Clinton Holds the Line on R&D

Selected increases are proposed for 1996, but the budget is sailing into uncharted waters in the Republican Congress, and plans to cut the deficit dim the outlook for science

First, the good news. The 1996 budget request that President Clinton sent to Congress this week includes a 7.6% boost for research programs at the National Science Foundation (NSF); a 4% increase for the National Institutes of Health (NIH); a new, $100 million fund for users of big machines at the Department of Energy's (DOE's) national laboratories; a $40 million jump in peer-reviewed research at the Environmental Protection Agency (EPA); and continued steep growth in the Department of Commerce's industrial research efforts. These are not the double-digit increases for science of just a few years ago—but they're not bad for a year in which the White House is vying with the new Republican-controlled Congress to cut the deficit while handing out tax cuts for the middle class. The overall R&D budget would hold steady, at $72.8 billion.

But there's plenty of bad news for researchers as well. Clinton's budget request would kill off the $2.9 billion Advanced Neutron Source, slash $300 million from the amount the Department of Defense spends on academic research, and chop NSF's program to rebuild deteriorating university facilities by 60%. And it may get worse. Republicans complain that the Clinton budget doesn't do enough to reduce the deficit, now hovering around $200 billion. Deeper cuts in discretionary spending, which includes the entire R&D budget, may be in store. Indeed, House Republicans have proposed holding NSF's annual increase to 1% less than inflation, which is now running at 3%. And industrial research may also take a hit; House Science Committee Chair Robert Walker (R–PA) says he "regrets the strong emphasis on applied science subsidies" in the president's science budget, although he calls it "a good starting point."

And if prospects are shaky this year, they look even more dire in the years ahead. The White House's economic prescription would reduce most domestic discretionary programs by 3% in fiscal year 1997, 5% in FY '98, 7% in FY '99, and 9% in FY 2000. Yet even those cuts would barely shrink the deficit. No wonder T. J. Glauthier, associate director of the Office of Management and Budget (OMB) for natural resources, energy, and science, predicts that the overall level of federal R&D spending will almost certainly decline as OMB carries out the second phase of the Administration's reinventing government initiative. Indeed, NSF Director Neal Lane admits that "we are projecting a slight decrease in the out years," and NIH Director Harold Varmus says he's concerned about the effect on future research funding from the middle-class tax cut and deficit reduction that Clinton has proposed. "We have to negotiate—that is, fight—each year," he says. "I take it one year at a time."

SELECTED NIH PROGRAMS
(dollars in millions)

Program	FY '95	Proposed for FY '96	Percent change
Research project grants	6001	6229	3.7
# noncompeting	17,284	17,828	3.1
# new and competing	6568	6046	–7.9
Centers	1015	1034	1.8
Research training	381	391	2.6
Intramural research	1235	1272	3.0
Human Genome Project	153	168	9.8
Nat'l Library of Medicine	140	150	7.1
Office of the Director	240	258	7.5
Buildings and facilities	114	144	26.3
NIH TOTAL	11,305	11,773	4.1
# Full-time staff	16,197	16,135	–0.3

SOURCE: DEPARTMENT OF HEALTH AND HUMAN SERVICES

GRAPHICS BY C. FABER SMITH

John Gibbons, the president's science adviser, is putting the best face on things, however. At a budget briefing for reporters Gibbons said a proposed 3.5% rise in federal support for basic research was proof that "science and technology are maintained as a priority investment ... despite overall cuts in discretionary spending." But Gibbons acknowledged that "no part of the federal budget will escape careful scrutiny."

Here are selected portions of the Administration's proposed R&D budget:

National Institutes of Health. A request of $11.773 billion—an increase of 4.1% over the 1995 appropriation—represents what Assistant Secretary of Health Philip Lee calls a "steady-state budget" for NIH. In fact, because prices for medical products and services are projected to rise 4.3% in 1996, the increase won't even maintain the status quo. Congress has traditionally been generous toward NIH—"many of our friends" and defenders sit on the appropriating committees in Congress, Varmus noted in a discussion after the budget's release. But it will be tough for even NIH's most devoted friends to push through a big increase for the agency this year.

Within the 4% request, a few programs have been singled out for larger increases. The National Center for Human Genome Research, now funded at $153 million, is slated to rise 9.8% to $168 million in 1996. Other areas getting special attention include breast cancer research, which would increase by 13% to $426 million; NIH's share of the high-performance computing initiative, up 12% to $78.9 million; and studies of AIDS/HIV, which would grow 5.4% to $1.4 billion. Intramural research would climb by only 2.9%, while funding for extramural research grants would increase by 3.7%. Although Varmus said he "fought hard" to maintain current levels of extramural funding, the number of new and competing grants would drop 7.9% while the overall number of grants would hold steady.

National Science Foundation. In the past few years, NSF has gone out of its way to emphasize its commitment to "research in strategic areas" that is linked to national needs. This year, however, the emphasis is on investigator-initiated research, which would increase by 7.6%, rising $174 million to $2.45 billion. The agency's overall $3.36 billion budget, in contrast, would drop by $38 million. "If you want to solve a problem in basic research, the idea is most likely going to come from the community," explains Lane. "It's sure not going to come from somebody in Washington."

A 1% decline in NSF's $605 million education budget will, among other things, put a crimp in plans to expand the Urban Systemic Initiative to all 25 eligible cities. Nine were funded last year and seven more sites have

just been chosen, but the rest "will have to be put on hold," says Luther Williams, who heads the education directorate. The major research facilities account would drop from $126 million to $70 million, devoted wholly to LIGO (the laser interferometer gravity wave observatory). Two other programs targeted for that account, a $250 million South Pole Station and a $150 million millimeter telescope array, are awaiting review by the National Science Board. NSF also plans to hold steady the number of centers, now at 170.

The biggest loser is the academic facilities program, which was promised $250 million by Congress this year if the Administration sought at least that much in 1996. But NSF asked for only $100 million. A larger request, Lane explained, "would have greatly distorted our priorities."

Department of Energy. At a time when the Energy Department is under fiscal siege, a requested $100 million hike in the department's $2.8 billion science budget to increase the use of high-tech accelerators, light sources, and other research facilities is a welcome relief (*Science*, 11 November 1994, p. 963). But the increase masks deep problems: The department's budget is expected to drop precipitously through the end of the century, and the science budget is likely to shrink with it.

The squeeze has already forced the Administration to abandon the Advanced Neutron Source, which would have been built at Oak Ridge National Laboratory and designed to benefit both basic science and industry researchers. "It was an excellent proposition, but also a very expensive proposition we can ill afford to make," said Gibbons, a former Oak Ridge researcher who supported the project. DOE officials now are looking at a spallation neutron facility, a cheaper alternative that uses an accelerator rather than a reactor to create neutrons—and also produce tritium for the U.S. nuclear weapons stockpile.

The fusion energy program has so far escaped the cutting block, but the fate of the $740 million Tokamak Physics Experiment—the next major step in the U.S. magnetic fusion program—is yet to be determined. A presidential panel will make recommendations on the program this summer (*Science*, 13 January, p. 164). Other critical decisions, such as how to restructure DOE's laboratories, also have yet to be made.

National Aeronautics and Space Administration. Flat budgets and modest new missions are the rule as space science joins a belt-tightening effort aimed at slashing $5 billion in spending on aeronautics and space over the next 5 years—even as NASA builds the space station. A 2.7% cut in the space science budget, to $1.959 billion, would be achieved by completing the Global Geospace Science project, with its Wind and Polar probes, and reducing payload and instrument development and launch services. Funding for planetary exploration would grow by about 1%, with $30 million for a "New Millennium" initiative to create tiny spacecraft that would take less time and money to build.

Physicists, astronomers, and planetary scientists would benefit from $54 million in added funds for the Stratospheric Observatory for Infrared Astronomy (SOFIA) and the Space Infrared Telescope Facility (SIRTF), and $49 million in new money for a small orbiter and lander to round out the Mars Global Surveyor program. Life sciences and microgravity research would rise by 4%, and the Mission to Planet Earth would hold steady. But there's no guarantee that Congress will ratify even these increases. "Everything is on the table," says NASA Administrator Daniel Goldin.

NATIONAL SCIENCE FOUNDATION
(dollars in millions)

Program	FY '95	Proposed for FY '96	Percent change
Research programs	2280	2454	+7.6
Education	606	599	–1.2
Academic infrastructure	250*	100	–60.0
Major facilities	126	70	–44.4
Salaries and other	134	137	+2.9
TOTAL	3398	3360	–1.1

* $132 million was linked to FY '96 budget request
SOURCE: NSF

Environmental Protection Agency. The biggest winners at EPA appear to be outside scientists funded through the agency's new Science to Achieve Results (STAR) initiative. It would double the budget for extramural grants, to $85 million, as money is shifted from contract lab work to peer-reviewed, academic grants. Top priorities include the human health effects of environmental hormones and the effects of ultraviolet radiation on wildlife.

EPA has targeted its Office of Research and Development (ORD) for a 13.2% increase, to $395 million, with much of the rise set to go to EPA's $120 million Environmental Technology Initiative, aimed at bringing green technologies to market. And research is threatened by a meager 1.9% increase in EPA's overall budget of $7.4 billion. If Congress ordered a 10% cut at EPA, says Administrator Carol Browner, "we wouldn't have a research and development program."

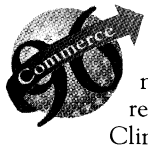
Interior. Last fall, some congressional Republicans threatened to ax the Interior Department's two main science bureaus—the U.S. Geological Survey (USGS) and the National Biological Service (NBS)—to help pay for their party's "Contract With America." Instead, the Administration has proposed small increases for these agencies, and Secretary Bruce Babbitt is rushing to their defense. Eliminating these bureaus, he said, "is like pulling the smoke alarm off the wall in frustration—it doesn't do anything to pre-

SELECTED RESEARCH PROGRAMS
(dollars in millions)

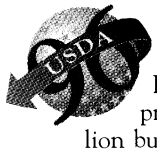
Program	FY '95	Proposed for FY '96	Percent change
Advanced Technology Program (NIST)	431	491	+14.1
Basic energy science (DOE)	734	811	+10.5
Biology and environmental science (DOE)	437	432	–1.1
High-energy and nuclear physics (DOE)	974	1007	+3.4
Fusion research (DOE)	368	366	–0.6
Global change research (multiagency)	2118	2157	+1.9
High-Performance Computing (multiagency)	1080	1142	+5.7
Life sci. and microgravity research (NASA)	483	504	+4.3
Mission to Planet Earth (NASA)	1340	1341	+0.1
National Biological Service (Interior)	167	173	+3.4
National Research Initiative (USDA)	103	130	+26.2
Office of R&D (EPA)	349	395	+13.2
Space science (NASA)	2013	1959	–2.7
Space station (NASA)	2100	2100	0.0
Technology Reinvestment Program (ARPA)	443	500	+13.9
U.S. Geological Survey (Interior)	571	586	+2.6

SOURCE: OMB, INDIVIDUAL AGENCIES

vent the fire." If USGS and NBS were cut, the research "would not be carried out by the private sector," warned USGS chief Gordon Eaton.



Commerce. The National Institute of Standards and Technology (NIST) continues its reign as a favored child of the Clinton Administration, with a requested 20% increase that would raise its budget to $1.02 billion. But mindful of Congressional opposition to its industry-led research programs, NIST has lowered its sights. The Advanced Technology Program (ATP)—the Administration's primary tool for funding high-risk industrial research—would receive a 14% boost, to $491 million, after a 150% rise in 1995. And there is a 62% increase, to $147 million, for the Manufacturing Extension Partnership program. NIST's director, Arati Prabhakar, says it will be hard to reach the Administration's goal for ATP of $750 million by 1997. But even getting this year's increase through Congress could be difficult. "We're cutting it all," says a staffer for Representative Harold Rogers (R–KY), chair of the House appropriations subcommittee that oversees Commerce's budget.



Agriculture. Twelve labs would be closed as the Agricultural Research Service braces for a proposed 2% cut in its $800 million budget. The work, mostly at crop improvement centers like the Pecan Field Station in Brownwood, Texas, would be discontinued and replaced by research in areas such as pest control and human nutrition.

The National Research Initiative (NRI) would receive $130 million, an increase of $27 million, for competitive peer-reviewed grants to researchers working in areas from plant and animal science to food safety.

The next step for the budget is Congress. Although Administration science officials talk about having "dodged a bullet" in preserving the overall R&D budget, they admit that they are likely to face heavier fire in the months to come.

–Jeffrey Mervis

With reporting from Andrew Lawler, Eliot Marshall, Antonio Regalado, Wade Roush, Robert Service, and Richard Stone.

U.K. BUDGET

Priority Initiatives Squeeze Science

Researchers in Britain got a surprise last week when the government announced how the research budget for fiscal year 1995–96 will be divvied up. Although Britain's six research councils will receive a total of 2.9% more cash than in the year before—just enough to keep up with inflation—science minister David Hunt announced that about 5% of the £1.28 billion ($2 billion) total would be earmarked for a set of "priority initiatives" in applied research defined by the goverment. As a result, some areas of research may have to be squeezed to pay for the new priorities.

This budget redirection is the first time researchers have truly felt the government's commitment to steer research into more wealth-creating areas, as outlined in a 1993 white paper, or policy statement. The white paper led to a reorganization of the responsibilities of the research councils last year that was well received by researchers (*Science*, 29 July 1994, p. 596). But it also launched an exercise dubbed "technology foresight," in which industrialists and academics were asked which areas of research would most benefit the country's prosperity. The new priority initiatives are the first fruits of that process.

The areas Hunt named as priorities include the genome project (to receive $6.2 million), bioprocessing, wealth-creating products from plants (such as designer plastics and oils), cognitive engineering (improving the human/computer interface), environmental diagnostics and clean technology, and mainstream physics and mathematics. In addition, the new Edward Jenner Institute for Vaccine Research in London will receive $3.9 million.

Although some of the initiatives are extensions of projects already under way, in some cases existing projects may have to be cut to shift funds to the new priority areas. "Inevitably there will be some reorientation. ... [But] we hope to protect as much of the curiosity-driven research as possible," says Tom Blundell, chief executive of the Biotechnology and Biological Sciences Research Council. An official from the Engineering and Physical Sciences Research Council says the requirement that $33 million of his council's budget be allocated to priority initiatives is "likely to mean problems with new commitments." He added that it is difficult to commit funds to 3-year projects if the government is going to require more initiatives in coming years. Each of the research councils will meet in the next month to decide how to redistribute funds to accommodate the initiatives.

ALLOCATION OF THE SCIENCE BUDGET
(£ millions)

	1994–95 allocation	1995–96 allocation	Increase	Priority initiatives
BBSRC	157.1	161.6	4.5	12.2
ESRC	59.8	61.2	1.4	1.3
EPSRC	358.9	365.7	6.8	21.1
MRC	269.3	277.8	8.5	14.0
NERC	151.7	155.5	3.8	3.2
PPARC	187.4	196.4	9.0	8.3
Others*	56.7	63.5	6.8	7.1
Total	1240.9	1281.7	40.8	67.2

BBSRC: Biotechnology and Biological Sciences Research Council; ESRC: Economic and Social Research Council; EPSRC: Engineering and Physical Sciences Research Council; MRC: Medical Research Council; NERC: Natural Environmental Research Council; PPARC: Particle Physics and Astronomy Research Council.
*Includes Royal Society and pensions.

The earmarking apparently came as a shock to the research councils, which previously defined their own research priorities, and the mostly university-based researchers they support. David Porteous, head of the Medical Research Council's (MRC's) Human Genetics Unit at Edinburgh, calls the emphasis on value for money at the expense of curiosity-driven research "worrying." He adds: "It's not always possible to know where the next breakthrough is going to come from."

Ironically, the council that will receive the largest increase for the year is the one with perhaps the least potential for wealth creation: the Particle Physics and Astronomy Research Council. This hike is due to European currency fluctuations that have caused large net increases in subscriptions to international consortia such as the CERN high-energy physics center and the European Space Agency (ESA). But even this increase will not be enough to avert a squeeze on some projects, says Chief Executive Ken Pounds: "There are [projects] queueing up for funding which we won't be able to fund." For example, Pounds predicts that any U.K. instruments for the forthcoming ESA gamma-ray observatory Integral will be "the first casualty" of the cash deficit. Other projects that the council may have to abandon include the GEO600 gravitational wave interferometer, planned in collaboration with Germany, and the proposed Very Small Array of telescopes in Tenerife in the Canary Islands, to detect microwave background radiation.

–Claire O'Brien

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