

Statement of the American Chemical Society, American Mathematical Society, American Physical Society and Federation of American Societies for Experimental Biology

FY 2005 APPROPRIATIONS FOR THE NATIONAL SCIENCE FOUNDATION

Before the Subcommittee on VA, HUD, and Independent Agencies Committee on Appropriations

U.S. House of Representatives

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Robert Wells, Federation of American Societies for Experimental Biology

Mr. Chairman, Mr. Mollohan and members of the Subcommittee, I am Robert Wells, President of the Federation of American Societies for Experimental Biology. I am here today with my colleagues Jane Hawkins of the American Mathematical Society, James Mitchell of the American Chemical Society and Myriam Sarachik, Past-President of the American Physical Society to testify in support of the National Science Foundation. Together we represent over 290,000 scientists in academia, industry and the national laboratories. I would like to emphasize that we are here, testifying together, in order to underscore the need for the ample support of all fields of scientific research and education. Our individual fields are joined intellectually and technologically, and advances in one scientific area have extraordinary impact, often unanticipated, on other areas. My colleagues and I will each amplify on this point.

Let me first express thanks on behalf of all of our organizations for the support that this committee has made to NSF. We believe that it has been money well spent in the public interest and that sustained investment will continue to pay extraordinary dividends in the years to come.

The National Science Foundation (NSF) has been the steward of America's science and engineering investments for more than 50 years and it continues to support the fundamental research that leads to groundbreaking advances in science, engineering and mathematics.

We have all benefited from the investment in NSF, yet there are some who would have us conduct an enormously high-risk experiment: to remove the federal government from its central role in supporting basic research and then wait for industry to step in. Others argue that our present level of investment is quite sufficient—especially given the current budget situation. We disagree. And we hope that you agree that rolling the dice in either fashion would be grossly unwise public policy.

Magnetic Resonance Imaging—a technology that is highly valued in health care today—is the result of five decades of advances in mathematics, physics, chemistry, and biology. And not surprisingly, NSF supported much of the research that made MRI possible. We must continue to nurture the seed corn of scientific discovery from which today's technology flows. For this reason, we urge the Subcommittee to sustain the vitality of the NSF and set the Foundation's

budget on the doubling path, which was authorized in 2002, with an increase of 15 percent to \$6.39 billion for FY 2005.

My colleague, Dr. Jane Hawkins, of the American Mathematical Society will continue.

Jane Hawkins, American Mathematical Society

Thank you, Bob. Mr. Chairman, Mr. Mollohan, and members of the Subcommittee, the NSF is one of our nation's most important agencies for promoting and funding scientific, mathematical, and engineering research and education. This support is across all fields of science, as well as for interdisciplinary partnerships and new frontiers of scientific inquiry, such as nanotechnology.

Many new products, procedures, and methods have accrued from the NSF investment in basic research. These innovations came out of inquiries in quite a different context, often just scientific discovery. Research of this kind is essential to breakthroughs relevant to our modern world even though at the time of discovery relevance is not even suspected. To illustrate: much of the theoretical machinery developed during the latter part of the twentieth century to solve the three hundred year old mathematics problem, Fermat's Theorem, is now finding its way into the construction of codes for secure communication. The mathematicians developing this theory were not thinking secure communication codes, they were trying to solve a famous mathematical problem. Fourier series, developed over one hundred years ago as a way to represent functions, has a modern-day equivalent, wavelets, that has been instrumental in image restoration, including military applications.

The recent budget request proposes only a 0.6 percent increase in the overall federal basic research budget of the U.S. The non-medical federal basic research budget will decline by 2.5 percent in FY 2005. NSF is an important agency for supporting basic research, in fact, although the NSF accounts for only 4.0 percent of federal spending for research and development; it supports nearly 50.0 percent of the non-medical basic research at our colleges and universities.

Federal support, broadly across all disciplines, is critical for the U.S. scientific enterprise to remain healthy and to be a contributor to innovation twenty to thirty years from now. Neglect of basic inquiry, over time, will inhibit the growth of innovation and affect the country's economic stability as well as our national security. I urge the Subcommittee to make an effort to increase the NSF budget substantially over the budget request level, thereby helping to establish an FY 2005 U.S. basic research budget that will sustain an optimum level of innovation.

I turn now to my colleague, Dr. James Mitchell, of the American Chemical Society.

James Mitchell, American Chemical Society

Thank you, Jane. Mr. Chairman, Mr. Mollohan, members of the Subcommittee.

The foundation's mission is imperative to ensuring the continuous stream of technological innovations that are essential to reinforcing and expanding one of America's main competitive advantages, technological leadership in the global economy.

NSF programs not only provide the underpinnings for technological innovation, but also help prepare the next generation of scientists and engineers for the jobs of the future. In a recent Department of Commerce report, manufacturers have expressed serious concerns about whether the U.S. was adequately preparing the next generation of workers for an increasingly high-tech workplace that requires advanced labor skills. From my experience at Lucent Technologies, I have witnessed firsthand the workforce challenges caused by increased global competition as well as significant structural changes in the manufacturing sector. The task of preparing the next generation of Americans to work and thrive in an increasingly high-tech work place is of paramount importance to the federal government. Studies have shown today's students have a declining interest in mathematics and science, the core skills needed for tomorrow's innovation based economy. NSF's Education Directorate provides critical support for K-12 science and mathematics education, helping teachers do a better job of teaching math and science and motivating children to choose careers in these fields. For these reasons, we disagree with the Administration's proposal to transfer the NSF Math and Science partnerships.

NSF prides itself on investing in the best ideas from the most capable scientists and engineers, as determined by outside reviewers through a rigorous, merit-based competitive process. In 2003 it evaluated proposals based on both intellectual merit and broader society impacts and selected almost 11,000 new awards from more than 40,000 proposals. This is the lowest funding rate in a decade. Greater support would allow NSF to pursue many unmet opportunities, including the funding more highly-rated proposals that will provide the potential for the pioneering of dramatic scientific advances. Increased investment will also educate and train the next generation of scientists whose role will be critical in expanding the United States' place at the forefront of scientific and technological innovation.

My colleague Dr. Myriam Sarachik, of the American Physical Society will conclude our remarks.

Myriam Sarachik, American Physical Society

Thank you, James. Mr. Chairman, Mr. Mollohan and members of the committee, my colleagues have already spoken about the importance of NSF to our nation, about its stellar record in supporting peer-reviewed research and about the crucial role it plays in science education. My colleagues have also emphasized that it is the interdependence among the sciences that has brought us here today to present joint testimony for this committee.

We all know that this is an incredibly difficult year for federal budgets and that this committee's task will not be very pleasant. But as you decide how to divide up the allocation among the various agencies and programs for which you have responsibility, I would ask you to consider how interrelated these activities truly are. The investments you make in NSF are investments made in the rest of the VA/HUD bill. I cite just two examples.

The veterans, who have made extraordinary sacrifices for our nation, so that we can live in freedom, have relied heavily on scientific advances for carrying out their missions, in fighting wars and defending threats to our homeland. They have also relied heavily on scientific advances for medical diagnoses and treatments they have received in the VA hospitals. The next generation of veterans will be no less reliant, and research supported by NSF today will surely provide significant benefits for them tomorrow.

Housing is another example. Improvements in energy efficiency, construction materials and the use of high-tech tools already save tax payers' money and make our homes safer. HUD's involvement in The Partnership for Advancing Technology in Housing (PATH) acknowledges the importance of research to HUD. Recently, PATH released the Top 10 Building Technologies. Two of the technologies relied on our fundamental knowledge of materials to make lightweight materials that are resistant to fire, moisture, and termites and that increase strength and stability. I have no hesitation in making the assertion that NSF's research programs of today will yield significant benefits for housing programs of tomorrow.

So, Mr. Chairman, while your choices will not be easy ones this year, they do not involve sacrificing one constituency for another. A proper balance will ensure that our nation's future remains secure and that the quality of life for all Americans continues to improve.