follow up on recommendations contained in a report it commissioned on data regarding the U.S. scientific, technical, engineering, and mathematics workforce. The RAND report, *The U.S. Scientific and Technical Workforce*, recommends that Federal agencies take eight priority actions to improve data collection on the S&T workforce. In a letter to John H. Marburger, Director of the White House Office of Science and Technology Policy, Rep. Gordon and Rep. Jerry Costello (D-IL), said that “with the increased off-shoring of technical jobs, along with perennial recommendations for the training of more U.S. scientists and engineers, we believe that the RAND recommendations merit a rapid and serious response.” Rep. Gordon noted, “In Washington, government-commissioned reports all too

often end up on a shelf. If Congress and the Administration are to make sensible policy decisions on the issue of off-shoring, we will need the best data available. The RAND report should not be consigned to a shelf – the Administration needs to follow up aggressively on its recommendations to improve the collection of these critical data.” The report is available at <http://www.rand.org/publications/CF/CF194/>

## **INFORMATION TECHNOLOGY RESEARCH**

The National Science Foundation has made awards of \$130 million over five years to nearly 120 new Information Technology Research (ITR) projects dedicated to addressing the information technology priorities facing the country – advances in science and engineering, economic prosperity, and national and homeland security. Projects cover a wide range of topics, including protection of critical infrastructures and stress corrosion cracking in materials. This year’s awards mark the fifth and final year of the ITR priority area at NSF. In prior years, the priority area emphasized fundamental information technology research and education, applications in science and engineering, and research and education in multidisciplinary areas, focusing on emerging opportunities at the interfaces between information technology and other disciplines.

## **NEW CENTERS FOR NANOSCALE RESEARCH**

NSF recently announced awards of \$69 million over five years to fund six major new centers in nanoscale science and engineering. The new centers will be located at the University of California-Berkeley, Stanford University, the University of Wisconsin, The Ohio State University, the University of Pennsylvania, and Northeastern University. The Nanoscale Science and Engineering Centers bring together researchers with diverse expertise – in partnership with industry, government laboratories, or partners from other sectors – to address complex, interdisciplinary challenges in nanoscale science and engineering. The new centers will impact a wide range of technologies, including nanomanufacturing, nanobiotechnology, electronics and medicine. In addition, the centers’ education programs are designed to develop an innovative workforce, advance pre-college training, address societal implications related to the research topic of each center, and to advance the public understanding of science and engineering.

## **FIRST NANOSCALE CENTER FOR LEARNING AND TEACHING**

With a five-year, \$15 million grant to Northwestern University, NSF is funding the nation’s first Center for Learning and Teaching in Nanoscale Science and Engineering. The Center will create modular education materials designed to integrate with existing curricula in grades 7-12, and to align with national and state science education standards. Expansions of the modules will be targeted at community colleges and undergraduate institutions and will eventually serve as the core of semester-long courses in nanotechnology. The initial modules will focus on materials science and engineering.

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## WASHINGTON NEWS FROM THE FEDERATION OF MATERIALS SOCIETIES SEPTEMBER 10, 2004

### LONG CONTINUING RESOLUTION OR LAME DUCK?

Will Congress be forced to pass a “continuing resolution” to keep the government functioning past the start of fiscal year 2005 on October 1? The answer is “probably yes,” but for how long? As late as mid-September, Senate Appropriations Committee Chairman Ted Stevens (R-AK) was resisting pressure for a resolution continuing operations until the new Congress convenes in January 2005 – or even longer. Increasingly likely is a resolution that would allow Senators and Representatives to adjourn for election campaigns on October 8, to reconvene after November 2. Complicating that scenario, however, is the fact that because of term limits and retirements, committee leaderships will change in 2005 regardless of which party wins control of the House and Senate, and the new chairmen will not want to be bound by the actions of a “lame duck” session. We’ll have a more definitive outlook in next month’s column.

### OUT-YEAR BUDGET PRIORITIES

As agencies start preparing their requests for inclusion in the President’s FY 2006 budget (which is supposed to be submitted to Congress in early February), the directors of the Office of Management and Budget and the Office of Science and Technology Policy within the White House have issued a joint memorandum describing the Administration’s priorities for research and development funding.

The memorandum states that “the Administration favors Federal R&D investments that:

- Enable potentially high-payoff activities that require a Federal presence to attain long-term national goals including national security and energy independence;
- Sustain specifically authorized agency missions and support the missions of other agencies through stewardship of user facilities;
- Strengthen science, mathematics and engineering education and accomplishments to enable continuation of superiority in math and science;
- Support technological innovation to enhance economic competitiveness and new job growth;

- Address the workforce needs of the Nation to ensure a scientifically literate population and a robust supply of qualified experts;
- Advance fundamental discovery to improve future quality of life;
- Enhance our understanding of the global environment;
- Maximize efficiency and effectiveness of the R&D enterprise through means such as competitive, peer-reviewed award and review processes and phase-out of programs that are only marginally productive or are not important to an agency's mission; and
- Strengthen international partnerships that foster advancement of scientific frontiers and accelerate the progress of science across borders.”

The directive emphasizes that “winning the war on terror and securing the homeland continue to be the highest of national priorities,” and states that “fundamental R&D should be considered to address and counter new or novel threats.” Nanotechnology is described as “a top Administration priority” and “novel approaches to accelerating interdisciplinary and interagency collaborations” in nanotechnology are encouraged.

The OMB/OSTP guidance contains an entire section on “Priorities of the Physical Sciences,” which states that “Investments in the physical sciences likely to lead to or enable economic competitiveness continue to be important. Priority will be given to research that aims to close significant gaps in the fundamental physical understanding of phenomena that promise significant new technologies with broad societal impact. High-temperature and organic superconductors, molecular electronics, wide band-gap and photonic materials, thin magnetic films, and quantum condensates are examples of novel atomic and molecular-level systems with such gaps where coherent control holds great potential.”

## **S&E JOBS – NOT JUST FOR THOSE WITH 4-YEAR DEGREES**

A new national Science Foundation report concludes that more than one-fifth of individuals employed in science and engineering occupations have less than a bachelor's degree. These S&E workers – more than 1 million people – hold high school diplomas (5 percent of the S&E workforce) or associate's degrees (17 percent). The proportions of individuals with less than bachelor's degrees vary by occupational groups, accounting for 40 percent of those employed in computer and math science and 20 percent of those employed in engineering. The proportions are much smaller (10 percent or less) for occupations in the life, physical, and social sciences. Men and women are represented in about the same proportions, but proportions of racial or ethnic groups with less than a bachelor's degree range from 6 percent for Asian-Pacific Islanders to 34 percent for blacks and 37 percent for Hispanics. The new NSF report is available at <http://www.nsf.gov/sbe/srs/infbrief/nsf04333>





## WASHINGTON NEWS FROM THE FEDERATION OF MATERIALS SOCIETIES AUGUST 5, 2004

### BUDGET PROCESS EVEN SLOWER THAN USUAL

Election year scheduling and political jockeying, combined with war spending necessities and the looming federal debt ceiling, make a post-election lame-duck session of Congress more and more likely. Although several committees in both houses held hearings on the 9/11 Commission recommendations during the August recess, Congress was not officially in session and no work on the budget is being done until mid-September – just a few short weeks before the start of fiscal year 2005 on October 1. The House has drafted all 13 appropriations bills and approved 10 of them in July, but debate on most science and engineering related bills was postponed to September. The Senate is further behind, with only 4 of 13 appropriations bills drafted and one approved. The only final Congressional action was on the Department of Defense appropriations bill, which was signed by the President early in August.

### SECURITY R&D UP, OTHER SECTORS CUT

Taken together, all the House appropriations bills would provide a record-high federal R&D portfolio of \$131.2 billion in FY 2005. Virtually the entire increase over FY 2004 would go to defense and homeland security R&D, according to an analysis by the American Association for the Advancement of Science (AAAS). The federal investment in non-defense R&D would increase only 0.2 percent to \$56.1 billion in the House bills, far less than the predicted inflation rate of 1.25 percent. Excluding a modest increase at the National Institutes of Health, physical science and engineering R&D budgets would fall 2.1 percent under the House plan, the AAAS analysis shows. Detailed tables are available at <http://www.aaas.org/spp/rd/>

### NSF A MAJOR LOSER

While the Administration had proposed a 3 percent increase in the NSF budget for FY 2005, the bill reported out by the House Appropriations Committee calls for a 2 percent cut in spending for the agency's programs. The committee's report explains that, "given the overall funding constraints, (among other programs) no funds are provided for the proposed Workforce for the 21<sup>st</sup> Century program, the proposed new class of Science and Technology Centers, or the proposed Innovation Fund." Funding would be reduced across the board in the Education and Human Resources Directorate, including the Math and Science Partnership program, although this program would not be completely shifted to the Department of Education as proposed by the Administration. The Coalition for National Science Funding and other science and engineering advocacy groups are working to get the figures increased when the "VA-HUD" bill (which funds NSF) reaches the floor of the House, and also are urging the Senate to make appropriations consistent with the spirit of the NSF Authorization Act of 2002 which authorizes a doubling of the agency's budget over five years.

## MATERIALS WORLD NETWORK

The National Science Foundation has issued a solicitation for proposals for collaborations between materials researchers from the US and their counterparts in the Americas, through the Inter-American Materials Collaboration (CIAM); Europe, including European national funding organizations, the European Science Foundation and the European Commission (EC); and other countries or regions. Proposals must have clear relevance to fundamental materials phenomena, synthesis, characterization, properties and/or processing. NSF will consider support for the US side of such collaborations, with the expectation that funding or research organizations from the appropriate countries/regions will consider supporting the costs of the non-US participants. Projects proposed to NSF are expected to offer students and junior researchers the opportunity to participate in an international research and education experience and, more generally, for integrating research and training in an international environment. The exchange of students and post-doctoral research associates between the US and abroad is strongly encouraged. Further guidance is available from Carmen Huber, Program Director, Office of Special Programs, Division of Materials Research, National Science Foundation at [chuber@nsf.gov](mailto:chuber@nsf.gov)

## NSF RELEASES FUNDING DATA

According to preliminary data from the National Science Foundation, federal obligations are expected to reach over \$105 billion in fiscal year 2004 for activities related to R&D. The estimates are provided in advance of the detailed statistical report, *Federal Funds for Research and Development: Fiscal Years 2002, 2003, and 2004*, which will be released this fall. The new figure represents a 4 percent increase over the FY 2003 level. Research (both basic and applied) accounts for \$54 billion. Development, which comprises design, development, and improvement of prototypes and new processes, accounts for \$47 billion, or 45 percent of the total. This reverses a decreasing share of development funding, which fell from 64 percent in FY 1990 to an estimated 43 percent in FY 2003. In both basic and applied research, the life sciences account for over half the federal funding. The InfoBrief is available at <http://www.nsf.gov/sbe/srs/infbrief/nsf04331>

At the same time, NSF has released a report on *Federal R&D Funding by Budget Function: Fiscal Years 2002-04*, which is available in electronic format only at <http://www.nsf.gov/sbe/srs/>

Finally, NSF has released *Academic Research and Development Expenditures: Fiscal Year 2002*. This report, a census of the full population of eligible institutions, includes total current expenditures for separately budgeted science and engineering R&D specifically organized to produce research outcomes and either commissioned by an agency external to the institution or separately budgeted by an organizational unit (i.e., research centers) within the institution. In addition, schools were asked to provide the percentage of the total and the percentage of the federally financed expenditures that are considered basic research. Also included are research funds for which an outside organization, educational or other, is a subrecipient. The data also are broken down by detailed science and engineering fields, and by portions used for the purchase of research equipment. The report is available at <http://www.nsf.gov/sbe/srs/>

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## WASHINGTON NEWS FROM THE FEDERATION OF MATERIALS SOCIETIES JULY 8, 2004

### LONG HOT SUMMER WITH NO SPENDING ACTION

Congress is heading off for its six-week political convention recess without resolving key budget issues and will have to face an omnibus spending bill when the House and Senate reconvene in September. Fiscal year 2005 begins October 1, and lawmakers want to adjourn early in October for election campaigns. Democrats blamed Republicans for stalling and Republicans blamed Democrats for refusing to accept overall spending limits in a pattern that was supposed to be eased by a revamping of the Congressional budget process in 1974. In the past three decades, the 13 appropriations bills needed to fund the government have been passed on time in only a handful of years.

### HOUSE PASSES BILLS ON “COMPETITIVENESS AGENDA”

House Republicans have been grouping bills for floor consideration in a series of “theme weeks” this year. The first week in July was set aside for the “competitiveness agenda,” and several pieces of legislation of interest to the materials community were passed. The bills, all reported out of the House Science Committee, “would spur innovation, increase U.S. competitiveness, and mitigate environmental problems that cost the economy millions of dollars annually,” according to Science Committee Chairman Sherwood Boehlert (R-NY).

The High-Performance Computing Revitalization Act (H.R. 4218) and the Department of Energy High-End Computing Revitalization Act (H.R. 4516) were both sponsored by Reps. Judy Biggert (R-IL) and Lincoln Davis (D-TN). H.R. 4218 would strengthen U.S. supercomputing capabilities by requiring the National Science Foundation and the Department of Energy to ensure U.S. researchers access to high-performance computers, and by increasing interagency coordination of supercomputing programs. The bill has been endorsed by the Bush Administration. H.R. 4516 also would further U.S. computing capabilities by establishing a research and development program within DOE to develop more advanced computers and by authorizing DOE to establish supercomputer user facilities that would be available for use by U.S. researchers on a competitive, peer-reviewed basis.

The House also passed H.R. 3890, a bill sponsored by Rep. Melissa Hart (R-PA) to reauthorize the Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1998. The programs authorized by the Act have resulted in the development of a “roadmap” by DOE and the steel industry which identifies research projects for which they are willing to cost share. Project awards are made, and the research is generally conducted at universities and national laboratories, although some research may also be carried out onsite at participating companies’ facilities. To ensure that the benefits are realized domestically, the Act limits company participation to those companies “substantially involved in the United States domestic production, processing, or use” of steel, aluminum, or copper. H.R. 3890 adds language to the original act specifically authorizing research to target greenhouse gas reductions. After passage of the bill, Rep. Hart said, “I am pleased that my colleagues in the House of Representatives have agreed with me that we must give every advantage possible to our steel industry by continuing to fund research

that reduces energy consumption and pollution and boosts competitiveness. My bill recognizes that the steel industry isn't looking for handouts from taxpayers, rather, the role of government in this case should be to create the type of climate manufacturing and metals businesses need to succeed.”

## **NSF HIGHLIGHTS RECORD FEDERAL SUPPORT FOR SCIENCE & ENGINEERING IN ACADEMIA**

Latest statistics from the National Science Foundation Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions show that federal agencies obligated a new high of \$24.4 billion for academic science and engineering activities in FY 2002, an increase of \$1.9 billion (more than 8 percent) over FY 2001 levels. The report shows that the Department of Health and Human Services (largely the National Institutes of Health) accounted for 59 percent of all federal FY 2002 academic S&E obligations. Together with the National Science Foundation and the Department of Defense, HHS provided 84 percent of total federal academic S&E funding. NASA, the Department of Agriculture, and the Department of Energy provided most of the remaining academic S&E total. Of these three agencies, only NASA increased its FY 2002 levels (10 percent); in current dollars, Agriculture support was down over 9 percent, and DOE was down 4 percent. For further details, including a list of receiving institutions, see <http://www.nsf.gov/sbe/srs/infbrief/nsf04324/start.htm>

## **GRAD STUDENT ENROLLMENT AND POST-DOCS REACH NEW PEAK, BUT FOREIGN STUDENT ENROLLMENT DECLINES**

The National Science Foundation reports that 455,400 students were enrolled in science and engineering graduate programs in fall 2002, surpassing the previous peak reached in 1993 by 6 percent. The number of post-doctoral appointments in academic institutions also reached a new high at 32,100 in 2002, up 6 percent from 2001. The numbers represent the first national data on graduate S&E enrollment since the 9/11 terrorist attacks and shed light on the fate of foreign students on temporary visas. While graduate enrollment of foreign students in S&E fields increased by 8 percent, full-time, first-time graduate enrollment of foreign students in these fields declined by about 2,100 (7.9 percent) in 2002. The largest decline was in computer sciences (almost 15 percent). In contrast, first-time S&E graduate enrollment increased almost 14 percent for U.S. citizens and permanent residents. Other topics covered in the report, “Graduate Enrollment in Science and Engineering Fields Reaches a New Peak; First-Time Enrollment of Foreign Students Declines,” include trend data since 1992 for graduate enrollment by citizenship, enrollment status, sex, race/ethnicity, and S&E field, and for post-docs by citizenship. See <http://www.nsf.gov/sbe/srs/infbrief/nsf04326/start.htm>

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## WASHINGTON NEWS FROM THE FEDERATION OF MATERIALS SOCIETIES JUNE 8, 2004

### FY 2005 BUDGET PROCESS SLOWS, FY 2006 LOOKS GRIM

The stated determination of leaders in both houses of Congress to complete appropriations for Fiscal Year 2005 before recessing on July 23 for the political party conventions received blow after blow early in the summer, including the unexpected week off for tributes and services for the late President Ronald Reagan. A post-elections omnibus spending package is now considered inevitable, perhaps broken up into three-bill or four-bill "mini-buses." Regardless, appropriators are working within a spending cap of \$821.4 billion in discretionary spending, \$1.6 billion less than the President's proposal to allow room for supplemental defense appropriations later in the year.

Meanwhile, the White House Office of Management and Budget has issued a guidance memo to agencies preparing their FY 2006 budget requests. It directs all R&D funding agencies except the Department of Defense, the Department of Energy, the Department of Homeland Security, and NASA to plan for cuts in their portfolios as part of the Administration's plans to cut federal deficits in half over the next five years. The FY 2006 requests will be hammered out over the next several months, but the OMB memo makes it clear that any increase to a program above the projected FY 2005 level would have to be offset by a cut in another program within the agency. An analysis prepared by the American Association for the Advancement of Science, which is available on the AAAS website at <http://www.aaas.org/spp/rd/proj05u.htm>, shows that even in the favored departments, programs important to the materials community would be cut. For example, AAAS reports that "DOD would cut its support of 'S&T' (basic and applied research plus technology development) steeply in FY 2005 and by another percentage point in FY 2006, leaving the DOD S&T portfolio 18 percent smaller after inflation than in FY 2004." Similarly, AAAS says, "DOE's Office of Science would see its budget fall 2.4 percent or \$81 million in FY 2006 following a proposed cut in FY 2005. The Office of Science would see its R&D budget fall 5.4 percent in just two years after adjusting for inflation." Finally, "NSF would see its proposed gains in FY 2005 reversed the next year with a 2 percent or \$85 million cut for its R&D programs in FY 2005, leaving NSF R&D below this year's funding level after adjusting for inflation."

### METALS INITIATIVE RENEWAL MOVING IN HOUSE

This summer the House could vote on H.R.3890, a bill introduced by Rep. Melissa Hart (R-PA) that would reauthorize the Metals Initiative, a research and development program at the Department of Energy that supports energy efficiency efforts of the domestic metals industry. It sailed through the House Science Committee, and is unopposed by the Administration. The DOE efficiency R&D program was first authorized by the Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988 and was reauthorized in the Energy Policy Act of 1992. The program is closely coordinated with industry through participation in research planning and cost-sharing. This involvement serves as a "market test" of whether industry perceives the activities as important enough to contribute their time and money. In general, the program solicits proposals, which are concurrently reviewed by the industry's trade organization and DOE to ensure that the projects meet the criteria and objectives of both. The

resulting list of qualified proposals is then distributed to the trade group's member companies, which determine priority projects by identifying projects for which they are willing to cost share. Project awards are made, and the research is generally conducted at universities and national laboratories, although some research may also be carried out onsite at participating companies' facilities. To ensure that the benefits are realized domestically, the Act limits company participation to those companies "substantially involved in the United States domestic production, processing, or use" of steel, aluminum, or copper. H.R.3890 would add language to the original act specifically authorizing research to target greenhouse gas reductions.

## **SUPERCOMPUTING BILLS ADVANCE**

Legislation is progressing through both houses to deal with the threatened loss of U.S. supremacy in supercomputing. The House bill, sponsored by Science Committee Chairman Sherwood Boehlert (R-NY) and Energy Subcommittee Chair Judy Biggert (R-IL), would update the High Performance Computing Act of 1991 by requiring the White House Office of Science and Technology Policy to direct an interagency planning process and develop and maintain a roadmap for the research, development, and deployment of high-performance computing resources. It would require the National Science Foundation and the Department of Energy to assure the U.S. research community sustained access to world-class high-performance computing systems. The bill addresses training, product support, and software and standards development. It is endorsed by the Administration.

In the Senate, Senators Jeff Bingaman (D-NM) and Lamar Alexander (R-TN) are sponsoring S.2176, "The High End Computing Revitalization Act of 2004." It establishes a new, unclassified, bleeding-edge, multi-architecture, multi-facility supercomputer designed to increase computing capability by a factor of 100 and be a test-bed for promising new hardware and software. This is listed as Priority #2 in the Department of Energy's recently released "Facilities for the Future of Science" Plan. The bill also establishes a high-end software development center, whose location will be determined by a competitive, peer-reviewed technical process. According to the Senators, this addresses widespread concerns that software development is often neglected in favor of hardware acquisition for high-end systems, and is a major component of improved efficiency.

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## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

MAY 7, 2004

#### NSF RELEASES S&E INDICATORS 2004

The biennial report of the National Science Board of the National Science Foundation includes in its newest edition a state-by-state breakdown of two dozen science and technology indicators. The state statistics in *S&E Indicators 2004* focus on secondary and higher education, the S&E workforce, research and development spending, R&D outputs (such as doctoral degrees, patents and academic articles), and the high-tech economy. In 2000, the most recent year for which complete data were available, the 20 highest-ranking states continue to account for 87 percent of R&D expenditures, while the 20 lowest-ranking states account for only 4 percent. The new state indicators demonstrate that R&D expenditures do not necessarily reflect a state's ranking on other indicators, such as 8<sup>th</sup>-grade educational performance, bachelor's degrees conferred, patents awarded, federal R&D spending share, or share of high-tech businesses. College graduates are more likely to be found in states with strong federal and industry R&D investments or strong high-tech economies. A wide gap separates the top states for industrial R&D investment from those at the bottom. Similarly skewed distributions appear among rankings for federal R&D spending.

Access the full report and ratings through <http://www.nsf.gov/sbe/srs/seind04>

#### STATISTICS ON FEDERAL R&D, SCIENCE & ENGINEERING DEGREES

The National Science Foundation also has released Volume 51 of *Federal Funds for Research and Development*, covering fiscal years 2001, 2002, and 2003. The data presented in this report were derived from the Survey of Federal Funds for Research and Development, and accuracy of the data depends in part on the federal respondents to the survey. The R&D obligation data are categorized according to character of the work (basic research, applied research, and development), performer, field of science or engineering (for research but not for development), and federal R&D funding by state. Obligations for research performance at universities and colleges by fields of science or engineering are also shown, as are R&D plant data. The report is available at <http://www.nsf.gov/sbe/srs/nsf04310/pdf>

Another NSF report contains data on *S&E Degrees 1966-2001*. Of particular interest is Section C, "Classification of Programs." The authors note that "It is difficult to establish a completely consistent series of degree data over a long period of time because of changes in definitions, instructions, and field classifications, including the introduction of new specialties." The report is available at <http://www.nsf.gov/sbe/srs/nsf04311/start.htm>

#### DOE REORGANIZES OFFICE OF SCIENCE

The Department of Energy's Office of Science (SC) has been reorganized to "take (it) into the 21<sup>st</sup> century as an efficient, high-performing organization that continues to produce great science and real benefits for the American people," according to SC Director Raymond L. Orbach. The new structure eliminates a layer of management, redefines roles and responsibilities for headquarters and field managers and clarifies lines of authority and accountability. Office of Science policy and direction as well as scientific program development and management will be a headquarters responsibility, while program execution and implementation functions will be the responsibility of the Field, including the National Laboratory Site Offices and the Oak Ridge and Chicago Offices. The restructuring does not require relocation of staff, and DOE expects no involuntary separations or reductions-in-force during either

restructuring or subsequent reengineering, assuming Congressional funding of Administration budget requests. Further details are available at <http://www.secrestruct.doe.gov/indexrollout.html>

## CONGRESSIONAL MEDAL FOR MATH & SCIENCE EDUCATION

By a vote of 411-7, the House has passed legislation designed to recognize and encourage contributions of the private sector in math and science education by establishing a Congressional Medal for Outstanding Contributions in Math and Science Education. The bill, sponsored by retiring House Science Subcommittee on Research Chairman Nick Smith (R-MI), establishes the program at the National Science Foundation. It is patterned after the Baldrige Awards given annually by the Commerce Department to recognize innovative practices by private sector companies and organizations. The new Congressional Medal will recognize businesses and other private-sector entities that display an outstanding commitment to math and science education. NSF will publicize information regarding award winners to encourage the replication of best or promising practices. The bill now goes to the Senate for its consideration.

## CONGRESS APPROVES ANTITRUST EXEMPTION FOR STANDARDS DEVELOPERS

The Senate has passed legislation approved in slightly different form last year by the House which would amend the National Cooperative Research Act of 1984 to limit recovery of antitrust damages against standards development organizations (SDOs). As the federal government has increased its reliance on voluntary standards, individuals and organizations taking issue with those standards and their enforcement have discovered they can more easily sue the SDOs which developed the standards rather than challenge the government decision through regulatory or legal channels. Congress now is recognizing that the threat of treble damages and the cost of defending against antitrust suits pose a threat to voluntary standards development.

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## WASHINGTON NEWS FROM THE FEDERATION OF MATERIALS SOCIETIES April 7, 2004

### R&D TAX CREDIT EXPANDED, EXTENDED

The Senate has passed an expansion of the research and development tax credit that would allow a consortium of up to five U.S. companies to take advantage of the 20 percent credit, thus enabling them to share capital costs. The bill, sponsored by New Mexico Senators Pete Domenici (R) and Jeff Bingaman (D), also would allow companies to consider 100 percent (up from the current 65 percent) of their eligible research expenses for the purpose of calculating the tax credit when the research is conducted at federal laboratories, universities or small businesses.

### DOE HEARINGS FIND MUCH SUPPORT, FEW DOLLARS

Department of Energy officials testifying before Congressional authorizing and appropriations committees recently heard strong statements of support from Senators and Representatives coupled with bleak assessments of the possibility of increased funding to back up that support. In fact, in its FY 2005 budget proposal, the Administration provides for a 2.0 percent decrease in Office of Science funding from FY 2004. At House Science Subcommittee hearings, Deputy Director James Decker testified that the proposed funding would allow an increase in scientific user facilities from 92 percent to 95 percent of optimal use, support for continued construction of the Spallation Neutron Source, and construction of four nanoscience research facilities. It would also enable the Science Office to contribute to the President's hydrogen initiative and begin preparations for some new projects identified in the DOE facilities roadmap

### DOE RELEASES LONG-TERM HYDROGEN RESEARCH PLAN

The Department of Energy has released its "Hydrogen Posture Plan," identifying activities, deliverables and milestones for technology development over the next decade, leading up to a commercialization decision by industry in 2015. According to Energy Secretary Spencer Abraham, "If we achieve our technical objectives, the automotive and energy industries will be in a position to begin to mass market availability of both vehicles and refueling infrastructure by 2020." The Administration's FY 2005 budget request includes \$227 million for research to overcome technical challenges, integrating research, development and demonstration activities from the DOE renewable, nuclear, fossil and science offices. DOE also is coordinating its work on codes and standards with the Department of Transportation and other agencies. The plan is available at [www.eere.energy.gov/hydrogenandfuelcells](http://www.eere.energy.gov/hydrogenandfuelcells)

### CONGRESSIONAL MEDAL FOR MS&E EDUCATION

Within the span of two weeks, legislation was introduced and reported out by the House Science Committee to create a new Congressional Medal for Outstanding Contributions in Math and Science Education to recognize companies which contribute to math and science education and disseminate best or promising practices in public elementary and secondary schools. The medal is patterned after the Baldrige Awards given annually by the Commerce Department.

### MANUFACTURING BILL TO BE CONSIDERED

The full House Science Committee later this spring will take up H.R.3598, the Manufacturing Technology Competitiveness Act, after it was approved by the Subcommittee on Environment, Technology and Standards on March 25. The bill, sponsored by Subcommittee Chairman Vernon J. Ehlers (R-MI), would foster innovation in the manufacturing sciences by creating a mechanism for coordinating federal manufacturing research and development. It would also create strengthened programs that support manufacturing research, development, and innovation, and would provide technical extension services to small and medium-sized manufacturers. It would strengthen the Manufacturing Extension Program within the National Institute of Standards and Technology, establish a collaborative grants program at NIST to support innovation, and create a fellowship program at NIST to cultivate greater U.S. expertise in the manufacturing sciences. When the bill is considered at the full Committee level and later on the House floor, Subcommittee Ranking Member Mark Udall (D-CO) is expected to offer an amendment to restructure the Commerce Department's Technology Administration and create a new Manufacturing Administration to be headed by an Undersecretary of Commerce for Manufacturing and Technology. The Udall amendment also would provide additional funding through NIST and the National Science Foundation to educate and certify skill levels of manufacturing technicians.

## **EPSCOR RESEARCH INFRASTRUCTURE IMPROVEMENT GRANT PROGRAM**

The latest round of program solicitations for the EPSCOR Research Infrastructure Grant Program has been published at [www.nsf.gov/pubs/2004/nsf04564/nsf04564.htm](http://www.nsf.gov/pubs/2004/nsf04564/nsf04564.htm). The EPSCOR program is directed at promoting scientific progress in jurisdictions that have historically received lesser amounts of National Science Foundation research and development funding. Twenty-four states, the Commonwealth of Puerto Rico, and the U.S. Virgin Islands currently participate. Through this program, NSF establishes partnerships with leaders in the state government, higher education and industry designed to effect lasting improvements in a jurisdiction's research infrastructure and its national R&D competitiveness.

## **OPEN ACCESS TO DATA**

Open access to data resulting from publicly funded research is essential to advance science and the public good, but lack of consistency in government policies and within the scientific community hinders the open-access ideal, according to a report partially funded by the National Science Foundation. The report's international team of authors studied data-access issues on behalf of the 30-nation Organisation for Economic Cooperation and Development (OECD). The authors looked at the policies that governments need to consider and identified a framework that the research community should examine to achieve the vision of open access to data. The report points out inconsistent data-access policies among nations and among agencies in the same country and among scientific disciplines. The authors lay out common principles for access to publicly funded research data and call for an international effort by scientists, funding agencies and other international and national bodies to overcome the barriers to this ideal.

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## WASHINGTON NEWS FROM THE FEDERATION OF MATERIALS SOCIETIES MARCH 8, 2004

### OUTLOOK BLEAK FOR SCIENCE BUDGETS

While the Administration proposes a \$6 billion increase in federal research and development spending for fiscal 2005 over FY 2004, virtually all the additional monies would go to weapons development and homeland security R&D. According to data compiled by the American Association for the Advancement of Science, most other R&D programs would receive flat or declining funding; basic and applied research funding would actually fall 0.1 percent to \$56 billion. For a detailed analysis, see <http://www.aaas.org/spp/rd>

Congressional budget resolutions currently working their way through the House and Senate would actually freeze non-discretionary spending (including R&D accounts) at FY 2004 levels. While appropriations bills for individual agencies are expected to provide funding increases for specific programs, it is highly unlikely that all 13 appropriations measures can be passed during this election-foreshortened year. Many Congressional observers already are predicting a series of “continuing resolutions” to keep the government functioning at current spending levels.

Supporters of strong science and technology budgets in both houses of Congress already are working to reshape the President's proposals. In its “Views and Estimates” report, the House Science Committee notes the impact of budget deficits on the nation's long-term economic health, and “urges Congress to recognize the importance and contributions of science and technology to productivity and economic growth – and consequently – fiscal security.” The report declares that “Indeed, nothing benefits federal revenues over the long-term as much as accelerated economic growth, and nothing fuels long-term economic growth more than science and technology.”

Rep. Vern Ehlers (R-MI), Chairman of the Science Subcommittee on Environment, Technology and Standards, echoed that theme in testimony before the House Budget Committee. “Scientific research and development forms the foundation of increased innovation, economic vitality and national security,” he said. “Scientific research is an investment that promises, and has historically delivered, significant returns on that investment...Basic research and science education are essential to advances in medicine, military applications and continued economic prosperity, including the development of cancer therapies, GPS- or laser-guided missiles, and the Internet. As a nation, we cannot afford to starve basic science research and education.”

### VISA PROCESS TO BE IMPROVED

Administration officials acknowledged before a House Science Committee hearing at the end of February that there are problems with the current visa process for science students and scholars, but outlined steps they are taking to improve the system and reduce visa delays. The officials were responding to problems identified in a General Accounting Office report, *Border Security: Improvements Needed to Reduce Time Taken to Adjudicate Visas for Science Students and Scholars* (<http://www.gao.gov>)

Science Committee Chairman Sherwood Boehlert (R-NY) said, “When it comes to visa policy, we sometimes talk about finding ‘the proper balance’ between enhancing homeland security and ensuring a thriving scientific enterprise. But talk of balance is in many ways misleading. Our nation will not be secure, in the long run, if it does not have a healthy scientific enterprise, and science cannot thrive in an atmosphere of insecurity. But security and science are also complementary in more practical ways that must be kept in mind when reviewing visa policy. A visa regime that casts too wide a net – that hold up just about everybody for excessive security checks – that regime is not good for security or for science.” Added Ranking Minority Member Bart Gordon (D-TN), “excessive delays and uncertainty in the visa program have made the U.S. less attractive as a destination for scientific training and for research collaborations. That's bad news for science. But just as importantly, it's bad news for America because our nation has benefited from welcoming the infusion of scientific and engineering talent from abroad. We need to find that place where the need to protect

America's homeland security interests is balanced against the well-being of the nation's science and technology enterprise.”

In its report, GAO recommended that the Secretary of State, in coordination with the Director of the FBI and the Secretary of Homeland Security, develop and implement a plan to improve the security check process known as Visas Mantis to avoid unnecessary delays in visa issuance. Specifically, the government should:

- Consider actions to establish milestones to reduce the current number of pending Visas Mantis cases;
- Develop performance goals and measurements for processing Visas Mantis checks;
- Provide additional information to consular posts that clarifies guidance on the Visas Mantis program; and
- Work to achieve interoperable systems and expedite the transmittal of data between agencies.

DHS is continuing to work on improving the technical problems and critical process of the Student Exchange and Visitor Information System (SEVIS). The agency also is working to increase its presence at consular posts throughout the world. The Office of Consular Affairs at the State Department is working to improve interoperability of computer systems by investing over \$1 million to update from a cable-based system, which the FBI can connect to. The State Department also is continuing to improve officer training at the consular level to address questions and uncertainty regarding application of the Visa Mantis program.

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## WASHINGTON NEWS FROM THE FEDERATION OF MATERIALS SOCIETIES JANUARY 5, 2004

### **"ONE-STOP SHOPPING" FOR GOVERNMENT GRANTS**

The Bush Administration has launched one of the showpieces of its E-Gov initiative which aims at "harnessing internet-based technology to make it easy for citizens and businesses to interact with the government, save taxpayer dollars and streamline citizen-to-government communications."

A new web site, Grants.gov, will contain information about finding and applying for all federal grant programs. It was unveiled by the Department of Health and Human Services, which was designated the lead agency for the initiative because it awards more than half of all the competitive grants across the federal government. The site currently has information on more than 800 available grant programs involving all 26 federal grant-making agencies, which together award more than \$360 billion in grant funds. The site provides information in a standardized format across agencies and includes a "Find Grant Opportunities" feature to help applicants find potential funding opportunities. It also contains an "Apply for Grants" feature that simplifies the application process by allowing applicants to download, complete and submit applications for specific grant opportunities from any federal grant-making agency. At the beginning of 2004, application packages had been posted to the Grants.gov site by five agencies – the Departments of Commerce, Education, Energy, Justice, and HHS. This will be expanded in the coming months to include the Departments of Agriculture, Defense, Homeland Security, Housing and Urban Development, Labor, and Transportation, as well as the National Science Foundation.

The site is located at <http://www.grants.gov>

### **NANOTECHNOLOGY INFRASTRUCTURE NETWORK**

The National Science Foundation is establishing a National Nanotechnology Infrastructure Network (NNIN) – 13 university sites that will form an integrated, nationwide system of user facilities to support research and education in nanoscale science, engineering and technology. Led by Cornell University, the NNIN is to be funded at \$70 million for a five-year period beginning in 2004. Joining Cornell will be Georgia Tech, Harvard, Howard, North Carolina State, Stanford and Pennsylvania State Universities, and the University of California at Santa Barbara, the University of Michigan, the University of Minnesota, the University of New Mexico, the University of Texas at Austin, and the University of Washington. NSF expects to hold future open competitions to expand the scope of the NNIN by adding new sites and capabilities as the need arises, providing flexibility within the program.

According to Lawrence Goldberg, NSF senior engineering advisor, the NNIN will not only provide users across the nation with access to leading-edge tools and instruments, but also will contribute to a new workforce skilled in nanotechnology and the latest laboratory techniques. "NNIN will implement, on a national scale, innovation in education that will impact all levels from professional through K-12, include outreach efforts to non-traditional users, reach underrepresented groups, and disseminate knowledge to the wider technical community and public," Goldberg said. "It will also develop the intellectual and institutional capacity needed to examine and address societal and ethical implications of nanotechnology."

### **OUTLOOK FOR INDUSTRIAL R&D**

The Industrial Research Institute has released its annual forecast for research and development spending. Written by IRI's Research-on-Research Committee Chair Albert R. Johnson (Corning, Inc.), the report concludes that foreign companies are outspending U.S. companies as measured by "research intensity." Japanese companies traded on U.S. stock exchanges spend over 4 percent of each sales dollar on R&D, the data show, compared with the 1.7 percent spent by U.S. counterpart companies. "This might have strategic

implications for U.S. companies on global markets, because even though U.S. companies lead the world in innovation, if present trends continue this soon will not be true,” the report says. “They are outspent and as non-U.S. economies develop and mature the U.S. companies will likely be out-sold.”

Comparing the results of this year's survey of IRI member companies with previous years, the report forecasts decreases in total company R&D expenditures, R&D professional personnel, hiring new graduates, licensing technology from others, and the R&D-to-sales ratio. “All of these indices are at their lowest levels since the year 2000,” the report states. It also notes that “not only are companies predominantly planning on spending less, but also...for many companies that spending is a shrinking share of shrinking industrial revenue.” Finally, the IRI survey respondents reported that they intend to increase activity in precompetitive university research consortia and to increase contacts with government labs, as well as to participate in more joint ventures and alliances for R&D. Also, the trends are for decreasing outsourcing to other companies and licensing technology from others. “This combination of strategic activity confirms...that companies will put more emphasis on working with others and less emphasis on outsourcing in which they pay others to do research under contract,” the report states. “Companies will likely focus collaborations on current and new relationships in which contract terms are most reasonable – the observed decrease in intent to partner with universities implies that significant factors such as contract terms, technical performance or strategic preferences do not support increases,” IRI concludes.

Further information is available from IRI at <http://www.iriinc.org>

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## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

DECEMBER 4, 2003

#### S&T DOES FAIRLY WELL IN APPROPRIATIONS

Not wanting to go too far into an election year vulnerable to charges of not keeping the government running, Congress rolled all its undone appropriations bills into one omnibus package. After including an across-the-board 0.59 percent "adjustment" to pay for increased veterans benefits, the numbers bode fairly well for science and technology programs, although in most cases they are lower than would have been the case had the bills passed individually.

- National Science Foundation: The NSF budget will increase 5 percent over fiscal year 2003, which is more than the 3.2 percent requested by the Administration but far below the 10.4 percent increase approved in the last budget cycle. While the agency is authorized to receive \$6,390 million under the "NSF doubling" legislation enacted last year, the new budget is only \$5,577.9 million. The science, math and engineering community will be pressing for appropriations equal to the authorized amounts in the fiscal year 2005 and future budget cycles. The conference report on the omnibus appropriations bill seems to acknowledge this concern, and directs NSF "to include multi-year budget estimates and future budget impacts for multi-disciplinary and mid-level activities in the annual operating plan and in future budget requests."
- National Institute of Standards and Technology: NIST funding is down significantly, 11.8 percent below last year's levels. It still exceeds the Administration's request, however, largely because it continues the Advanced Technology Program and the Manufacturing Extension Partnerships which were proposed for phase-out. On the laboratory side, however, the omnibus bill provides a cut of 4.3 percent.

#### ENERGY APPROPRIATIONS SIGNED SEPARATELY

One appropriations bill which did make it through the normal process to stand on its own provides an increase of 5.8 percent in the Department of Energy's Office of Science (to \$3, 451.7 million), compared to the FY 2003 cut of 1.5 percent. The new level is still \$333 million below the level authorized for FY 2004 in the omnibus energy bill which would set a funding path for the Office of Science to grow by 76 percent from last year through FY 2008. Because of politically controversial provisions in the 1000-page omnibus energy authorization, the bill may die in the Senate when Congress reconvenes on January 20. In that case, the pursuit of real growth in the Office of Science budget would have to start all over again.

#### NANOTECHNOLOGY BILL A WINNER

With an unusual amount of publicity, President Bush on December 3 signed the 21<sup>st</sup> Century Nanotechnology Research and Development Act, which the White House called "one of the President's highest multi-agency R&D priorities." The new law authorizes \$3.7 billion over the next four years for the National Nanotechnology Initiative. It requires the creation of research centers, education and training efforts, research into the societal and ethical consequences of nanotechnology, and efforts to transfer technology into the marketplace. The White House fact sheet made special note of the opportunities opened up by carbon nanotubes for future electronic devices and energy applications. It also noted that "Nano-manufacturing of parts and materials from the bottom up – by assembling them on an atom-by-atom basis – may one day be used to reduce waste and pollution in the manufacturing process."

## MANUFACTURING FOCUS OF NEW BILL

Hearings are expected early in the new year on a bill recently introduced by House Science Subcommittee Chairman Vern Ehlers (R-MI), the "Manufacturing Technology Competitiveness Act." The measure would establish a new Undersecretary of Commerce for Manufacturing and Technology to oversee federal manufacturing research and development policy and act as the lead in the federal government on these issues. The

President would be directed to establish an Interagency Committee on Manufacturing Research and Development consisting of representatives from the federal agencies that have significant manufacturing technology programs. NIST would be responsible for a new competitive grant program to enlist university researchers in conducting applied research to help manufacturers. The Manufacturing Extension Partnerships program would be expanded so that MEP centers could compete for new funds to help solve specific manufacturing problems. In remarks on the House floor, Rep. Ehlers noted that "While Congress, the Administration and the American people have discussed the many challenges facing our nation's manufacturers, such as international trade, China policy, tax policy and health care costs,...a fundamental issue has been generally left out of the debate – innovation. For decades, innovation has underpinned America's dominance in the world economy. If our manufacturing sector is to remain competitive in the global marketplace, we must foster innovation within this sector...Funding research and development underpins innovation."

### "NEW SENSE OF URGENCY" IN NSB WORKFORCE REPORT

The National Science Board has released a report following a three-year study on the U.S. science and engineering workforce, calling on the government to "act now" to meet future needs in science, engineering and technology fields.

The report concludes that a sampling from 2000 census figures indicates a larger than previously known percentage of degree-holding, foreign-born professionals working in the U.S. in science and engineering occupations. At the same time, there has been a downturn in the number of H1-B visas issued to foreign-born workers in science and technology. One of the NSB's key recommendations is that the government should provide undergraduate students and institutions with substantial new support in scholarships, financial assistance and incentives to assure success in S&E study by American students. The NSB calls for more federal support for graduate and postdoctoral research programs through improved stipends, benefits and interdisciplinary opportunities. Pre-college teachers of mathematics, science and technology also need better compensation, in-service training and support as an integral part of the scientific and engineering professions, NSB declares.

The full report is available at <http://www.nsf.gov/nsb/documents/2003/nsb0369/nsb0369.pdf>

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## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

NOVEMBER 3, 2003

#### FUTURE OF DOE SCIENCE

The Secretary of Energy Advisory Board's Task Force on the Future of Science Programs at the Department of Energy has submitted its final report for public comment. The report will be considered for adoption at the next SEAB meeting, date to be determined.

The report declares that "Our future economy, security, health and quality of life fundamentally depend on continuing advances in science and technology. Frontier research will determine whether we can produce, store and distribute secure, sustainable, clean and affordable energy, and whether we can develop and produce the new materials, devices, systems and processes that will enable our industries to win in the competitive, knowledge-based, global economy." The task force calls on DOE to "lead our nation effectively through its stewardship and assessment of critical areas of scientific research and advanced technology by:

- Appointing an Under Secretary for Science;
  - Developing and sustaining an increased level of research and development funding;
  - Administering its programs using modern management tools and merit-based decisions;
  - Establishing critically important and inspirational new scientific programs addressing:
    - Energy production, storage, distribution, or conservation,
    - Advanced computation for basic sciences; and
    - Frontier, internationally-leading research facilities for fundamental science;
  - Improving its congressional, intergovernmental and public relations and communications; and
- Inspiring, attracting, educating and training the best and brightest as scientists and engineers for careers in DOE-related fields."

The report and instructions for submitting comments are available at <http://www.seab.doe.gov/publications/FSPFinalDraft.pdf>

#### MAJOR RESEARCH INSTRUMENTATION

The National Science Foundation has issued a new solicitation for the Major Research Instrumentation Program (MRI), with proposals due by January 22, 2004.

The goals of the MRI program are to:

- Support the acquisition, through purchase, upgrade, or development, of major state-of-the-art instrumentation for research, research training, and integrated research/education activities at institutions;
- Improve access to and increase use of modern research and research training instrumentation by scientists, engineers, and graduate and undergraduate students;
- Enable academic departments or cross-departmental units to create well-equipped learning environments that integrate research with education;
  - Foster the development of the next generation of instrumentation for research and research training; and
  - Promote partnerships between academic researchers and private sector instrument developers.

The MRI program assists in the acquisition or development of major research instrumentation that is too costly for support through other NSF programs. NSF particularly encourages collaborations between disciplinary scientists and private sector experts in the area of instrument manufacture, noting that "working together within a framework of concurrent engineering, such partnerships have the potential to create new products with wide scientific and commercial impact.

The solicitation is at <http://www.nsf.gov/pubs/2004/nsf04511/nsf04511.htm>

### **DARPA UNDER REVIEW**

The Defense Science Board is conducting a review of the focus and direction of DARPA's science and technology work. As directed by Acting Defense Department acquisition chief Michael Wynne, a Science Board task force "will conduct a one-time evaluation of DARPA's current technology portfolio to confirm that DARPA has advanced research projects based on sound, proven scientific and technological foundations, practices and methods, and are of high value to DOD's operational mission." DARPA's Information Awareness Office has been the focus of controversy over its Total Information Awareness research project which was cancelled by Congress in the recently passed Defense appropriations act after concerns were raised that it could be used to spy on U.S. citizens. Most observers discount that as the impetus behind the new review, however, pointing to language in the Senate version of the Defense authorization bill (yet to be finalized as this report was written) directing DOD to commission a study by the National Academy of Sciences to "assess the basic research portfolio of the services and DARPA." The balance between basic and applied research, and between research conducted Defense-wide (i.e., DARPA) and research "devolved" to the individual services, is increasingly controversial.

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## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

October 6, 2003

#### BUDGETS STILL NOT FINAL

"At least it's better than last year" was the assessment of a long-term Senate Appropriations Committee staffer commenting on the state of the federal budget process at the beginning of fiscal year 2004 on October 1. And, indeed, two of the thirteen appropriations bills had actually been passed and signed into law by the statutory date, leaving at least some hope that the remainder can be enacted by the time Congress adjourns in November or early December rather than spilling over to the spring of the next calendar year as was the case in 2002-2003. Meanwhile, the first of what will probably be several "continuing resolutions" is keeping the government operating until October 31.

#### HOMELAND SECURITY SCORES...

One of the two federal agencies to receive its full FY2004 funding on time is the Department of Homeland Security. The research and development portfolio for DHS totals \$907 million in FY 2004, a 36 percent increase over last fiscal year. But DHS is only one of many agencies included in the overall federal thrust on R&D related to homeland security. According to a new inventory compiled by the Office of Management and Budget, more than a dozen departments fund such R&D, with half of the total coming from the Department of Health and Human Services, mostly for National Institutes of Health research activities aimed at developing biomedical detection and remediation tools against biological agents.

DHS itself is moving to create the Homeland Security Advanced Research Projects Agency (HSARPA, modeled after DARPA in the Department of Defense) as the external funding arm of the new agency. Dr. David Bolka, an engineering acoustics Ph.D. who has worked at the Department of Defense as well as AT&T Bell Labs and Lucent Technologies, has been named HSARPA's first director. In addition to HSARPA, the Department is creating organizations to implement its university programs, fellowship programs, standards-setting, and rapid prototyping of homeland security products.

#### ...AS DOES DEFENSE

Support has been growing both within the Department of Defense and from the outside science and engineering community for setting a goal of 3 percent of the DOD budget for science and technology investment. The FY 2004 appropriations bill raises that to 3.3 percent, in contrast to the Administration's request for a 2.7 percent ratio. The technical community is concerned, however, that the increase is heavily concentrated in the 6.3 programs of DOD (the "D" part of R&D) at the expense of basic research. Also of concern is the "devolvement" of programs such as the University Research Initiatives from the Office of the Secretary of Defense to the purview of the three services. Funding for these programs will rise 22 percent to \$286 million but much of the increase will go to Congressional "earmarks" for specific projects. DARPA funding, which funds basic research in DOD laboratories and universities, will fall 6 percent to \$893 million.

#### NIH ROADMAP RECOGNIZES PHYSICAL SCIENCES

The Director of the National Institutes of Health has released a "roadmap" for medical research in the 21<sup>st</sup> century which would significantly reorganize the way the huge agency conducts its research, in part by developing cooperative interdisciplinary projects emphasizing the importance of the physical sciences such as materials to the biomedical portfolio. In addition to refocusing some of its own funding (doubled by Congress over the last five fiscal years), NIH seeks to develop more cooperative programs with other appropriations homes such as the Department of Energy's Office of Science. NIH envisions awarding 15 planning grants in fiscal year 2004 for interdisciplinary research centers.

## **INSTRUMENTATION FOR MATERIALS RESEARCH**

The National Science Foundation is soliciting proposals for Major Instrumentation Projects for materials research which cost more than \$2 million per instrument. The program is designed to support the development of detailed conceptual and engineering design for new tools for materials preparation or characterization at major national facilities. NSF notes that it "has a key role to play in supporting the education and training of the future researchers who will develop instrumentation for these facilities...Therefore priority will be given to those proposals which involve students in the design and construction of the instruments." Details are available at <http://www.nsf.gov/pubs/2003/nsf03604/nsf03604.htm>

## **MATH AND SCIENCE EDUCATION**

NSF has announced the award of \$216.3 million in funding for the second year of its Math and Science Partnerships (MSP). Details, including a listing of the awardees and descriptions of their projects, are at <http://www.nsf.gov/pubs/ods/getpub.cfm?pr03112>

At the same time, NSF is opening competition for the new round of the MSP focusing on middle and high school partnerships and adding "Institute Partnerships – Teacher Institutes for the 21<sup>st</sup> Century" and a focused set of Research, Evaluation and Technical Assistance projects that directly support the work of the Institute Partnerships. Full proposals are due by December 16, 2003. See <http://www.nsf.gov/pubs/2003/nsf03605/nsf03605.htm>

## **CENTERS FOR LEARNING AND TEACHING**

The new NSF solicitation for Centers for Learning and Teaching is available at <http://www.nsf.gov/pubs/2004/nsf04501/nsf04501.htm>

The program focuses on the advanced preparation of science, technology, engineering, and mathematics (STEM) educators, as well as the establishment of partnerships among Ph.D.-granting institutions, school systems, and professional societies, business and industry, research laboratories, private foundations, and informal science centers. Preliminary proposals are due December 2, 2003.

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## **WASHINGTON NEWS**

### **FROM THE FEDERATION OF MATERIALS SOCIETIES**

**SEPTEMBER 2, 2003**

#### **CURRENT EVENTS TO INFLUENCE HILL ACTION**

As Senators and Representatives work through September to try to wrap up the first session of the 108<sup>th</sup> Congress, they will be heavily influenced by new projections of record federal budget deficits and by the Midwest-Northeast-Canada blackout. The deficit numbers, expected to be made even more bleak by an almost-inevitable Administration request for supplemental funding for the ongoing war in Iraq, make decisions on appropriations bills more thorny. Few observers expect all thirteen of the appropriations measures to be passed by the start of the fiscal year on October 1, meaning the government probably will continue to operate on continuing resolutions. And predictions for the fate of the omnibus energy bill currently in conference between the House and Senate are all over the map. The conference committee deliberation were already going to be contentious because of issues such as drilling in the Arctic National Wildlife Preserve, and could get really bogged down if the effort to prevent future blackouts turns in to a broader debate on the future of energy deregulation. On the other hand, the pressure to "do something" could result in final passage of slimmed-down legislation. Congressional leaders are optimistically promising action by the end of September.

#### **NASA IN THE SPOTLIGHT**

The report of the Columbia Accident Investigation Board has prompted a wide-ranging discussion in Congress of the future not only of the space shuttle program but also of the structure and mission of NASA itself. The House Science Committee and the Senate Commerce Committee are holding hearings during September focusing on the report and how to respond to its recommendations. Science Committee Chairman Sherwood Boehlert (R-NY) said that both Congress and the Administration must "chart the future for NASA... without any preconceived notions about what the space program should look like." The committee hearings are focusing on risk assessment, management structure, and budgets. Meanwhile, the House Appropriations Committee has instructed NASA to develop a preliminary cost estimate for improving shuttle safety. The fiscal year 2004 VA-HUD appropriations bill passed by the House in July includes \$15.5 billion for NASA, but the spending priorities now may have to be changed. The Senate has not yet passed its VA-HUD bill.

#### **PEER REVIEW STANDARDS FOR REGULATORY SCIENCE**

The Office of Management and Budget has proposed a standardized process by which all significant regulatory science documents will be subjected to peer review by qualified specialists in appropriate technical disciplines. Although some federal agencies already practice peer review, there are no minimum government-wide standards. The proposal establishes uniform government-wide standards for the peer review; focuses on the role of public participation in peer review activities, the content of peer reviewers, and the agency's responsibilities to respond to the comments of peer reviewers; and requires disclosure of a peer review panel. Agencies are authorized to tailor the intensity of the peer review to the importance of the document. If the information has already been subject to adequate peer review (e.g., by a respected scientific journal), OMB would permit agencies to use that peer review to satisfy the new requirements. OMB has printed the proposal on its website at <http://www.omb.gov> and requests comments by October 28.

## INTERNATIONAL MATERIALS INSTITUTES

The National Science Foundation will support the establishment of two to four new International Materials Institutes in Fiscal Year 2004 to advance materials research by coordinating international projects involving condensed matter and materials physics; solid state and materials chemistry; and the design, synthesis, characterization, and processing of materials to meet global and regional needs. The Institutes' long term goal is the creation of a worldwide network in materials research and the development of a new generation of scientists and engineers with enhanced international leadership capabilities. The Institutes must be university-based (single or multi-campus) and must address two long-term goals: (1) creating elements of a global materials research network designed to coordinate and support the rapidly growing interdependence of materials research priorities and related activities carried out in all regions of the world; and (2) developing a new generation of students, postdoctoral scholars, and materials researchers and educators with enhanced international leadership capabilities. Proposals are due by December 1, 2003. The program solicitation is at <http://www.nsf.gov/pubs/2003/nsf03593/nsf03593.htm>

## UNDERGRADUATE RESEARCH CENTERS

The National Science Foundation has initiated a pilot program of Undergraduate Research Centers (URCs) in the chemical sciences or in interdisciplinary areas such as materials sciences and engineering supported by the chemical sciences. The program seeks new models and partnerships with the potential (1) to expand the reach of undergraduate research to include first- and second-year college students; and (2) to enhance the research capacity, infrastructure, and culture of participating institutions, thereby strengthening the nation's research enterprise. The new NSF solicitation supports both planning grants that can be used to develop models, partnerships, and pilot projects, and awards in support of the full scope of URC activity. The deadline for proposals is January 16, 2004, and details can be found at <http://www.nsf.gov/pubs/2003/nsf03595/nsf03595.htm>

## DISCOVERY CORPS FELLOWSHIPS

The Discovery Corps Fellowship Program is a pilot program of the National Science Foundation seeking new postdoctoral and professional development models that combine research expertise with professional service. For this solicitation, successful applicants will have research expertise in the chemical sciences or in interdisciplinary areas supported by the chemical sciences, such as materials science and engineering. The proposal deadline is December 15, 2003, for the solicitation printed at <http://www.nsf.gov/pubs/2003/nsf03596/nsf03596.htm>

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## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

**AUGUST 1, 2003**

Congress is in recess for the month of August. When members reconvene after Labor Day, they will face crucial decisions on appropriations bills, reconciling differing House and Senate versions of omnibus energy legislation, and other measures affecting the materials community. The recess provides an excellent opportunity for scientists and engineers to visit Congressmen and Senators in their local offices to offer expertise and express opinion on pending legislation. Further information is available from the Federation of Materials Societies at [betsyhou@ix.com](mailto:betsyhou@ix.com)

#### NSF APPROPRIATIONS ON TRACK

The House passed the VA-HUD appropriations bill, which includes funding for the National Science Foundation, on July 25, an action that House Science Committee Chairman Sherwood Boehlert (R-NY) hailed as "another feather in the cap for the scientific community." The bill provides NSF with a budget of \$5.689 billion, which represents a 6.2 percent increase over the current fiscal year. While significantly below the increase necessary to achieve the goal of doubling the NSF budget over five years, Rep. Boehlert and others hailed the amount as representing a major step in the right direction in the face of the existing constraints on discretionary spending in the federal budget. In its report on the bill, the House Appropriations Committee took note of the constraints and directed that "the Foundation should give the highest priority to increasing research opportunities for investigator initiated research in the core scientific disciplines."

#### RESEARCH IN HOMELAND SECURITY

The Senate Appropriations Committee finished its version of the Homeland Security Department funding bill before leaving for the August recess. The full House passed its version of the legislation in June. Both bills provide more funding for science and technology research than requested by the Administration. The House version includes \$900.4 million for the department's Science and Technology Research, Development, Acquisition and Operations account, an increase of \$63.1 percent over the Administration's request. The Senate Appropriations bill calls for \$866.0 million, an increase of 59.9 percent.

#### ENERGY SCIENCE A MIXED BAG

In one of the stranger twists just before the recess, the Senate broke off stalemated debate on its comprehensive authorization bill and substituted the language of the legislation it passed last year. The newly resurrected bill passed by a vote of 84-14, with the understanding that it will be rewritten in conference with the House. Last year's authorization called for significant funding increases for the Department of Energy's Office of Science.

On the appropriations front, the Senate will consider a bill in September that would give the Office of Science \$3.1 billion for research and development, a boost of just 1.2 percent over the current fiscal year although a slight improvement over the cut requested by the Administration. The House bill, on the other hand, would give the Office of Science an increase of 4.3 percent with funds added to high-performance computing research, domestic fusion research, and for increased extramural user time at DOE's large-scale scientific facilities.

Also just before the recess, a Senate Energy and Natural Resources subcommittee held a hearing to examine the role of the DOE Office of Science. The subcommittee chairman, Sen. Lamar Alexander (R-TN), called the Office of Science "the brightest star in the Department of Energy," noting that it is the nation's largest supporter of basic research in the physical sciences, sponsoring research at universities and

national laboratories, which he called "our nation's secret weapons." Sen. Alexander called for greater support within the Administration for the mission of the Office of Science.

## **NSF NANOSCALE SCIENCE & ENGINEERING**

NSF is soliciting proposals by October 22 under its program on collaborative research and education in nanoscale science and engineering. The program supports fundamental research and catalyzes synergistic science and engineering research and education in the emerging areas of nanoscale science and technology, including: biosystems at the nanoscale; nanoscale structures, novel phenomena, and quantum control; nanoscale devices and system architecture; nanoscale processes in the environment; multi-scale, multi-phenomena theory, modeling and simulation at the nanoscale; manufacturing processes at the nanoscale; and studies on the societal and educational implications of scientific and technological advances on the nanoscale. This solicitation will provide support for Nanoscale Interdisciplinary Research Teams (NIRT), Nanoscale Exploratory Research (NER), and Nanoscale Science and Engineering Centers (NSEC). The solicitation is available at [www.nsf.gov/pubs/2003/nsf03043/nsf03043.htm](http://www.nsf.gov/pubs/2003/nsf03043/nsf03043.htm)

## **SCIENCE AND ENGINEERING STATE PROFILES**

NSF's Division of Science Resources Statistics publishes *Science and Engineering State Profiles* annually. The latest report, for 200-2001, has just been published on the web at [www.nsf.gov/sbe/srs/nsf03324/start.htm](http://www.nsf.gov/sbe/srs/nsf03324/start.htm)

For each state, the District of Columbia, and Puerto Rico, the survey quantifies doctoral scientists, doctoral engineers, S&E doctorates awarded, S&E graduate students in doctorate-granting institutions, population, civilian labor force, personal income per capita, total Federal expenditures, Federal R&D obligations, Total R&D performance, industry R&D, academic R&D, public higher education current-fund expenditures, number of SBIR awards, utility patents issued to state residents, and gross state product. Each state is ranked in each of the categories (for example, California rates #1 in all categories, while Pennsylvania ranges from #4 in academic research to #16 in personal income per capita).

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## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

**JULY 3, 2003**

#### APPROPRIATIONS BILLS ON THE MOVE

Determined to try to avoid the budget standoff which delayed funding for major programs for the current fiscal year, Congressional leaders are steadily churning out appropriations bills for fiscal year 2004 which begins October 1.

The goal is to pass at least half of the thirteen measures by the time Congress recesses for the month of August. The House started the process before the Independence Day break by approving spending bills for the Department of Homeland Security. DHS is set to become one of the major funding sources for federal research and development. The R&D portfolio in the House bill totals \$1.1 billion.

The House Appropriations Committee approved its FY2004 defense spending bill on June 26. It provides a 10.4 percent increase over the current year for Department of Defense science and technology programs. Most notably, it allocates 3.2 percent of the bill's total funding to S&T programs – in line with, in fact slightly above, the recommendations of the Defense Science Board and the intersociety Coalition for National Security Research. Within the S&T total, basic research (6.1 programs) would receive \$1.43 billion, and applied research (6.2 programs) would be funded at \$4.38 billion. A number of programs, including the University Research Initiative, would be devolved from the defense-wide 6.1 account to the individual services as requested by the President.

#### NSF QUANTIFIES R&D FUNDING TRENDS

Federal obligations for R&D and R&D plant are expected to reach \$103.1 billion in fiscal year 2003, according to the National Science Foundation's annual Survey of Federal Funds for Research and Development – a nearly 6 percent increase over FY2002. NSF reports that the FY2003 obligations represent a 3.5 percent annual growth rate (or average annual percent change) over the FY1990-2003 period. When adjusted for inflation, the annual growth rate over the same time period is 1.3 percent. The NSF report analyzes data for the six federal agencies providing the most funds – the Departments of Defense, Health and Human Services (which includes the National Institutes of Health), NASA, the Department of Energy, NSF, and the Department of Agriculture. In FY2003, combined research dollars from DoD, HHS and NASA are expected to account for 73 percent of the total research money provided by the Federal government. Total research obligations are reported for eight broad fields of science and engineering in the survey: life sciences; psychology; physical sciences; environmental sciences; mathematics and computer sciences; engineering; social sciences; and other sciences, not elsewhere classified. A summary of the report is available online at <http://www.nsf.gov/sbe/srs/infbrief/nsf03321/start.htm>

#### NANOTECHNOLOGY LEGISLATION HEADS TO FINAL PASSAGE

Nanotechnology continues to be a hot topic on Capital Hill. In May, the House passed a nanotech research bill, and in June the Senate Commerce Committee reported out its version of the legislation. The bills authorize similar new nanotech R&D programs, but differ in the details of how the overall program would be managed. The House bill calls for a new interagency committee, while the Senate gives authority to the existing National Science and Technology Council within the White House Office of Science and Technology Policy. Another significant difference is that the House authorizes "Science and Technology Graduate Scholarship Programs" while the Senate bill contains no such provision. Also, the Senate bill authorizes \$5 million for an American Nanotechnology Preparedness Center "to encourage, conduct, coordinate, commission, collect, and disseminate research on the educational, legal, workforce, societal and ethical issues related to nanotechnology." These differences are expected to be worked out in a Conference Committee after the Senate passes its bill, probably clearing the way for final Congressional action in the fall.

#### EDUCATION BILLS IN THE SPOTLIGHT

Before heading home in August, the House is expected to pass two bills designed to improve both the quality and quantity of math and science teachers in grades K-12. H.R.2211, the "Ready to Teach Act," would authorize funds to recruit and train teachers and create "centers of excellence" at "high-quality, minority-serving institutions." The bill includes an amendment by Rep. Rush Holt (D-NJ) designed to link businesses with current and prospective teachers to provide them with clinical experiences including the use of laboratory equipment. The other bill, H.R.438, is designated the "Teacher Recruitment and Retention Act." It would expand to \$17,500 the federal student loan forgiveness amount for elementary and secondary math, science and special education teachers in low-income areas.

### **SCIENCE COMMITTEE CONSIDERS MANUFACTURING R&D**

In preparation for a possible new focus on legislation designed to enhance U.S. manufacturing R&D, the House Science Subcommittee on Environment, Technology and Standards held a hearing in June at which Subcommittee Chairman Vernon Ehlers (R-MI) set the tone by warning that "We are in a potentially worrisome situation today, with the prospect of losing many different industries to foreign competition, together with their supply chains, and ultimately, our R&D." Witnesses and Congressmen at the hearing agreed that, while U.S. support for R&D is high in general, neither companies nor the Federal government spend nearly enough on R&D to support the development and commercialization of products and on improvement in the manufacturing process itself. A particularly colorful comment came from Rep. Brad Miller (D-NC): "Protecting and creating manufacturing jobs is critical to our standard of living for the next generation...Cutting vocational education at community and technical colleges is dumber than dirt when you think about the economic transition we need to make in this country."

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## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

JUNE 3, 2003

#### SCIENCE BOARD URGES MORE SUPPORT FOR RESEARCH INFRASTRUCTURE

The National Science Board, the policy body for the National Science Foundation, has released a report concluding that funding for academic research infrastructure "has not kept pace with rapidly changing technology, expanding research opportunities, and an increasing number of facility users." It recommended that increased funding and attention be devoted to science and engineering research infrastructure at the nation's colleges and universities to achieve maximum results at these institutions, which represent the vast majority of the nation's base of support for fundamental research.

The report represents a significant change in thinking about research infrastructure, the NSB notes. Typically thought of as being the "hardware on the floor," the term infrastructure now encompasses "distributed" systems of hardware, software, databases and expert systems, thanks to the information revolution.

Citing new information technology and other tools that will require researchers and educators to "be connected to a sophisticated array of facilities, instruments, databases (and) technical literature," the NSB said it is "urgent" to increase federal investments for the "latest and best science and engineering infrastructure" as well as to update infrastructure currently in place in order to provide broad access to these resources by scientists and engineers nationwide.

Specifically, the NSB said the current 22 percent share of the NSF budget devoted to small and medium-scale infrastructure is too low, considering the added needs for cyberinfrastructure, and recommended a share of up to 27 percent. Special emphasis should be placed on advanced instrument technology and computational tools, increased mid-sized infrastructure projects ranging from several million to tens of millions of dollars that have been unfulfilled priorities, large facility projects that have been approved for funding but not provided the budgetary support, and development and deployment of advanced cyberinfrastructure on a broad scale. The NSB was particularly concerned about the large infrastructure projects, saying that an annual investment of \$350 million is needed over several years to address the backlog of facility construction. Further postponement of this investment, the Board said, "will not only increase the future costs of these projects, but also result in the loss of U.S. leadership in key research fields."

Other recommendations of the NSB included the need to expand education and training opportunities at research facilities, strengthen the infrastructure planning and budgeting process and develop interagency plans to establish infrastructure priorities, deployment strategies, protection of resources and partnering among organizations to enable mutual support of research facilities across national boundaries.

The final report, which is expected to guide NSF's future funding priorities, is available at <http://www.nsf.gov/nsb/documents/2003/start.htm>

#### DEFENSE AUTHORIZATION FLAT, COALITION URGES INCREASE

It will be months before final spending levels are set in appropriations bills for the Department of Defense, but the authorization language approved by both the House and Senate last month don't augur well, calling for cuts in funding for Basic Research (6.1) and Applied Research (6.2) programs, and significant increases in the Advanced Technology Development program (6.3). The authorization for total funding for all three programs remains basically unchanged from fiscal year 2003 levels, at 2.7 percent of the total DOD budget (as opposed to the 3.0 percent recommendation in the Quadrennial Defense Review).

The Coalition for National Security Research, a broadly based coalition including the Federation of Materials Societies, of which TMS is a member, has adopted a position statement endorsing the Quadrennial Defense Review recommendation, specifically calling for:

- An increase in funding to not less than \$11.4 billion for DOD's core S&T programs in FY04 – a 5.8 percent increase over current year funding;
- A halt to the diversion of funds from 6/1 (basic research) accounts to meet shortages in other accounts, which undermines the long-term goal of defense transformation and future capabilities development;
- Maintaining critical, joint, multidisciplinary S&T programs at the Office of the Secretary of Defense. Given the results of previous proposals to devolve or transfer such activities, such a move could damage the unique nature and design of these programs and would inhibit cross-service integration and coordination.

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## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

**MAY 7, 2003**

#### **NANOTECH BILL PASSES HOUSE, HEADS FOR SENATE FLOOR**

On May 7, the House overwhelmingly passed the first major legislation codifying the Federal investment in nanotechnology. The bill, passed by a vote of 405-19, would authorize \$2.4 billion over the next three years for federally funded research into nanotechnology, which is the Administration's highest science and technology priority in the fiscal year 2004 budget. The funds would go to projects sponsored by the National Science Foundation, the Department of Energy, the Department of Commerce, NASA, and the Environmental Protection Agency. The bill provides a formal structure for coordination of research across the agencies, emphasizes interdisciplinary research, addresses societal concerns raised by nanotechnology, requires outside reviews of the program, promotes efforts to commercialize nanotechnology applications, and provides incentives for U.S. citizens and legal residents to pursue degrees in science and engineering. As bill sponsor Mike Honda (D-CA) said, "Nanotechnology has the potential to become a \$1 trillion global market in a little over 10 years and as such, countries around the world are in a race to develop their nanotechnology industries. It is imperative that in this race, the U.S. must be first across the finish line."

A similar bill, S.189, sponsored by Senators George Allen (R-VA) and Ron Wyden (D-OR), is pending in the Senate Commerce, Science and Transportation Committee, where Committee Chairman John McCain (R-AZ) has given it a high priority.

#### **SCIENCE FARING WELL IN DOE LEGISLATION**

While the fate of omnibus energy legislation is still very much up in the air because of controversy over fuel economy, Alaska oil drilling and other issues, both the House and Senate bills include fairly generous authorizations for the Office of Science.

The bill passed last month in the House includes a Science Committee bill authorizing annual boosts of between 9.7 percent and 16 percent for the Office of Science in the next four years. This culminated a major push by the physical science and engineering community in support of the underlying Office of Science legislation originally sponsored by Rep. Judy Biggert (R-IL).

In the Senate, the bill reported out by the Senate Energy Committee and on the Senate floor as this report was written would increase the authorization level for the Office of Science to \$5.4 billion in FY2008 from the current budget of \$3.3 billion. It also would create a new Under Secretary for Energy and Science, with the Director of the Office of Science elevated to Assistant Secretary for Science.

#### **NSF – LAWMAKERS URGE APPROPRIATIONS TO FOLLOW DOUBLING PRESCRIPTION**

One of the messages carried by participants in this year's Science-Engineering-Technology Congressional Visits Day was to make appropriations for the National Science Foundation meet the goals set forth in the NSF "doubling" bill passed last year and signed by President Bush. The President's proposed budget calls for only a 3.2 percent increase in FY2004 over the actual levels in FY2003 – far short of the \$6.39 billion called for in the authorization law. The issue is gaining visibility on both sides of Capital Hill.

In the Senate, Administration witnesses were roundly chastised at hearings by Appropriations Subcommittee Chairman Christopher Bond (R-MO) and ranking minority member Barbara Mikulski (D-MD), both of whom called the President's request "paltry" and "disappointing." In the House, a letter is being circulated for bipartisan signatures calling on Appropriations Subcommittee Chairman James Walsh (R-NY) and ranking minority member Alan Mollohan (D-WV) to provide for the \$6.39 billion in FY2004. The letter points out the importance of investing now in research for the future, and in expanding NSF's education programs to support development of a 21<sup>st</sup> century workforce. Congressmen Walsh and Mollohan have been leaders in the effort to pass the NSF authorization and to back it up with appropriations. The letter's authors – Reps. Vern Ehlers (R-MI), Nick Smith (R-MI), Ralph Hall (D-TX), Eddie Bernice Johnson (D-

TX) and Rush Holt (D-NJ) – hope to gather a large number of signatures from both parties to bolster Reps. Walsh and Mollohan.

## **METALLURGY/MATERIALS ENGINEERING GRADUATE ENROLLMENT INCREASED IN 2001**

The National Science Foundation has released a report, "Graduate Enrollment Increases in Science and Engineering Fields" ([www.nsf.gov/sbe/srs/infbrief/nsf03315/start.html](http://www.nsf.gov/sbe/srs/infbrief/nsf03315/start.html)) which show a 4 percent overall increase in the number of graduate students enrolled in S&E programs in 2001 over 2000. The greatest gain in science fields was in computer sciences, and biomedical engineering led in engineering fields with an 11 percent increase, followed by an 8 percent increase in metallurgical/materials engineering. The report notes that an increase of students with temporary visas accounted for much of the recent increase in graduate science and engineering enrollment.

## **NSF MATERIALS RESEARCH AND EDUCATION PROPOSALS**

The National Science Foundation has requested proposals for two materials programs, with proposals due this summer.

"Cooperative Activities in Materials Research between the National Science Foundation and the European Commission" ([www.nsf.gov/pubs/2003/nsf03564](http://www.nsf.gov/pubs/2003/nsf03564))

is a continuation of the cooperative activities in materials research between NSF and the European Commission (EC) initiated in 2000. NSF will accept proposals from U.S. organizations to support the U.S. side of innovative collaborative research with scientists from the countries of the European Union and affiliated countries. Proposals also are solicited for the development of electronic networking among European and U.S. materials research centers to facilitate cooperation and interaction among materials researchers in the U.S. and the European Union. The budget may include equipment, operating costs and coordination costs for the network. The proposal deadline is July 18, 2003.

"Partnerships for Research and Education in Materials (PREM)" can be found at [www.nsf.gov/pubs/2003/nsf03565/nsf03564.pdf](http://www.nsf.gov/pubs/2003/nsf03565/nsf03564.pdf). It is intended to enhance the quantity and quality of materials research opportunities for students and faculty members at participating minority-serving institutions. The activity will produce models for developing long-term materials education and research relationships between minority-serving institutions and MRSECs and other groups, centers and facilities supported by NSF's Division of Materials Research. The proposal deadline is August 15, 2003.

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## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

APRIL 11, 2003

#### ENERGY BILLS MOVING TOWARD ENACTMENT

Congressional support for increased funding for the Department of Energy's Office of Science continues to grow. On April 11, the House approved its comprehensive energy package which includes a Science Committee bill authorizing annual boosts of between 9.7 percent and 15 percent for the Office of Science in the next four years. This culminated a major push by the physical science and engineering community in support of the underlying Office of Science legislation originally sponsored by Rep. Judy Biggert (R-IL) and enthusiastically supported by the entire Science Committee. Ironically, however, Science Committee Chairman Sherwood Boehlert (R-NY) and several other key supporters ended up voting against the omnibus energy bill because of its inclusion of controversial provisions including allowing drilling in the Arctic National Wildlife Refuge.

In the Senate, meanwhile, the Energy Committee completed about half the provisions in its own version of a comprehensive bill before adjourning for the two-week Easter recess. Office of Science issues will be taken up when the Committee reconvenes the last week in April, and authorization amounts are expected to be "robust" in the words of a key Committee staffer. Meanwhile, Senators John Warner (R-VA) and Jeff Bingaman (D-NM) spearheaded a 39-Senator letter to Majority Leader Bill Frist (R-TN) and Minority Leader Tom Daschle (D-SD) declaring bipartisan support for the Office of Science. The letter points out that despite the importance of the research conducted under the Office of Science, its budget has remained flat in real dollars for over a decade. "We urge you, during the upcoming budget resolution and appropriations process, to increase funding for the Office of Science by ten percent over the request level," the letter concludes. "This bold yet necessary step will strengthen our nation's scientific capabilities and the role that the physical sciences play in our energy security and economic growth."

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In the Senate, Administration witnesses were roundly chastised at hearings by Appropriations Subcommittee Chairman Christopher Bond (R-MO) and ranking minority member Barbara Mikulski (D-MD), both of whom called the President's request "paltry" and "disappointing." In the House, a letter is being circulated for bipartisan signatures calling on Appropriations Subcommittee Chairman James Walsh (R-NY) and ranking minority member Alan Mollohan (D-WV) to provide for the \$6.39 billion in FY2004. The letter points out the importance of investing now in research for the future, and in expanding NSF's education programs to support development of a 21st century workforce. Congressmen Walsh and Mollohan have been leaders in the effort to pass the NSF authorization and to back it up with appropriations. The letter's authors – Reps. Vern Ehlers (R-MI), Nick Smith (R-MI), Ralph Hall (D-TX), Eddie Bernice Johnson (D-TX) and Rush Holt (D-NJ) – hope to gather a large number of signatures from both parties to bolster Reps. Walsh and Mollohan.

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## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

**March 7, 2003**

#### ADMINISTRATION'S BUDGET REQUEST: DOA IN CONGRESS?

At the first hearings in the House Science Committee on the President's proposed FY04 budget for science and technology, White House Office of Science and Technology Policy Director John Marburger said the request is a "starting point" that provides important signals that "priorities have been set." While praising the language supporting S&T as vital to the nation's economic and strategic security, Committee Chairman Sherwood Boehlert (R-NY) said, "there's much to cause distress as well – like the virtual elimination of the Advanced Technology Program and the Manufacturing Extension Program, and flat funding for the Department of Energy Office of Science...(T)he concern expressed for the physical sciences in the budget reminds me a little bit of the old joke about the will that said, 'To Joe – who I said I would mention in my will – Hello, Joe!'"

In its "Views and Estimates" prepared for the House Budget Committee, the Science Committee majority (Republicans) says it will focus committee efforts this year on:

- Homeland Security, including cybersecurity, establishment of the new Department of Homeland Security, and the impact of security concerns on the conduct of research;
  - Reauthorization of space and aeronautics programs and the Space Shuttle Columbia investigation; and
  - Oversight of the Department of Energy and development of the research title for a comprehensive energy bill.

The Committee Republicans generally endorse the Administration's five multi-agency R&D priorities – networking and information technology, nanotechnology, climate change, combating terrorism, and math and science education – although they clearly think the proposed funding is too low. For individual agency budgets, their criticism is more pointed, noting in particular that the proposal for the National Science Foundation falls far short of the amount authorized in the recently enacted "NSF doubling" bill. According to the report, "The Committee believes that NSF should receive \$6.39 billion in FY04, the amount authorized...This request would increase funding for NSF's core science programs, such as information technology and nanoscale science and engineering research, and it would enable NSF to begin fully funding K-12 education programs and the large facility projects that have already been approved by the National Science Board."

Democrats on the Science Committee are even more vocal, calling for an 8-10 percent increase across-the-board from FY03 levels and saying it would be "irresponsible" to "stay wedded to the President's numbers."

#### ENERGY BILLS ON FAST TRACK

Driven by impending war and currently escalating prices for oil, natural gas, gasoline and heating oil, House committees with jurisdiction over energy legislation are planning action before the two-week Spring recess begins on April 11. The House Science Committee, in particular, is ready to move on its Office of Science research and development authorization. Committee Chairman Boehlert's bill, HR238, reflects the Office of Science language largely agreed to by conferees on last year's omnibus energy package. A slightly different tack is taken by a bill (HR34) introduced by House Science Subcommittee on Energy Chair Judy Biggert (R-IL) which has gathered over

70 cosponsors. The bills take a different approach to increasing funding for the Office of Science. While both bills would elevate the Director of the Office of Science to an Assistant Secretary of Energy, HR34 goes farther for formalize increased visibility for R&D programs within the Department by creating an Undersecretary of Energy Research and Science.

## **NANOTECHNOLOGY HIGH ON ADMINISTRATION, CONGRESSIONAL PRIORITY LISTS**

The National Nanotechnology Initiative, originally proposed by President Clinton and now given high priority by the Bush Administration, is on track to become a formalized budget priority in FY05. The President's Council of Advisors on Science and Technology (PCAST) has begun a review of the Grand Challenges and Strategic Plan for the cross-agency program with an eye to aiding in development of FY05 budget priorities. Three informal task forces will investigate issues related to nanotechnology in the fields of medical, biological and social implications; materials and electronics; and energy and the environment. The materials and electronics task force will be co-chaired by Wayne Clough, President of Georgia Institute of Technology.

In Congress, the House Science Committee is considering a bill which would give the Administration's initiative "a statutory basis and clearer funding expectations, and strengthen its interagency coordination and interdisciplinary focus," according to Committee Chairman Boehlert. The bill, HR766 by Reps. Boehlert and Mike Honda (D-CA), would authorize \$2.1 billion over three years for nanotechnology research and development programs at the National Science Foundation, Department of Energy, Department of Commerce, NASA, and the Environmental Protection Agency. The bill also provides a formal structure for coordination of interagency research, emphasizes interdisciplinary research, and requires outside reviews of the program. In the Senate, Ron Wyden (D-OR) and George Allen (R-VA) have introduced a less far-reaching bill which all sponsors hope to reconcile between the House and Senate this spring.

## **MANUFACTURING R&D THE FOCUS OF NEW INTERAGENCY EFFORT**

A new Government Agencies Technology Exchange in Manufacturing (GATE-M) has been launched to improve the exchange of information about technical programs and identify potential areas of collaboration. The agencies involved are NIST, the Departments of Energy and Defense, NASA, and the National Science Foundation. Initially, the GATE-M agencies will focus on:

Intelligence in manufacturing, a cross-cutting technology area where industry is only beginning to use capabilities made possible by intelligent, open-architecture controls that could have a major impact on supply chain cost, quality and reliability.

Nano- and micro-scale systems and technologies, which presents many manufacturing and systems issues related to electrical and mechanical applications, assembly, and measuring techniques and tools. GATE-M activities in this area will be coordinated with the National Nanotechnology Initiative.

GATE-M plans to issue joint white papers that represent interagency positions. Other possible strategies include the issuance of joint "challenges" to the research community to tackle and solve difficult technical obstacles, the development of joint Small Business Innovative Research (SBIR) topics and awards, and joint support of studies by authoritative third parties to address technical issues.

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## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

**February 6, 2003**

#### **FY 04 BUDGET PROPOSAL: S&T UP, BUT COMPARED TO WHAT?**

The fiscal year 2004 budget which the Administration proposed on February 3 contains a welcome focus on science and technology research and development spending, but most of the increases focus directly on defense and homeland security with the rest of the portfolio slated for relatively flat or even decreased funding.

In addition to the looming war expenditures, suddenly rising deficits and the space shuttle tragedy, the budget picture is complicated by the fact that at the time of its submission, Congress had not yet passed fiscal year 2003 funding for any but defense appropriations. Thus, comparisons of the newly proposed levels are made to the President's request for last year rather than actual expenditures. For example, the FY 04 request for the National Science Foundation shows a 9 percent increase – but if the Congressional numbers for FY03 were applied, the real increase would be only about 4 percent. Using either comparison, the Administration has requested far less than the approximate 15 percent increase authorized by the NSF "doubling" bill the President signed in December.

A positive note is the new emphasis on investments in the physical sciences including materials science and engineering. NSF's Directorate of Mathematical and Physical Sciences would receive a 12.7 percent increase, the Department of Energy would receive an 8.1 percent overall increase although the Office of Science would remain largely flat, and the multi-agency National Nanotechnology Initiative would jump 9.4 percent.

Initial Congressional reaction came from House Science Committee Chairman Sherwood Boehlert (R-NY): "The Administration's budget proposal for science and technology is disappointing, although perhaps unsurprising given the budgetary constraints. On the positive side, the Administration has acknowledged the importance of funding for basic research, particularly in the physical sciences...On the other hand, many science programs do not even keep up with inflation. In many areas...there aren't enough details yet to fully understand the proposals. Perhaps the best that can be said is that this budget document may have to be rethought in any event once Congress finally provides domestic appropriations for fiscal 2003...I look forward to working with the Administration, as I have in the past, to boost the funding for science beyond the initial proposals."

For a good overview of the budget proposal, check the American Association for the Advancement of Science's R&D project at [www.aaas.org/spp/rd](http://www.aaas.org/spp/rd)

#### **DARPA SUBMITS STRATEGIC PLAN**

In response to a directive in last year's Defense Authorization Act, DARPA has submitted its Strategic Plan to Congress, and posted it on its website at [www.darpa.mil](http://www.darpa.mil)

After describing its structure and decision-making process, DARPA describes its emphases in research in eight "strategic thrusts" including counter-terrorism; assured use of space; networked manned and unmanned systems; robust, self-forming networks; detect, identify, trace and destroy elusive surface targets; characterization of underground structures; bio-revolution; and cognitive computing. The agency then notes that a major portion of its research emphasizes "Enduring Foundations" – such as materials – that historically have been the technological feedstocks enabling quantum leaps in U.S. military capabilities. DARPA says that over 40 percent of its budget can be considered as devoted to high-risk, high-payoff component technologies, consistent with the goal of the Under Secretary of Defense that such a percentage be for "core technologies."

## **OPTICAL COMMUNICATIONS PROGRAM SOLICITATION**

The National Science Foundation has announced a broad interdisciplinary program of research and education on ultra-high capacity optical communications, including novel concepts in photonic devices, advanced fiber communication systems, component technologies for broadband optical access, new approaches to low-cost processing and manufacturing, and new mathematical models to simulate the device and system performance. The objective is to enable the continued growth of broadband optical access and high-capacity optical communications into the next decade. DARPA will be involved in the reviews and identification of proposals of mutual interests, but awards will be made by NSF. Letters of intent are due by March 31. Details are available at [www.nsf.gov/pubs/2003/nsf03537](http://www.nsf.gov/pubs/2003/nsf03537)

## **SCIENCE AND MATH EDUCATION INITIATIVE**

On February 6, Secretary of Education Rod Paige convened a math and science summit to discuss ways to improve student achievement and instruction, further engage the public, develop a research base, and enhance teacher knowledge. Secretary Paige called the summit "the first step in our five-year mathematics and science initiative, which will help develop the next generation of scientists and engineers who help keep American stay strong and keep our country safe." The three major goals of the initiative are to:

- Conduct a broad-based public engagement campaign that draws attention to the need for better math and science education;
- Initiate a major campaign to recruit, prepare, train, and retrain teachers with strong backgrounds in math and science; and
- Develop a major academic base to improve our knowledge of what boosts student learning in math and science

The initiative is being developed and implemented by the Department of Education, the National Science Foundation, the National Institutes of Health, and NASA. A follow-up meeting is scheduled for March 13.

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## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

January 6, 2003

#### NATIONAL ACADEMIES CALL FOR ACTION ON VISA RESTRICTIONS

The Presidents of the National Academy of Sciences, National Academy of Engineering, and National Institute of Medicine have released a statement in which, on behalf of the U.S. scientific community, they "urgently call upon the U.S. government to implement an effective and timely visa screening procedure for foreign scientists, engineers, and medical researchers, one that is consistent with the twin goals of maintaining the health of science and technology in the United States and protecting our nation's security." The Academy Presidents report that "the evidence we have collected...reveals that ongoing research collaborations have been hampered; that outstanding young scientists, engineers, and health researchers have been prevented from or delayed in entering this country; that important international conferences have been canceled or negatively impacted; and that such conferences will be moved out of the United States in the future if the situation is not corrected." They suggest mechanisms for streamlining the visa approval process without compromising security, to include:

- Reinstating a procedure of pre-security clearance for scientists and engineers with the proper credentials;
- Instituting a special visa category for established scientists, engineers, and health researchers; and
- Involving the U.S. scientific and technical community in determining areas of particular security concern.

They also call on the U.S. research community to "assist consular officials by providing appropriate documentation for those foreign citizens who are engaged in collaborations with our scientists and engineers."

#### PROPOSALS SOLICITED FOR NATIONAL NANOTECHNOLOGY INFRASTRUCTURE NETWORK

The National Science Foundation has announced a solicitation of an open competition to establish a National Nanotechnology Infrastructure Network (NNIN) as an integrated national network of user facilities in the nanoscale science and engineering field. The new national network will encompass the full spectrum of science and engineering that spans the scale from the nano to the micro domain and will build upon the culture of open-access facilities; the fostering of research, education and outreach in diverse fields; the necessary investments in capital equipment, processes, tools, and instrumentation; and will provide the infrastructure for education, training, and workforce development in nanoscale science, engineering and technology at all levels. NSF will host an informational meeting about the NNIN on January 30-31, 2003, at the Arlington Hyatt Hotel in Rosslyn, Virginia. Details on the meeting and a copy of the solicitation are available at [www.nsf.gov/nnin.htm](http://www.nsf.gov/nnin.htm)

#### SURVEY SHOWS INDUSTRIAL R&D EXPENDITURES INCREASING

Companies spent \$199.5 billion on research and development that they performed in the United States during the year 2000, up 9 percent over the 1999 figure, according to the National Science Foundation. Company funding of R&D continued to increase as it has every year since 1953, while federal funding of industrial R&D fell. After adjusting for inflation, total industrial R&D rose 7 percent, company-funded R&D rose 10 percent, and federally funded R&D in industry fell 17 percent. Manufacturing industries performed 61

percent of company-funded R&D in 2000. The R&D-to-sales ratio for all R&D-performing companies was an historical high of 3.8 percent in 2000. The InfoBrief, NSF 03-306, is available at [www.nsf.gov/sbe/srs](http://www.nsf.gov/sbe/srs)

### **NATIONAL SURVEY SHOWS DROP IN DOCTORAL DEGREES IN SCIENCE AND ENGINEERING**

A 2001 nationwide survey conducted for the National Science Foundation reports that for the first time in nine years, the number of doctoral degrees awarded by U.S. universities dropped to below 41,000. A significant decline in science and engineering doctorates has led a rollback of total Ph.D.s to pre-1994 levels. However, analysts cite a two-year turn upward in 2000-2001 graduate enrollments in S&E that could reverse the downward trend. The survey shows that women and minorities have shown slow, steady increases but are still underrepresented in most fields. Approximately 59 percent of Ph.D.s went to U.S. citizens, according to the survey. For more information, see [www.nsf.gov/sbe/srs/nsf03300/start.htm](http://www.nsf.gov/sbe/srs/nsf03300/start.htm)

### **TASK FORCE TO STUDY SCIENCE PROGRAMS AT DOE**

Secretary of Energy Spencer Abraham recently named MIT President Charles M. Vest to head a high-level Task Force on the Future of Science Programs at the Department of Energy. The task force will examine science and technology programs across the department and consider future priorities for scientific research. The task force will make its report to the Secretary of Energy Advisory Board (SEAB) next summer.

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## WASHINGTON NEWS FROM THE FEDERATION OF MATERIALS SOCIETIES

**November 29, 2002**

### NSF DOUBLING BILL FINALLY A REALITY

On November 15, the House and Senate gave final approval to legislation leading to a doubling of the National Science Foundation's budget over the next five fiscal years.

The bill (H.R.4664), a long-term goal of the science and engineering community, combines five House-passed bills, the Senate version of the NSF authorization, and language worked out with the White House Office of Management and Budget to satisfy Administration concerns. It is expected to be signed by the President as one of the last accomplishments of the 107<sup>th</sup> Congress.

Administration concerns had included the use of the politically-charged term "doubling" in the bill's title, and objections to the five-year span of authorization. Bill sponsors compromised by calling the bill simply the "National Science Foundation Authorization Act of 2002" and by making the last two years of authorization (fiscal years 2006 and 2007) contingent on a finding by the Congress that NSF "has made successful progress toward meeting (specified) management goals," taking into account OMB's evaluation on that progress.

The "Policy Objectives" section of the bill echoes the call of the science and engineering community for balance among broad disciplines, directing NSF "to strengthen the Nation's lead in science and technology by (A) increasing the national investment in general scientific research and increasing investment in strategic areas; (B) balancing the Nation's research portfolio among the life sciences, mathematics, the physical sciences, computer and information science, geoscience, engineering, and social, behavioral, and economic sciences, all of which are important for the continued development of enabling technologies necessary for sustained international competitiveness..."

The final version of the legislation included provisions of several other bills that originated in the House Science Committee related to science, technology, engineering and mathematics (STEM) education. The Senate version had attempted to consolidate math and science partnership programs from the Department of Education with the merit-based programs of NSF, but after objections from the science and technology community the two programs were kept separate. The final bill also authorizes a Noyce Scholarship program to encourage STEM majors to pursue teaching careers, a Tech Talent program to encourage college students to pursue STEM careers, and Centers for Research on Learning and Education improvement.

### DEFENSE AUTHORIZATION BILL HIGHLIGHTS S&T

The conference report on the recently-signed authorization bill for the Department of Defense makes very clear that Congress is concerned about "the continuing trend of overall reduction in the military departments' science and technology programs and the effect of that trend on the critical role that the military departments play in the transition of science and technology into acquisition programs...[A] major reason the military departments' science and technology budgets have declined is because the services have had to emphasize funding for current operations. The shift...raises issues of whether the services are investing sufficiently to properly address their long-term technology needs. The Department's science and technology program has long played a crucial role in the development of technology and in the education and training of the scientific and engineering personnel required to support the continuing technical advances critical to maintain superior military capabilities...The conferees commend the Department of Defense commitment to a

goal of three percent of the budget request for the defense science and technology program and progress toward this goal.”

TMS and other members of the Federation of Materials Societies joined with other technical organizations and universities in a letter to the DOD Under Secretary for Acquisition, Technology and Logistics endorsing the recommendations of the Defense Science Board and the 2001 Quadrennial Defense Review Report that three percent of the Department’s budget should be allocated to DOD’s basic, applied and advanced technology development (6.1, 6.2 and 6.3) programs in FY 2004 and beyond.

## **SCIENCE AND TECHNOLOGY IN THE DEPARTMENT OF HOMELAND SECURITY**

The new Department of Homeland Security will have its own science and technology policy infrastructure and its own R&D portfolio, drawing on transfers of programs from other agencies as well as newly created R&D programs and R&D performing organizations. An Under Secretary for Science and Technology will head the Directorate of Science and Technology, one of four broad directorates in the new department. This Directorate will have responsibility for setting homeland security R&D goals and priorities, coordinating homeland security R&D throughout the federal government, funding its own R&D, facilitating the transfer and deployment of technologies for homeland security, and advising the DHS Secretary on all S&T matters. There will be a Homeland Security Advisory Committee representing first responders, citizen groups, researchers, engineers, and businesses to provide advice to the Under Secretary. DHS will also have authority to create a new federally funded research and development center, the Homeland Security Institute, to act as a think tank for risk analyses and strategic plans for counterterrorism technology development. An Office for National Laboratories will coordinate DHS interactions with DOE national labs. One or more university-based centers for homeland security will be established. Finally, a new Homeland Security Advanced Research Projects Agency (HARPA) will be established within the Department of Defense, based on the model of DARPA.

A comprehensive overview and analysis of R&D within the new Department is available from the American Association for the Advancement of Science at [www.aaas.org/spp/rd](http://www.aaas.org/spp/rd)

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FMS WASHINGTON NEWS - SPECIAL EDITION

November 15, 2002

## **NSF DOUBLING BILL FINALLY A REALITY**

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The legislation contains important provisions for K-12 math and science education partnerships, including the training of master teachers; and the Tech Talent program to address the decline in the technical workforce and to improve undergraduate math and science education.

The "Policy Objectives" section of the bill echoes the call of the science and engineering community for balance among broad disciplines, directing NSF "to strengthen the Nation's lead in science and technology by (A) increasing the national investment in general scientific research and increasing investment in strategic areas; (B) balancing the Nation's research portfolio among the life sciences, mathematics, the physical sciences, computer and information science, geoscience, engineering, and social, behavioral, and economic sciences, all of which are important for the continued development of enabling technologies necessary for sustained international competitiveness..."

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## WASHINGTON NEWS FROM THE FEDERATION OF MATERIALS SOCIETIES

NOVEMBER 6, 2002

### ELECTION EFFECT AND LAME-DUCK OUTLOOK

How the shift to Republican majorities in both the House and Senate will affect issues relating to science, engineering and technology remains unclear as Congress heads into a lame-duck session. The most popular early guess is that new “continuing resolutions” will be passed to keep the government operating at fiscal year 2002 levels until sometime in late January or February, with action on FY2003 appropriations bills postponed for action by the new Congress. Republicans will take over committee chairmanships in the Senate and new members will have to be assimilated in both houses, so the SET community will be working hard to educate Senators, Representatives and their staffs on the importance of federal investment in R&D and education. Because of party seniority and other rules, few surprises are expected in SET leadership positions. One defeated member who will be missed, however, is Rep. Connie Morella (R-MD), called by her colleagues “the angel of NIST” and a strong and reliable supporter of SET legislation for many years.

### NSF DOUBLING HITS SNAG

In a case of the best-laid plans gone astray, legislation to double the authorized funding for the National Science Foundation was quietly laid aside as Congress adjourned its regular session. As reported earlier, the House and Senate each passed similar legislation putting NSF on the path to a doubled budget over the next five fiscal years. For several weeks, staff members from the House Science Committee, the Senate Health, Education, Labor and Pensions Committee and the Senate Commerce Committee worked out differences between the two bills and readied the compromise for what was supposed to be quiet passage under “unanimous consent” by both houses. At the last minute, however, a “hold” was placed on the bill by Senator Jon Kyl (R-AZ) at the behest of the Office of Management and Budget.

OMB reportedly objects to the use of the word “doubling” in the title of the legislation, and more fundamentally objects to an authorization that extends over five years (this despite the Administration’s support of the five-year doubling mandate for the National Institutes of Health, begun under the Clinton Administration). Staffers also cite objections to the bill’s “Tech Talent” provisions and language granting the National Science Board more independence from NSF. Staffers continue to try to work out these hurdles so action can be taken in the lame-duck session in December. Otherwise, the authorization process will have to start over again in the new Congress.

### NEW LAW FOCUSES ON MANUFACTURING PROCESSES

On Election Day, President Bush signed into law the Enterprise Integration Act, authorizing the National Institute of Standards and Technology to work with manufacturing industries to support the development of standards for information exchange and use these standards to ensure the seamless flow of information up and down the supply chain. NIST is directed to involve its laboratories, the Manufacturing Extension Partnership, and the Malcolm Baldrige National Quality Program, and consortia that include government and industry in the process. For each major U.S. manufacturing industry, NIST is to work with industry, trade associations and professional societies to identify all enterprise standardization and implementation activities underway, and to assist in the development of roadmaps (to be based on voluntary consensus standards) to permit supply chains to operate as an integrated electronic enterprise. Technical and financial support would be provided to small and medium-sized businesses that set up enterprise integration pilot projects.

### NSF TEACHING LEADERSHIP CENTERS

The National Science Foundation has announced its investment in five new Centers for Learning and Teaching to increase the numbers, professionalism and diversity of K-12 math and science teachers, and higher education faculty who prepare future teachers. The new centers – at the American Association for the Advancement of Science, Washington University in St. Louis, and the Universities of Wisconsin, Washington, and Georgia – will receive an estimated \$10 million each over the next five years. Individual efforts in the K-12 component of the program range from development of new math and science curricula, to instructional materials and professional development of teachers. The higher-education component will provide for coordinated efforts in research, faculty professional development and education practice at colleges and universities. More information is available at <http://www.ehr.nsf.gov/esie/programs/clt/clt.asp>

## **NEW FEDERAL R&D REPORT**

The long-awaited analysis of federal investment in R&D prepared for the President’s Council of Advisors on Science and Technology has been released by the RAND Science and Technology Policy Institute. The analysis, “Federal Investment in R&D,” does not make policy recommendations but rather is a distillation of statistics from the National Science Foundation, the American Association for the Advancement of Science, and other sources. It underscores, in the words of PCAST member Erich Bloch, the fact that “A review of the last 25 years of R&D funding shows the rather large changes in the areas supported. There are not only changes between defense and civilian R&D caused by changes in the international political climate, but also rather large shifts in funding among science and engineering disciplines, such as the physical and life sciences.” In his introduction to the report, Bloch identifies declining or stagnant human resources in science and engineering as the “paramount” issue for PCAST. The full report is at <http://www.rand.org/publications/MR/MR1639.0/>

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## WASHINGTON NEWS FROM THE FEDERATION OF MATERIALS SOCIETIES

October 1, 2002

### R&D FUNDING INCREASES CAUGHT IN BUDGET MORASS

With Congress adjourning for election campaigns without sending any of the thirteen regular appropriations bills to the President, federal agencies were left to operate on a series of “continuing resolutions” which provide funding at fiscal year 2002 levels. This does not mean that all the hard work by proponents of increased federal support for science and engineering research went for naught this year, but it does cloud the picture as far as immediate actions are concerned. The outlook will become clearer after the elections, particularly for the movement to double the R&D budget of the National Science Foundation.

As this newsletter went to press, Congress still had on its plate two versions of legislation setting **NSF** on a path to doubling its research budget over five years. The House overwhelmingly passed a bill over the summer which would start the process with 15 percent increases over each of the next three fiscal years, and the Senate Commerce Committee and Senate Health, Education, Labor and Pensions Committee approved even more generous terms covering five years. Before bringing the bill to a final vote in the Senate, House and Senate staff members were meeting to try to come to agreement on the terms of the bill. In addition to the differing number of years for the authorization to run, the Senate bill contains a provision dealing with math and science education partnerships that troubles many in the science and technology community. It would combine programs of the Department of Education and NSF, and turn the Math and Science Partnerships program at NSF into a formula program rather than the traditional NSF practice of awarding grants by merit only, beginning in FY 2006. Further complicating the picture is opposition from NSF itself because the authorization level exceeds the President’s budget request for FY 2003, the bill increases the independence of the National Science Board from the National Science Foundation, and the Tech Talent program established by the bill might violate recent court rulings on affirmative action.

### DEPARTMENT OF ENERGY SCIENCE FUNDING

At our press time, the House Appropriations Committee had just reported out its DOE bill but the full House had not acted on it. While providing only a 1.6 percent increase for DOE’s Office of Science, the Committee report offered some hopeful perspectives:

“As are many others, the Committee is concerned about the growing imbalance in the Federal investment in research in the physical sciences versus the life sciences...The Committee hopes that the Department submits a fiscal year 2004 budget request that will support a robust physical sciences research program in the Office of Science. In addition to funding the capabilities that already exist at the national laboratories, the next budget request should also invest in the future by supporting the development of the next generation of scientists and engineers and the next generation of research instruments. The Committee will support future growth in the Science budget if the Department is able to present a rational scheme for setting priorities among the various research areas and among the wide range of possible new projects..., can improve its program and project management, and takes tangible and aggressive steps to implement external regulation at its Science laboratories.”

### NEW NANOTECHNOLOGY BILL

Senators Ron Wyden (D-OR), Joe Lieberman (D-CT) and George Allen (R-VA) are the sponsors of the 21<sup>st</sup> Century Nanotechnology Research and Development Act, introduced on September 17 and approved two days later by the Senate Commerce, Science and Transportation Committee. Senator Lieberman emphasized that the bill, S.2945, would complement and

expand the current civilian National Nanotechnology Initiative, begun by President Clinton and continued by President Bush, by “authorizing establishment of an independent advisory panel; emphasizing long-term goals; striking a balance between long-term and short-term research; supporting the development of research facilities, equipment, and instrumentation; creating special funding to support research that falls in the breach between agency missions and programs; promoting interdisciplinary research and research groups; facilitating technology transition and outreach to industry; conducting studies on the societal implications of nanotechnology including those related to ethical, educational, legal, and workforce issues; and the development of metrics for measuring progress toward program goals.” Senator Lieberman also noted that the legislation will complement the provision he authored in this year’s Defense Department authorization bill, which would establish a nanotechnology R&D program within DOD. As S.2045 was sent to the Senate floor, Senator Wyden said, “Here’s a chance for a model for our times. We can use it over and over again if we do it right.”

## **NSF SOLICITATION FOR MATH AND SCIENCE PARTNERSHIP PROGRAM**

On October 1, the National Science Foundation published its program solicitation 02-190 for Math and Science Partnership Program (MSP) Comprehensive and Targeted Projects. Comprehensive awards will be made as Cooperative Agreements, target awards will be made as Standard or Continuing Grants or as Cooperative Agreements. MSP Project Data Registration is strongly encouraged by December 2. Full proposal deadlines are January 7, 2003. The solicitation is at [www.nsf.gov/pubs/2002/nsf02190.htm](http://www.nsf.gov/pubs/2002/nsf02190.htm)

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## WASHINGTON NEWS

### FROM THE FEDERATION OF MATERIALS SOCIETIES

**AUGUST 30, 2002**

#### SCIENCE AND ENGINEERING INDICATORS

The National Science Foundation released its biennial report on science and engineering trends, performance, and funding, “Science and Engineering Indicators – 2002.” This two-volume compilation of information contains, in the words of National Science Board Chairman Eamon Kelly, “quantitative analyses of key aspects of the scope, quality, and vitality of the Nation’s science and engineering enterprise,” and is intended “to provide a broad base of quantitative information for use by public and private policymakers.” The widely-used report contains analyses of “The United States in a Changing World,” U.S. elementary and secondary education, U.S. higher education, status of the U.S. science and engineering workforce, foreign-born scientists and engineers in the U.S. workforce, indicators of U.S. competitiveness, U.S. industrial R&D, expanding R&D activities around the world, and national and international research alliances. It shows that, when inflation is taken into account, total federal R&D spending and federal spending on applied research both are in decline. The data also show that industry’s share of R&D spending has grown significantly over the past four decades, while federal support represents a declining share of R&D expenditures (only 26.3 percent of total R&D expenditures in 2000 as compared to 65 percent in 1960). The report is available on the web at <http://www.nsf.gov/sbe/srs/seind02>

NSF also has published “Characteristics of Doctoral Scientists and Engineers in the United States: 1999” which presents data on the demographic and employment characteristics of the nation’s scientists and engineers gathered from a 1999 survey. The goal of the survey (SDR) is to provide policymakers and researchers with high-quality data and analyses for making informed decisions related to the educational achievement and career patterns of the nation’s doctoral scientists and engineers. The detailed statistical tables in the report provide information on the number and median salaries of scientists and engineers by field of degree and occupation; for demographic characteristics such as gender, race/ethnicity, and citizenship; and employment-related characteristics such as occupation, sector of employment, median annual salary, and various labor force rates. The report is available at <http://www.nsf.gov/sbe/srs/nsf02328>

#### WHITE HOUSE ADVISORS WEIGH IN ON RESEARCH FUNDING

Early in September, in a move carefully timed to provide input at a critical phase in development of Administration advance plans for the fiscal year 2004 budget (the fiscal year beginning October 1, 2003), the President’s Council of Advisors on Science and Technology sent a letter and report directly to President Bush advocating increases in federal investment in science and engineering research.

PCAST, which is co-chaired by Dr. John Marburger, Director of the Office of Science and Technology Policy within the Executive Office of the President, emphasized that if the current downward trend in federal support for research is not reversed, the nation’s science and engineering enterprise will soon become unsustainable. The Council cited a number of concerns:

- “Federal R&D funding as compared to gross domestic product continues its decline,” with R&D support from the federal government falling to its lowest point as a percentage of GDP in over 25 years, now exceeded by a number of countries;
- “Private sector R&D investments do not sufficiently replace shrinking federal support;
- “Inadequate federal funding for physical sciences and engineering hurts all scientific disciplines,” and while recent increases in

- biological and life sciences are commendable, they must now be balanced with increases in physical sciences and engineering;
- “Declining federal support for science and engineering students jeopardizes economic growth;
  - “Complex management structure prevents a focused R&D vision” by the federal government, which PCAST emphasized to the President “is particularly important as your Administration and Congress work to provide support for homeland security through a wide variety of agencies. Coordination within a strategic view is needed.”

PCAST took note of proposals in Congress to double the R&D budgets of the National Science Foundation, Department of Energy and other agencies, but recognized the politically charged nature of this concept, urging instead that “we must now redress R&D funding patterns to guarantee that our federal investments in science and technology ensure economic strength, national security, and prosperity and health for our citizens.”

# WASHINGTON NEWS

## FROM THE FEDERATION OF MATERIALS SOCIETIES

July 31, 2002

### NSF RESEARCH ON DOUBLING PATH

The next step toward doubling the budget for research and development funded by the National Science Foundation was taken in the Senate just before the August recess. The Senate Appropriations Committee called for an 11.8 percent increase in the NSF fiscal year 2003 total budget over the FY 2002 level, exceeding the Administration's request by approximately \$400 million. Under the Senate appropriations bill, NSF's R&D funding would increase 11.9 percent, including a 14.8 percent boost in the Research and Related Activities account which may be the first step toward a doubling over five years. Within Research and Related Activities, the Mathematical and Physical Sciences budget would increase 14.8 percent; Engineering would increase 20.3 percent; Education and Human Resources would increase 8.3 percent.

The Appropriations Committee's report language, always important in how the money actually gets spent, is particularly instructive this year. In discussing the large increase for the math and physical sciences directorate, the Committee says it "remains concerned that support for the physical sciences has not kept pace with the growth in other disciplines. Yet it is the sustained investment in these disciplines that has enabled the development of today's advanced weapon systems, state-of-the-art medical diagnostic equipment, and improved communications systems." Among other programs, the bill provides an additional \$50 million for the major research instrumentation program. In its report, "The Committee reiterates its long-standing concern about the infrastructure needs of developing institutions, historically black colleges and universities, and other minority-serving colleges and universities. The Committee directs NSF to use these additional funds to support the merit-based instrumentation and infrastructure needs of these institutions. The Committee's recommendation includes an additional \$10 million for the innovation partnership program. With these funds, NSF is to support competitive, merit-based partnerships, consisting of States, local and regional entities, industry, academic institutions, and other related organizations for innovation-focused local and regional technology development strategies."

While the appropriations action is important and welcomed by the science and technology community, there is still concern that the Senate has not yet passed an NSF authorization bill setting out a plan to double the research budget over five years, as the House has done. Jurisdiction over NSF is divided between two Senate committees – the Health, Education, Labor and Pensions Committee, and the Commerce, Science and Transportation Committee – both of which plan to mark up NSF authorization bills in September.

## **ENERGY SCIENCES FUNDING ADVANCES**

When Congress returns in September, conferees will be working to resolve differences between the massive “comprehensive” energy bills passed by the House and Senate. The Senate version is much more generous to the Department of Energy’s Office of Science, and now a move is underway in the House to pressure conferees to adopt those provisions. Rep. Judy Biggert (R-IL) and a number of cosponsors introduced legislation to double the DOE Science budget over five years and to upgrade science management within the Department. Rep. Biggert notes that the budget for the Office of Science is still only at its 1990 level, and that current appropriations allow the Office to fund only 10 percent of the unsolicited, peer-reviewed proposals it receives annually. Additional funding is needed for new initiatives planned by the Office of Science, including nanoscience centers, Genomes to Life, Advanced Computing, and workforce and education programs. On the management side, while the House-passed energy authorization bill provides for only a study of the best way to raise the profile of science at DOE, the Senate version and Rep. Biggert’s new bill would create a new Undersecretary for Science and Energy Research, and elevate the Director of the Office of Science to an Assistant Secretary.

## **SCIENCE, TECHNOLOGY AND HOMELAND SECURITY**

The Department of Homeland Security bill approved by the House on July 26 included key provisions developed by the House Science Committee creating an Undersecretary for Science and Technology and otherwise increasing the visibility of science and engineering concerns. Science Committee Chairman Sherwood Boehlert said that “With this Undersecretary, the bill ensures that one senior official in the new Department will be responsible – and accountable – for the science and technology activities of the entire Department. This approach will also ensure that the science and technology activities of the Department have the critical mass and the skilled leadership they need to succeed.” Science Committee provisions included in H.R.5005 also blocked the transfer of the National Institute of Standards and Technology’s Computer Security Division, strengthened cyber security provisions of the bill, and ensured that entrepreneurs and inventors can get through quickly and easily to government officials who can help them develop their ideas for Homeland Security.

The Senate will take up its Homeland Security Department bill as soon as it returns from the August recess, but it is unlikely that legislation will be on the President’s desk by September 11, as originally envisioned.

## **SIGNIFICANT DOD INCREASE ADVANCES**

The Senate Appropriations Committee has approved a 9.2 percent increase in the Department of Defense science and technology programs, increasing 6.1, 6.2 and 6.3 programs by \$904 million in FY2003. In terms of percentage of the total defense budget, the Senate bill allocates 3.0 percent for S&T, exactly what is recommended by the Defense Science Board. The Administration had requested 2.7 percent, and the House Appropriations Committee approved 3.2 percent.