



American Society of Plant Biologists

Cultivating a better future through plant biology research

Official Written Testimony for Fiscal Year 2012 Budget

Submitted to the Subcommittee on Commerce, Justice, Science, and Related Agencies
Committee on Appropriations
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Submitted by

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&

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On behalf of the American Society of Plant Biologists (ASPB), we submit this testimony for the official record to support the requested level of \$7.767 billion for the National Science Foundation (NSF) for Fiscal Year (FY) 2012. ASPB and its members recognize the difficult fiscal environment our nation faces, but believe that investments in scientific research will be a critical step toward economic recovery.

ASPB would like to thank the Subcommittee for its consideration of this testimony and for its strong support for the research mission of the National Science Foundation.

Our testimony will discuss:

- Plant biology research as a foundation for addressing food, fuel, environment, and health concerns;
- The rationale for robust funding for the National Science Foundation to maintain a well-proportioned science portfolio with support for all core science disciplines, including biology; and
- The rationale for continued support for NSF education and workforce development programs that provide support for the future science and technical expertise critical to America's competitiveness.

The American Society of Plant Biologists is an organization of approximately 5,000 professional plant biology researchers, educators, graduate students, and postdoctoral scientists with members in all 50 states and throughout the world. A strong voice for the

global plant science community, our mission—achieved through work in the realms of research, education, and public policy—is to promote the growth and development of plant biology, to encourage and communicate research in plant biology, and to promote the interests and growth of plant scientists in general.

Food, Fuel, Environment, and Health: Plant Biology Research and America's Future

Plants are vital to our very existence. They harvest sunlight, converting it to chemical energy for food and feed; they take up carbon dioxide and produce oxygen; and they are the primary producers on which all life depends. Indeed, plant biology research is making many fundamental contributions in the areas of energy security and environmental stewardship; the continued and sustainable development of better foods, fabrics, and building materials; and in the understanding of biological principles that underpin improvements in the health and nutrition of all Americans.

In particular, plant biology is at the interface of numerous scientific breakthroughs. For example, with the increase in plant genome sequencing and functional genomics supported by the National Science Foundation, plant biologists are using computer science applications to make tremendous strides in understanding complex biological systems ranging from single cells to entire ecosystems. Understanding how plants work will ultimately result in better and more productive crops, new sources of fuel, and the development of better medicines to treat diseases like cancer.

Despite the fact that basic plant biology research—the kind of research funded by the NSF—underpins so many vital practical considerations, the amount invested in understanding the basic function and mechanisms of plants is relatively small when compared with the impact plants have on our economy and in addressing some of the nation's most urgent challenges such as food and energy security.

Robust Funding for the National Science Foundation

The American Society of Plant Biologists encourages the Subcommittee to fund the National Science Foundation at robust levels that would keep the Foundation's budget on a doubling path over the next several years.

The FY 2012 NSF budget request would fund the NSF at \$7.767 billion, keeping the Foundation budget on a path for doubling. ASPB supports this request and encourages proportional funding increases across all of the science disciplines supported by the NSF. As scientific research becomes increasingly interdisciplinary with permeable boundaries, a diverse portfolio at the NSF is needed to maintain transformational research and innovation.

NSF funding for plant biology specifically enables the scientific community to address cross-cutting research questions that could ultimately solve grand challenges related to a sustainable food supply, energy security, and improved health. The idea that support for research in one area will impact a variety of applications is reflected in the National Research Council's report *A New Biology for the 21st Century*.

The NSF Directorate for Biological Sciences is a critical source of funding for scientific research, providing 68 percent of the federal support for non-medical basic life sciences research at U.S. academic institutions. The Biological Sciences Directorate supports research ranging from the molecular and cellular levels to the organismal, ecosystem, and even biosphere levels. These investments continue to have significant pay offs, both in terms of the knowledge directly generated and in deepening collaborations and fostering innovation among communities of scientists.

The Biological Sciences Directorate's Plant Genome Research Program (PGRP) is an excellent example of a high impact program, which has laid a strong scientific research foundation for understanding plant genomics as it relates to energy (biofuels), health (nutrition and functional foods), agriculture (impact of changing climates on agronomic ecosystems), and the environment (plants' roles as primary producers in ecosystems). *The American Society of Plant Biologists asks that the PGRP be restored as a separate funding line within the NSF budget, as in years past, and that the PGRP have sustained funding growth over multiple years to address 21st Century Challenges. For FY 2012 ASPB asks that PGRP be funded at the highest possible level.*

Without significant and increased support for the Biological Sciences Directorate and the NSF as a whole, promising fundamental research discoveries will be delayed and vital collaborations around the edges of scientific disciplines will be postponed, thus limiting the ability to respond to the pressing scientific problems that exist today and the new challenges on the horizon. Addressing these scientific priorities also helps improve the competitive position of the United States in a global marketplace.

Continued Support for NSF Education and Workforce Development Programs

The National Science Foundation is a major source of funding for the education and training of the American scientific workforce and for understanding how educational innovations can be most effectively implemented. The NSF's education portfolio impacts students at all levels, including K-12, undergraduate, graduate, and postgraduate. Importantly, the Foundation also offers programs focused on outreach to and engagement of underrepresented groups and of the general public.

The Integrative Graduate Education and Research Traineeship (IGERT) program is just one example of NSF's commitment to education. IGERT is successful in fostering the development of novel programs that provide multidisciplinary graduate training. As

discussed above, it is at the intersections of traditional disciplines that the greatest opportunities for scientific advancement can be found. *The American Society of Plant Biologists encourages expansion of the IGERT program in order to foster the development of a greater number of innovative science leaders for the future.*

Furthermore, *ASPB urges the Subcommittee to expand NSF's fellowship and career development programs—such as the Postdoctoral Research Fellowships in Biology, the Graduate Research Fellowship (GRF) and the Faculty Early Career Development (CAREER) programs—and, thereby, to provide continuity in funding opportunities for the country's most promising early career scientists. Additionally, such continuity and the broader availability of prestigious and well-supported fellowships may help retain underrepresented groups in the science, technology, engineering, and mathematics (STEM) fields. ASPB further encourages the NSF to develop “transition” awards that will support the most promising scientists in their transition from postdoctoral research to full-time, independent, tenure-track positions in America's universities. The NSF might model such awards after those offered by the National Institutes of Health and initially championed by private philanthropies such as the Burroughs Wellcome Fund.*

ASPB urges the NSF to further develop programs aimed at increasing the diversity of the scientific workforce by leveraging professional scientific societies' commitment to provide a professional home for scientists throughout their education and careers and to help promote and sustain broad participation in the sciences. Discreet focused training and infrastructure support programs for Hispanic Serving Institutions, Historically Black Colleges and Universities, and Tribal Colleges and Universities remain vitally important, as they foster a scientific workforce that reflects the U.S. population. These institutions are key producers of members of the STEM workforce; *therefore ASPB recommends that distinct funding amounts be specified for Hispanic Serving Institutions, Historically Black Colleges and Universities, and Tribal Colleges and Universities.*

ASPB urges support for education research that enhances our understanding of how educational innovations can be sustainably implemented most effectively in a variety of settings. NSF programs such as Transforming Undergraduate Education in STEM, Discovery Research K–12, and Research and Evaluation on Education in Science and Education provide opportunities to expand NSF's research and evaluation efforts to address scale-up and sustainability. Increasingly, the challenge is not only to understand what works but to determine how it can be best put into practice. *ASPB encourages continued support for education research programs within NSF's Education and Human Resources portfolio with a focus on understanding how previous investments in educational strategies can be made most effective. ASPB also encourages support for implementation of the recommendations made in the recent NSF-sponsored report on Vision and Change in Undergraduate Biology Education: A Call to Action.*

The National Research Council report *A New Biology for the 21st Century* has been cited numerous times in its first year in publication as a model of societal needs and describes

our continuing need to press ahead. These challenges will not be resolved in a year, an administration, or a generation, but will take continued attention and investment at federal research agencies, such as the National Science Foundation, over decades.

Thank you for your consideration of our testimony on behalf of the American Society of Plant Biologists. Please do not hesitate to contact the American Society of Plant Biologists if we can be of any assistance in the future.

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