The president wants to finish doubling NIH's budget, but significant growth in basic research elsewhere may hinge on a stronger economy

War Effort Shapes U.S. Budget, With Some Program Casualties

The bark proved worse than the bite. After months of warning that government research spending could become a casualty of the war against terrorism, the Bush Administration this week unveiled a budget proposal for 2003 that would significantly increase spending on bioterrorism, nanotechnology, and space science, while taking nibbles out of some defense, environment, and energy research programs.

Overall, the $2.1 trillion blueprint sent to Congress on 4 February calls for an 8% rise in research spending, to $112 billion, in the fiscal year that begins 1 October. It includes an additional $2.4 billion in research-related efforts to combat terrorism, led by $1.7 billion for the National Institutes of Health (NIH) and $420 million for the Department of Defense (DOD). The budget is "a good story" for most scientists, says White House science adviser John Marburger, given the constraints imposed by a slumping economy and increased security demands.

HIGHLIGHTS FROM 2003 BUDGET REQUEST (IN $ MILLIONS)

	2002	Proposed 2003	% change
National Institutes of Health	23,333	27,335	17%
Cancer Institute	4210	4725	12%
Heart Institute	2582	2798	8%
Allergy and Infectious Disease Institute	2542	4000	57%
National Science Foundation	4789	5028	5%
Research	3598	3783	5%
Education	875	908	4%
Major Equipment/Facilities	139	126	–9%
Defense			
Basic Research	1375	1365	–1%
Department of Energy Office of Science	3281	3285	0
High Energy Physics	713	725	2%
Nuclear Physics	359	382	6%
Fusion	247	257	4%
Biological/Environmental	570	504	–12%
Basic Science	1000	1020	2%
NASA	14,793	15,000	1%
Space Science	2873	3428	19%
Earth Science	1631	1639	0
Biological/Physical Science	823	851	3%
Space Station	1722	1492	–13%
NIST			
Core program	332	362	9%
Advanced Technology Program	185	108	–42%
Department of Agriculture			
Agricultural Research Service	1062	1014	–5%
National Research Initiative	120	240	100%
Environmental Protection Agency R&D	592	627	6%
Geological Survey	950	867	–9%
Multiagency Initiatives			
Information Technology	1844	1890	2%
Nanotechnology	579	679	17%
Climate Change Research	N/A	40	N/A
Global Change Research	1670	1714	3%
Bioterrorism R&D	300	2400	700%
Total Defense R&D	**49,171**	**54,544**	**11%**
Total Civilian R&D	**54,011**	**57,212**	**6%**
Total R&D	**103,182**	**111,756**	**8%**

SOURCE: OMB, 2003 BUDGET

But not everybody is thrilled. By preserving NIH's place as the dominant player—spending two-thirds of the government's investment in basic research—the president's budget "gives short shrift to everything except the life sciences," laments Michael Lubell of the American Physical Society. And legislators seem likely to object to several provisions, including those that transfer three research programs to the National Science Foundation (NSF) and reshuffle NASA's planetary research program.

Here are research highlights from the president's spending plan:

Biomedical research: A 16%, $3.7 billion boost to $27.3 billion would complete a 5-year campaign to double the NIH budget (*Science*, 1 February, p. 785). More than half of the increase would go to bioterrorism and cancer research mainly at two institutes. NIH's other 25 institutes would see increases averaging 9%. New and competing grants would rise by 477 to 9854, with the average grant jumping 4% to $369,500. For the first time, NIH could fully fund multiyear grants in the first year.

NIH's AIDS budget would increase 10% to $2.8 billion, part of which will fund DOD's $23 million AIDS research program that otherwise was slated for termination. "We're on the verge of what I'm terming an acquisition merger," says Col. John McNeil of the program, which is headquartered in suburban Maryland.

At the Atlanta, Georgia–based Centers for Disease Control and Prevention (CDC), spending is up 35% from 2001, to $5.8 billion, but down by $1 billion from this year because of a one-time shot of cash after 11 September and the anthrax attacks. About $1.6 billion is reserved for bioterrorism preparedness, including $400 million more to stockpile vaccines and drugs against a bioterror attack and $120 million for new

labs and training facilities in Atlanta and Fort Collins, Colorado, home to CDC's insect-borne diseases lab. At the same time, the Bush Administration would end a $68 million campaign to promote healthy teenage lifestyles and take 3% off a $355 million budget for "ordinary" infectious diseases.

NSF: Director Rita Colwell got most of what she wanted—but at a price. A 5% increase, to $5.04 billion, would allow NSF to start two long-awaited projects, fund larger grants, increase graduate student stipends, add $30 million to a mathematics initiative, and expand a program to upgrade the skills of elementary and secondary school teachers. NSF's 1550-person workforce would also grow by about 5% to meet the demands of managing more interdisciplinary and complex science. But the trade-offs are significant, including a negligible rise in the number of new awards and cuts to several core research and education programs.

NSF's research account would increase by $184 million. But $76 million of that would come from running programs transferred from other agencies (see sidebar on p. 954). A 10% jump in the average grant size, to $125,000, will force NSF to hold nearly constant the number of awards it makes annually at 10,500. Astronomers are hailing a $30 million request to continue building the $660 million Atacama Large Millimeter Array in Chile but not the 3% cut in bread-and-butter research programs. EarthScope, a collection of geophysical instruments to probe the North American continent, would debut with $35 million, and a 10-site National Ecological Observatory Network would get $12 million to develop two locations.

Within NSF's education programs, the $40 million boost for the $160 million Math and Science Partnerships program more than eats up an overall increase of $33 million. That would mean cuts in programs to help states become more competitive, as well as efforts to strengthen undergraduate science and to reform local and state school districts. Graduate students also got mixed news. Colwell says she is "delighted" about the proposed $3500-a-year boost, to $25,000, in stipends for three graduate fellowship programs, although the number of students served will remain flat.

NASA: New Administrator Sean O'Keefe made a splash by canceling two planetary missions and proposing development of nuclear systems for spacecraft. The moves are sure to spark a heated battle among lawmakers and researchers over the future of solar system science.

The most dramatic gesture in the $15 billion budget, up 1.4%, is to wipe clean the outer planetary program, which has been mired in controversy (*Science*, 4 January, p. 32). O'Keefe canceled the mission to Jupiter's moon Europa now being planned by Pasadena, California's Jet Propulsion Laboratory, as well as a competed Pluto flight being prepared at Maryland's Applied Physics Laboratory for which Congress earmarked funds in the 2002 budget. Costs were "going out of control," says Marburger. In their place is a program of competitively selected missions, costing up to $650 million apiece, that would take no more than 4 years to develop. Marcus Peacock of the White House Office of Management and Budget says that the choice of missions for this New Frontiers program likely will hinge on the results of a National Academy of Sciences study due out this spring of priorities for solar system exploration.

A second controversial move is to pump some $125 million into developing nuclear electric propulsion systems and nuclear electric power generation systems. O'Keefe and space science chief Ed Weiler argue that nuclear systems are the best choice for long-term missions to Mars and beyond, allowing for longer operation and enough power for a more complex array of instruments. But antinuclear activists worry that such systems could pose a threat to Earth during launch or flybys, and some researchers are wary that missions will be delayed until the new technologies are mature. Indeed, the budget plan also postpones a Mars smart lander and mobile laboratory from 2007 to 2009 to take advantage of new nuclear power systems. However, Michael Drake, an astronomer at the University of Arizona in

NSF Shines Brightest in New Good-Government Scorecard

The National Science Foundation (NSF) manages its $4.8 billion budget better than any other federal agency, according to the foundation's overseers at the White House Office of Management and Budget (OMB). In fact, OMB this week awarded NSF the only "green light" in the executive branch, praising its ability to instantaneously tell scientists the status of their research proposal or how much grant money is left in their account. The exercise is part of a new ratings system tied to the president's 2003 budget request (see main text).

In a bid to improve government operations, OMB has assigned every agency a red, yellow, or green light in each of five categories: human resources, competitive sourcing, financial management, electronic commerce, and integrating budget and performance. The grading initiative extends a 1993 law (*Science*, 6 January 1995, p. 20) that forces agencies to look inward, set consumer-oriented goals, and then track how well they are meeting them. "It should be no surprise that 80% of [this year's] ratings are red," says OMB's Marcus Peacock, because officials wanted to highlight the need for improvements. Even NSF's top mark in financial management, for example, is offset by three reds and one yellow in the other areas. Still, Peacock says other agencies should seek "to emulate" NSF's budgetary prowess.

What is NSF's secret? Its electronic grants management system, called FastLane, helps investigators and program managers keep close tabs on the agency's research efforts. Using peer review to award 94% of its research dollars also helps—although the Department of Health and Human Services, parent of the National Institutes of Health, also scores a commendable 83%. (The Department of Energy, in contrast, peer reviews just 24% of its research.) The extensive use of upfront funding to avoid tying up its budget in long-term commitments also gets good marks.

In addition, it probably doesn't hurt that NSF's former chief financial officer, Joseph Kull, now oversees the OMB review of federal financial management systems. "I've taken a lot of ribbing for that," Kull admits. "But when my boss learned about everything that NSF has done, he totally agreed with the [top] rating." —JEFFREY MERVIS

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Tucson who chairs NASA's solar system exploration advisory subcommittee, says that the move to push technology is "basically right." The Administration rejected NASA's request to begin work on new earth science missions, pending a review of the government's climate change program. The budget request calls for the White House and NASA to come up with "clear, high-priority, affordable science objectives" which can be accomplished soon aboard the space station; it also calls for NASA to study the effect of space radiation on biological systems.

Defense: The Pentagon would get a 14% boost to $379 billion, but little of the new money would trickle down to research. The military's basic research account—a major source of funding for university math, engineering, and computer science studies—would remain flat at about $1.3 billion, and its overall science and technology budget would drop 2%, to $9.7 billion, well below the $11 billion sought by a coalition of academic and science groups.

Energy: A $21.9 billion overall budget holds the Office of Science at current levels, with some reshuffling. Fermilab's Tevatron collider picks up $6 million from cuts made to the fixed-target facility at Brookhaven National Laboratory, and the RHIC collider at Brookhaven gets approximately $14 million extra to double its run time. Fusion research gets a 4% increase to correct an "underutilization" of facilities, says acting science director James Decker. There are also plans to construct a $69 million compact stellarator, a variation of the classical tokamak-shaped fusion facility, at the Princeton Plasma Physics Laboratory. DOE also plans to spend $35 million to open one new nanoscience center and start planning three others.

National Institute of Standards and Technology (NIST): A proposed 42% cut in the ever-controversial Advanced Technology Project (ATP), which funds high-risk industrial research, would bring its budget down to $108 million. But "what you see and what we end up with are often two different things," says one NIST budget watcher. The Administration says it wants to boost university participation in ATP, limit large-company involvement, and require firms whose ATP ventures turn a profit to reimburse the government's investment as much as fivefold. Elsewhere, the Administration would boost funding for NIST's core labs by 9%, to $362 million, and provide $50 million to complete the agency's Advanced Measurement Laboratory in Gaithersburg, Maryland, plus $35 million for equipment.

Agriculture: The Administration is taking another stab at boosting funds for competitive grants: It has proposed doubling the National Research Initiative, to $240 million. "That's phenomenal," says Karl Glasener of the American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America. On the other hand, the department has not even asked to fund the Initiative for Future Agriculture and Food Systems—a $120-million-a-year legislatively mandated program that's long been a political hot potato.

Geological Survey: Once again the survey would suffer under the president's budget proposal, with an 8.7% cut, to $867 million. Much of the decline, not including a 9% reduction in the National Water-Quality Assessment, to $57 million, is the result of eliminating congressional earmarks. The $14 million Toxic Substances Hydrology Research program would disappear, although $10 million of it would be shifted to NSF.

Environmental Protection Agency (EPA): Some 60% of a requested $200 million increase for the $7.5 billion agency would go for antiterrorism initiatives, including figuring out how to clean up buildings contaminated by biological agents. EPA's scientific core, the Office of Research and Development, would lose ground: A proposed $75 million for cleaning up contaminated buildings more than erases a $35 million hike, to $626.9 million. Administrator Christine Todd Whitman also has requested $8 million for "computational toxicology": using data from the Human Genome Project to do risk assessment of compounds. "We tried to come up with a sexier name, but when you're dealing with scientists that's a tough thing to do," she says. EPA's budget also includes $8 million to keep water out of South Dakota's Homestake gold mine, the proposed site of an underground neutrino laboratory.

–DAVID MALAKOFF

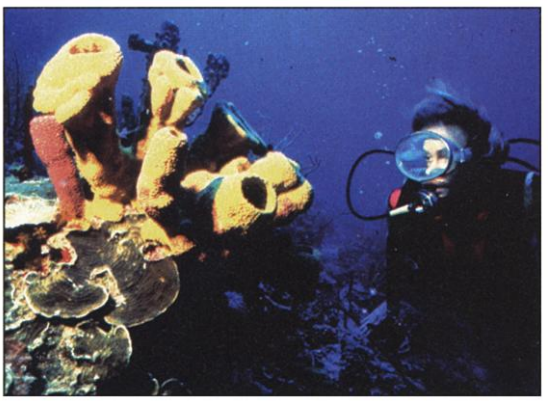
With reporting by Martin Enserink, Constance Holden, Jocelyn Kaiser, Andrew Lawler, Jeffrey Mervis, Charles Seife, Robert F. Service, and Erik Stokstad.

White House Wants to Shuffle, But Will Congress Dance?

National Science Foundation (NSF) director Rita Colwell laced up her political track shoes and ran for cover this week. She was anxious to avoid getting caught in the middle of an upcoming clash between the White House and Congress over a controversial presidential proposal to transfer three research programs from other agencies to NSF.

"I have no opinion" on the proposed moves, Colwell told a group of journalists and science lobbyists assembled to hear her analysis of the agency's proposed budget for 2003. "We will do whatever we are assigned to do, well." But her comments, unusually frank for an agency head, suggest that her real preference would be to see the issue vanish.

The proposal, by the White House Office of Management and Budget (OMB), would give NSF responsibility for the $57 million Sea Grant program currently run by the National Oceanic and Atmospheric Administration, a $10 million water-quality program at the U.S. Geological Survey (USGS), and a $9 million environmental education program at the Environmental Protection Agency. OMB officials say that the three programs would benefit from being part of an open, NSF-run research competition, implying that they currently suffer from lax management. "The idea is that if the work is competed, it could end up back at USGS or somewhere else" that proposes a better way to do it, says OMB's Marcus Peacock.



Sea change. White House wants to move some marine science programs to NSF.

It's hard to find anyone who thinks the transfer will happen, however. Federal budget officials, congressional aides, and lobbyists all say that the proposals are dead on arrival at Congress, as congressional committees are expected to fight to keep the programs in the agencies they oversee. OMB has already bowed to pressure and withdrawn a similar plan to give NSF $35 million from three research centers run by the Smithsonian Institution, settling instead for a feasibility study. At the same time, nobody expects OMB to abandon its underlying message: Agencies must earn the right to manage a research program. –J.D.M.

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