Dr. France Córdova
Director
National Science Foundation

Before the
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Subcommittee on Research and Technology
United States House of Representatives

on
The President's Fiscal Year 2016 Budget Request
for the National Science Foundation

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Chairwoman Comstock, Ranking Member Lipinski, and Members of the Subcommittee, it is my privilege to be here with you today to discuss the National Science Foundation's fiscal year (FY) 2016 Budget Request.

NSF is the only federal agency with a mandate to support research and education in every science and engineering discipline. The results of discovery research have a long record of improving lives, investing in the national interest, and meeting national needs. They are the very bedrock of economic growth; the path to sustainability in energy, agricultural, and environmental domains; the seeds of the next technology revolution; and the foundation for advances in medicine. Sustained momentum in NSF's core programs is essential for progress in science and engineering. NSF's broad scope uniquely positions us to integrate the natural sciences and engineering with social, behavioral, and economic sciences to address the complex societal challenges of today. For all these reasons, the FY 2016 Budget Request provides increased support for the core fundamental research programs across NSF.

NSF's organization represents the major science and engineering fields, including: biological sciences; computer and information science and engineering; engineering; geosciences; mathematical and physical sciences; and social, behavioral, and economic sciences. NSF also carries out specific responsibilities for education and human resources, cyberinfrastructure, integrative activities, international science and engineering, and polar programs. The 25-member National Science Board sets the overall policies of the Foundation.

The Foundation's annual budget represents 25 percent of the total federal budget for basic research conducted at U.S. colleges and universities, and this share increases to 60 percent when

medical research supported by the National Institutes of Health is excluded. In many fields NSF is the primary source of federal academic support.

With this request, NSF expects to evaluate over 51,700 proposals through a competitive merit review process and make over 12,000 new awards. This will require over 225,000 proposal reviews, engaging on the order of 35,000 members of the science and engineering community participating as panelists and proposal reviewers. NSF awards reach over 1,800 colleges, universities, and other public and private institutions in 50 states, the District of Columbia, and U.S. territories. In FY 2016, NSF support is expected to reach approximately 356,000 researchers, postdoctoral fellows, trainees, teachers, and students.

NSF's comprehensive and flexible support of meritorious projects enables the Foundation to identify and foster both fundamental and transformative discoveries and broader impacts within and among fields of inquiry. NSF has the latitude to support emerging fields, high-risk ideas, interdisciplinary collaborations, and research that pushes – and even creates – the very frontiers of knowledge. In these ways, NSF's discoveries inspire the American public – and the world.

NSF: Where Discoveries Begin

Sustained federal support for research and education has fueled innovation and provided benefits to the American public for decades, and NSF has played a significant role in this success. For over 60 years, NSF has been a catalyst for the development of new ideas in science and engineering and supported the people who generate them.

In 1952, Caltech professor Max Delbruck used one of NSF's first grants to invent molecular biology techniques that enabled one of his students, James Watson, to determine the molecular structure of DNA. Since then, an entire biotechnology industry has bloomed and prospered, with profits reaching $3.7 billion last year.

In the 1960s and '70s, NSF provided seminal funding for fundamental mathematical and process innovations for manufacturing that industry considered too risky to fund. These led directly to rapid prototyping—and revolutionized how products are designed and manufactured.

In the 1980s, NSF supported the very first computer science departments in U.S. universities, bringing computer science into the mainstream of research, and providing a training ground for the first and subsequent generations of computer scientists and entrepreneurs. Today, NSF provides 89 percent of total federal support for research in computer science conducted in the nation's universities and colleges. Jobs related to computer and information technologies are among the most rapidly growing in the nation according to Bureau of Labor Statistics projections.

In the 1990s, NSF supported pioneering research in the emerging field of nanotechnology. Between 2001 and 2010, NSF-supported centers and networks created 175 start-ups and developed collaborations with over 1,200 companies.

Investments in discovery research often yield unexpected benefits as well. NSF's support of game theory, abstract auction theory, and experimental economics provided the Federal Communications Commission (FCC) with its current system for apportioning the airwaves. Since 1994, FCC "spectrum auctions" have netted over $45 billion in revenue for the federal government and more than $200 billion in worldwide revenue.

The NSF FY 2016 Budget Request builds on these past accomplishments and provides a direction for future success. To fuel the innovations of the future, NSF continues to support fundamental research and education in all fields of science and engineering to maintain a global edge in the competition for new ideas and the most talented people. The core science and engineering disciplines form the "building blocks" for future innovations, and provide the new ideas and approaches needed to advance the interdisciplinary research that is a hallmark of contemporary science and engineering. In all these activities, we keep a steady focus on the frontier, where discoveries begin.

In short, the NSF mission is to look toward the frontier – to identify the most innovative and promising new research and education projects. NSF specifically targets its investments in discovery research at the frontiers of science and engineering. Here, advances push the boundaries of innovation, progress, and productivity.

We identify such frontiers by sticking to our proven, "bottom-up" philosophy. The best ideas come directly from the scientific and engineering community. We support workshops, conferences, and symposiums to tap the extraordinary talent of the community in plotting innovative strategies for research and education directions for the future.

Before I get into the details of our FY 2016 request, let me first expand upon the question of priority setting at the Foundation. Although my testimony below mentions some of the mechanisms for priority setting for NSF – how they are set both across and within accounts and among agency objectives, let me briefly expand upon those points, as this is an excellent starting point for gaining a proper perspective on NSF, because setting priorities is at the core of what we do every day.

The most important source of information for setting priorities comes from the research communities themselves. The research proposals that we receive help identify the leading edge of research and areas ripe for greater investment. The broader research communities also provide continuous input in the form of advice and analyses from myriad National Academy reports, analyses by professional societies, and national and international workshops and conferences. Our Committees of Visitors provide top-to-bottom reviews of existing programs and help formalize research priorities within and across disciplines. Ultimately the priorities reflected in our budget request are refined through consultations with the NSF's Assistant Directors. We then work closely with the National Science Board to ensure our priorities match the broader needs of the scientific community, and the multi-agency science and technology priorities enumerated yearly by the Office of Science and Technology Policy and the Office of Management and Budget (OMB). Finally, the decisions are reflected in the President's budget request to Congress.

At a more local level, NSF internal programs work closely together to align investment decisions and to balance the portfolio of work we fund. For example, if a strong proposal is received by one directorate, program officers may reach out to another directorate – or multiple directorates – where they see opportunities to co-fund projects that are multidisciplinary. My testimony also highlights a number of cross-directorate efforts that are coordinated from their genesis amongst the various directorates. These efforts are coordinated through working groups that regularly meet to examine priorities, directions, and future opportunities.

These mechanisms both inside and outside of NSF ensure that on a daily basis we make sure to complement other agency efforts and that our funding supports the most important research for the nation.

THE NSF FY 2016 BUDGET REQUEST

This FY 2016 Budget Request for the National Science Foundation continues NSF's longstanding commitment to making investments in learning and discovery that will grow our economy, sustain our competitive advantage, and enable America to remain the world leader in innovation. It embraces the challenge of ensuring that scientific discovery and technological breakthroughs remain engines for expanding the frontiers of human knowledge and responding to the challenges of the 21st century.

NSF's FY 2016 Budget Request is $7.724 billion, an increase of $379.34 million (5.2 percent) over the FY 2015 Estimate. This reflects a strong commitment from the Administration to support science and engineering broadly, as well as the people that keep our Nation's scientific enterprise at the forefront of knowledge and discovery.

In turn, NSF is committed to a careful and continuous evaluation of its portfolio to maximize efficiency, effectiveness, and return on investment. This ensures that the agency establishes clear priorities, and it also fosters the development of innovative mechanisms for achieving its investment goals. NSF also works to leverage resources, infrastructure, networks, and data across the federal government and invest in promising collaborative international opportunities.

The investments that form this Budget Request flow from the goals established in the agency's strategic plan: Transform the Frontiers of Science and Engineering, Stimulate Innovation and Address Societal Needs through Research and Education, and Excel as a Federal Science Agency. In FY 2016, key NSF investments in all fields of science and engineering strive to create new knowledge, enable discovery, address complex societal problems, and promote national prosperity.

CROSS-FOUNDATION INVESTMENTS

NSF continues to bring together researchers from all fields of science and engineering to address today's cross-disciplinary questions and challenges through Foundation-wide activities. In FY 2016, four priority investments address issues of major scientific, national, and societal importance.

Understanding the Brain ($143.93 million) encompasses ongoing cognitive science and neuroscience research and NSF's contributions to the Administration's Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative. The goal of the Understanding the Brain investment is to enable scientific understanding of the full complexity of the brain in action and in context. Priorities include: development of innovative technologies, tools and instrumentation, computational infrastructure, theory, and models to understand the brain; increased understanding of relationships between neuronal activity, cognitive processes, and behavior; exploration of links between environment, behavior, and brain function; and training for the next generation of neuroscientists and neuroengineers. Improved understanding of the brain will promote brain health; enable engineered solutions that enhance, replace or compensate for lost function; improve the effectiveness of formal and informal educational approaches; and lead to brain-inspired smarter technologies for improved quality of life. Basic research in these areas can provide novel insights into how cognitive abilities develop and can be maintained and improved throughout the lifespan.

Risk and Resilience ($58.0 million) investments aim to improve predictability and risk assessment and increase resilience to extreme natural and man-made events in order to reduce their impact on quality of life, society, and the economy. NSF is uniquely positioned to support such improvements that require multidisciplinary expertise in science, engineering, and education, such as understanding the dynamic processes that produce extreme events, how people respond to extreme events, and how to engineer resilient infrastructure. One supporting program is Critical Resilient Interdependent Infrastructure Systems and Processes, which directly addresses the need for the resilient and reliable infrastructure that is critical to U.S. economic competitiveness and national security. Another is Prediction of and Resilience against Extreme Events, which aims to enhance the understanding and prediction of, as well as resilience and sustainable responses to, extreme events and geohazards, as well as their impact on natural and human systems.

Innovations at the Nexus of Food, Energy, and Water Systems (INFEWS) ($74.96 million) is an NSF-wide investment that aims to understand, design, and model the interconnected food, energy, and water system through an interdisciplinary research effort that incorporates all areas of science and engineering and addresses the natural, social, and human-built factors involved. Throughout NSF, activities address food, energy, or water, such as the SEES portfolio, particularly Water Sustainability and Climate and Hazards SEES; Coupled Natural and Human Systems; and Basic Research to Enable Agricultural Development. INFEWS, however, will be the first program to study the interconnected food-energy-water nexus. The need for this program is increasingly urgent, as growing U.S. and global populations, changes in land use, and increasing geographic and seasonal variability in precipitation patterns are placing an ever-increasing stress on these critical resources. NSF, through INFEWS, is uniquely poised to focus not only on the fundamental science and engineering questions at this nexus, but to train the next generation of researchers in this interdisciplinary area.

A new approach, **NSF INCLUDES (Inclusion across the Nation of Communities of Learners that have been Underrepresented for Diversity in Engineering and Science)** ($15 million) is an integrated, national initiative to increase the preparation, participation, advancement, and

potential contributions of those who have been traditionally underserved and/or underrepresented in the science, technology, engineering, and mathematics (STEM) enterprise. Following wide community engagement in FY 2015, FY 2016 efforts will focus on the development of a set of new scalable concepts that will provide focus for collaborative action. Our investments are intended to produce rapid progress on changing the balance of diversity in S&E, have significant national impact for the participation of underrepresented groups, stimulate the community, forge new partnerships, and catalyze new approaches. NSF INCLUDES will build on and amplify NSF's nearly $800 million investment portfolio in broadening participation.

ONGOING NSF-WIDE PRIORITIES

NSF addresses many of the complex issues that face the Nation today through interdisciplinary science, engineering, and educational activities. Foundation-wide programs and priorities bring together researchers from all fields of science and engineering to focus on these challenges from a myriad of perspectives, methodologies, and knowledge bases. These interdisciplinary investments are carefully balanced with a longstanding commitment to the fundamental research that addresses grand challenges and furthers basic scientific knowledge.

- **Clean Energy Technology** ($377.22 million) investments are driven by the fundamental research questions that underlie future energy pathways. NSF's clean energy investments support research and education in alternative energy for electricity (solar, wind, wave, geothermal) and fuels (chemical and biofuels). NSF funding also addresses the collection, conversion, storage, and distribution of energy from diverse power sources, including smart grids; the science and engineering of energy materials; energy use; and energy efficiency. Clean energy research addresses our advancement toward reliable and sustainable energy resources and systems that preserve essential ecosystems and environmental services, promote positive social and economic outcomes, and prepare society to responsibly adopt them.

- **Cyber-enabled Materials, Manufacturing, and Smart Systems (CEMMSS)** ($256.95 million) aims to integrate a number of science and engineering activities across the Foundation – breakthrough materials, advanced manufacturing, robotics, and cyber-physical systems. It will address pressing technological challenges facing the Nation and promote U.S. manufacturing competitiveness. In FY 2016, CEMMSS continues to leverage key interagency activities, including the Administration's Materials Genome Initiative, Advanced Manufacturing Partnership, and the National Robotics Initiative. Through CEMMSS, NSF also invests in Advanced Manufacturing ($176.57 million).

- **Cyberinfrastructure Framework for 21st Century Science, Engineering, and Education (CIF21)** ($143.06 million) accelerates and transforms the process of scientific discovery and innovation by providing advanced cyberinfrastructure and new capabilities in computational and data-enabled science and engineering. In FY 2016, NSF will continue to lead the Big Data/National Data Infrastructure program, a joint solicitation with the National Institutes of Health that strives to enable breakthrough discoveries and innovation in science, engineering, medicine, commerce, education, and national security.

- **Innovation Corps (I-Corps™)** ($30.0 million) improves NSF-funded researchers' access to resources that can assist in bridging the gap between discoveries and downstream technological applications. In FY 2016, NSF will continue to support I-Corps™ Nodes and I-Corps™ Sites to further build, utilize, and sustain a national innovation ecosystem that augments the development of technologies, products, and processes that benefit the Nation.

- **NSF Research Traineeships (NRT)** ($62.01 million) in its third year, continues to identify priority research themes that both align with NSF priority research activities and have strong potential in areas of national need where innovative practices in graduate education can be developed. NRT investments aim to advance the research agenda of these themes, as well as develop and conduct research on new approaches and models for educating the next generation of scientists and engineers.

- **Research at the Interface of Biological, Mathematical, and Physical Sciences (BioMaPS)** ($32.81 million) involves the Directorates for Biological Sciences, Mathematical and Physical Sciences, and Engineering, and it seeks to advance discovery at the intersections of these established disciplines. Research includes activities such as development of models, informed by statistical physics that establish the mechanisms linking the biological function of chromosomes to their cellular structure.

- **Science, Engineering, and Education for Sustainability (SEES)** ($80.50 million) aims to increase understanding of the integrated system of supply chains, society, the natural world, and alterations humans bring to Earth, in order to create a sustainable world. In FY 2016, SEES continues to ramp down in anticipation of a planned FY 2017 sunsetting; however, SEES continues to support important scientific and societal contributions during the phase-down period and will make significant progress towards achieving programmatic goals through projects currently underway. The success of several SEES research programs motivates new FY 2016 investments in INFEWS and Risk and Resilience.

- The **Secure and Trustworthy Cyberspace (SaTC)** investment ($124.25 million) aims to build the knowledge base in cybersecurity that enables discovery, learning and innovation, and leads to a more secure and trustworthy cyberspace. Through a focus on long-term, foundational research, SaTC will develop the scientific foundations for cybersecurity research for years to come. SaTC aligns NSF's cybersecurity investments with the four thrusts outlined in the national cybersecurity strategy, *Trustworthy Cyberspace: Strategic Plan for the Federal Cybersecurity Research and Development Program.*

ADDITIONAL PRIORITIES AND HIGHLIGHTS

In FY 2016, NSF continues to emphasize investments in important or emerging areas that have been developed in recent years, including:

- **Synthetic Biology** (approximately $60 million) investments support the design and construction of new biological components as well as the redesign of existing natural biological systems for tailored purposes (e.g., improving the efficiency of photosynthesis for clean energy generation, or introducing the ability of economically important crop plants to

fix nitrogen thereby eliminating dependence on environmentally damaging fertilizers). Also included are investments in the basic biological, physical, and computational sciences and engineering that will enable the construction of a rule set and design tools for synthetic biology (i.e., the rules that govern the construction and function of new biological parts). This portfolio, which promises to develop rapidly emerging technology for new applications and disruptive technology for long-standing problems in food, energy, biomanufacturing, and other areas of national need, spans several NSF directorates as the synthetic biology approach integrates engineering and computer assisted design with biological research. There are also a number of potential partnerships with industry, other federal agencies, and other countries that will be further explored.

- **Urban Science** ($7.50 million) investments will focus on the research and development of critical infrastructure and applications, which address pressing urban challenges, such as sustainability, livability, and equity, through both fundamental research and translational research that is supported via partnerships. Multidisciplinary Urban Science research efforts at NSF and other agencies will address the question of how we can intelligently and effectively design, adapt, and manage cities to maximize their positive potential. It will enable the integration of networked computing systems, physical devices, data sources, and infrastructure leading to smart cities.

- NSF aims to increase the operational efficiency of **U.S. activities in the Antarctic** ($18.50 million) by continuing progress on a multi-year commitment toward more efficient and cost-effective science support as recommended by the U.S. Antarctic Program Blue Ribbon Panel report, *More and Better Science in Antarctica through Increased Logistical Effectiveness*. Emphases include safety and health improvements, and facilities renewal at McMurdo and Palmer stations. Additionally, NSF aims to plan and execute more effective observational approaches to the Antarctic science community, as outlined in the 2011 National Research Council report, *Future Science Opportunities in Antarctica and the Southern Ocean*.

STEM EDUCATION

To ensure lasting capabilities to address these disciplinary and interdisciplinary challenges, NSF's educational programs and activities integrate research and education in all fields to engage tomorrow's workforce. These programs target all educational levels and emphasize broadening participation, so that STEM fields become more accessible to all whose imagination has been sparked by science and engineering.

NSF's STEM education investment, centered in the Directorate for Education and Human Resources (EHR), funds activities that support students, teachers, researchers, and the public. In keeping with the Administration's priorities and the strategic goals for STEM education as described in the 2013 National Science and Technology Council report, *Federal Science, Technology, Engineering, and Mathematics (STEM) Education 5-Year Strategic Plan*, NSF's key investments for FY 2016 focus on areas where NSF has a central role in STEM education, notably graduate education and undergraduate education, and they also emphasize the need to strengthen foundational STEM education research.

- **Improving Undergraduate STEM Education (IUSE)** ($134.58 million) aims to accelerate the quality and effectiveness of the education of undergraduates in all STEM fields by using decades of research on STEM learning and best practices in education to address challenges across fields as well as within specific disciplines. IUSE priorities are aligned with the four strategic objectives for undergraduate education identified in the federal STEM education strategic plan: increase use of evidence-based practices; increase authentic research experiences for students; improve the recruitment, retention, and STEM degree completion for students in two-year colleges; and address the high rates of failure in introductory college mathematics.

- **EHR Core Research (ECR)** ($103.84 million) remains a top priority. In FY 2016, ECR strengthens investments in and impact on the improvement of STEM learning, teaching, and workforce development, through three key areas: learning and learning environments, broadening participation and institutional capacity, and development of the STEM professional workforce.

- The **CyberCorps®: Scholarships for Service (SFS)** program ($45.0 million) supports cybersecurity education and research at higher education institutions. SFS also focuses on workforce development by increasing the number of qualified students entering the fields of information assurance and cybersecurity, which enhances the capacity of the United States higher education enterprise to continue to produce professionals in these fields to secure the Nation's cyberinfrastructure.

MAJOR RESEARCH EQUIPMENT AND FACILITIES CONSTRUCTION

In FY 2016, NSF requests funding to continue construction of three projects: the Daniel K. Inouye Solar Telescope, the Large Synoptic Survey Telescope, and the National Ecological Observatory Network. Funding concluded in FY 2014 for two projects, the Advanced Laser Interferometer Gravitational-wave Observatory and the Ocean Observatories Initiative.

- The **Daniel K. Inouye Solar Telescope** ($20.0 million) will enable the study of magneto-hydrodynamic phenomena in the solar photosphere, chromosphere, and corona at unprecedented spatial, temporal, and wavelength resolution to gain information on the creation, interaction, and ultimate annihilation of solar magnetic fields. Determining the role of magnetic fields in the outer regions of the Sun is crucial to understanding the solar dynamo, solar variability, and solar activity, including flares and coronal mass ejections. These can affect civil life on Earth through the phenomena generally described as "space weather" and may have impact on the terrestrial climate. FY 2016 is year eight of an eleven year construction process. By the end of FY 2016, the adjacent Support and Operations building will be completed, site testing of the telescope Enclosure will be finished, and the Coudé Rotator Lab will be installed in the pier. In addition, the Telescope Mount Assembly base erection will begin inside the weathertight Enclosure, along with the start of the electrical installation.

- The **Large Synoptic Survey Telescope** ($99.67 million) will be an 8-meter-class wide-field optical telescope designed to carry out surveys of the entire sky visible from its site. LSST

will collect nearly 40 terabytes of multi-color imaging data every night for ten years and will produce the deepest, widest-field sky image ever. It will image the entire visible sky twice per week, as well as issue alerts for moving and transient objects within 60 seconds of their discovery. The LSST surveys will result in a comprehensive data set that will enable hundreds of other fundamental astrophysical studies by the entire research community. FY 2016 is year three of a nine year construction process. In FY 2016, work on the lower enclosure will be complete at the LSST site, making it ready for construction of the telescope dome atop that enclosure. Following conclusion of a full bid-and-propose process, the contract for construction of the base facility will be awarded. The first components of the sensor, developed by the Department of Energy, will be delivered to the camera team, with production of the first "raft" of sensors (12K by 12K pixels) nearing completion.

- The **National Ecological Observatory Network** ($80.64 million) will consist of geographically distributed field and lab infrastructure networked via cybertechnology into an integrated research platform for regional to continental scale ecological research. NEON is the first research platform and the only national experimental facility specifically designed to collect consistent and standardized sensor and biological measurements across 106 sites nationwide in close to real-time, enabling basic research on complex phenomena driving ecological change and at the scales appropriate for studying many grand challenge questions in ecology. NEON allows researchers to expand the scale of their research to understand large-scale dynamics affecting ecosystems. FY 2016 is the final year of construction funding, and this will allow the project to complete civil construction, continue sensor deployment at terrestrial and aquatic locations, expand biological sampling, continue cyberinfrastructure hardware and software deployments in support of sites and domain Support Facilities acceptance, expand operational support systems, and ongoing development of data algorithms and related data release via NEON's web portal.

ORGANIZATIONAL EXCELLENCE

NSF seeks to integrate mission, vision, and core values to efficiently and effectively execute our activities and provide the flexibility and agility required for all aspects of its operations. This goal incorporates a culture of continuous improvement to ensure effective, inclusive, and accountable programs and merit review processes that provide the greatest value for taxpayer dollars.

In FY 2016, NSF will work towards full utilization of its established FTE allocations, which are increased from the FY 2015 request to a total of 1,367 to accommodate additional staffing for a Digital Service team and requirements of the DATA Act as noted below. The Foundation recognizes that maintaining staffing levels is vital for managing increasing numbers of proposals and the subsequent increase in workload.

In FY 2016, the primary drivers of the increase for the Agency Operations and Award Management (AOAM) account are the headquarters relocation and the 1.3 percent cost-of-living adjustment and related salary and benefit increases. AOAM also supports operational activities to ensure the Foundation has sufficient resources to fully fund ongoing operational requirements and maintain essential services as we approach the transition to the new NSF headquarters. These include strengthening capabilities in human resource management, consistent with the

opportunities for action or improvement identified in the FY 2014 Strategic Review. FY 2016 funding also includes equipment and technology costs related to NSF's Headquarters relocation.

In addition, $2.85 million will support NSF's efforts to implement the Digital Accountability and Transparency Act (DATA Act; P.L. 113–101) to include changes in business processes, workforce, or information technology to support high quality, transparent Federal spending information. Further, $1.0 million will fund staffing costs to build a Digital Service team that will focus on transforming the agency's digital services with the greatest impact to citizens and businesses so they are easier to use and more cost-effective to build and maintain.

Concluding Remarks

With intense global competition for knowledge and talent, we must focus our attention on finding the sophisticated solutions that will ensure a prosperous, secure, and healthy future for the nation and the world. Robust NSF investments in discovery research have returned exceptional dividends to the American people, expanding knowledge, improving lives, and ensuring our security. To keep those benefits flowing, we need to constantly replenish the wellspring of new ideas and train new talent while serving as good stewards of the public trust. That is the fundamental and continuing mission of NSF.

Madam Chair and members of the Subcommittee, I hope my testimony explains how the Foundation plays a vital role in ensuring that America remains at the epicenter of the ongoing revolution in research, innovation, and learning that is driving 21st century economies. More than ever, the future prosperity and wellbeing of Americans depend on sustained investments in our science and technology. NSF has been and continues to be central to this endeavor.

I hope that this overview has given you a taste of how important the National Science Foundation and its activities are to the future prosperity of the United States. I look forward to working with you in months ahead as we continue to advance science and engineering in the national interest, and I thank you for your leadership.

I will be pleased to answer any questions you may have.

Dr. France A. Córdova
Director
National Science Foundation

France A. Córdova, was sworn in as director of the National Science Foundation (NSF) on March 31, 2014. Nominated by President Barack Obama to head the $7.2-billion independent federal agency, she was confirmed by the U.S. Senate on March 12. Córdova leads the only government science agency charged with advancing all fields of scientific discovery, technological innovation, and science, technology, engineering and mathematics (STEM) education. NSF's programs and initiatives keep the United States at the forefront of science and engineering, empower future generations of scientists and engineers, and foster U.S. prosperity and global leadership.

Córdova is president emerita of Purdue University, where she served as president from 2007 to 2012. From 2002 to 2007, she led the University of California, Riverside, as chancellor and was a distinguished professor of physics and astronomy. Córdova was the vice chancellor for research and professor of physics at the University of California, Santa Barbara, from 1996 to 2002.

From 1993 to 1996, Córdova served as NASA's chief scientist. Prior to joining NASA, she was on the faculty of the Pennsylvania State University where she headed the department of astronomy and astrophysics from 1989 to 1993. Córdova was deputy group leader in the Earth and space sciences division at Los Alamos National Laboratory from 1988 to 1989 and staff scientist from 1979 to 1989. She received her Bachelor of Arts degree from Stanford University and her doctorate in physics from the California Institute of Technology in 1979.

More recently, Córdova served as chair of the Board of Regents of the Smithsonian Institution and on the board of trustees of Mayo Clinic. She also served as a member of the National Science Board (NSB), where she chaired the Committee on Strategy and Budget. As NSF director, she is an ex officio member of the NSB.

Córdova's scientific contributions have been in the areas of observational and experimental astrophysics, multi-spectral research on x-ray and gamma ray sources and space-borne instrumentation. She has published more than 150 scientific papers. In 1997, she was awarded an honorary doctorate by Loyola Marymount University, Los Angeles. She is a recipient of NASA's highest honor, the Distinguished Service Medal, and was recognized as a Kilby Laureate in 2000. The Kilby International Awards recoginze extraordinary individuals who have made "significant contributions to society through science, technology, innovation, invention and education." Córdova was elected to the American Academy of Arts and Sciences and is a National Associate of the National Academies. She is also a fellow of the American Association for the Advancement of Science (AAAS) and the Association for Women In Science (AWIS).

She is NSF's 14th director, succeeding Subra Suresh who stepped down in March 2013.

Córdova is married to Christian J. Foster, a science educator, and they have two adult children.