

Statement of Dr. John Marburger, III
Director, Office of Science and Technology Policy
to the
Subcommittee on Science, Technology, and Innovation
Committee on Commerce, Science and Transportation
United States Senate
“The FY 2009 Budget Proposal to Support U.S. Basic Research”

March 11, 2008

Chairman Kerry, Ranking Member Ensign, and Members of the Subcommittee, I am pleased to appear before you once again to present the President’s Fiscal Year 2009 research and development (R&D) budget. In the eighth and final year of this Administration, today’s hearing provides an opportunity to take stock of how far we have come, where we are today, and, most importantly, what remains to be done for U.S. science and technology. Last year I came before this Subcommittee seeking your support for the American Competitiveness Initiative (ACI). With Congressional passage and enactment of the America COMPETES Act you delivered that support.

Now I am asking for your help again. The basic research programs prioritized in the ACI and authorized in the America COMPETES Act remain critically important to the long term strength of our Nation’s economy, and should be fully funded at the level of the President’s request for 2009. The National Science Foundation, the Department of Energy’s Office of Science, and the National Institute of Standards and Technology’s core lab research and facilities provide basic research infrastructure for every field of science, and produce the new knowledge that make technology breakthroughs possible. This Subcommittee has a commendable history of bipartisan support for science funding, for effective advocacy of basic scientific research, and for its technical applications that benefit every part of our society. On behalf of the Administration, I thank the Subcommittee for the good working relationship it has established with the science agencies and with my office, and look forward to campaigning together for robust funding of our mutual innovation and competitiveness agenda.

Overall, Federal R&D in the 2009 Budget is \$147 billion, \$4 billion more than FY 2008. That represents one out of every seven dollars requested by the President in the discretionary budget. This total exceeds the Fiscal Year 2001 amount by \$56 billion and represents growth of 61 percent since then. Over these eight years, the cumulative Federal R&D investment will total over \$1 trillion.

The growth in non-defense R&D is even more dramatic in the 2009 Budget. The President is seeking a six percent increase in this category. By comparison, the remainder of the non-security discretionary budget is up less than 1 percent. And I draw your attention to the chart of Federal non-defense spending over time. (see Attachment #1) With the 2009 Budget, real growth in outlays for the conduct of non-defense R&D, with the effect of inflation factored out, is up 31 percent in eight years. Real non-defense R&D growth for the previous eight years was 11 percent. The President’s commitment to the government’s R&D enterprise is strong, and the advancement of science remains among his top budget priorities.

The most recent and dramatic evidence of this commitment can be found once again in the President's State of the Union address in January. In the President's words:

"To keep America competitive into the future, we must trust in the skill of our scientists and engineers and empower them to pursue the breakthroughs of tomorrow. Last year, Congress passed legislation supporting the American Competitiveness Initiative, but never followed through with the funding. This funding is essential to keeping our scientific edge. So I ask Congress to double federal support for critical basic research in the physical sciences and ensure America remains the most dynamic nation on Earth."

Increased funding for critical basic research in the physical sciences is my highest budget priority. This Subcommittee has led by fully authorizing these basic research increases in the bipartisan America COMPETES Act. Unfortunately, the Subcommittee's good work was not ultimately realized in the 2008 Omnibus funding bill (see Attachment #2), but I urge you to maintain your commitment. We now must succeed in implementing ACI/COMPETES with actual funding. If we fail, it will significantly impair and delay all our efforts to strengthen long-term economic competitiveness through innovation-enabling basic research in the physical sciences and engineering. Lost research time delays innovations, slows development, misses market opportunities, and costs jobs and economic growth.

ACI: As described above, the centerpiece of the Administration's basic research agenda is the American Competitiveness Initiative. The 2009 Budget calls for a 15 percent or \$1.6 billion increase for the ACI's three priority civilian science agencies: the National Science Foundation; DoE's Office of Science; and the laboratories of the National Institute of Standards and Technology. This level of total funding, \$12.2 billion, is necessary to restore the doubling path we all committed to last year. (see Attachment # 3)

In addition, planned basic research at the Department of Defense will grow by \$270 million over the FY 2008 request—a 19 percent increase, yielding a total of \$1.7 billion—consistent with the President's commitment to support high value research in the physical sciences. These investments are made to support national security but, due to the broad effects of basic research, also contribute to ACI innovation goals as well.

I know this Committee is as disappointed as I am at the current shortfall. In order not to lose yet another year of enhanced and expanded high-impact innovation research, this year Congress must complete the FY 2009 budget process on time.

America COMPETES Act: With respect to programs authorized by America COMPETES in the President's Budget, the Administration's approach is straightforward: among the many activities in the bill, establish priorities to ensure that limited resources are allocated where they are needed most. To this end, the Administration has accepted the conclusions of many studies and reports that funding for ACI basic research is most important and needs to be addressed first. This prioritization reflects a broad endorsement by the business and academic communities, most recently as part of last year's "American Innovation Proclamation," which states as its first conclusion that "Congress must act to: Renew America's commitment to discovery by doubling the basic research budgets at the National Science Foundation, the National Institute of Standards

and Technology, the Department of Energy's Office of Science and the Department of Defense." (see Attachment #4)

Prioritizing within the constraints of budget realities necessarily means that some of the programs and activities authorized in America COMPETES could not be requested in this Budget. (see Attachment #5) The lack of funding in the FY2008 Omnibus appropriations bill for the priority basic research increases authorized in the COMPETES Act makes it even more imperative to address these priorities in the forthcoming fiscal year. The President signalled this policy when he signed America COMPETES in August of last year, stating that "These new programs...and excessive authorizations will divert resources and focus from priority activities aimed at strengthening the basic research that has given our Nation such a competitive advantage in the world economy. Accordingly, I will request funding in my 2009 Budget for those authorizations that support the focused priorities of the ACI, but will not propose excessive or duplicative funding based on authorizations in this bill." (see Attachment #6)

As just one example of this prioritization, the Budget does not request funding for the new Commerce Department Technology Innovation Program or new math and science education programs at NSF. This is because the Administration believes very strongly that the fundamental research programs at NIST and NSF are a higher leverage investment and in greater need of funding than new programs, especially given the devastating impacts of last year's Omnibus appropriations bill on these agencies.

Earmarks: Before summarizing this year's Federal R&D budget, because research earmarks returned in the 2008 appropriations, I want to express my concern about the very serious deleterious impacts earmarks have on the science budget. I make these remarks knowing that this Subcommittee fully understands the impact of the problem and supports best practices in the allocation of research funding.

In FY 2008, DoD basic and applied research earmarks total about \$1.1 billion (about 1/6 of DoD research's total budget); \$124 million of the DoE Office of Science is earmarked; and \$83 million in earmarks and unrequested grants seriously dilute the core research and facilities proposed at the National Institute of Standards and Technology. Altogether, research earmarks are estimated at \$2 billion of the \$16.8 billion of overall appropriations earmarks government-wide in FY 2008. In nominal terms, this is more than the \$1.8 billion increase in the overall FY 2008 Federal Science & Technology (FS&T) budget and earmarks therefore result in an actual real cut in merit-reviewed research at the agencies that are included in the FS&T budget. As we discuss the importance of pursuing the best science to contribute to U.S. competitiveness, I hope the Congress will significantly reduce research earmarks in the FY 2009 appropriations process, as it did in fiscal year 2007. Earmarks that divert funding from a merit-based process undermine America's research productivity. The Administration commends Congress for not subjecting NSF and the National Institutes of Health to this debilitating practice. It is now time to end this practice for all research programs.

Basic Research: Looking at overall basic research in the 2009 Budget, \$29.3 billion is requested, an \$850 million increase. Since the effect of FY 2008 earmarks only enhance this difference and make the real programmatic increases even bigger, in my view this is a clear indication of the Administration's strong focus on fundamental research and the discovery of new knowledge as a leading mission of the Federal government. I want to emphasize that this

favorable treatment of basic research is occurring in a year of spending reductions for many other domestic programs, indicating the high priority this Administration places on the importance of this activity.

Climate Science: While basic research in the physical sciences for long term innovation and competitiveness is the priority driver in the 2009 Federal R&D budget, other science areas remain very important to our Nation's goals. Since FY 2001, the Administration will spend approximately \$14.6 billion on climate change science research through the multi-agency Climate Change Science Program, and the President's 2009 CCSP budget exceeds \$2 billion, a 12 percent increase over FY 2008 enacted. The U.S. leads the world in advancing climate change policy and programs, with planned expenditures of nearly \$9 billion in climate-related science, technology, international assistance, and tax incentive programs proposed in FY 2009 – much more than any other country and a nine percent increase over 2008 enacted levels.

Earth Observations and Ocean Initiative: In other programs relevant to the environment, the 2009 Budget includes increased funding for a number of Earth Observations programs, most notably \$74 million for the National Oceanic and Atmospheric Administration (NOAA) to sustain the highest priority climate measurement capabilities that once were part of the National Polar-orbiting Operational Environmental Satellite System (NPOESS) program, and \$103 million for NASA to embark on the new series of space-based Earth observing missions recommended by the National Research Council's recent Earth Sciences Decadal Survey. A new National Land Imaging Program office to ensure long-term continuity of multi-spectral imaging of the Earth's surface is established in the U.S. Geological Survey (USGS). This year's Budget again includes the Administration's Ocean Initiative, which calls for \$102 million in 2009 funding for ocean science and research at NOAA, NSF and the USGS.

Information Technology: President Bush's 2009 Budget of \$3.5 billion for Networking and Information Technology R&D (NITRD) represents a doubling since 2001. This brings the eight year total investment in this area to more than \$20.9 billion. The 2009 Budget emphasizes the NITRD priorities of high-end computing R&D and infrastructure, advanced networking, and cyber security and information assurance. The tools and capabilities that result from the NITRD program affect every area of science and technology and enhance the Nation's competitiveness.

Nanotechnology: This Administration's National Nanotechnology Initiative (NNI) continues strongly with over \$1.5 billion in FY 2009 for this well-coordinated multi-agency, investment in fundamental research, multi-disciplinary centers of excellence, and development of focused cutting-edge research and education infrastructure. With the 2009 request, nearly \$10 billion will have been invested in nanoscale R&D in seven years. The NNI includes important research on the societal implications of nanotechnology, including human and environmental health and methods for managing potential risks.

Office of Science and Technology Policy (OSTP): As you know, this Subcommittee also oversees OSTP itself. After sustaining a six percent cut in FY 2008, we are requesting \$5.3 million in the 2009 Budget. This amount is \$119,000 above the FY 2008 appropriation, but \$215,000 below the FY 2008 request. FY 2009 will take OSTP through the end of the current Administration and into the beginning of the next. Full funding of the OSTP request is important for both of these transition phases to proceed smoothly. The next Administration will undoubtedly propose an organization and funding level for OSTP to fulfill the agency's

functions in FY10 and beyond. The current request reflects our desire to continue to fulfill OSTP's mission in a robust manner to the end of the current term, and to provide the new Administration with flexibility to bring OSTP rapidly to an effective level of operation.

OSTP also seeks full funding for the Science and Technology Policy Institute (STPI) within NSF's request. STPI is a congressionally-chartered Federally Funded Research and Development Center that provides excellent objective, technical support to OSTP and other agencies. Because the congressional statute mandates that NSF sponsor STPI, OSTP requests that this amount be fully funded within the NSF budget in support of OSTP's mission. We have included such language in the OSTP budget narrative in response to the 2008 Omnibus report language that directed OSTP to request this funding. We respectfully request the Subcommittee's support.

AGENCY BUDGET HIGHLIGHTS

National Science Foundation (NSF):

Funds are requested to increase the budget for NSF to \$6.85 billion in FY 2009, 14 percent or \$822 million above 2008's \$6.03 billion. As one of the three key agencies in the American Competitiveness Initiative, NSF is the primary source of support for university and academic research in the physical sciences, funding potentially transformative basic research in areas such as nanotechnology, advanced networking and information technology, physics, chemistry, material sciences, mathematics and engineering. The NSF physical sciences directorates receive increases of about 20 percent.

NSF leads two previously mentioned Administration priority research areas that promise to strengthen the Nation's economy: the National Nanotechnology Initiative (NNI) and the Networking and Information Technology R&D program (NITRD). NSF-funded nanotechnology research, sustained at \$397 million in FY 2009, a 165 percent increase since 2001, has advanced our understanding of materials at the molecular level and has provided insights into how innovative mechanisms and tools can be built atom by atom. This emerging field holds promise for a broad range of developing technologies, including higher-performance materials, more efficient manufacturing processes, higher-capacity computer storage, and microscopic biomedical instruments and mechanisms. NSF's investments in NITRD, funded at \$1.1 billion in 2009, up \$159 million over 2008 and 71 percent since 2001, support all major areas of basic information technology (IT) research. NSF also incorporates IT advances into its scientific and engineering applications, supports using computing and networking infrastructure for research, and contributes to IT-related education for scientists, engineers, and the IT workforce. NSF will continue to support the development of a petascale computing capability widely accessible to the science and engineering community. A new \$20 million cross-Foundation investment that is part of both the NNI and NITRD, Science and Engineering Beyond Moore's Law, is a multidisciplinary effort to advance the fundamental science and technology of semiconductor electronics.

The 2009 NSF Education and Human Resources (EHR) budget will continue efforts to prepare U.S. students for the science and engineering workforce with a nine percent overall increase (+\$65 million) over the level in the 2008 Omnibus. Specifically, the 2009 EHR Budget provides a five percent increase for the Math and Science Partnerships program at NSF, and a seven

percent increase for the Noyce Scholarship program. NSF-wide Graduate Research Fellowships are proposed for a 32 percent increase and will support an additional 700 graduate students.

NSF's investment in Cyber-enabled Discovery (CDI), begun in FY 2008, more than doubles for a total of \$100 million in FY 2009. The CDI investment promotes the advancement of science and engineering along fundamentally new pathways opened by computational thinking.

NSF will continue to fund research on cybersecurity foundations, network security, and systems software that supports the objectives of the *Federal Plan for Cyber Security and Information Assurance Research and Development*. Emphasis will be placed on usability, privacy, and theoretical foundations.

Department of Energy (DoE):

DoE is the lead agency for the President's Advanced Energy Initiative (AEI). The 2009 AEI investment of \$3.2 billion in energy-related science and technology, a 25 percent increase over FY 2008 enacted, will keep us on track to meet the President's goal of reducing greenhouse gas intensity 18 percent by 2012 and on an achievable path to energy independence. Perhaps most critically, the FY 2009 AEI includes over \$788 million in basic research at DoE's Office of Science, a 55 percent increase, to overcome major technical barriers to the use of solar energy, cellulosic ethanol, energy storage, hydrogen fuel cells, and fusion energy, including critical commitment support for the ITER international fusion energy research project. Before leaving this topic I should note that ITER represents a long-term solution to an energy future without fossil fuel, and I was alarmed to learn that the FY 2008 Omnibus eliminated the U.S. contribution to this international project.

The 2009 AEI budget proposes:

- \$588 million for the Coal Research Initiative, R&D focused on coal gasification and carbon sequestration processes and systems, including \$156 million for the FutureGen program to demonstrate these technologies;
- \$343 million for biomass R&D to help enable cellulosic ethanol to become practical and competitive;
- \$225 million for solar R&D to accelerate development of cost-effective photovoltaic materials;
- \$238 million for R&D on hydrogen production, storage, distribution and use;
- \$103 million for R&D of hybrid electric systems including \$49 million for high-energy, high-power batteries for hybrid-electric and "plug-in" hybrid vehicles;
- \$53 million for wind energy research to help improve the efficiency and lower the costs of wind technologies for use in low-speed wind environments;
- \$30 million for geothermal research; and
- \$544 million for the GNEP and Nuclear Power 2010 initiatives to demonstrate advanced fuel cycle technologies, to expand the domestic use of nuclear power, and to provide for safe, environmentally responsible global nuclear energy systems that support non-proliferation objectives.

Full funding of \$215 million for the U.S. contribution to the ITER international fusion energy project is imperative to meet our international commitment.

The Office of Science in DoE (DoE SC) is another of the three priority research agencies in the President's American Competitiveness Initiative, providing many of the major cutting-edge scientific facilities and labs for a wide range of basic research related to potentially significant economic innovations. The 2009 Budget provides \$4.72 billion for DoE SC, an increase of 19 percent over the FY 2008 omnibus. The Budget includes funding for priorities such as nanotechnology (\$300 million), materials science research facilities (\$719 million), basic research in support of hydrogen production, use and storage (\$75 million), the advanced energy initiative including electrical battery storage and an advanced nuclear fuel cycle (\$788 million), and advanced scientific computing facilities and research (\$368 million). The Budget also includes funding (\$93 million) to begin construction of the National Synchrotron Light Source II, a new x-ray light source that will enable the study of materials properties and functions at a level of detail and precision (nanoscale) never before possible. It continues support for construction of the Linac Coherent Light Source (\$37 million)—a materials research facility that will provide laser-like x-rays allowing an unprecedented real-time glimpse of chemical and biological processes, fully funds operations for the five nanoscale science research centers, and provides \$29 million for the upgrade of the Continuous Electron Beam Accelerator Facility.

National Institute of Standards and Technology (NIST):

The Department of Commerce's NIST "core" research and facilities receive \$634 million in 2009, an increase of 22 percent over the 2008 Omnibus after accounting for earmarks and unrequested grants. In 2009, the American Competitiveness Initiative proposes NIST funding increases of nearly \$114 million for new initiatives in research and measurements in high-leverage areas such as nanotechnology manufacturing; expanding NIST's neutron facility to aid in characterizing novel materials in high-growth research fields; and improving our understanding of complex biological systems to accelerate innovations and enable investment in biosciences, including disease diagnosis and treatment.

Department of Education (ED):

ED is the lead agency for academic competitiveness and the President requested the following under America COMPETES authority:

- \$95 million for the Math Now program which authorizes competitive grants to improve instruction in mathematics for students in kindergarten through 9th grade. Grantees will implement research-based mathematics programs to enable all students to reach or exceed grade-level achievement standards and prepare them to enroll in and pass algebra courses.
- \$70 million under the America COMPETES Act for a new vision for advanced placement, as embodied in the President's American Competitiveness Initiative, the purpose of which is to support State and local efforts to increase access to advanced placement classes and tests for low-income students in order to better prepare them for success after high school. The new authority targets Federal support more specifically on the preparation of teachers to teach classes in the critical subjects of mathematics, science, and the critical foreign languages, and on encouraging more students from high-need schools to take and pass AP and IB courses and tests in those subjects.

- \$24 million for Foreign Language Partnerships, which is part of the Administration's National Security Language Initiative. These funds would support partnerships between institutions of higher education and school districts, in order to increase the number of American students who are proficient in languages that are critical foreign languages to national security.

The President's American Competitiveness Initiative also called for the creation of an Adjunct Teacher Corps to support qualified math and science professionals to become adjunct high school teachers. The President's 2009 Budget requests \$10 million for this program.

Additionally, the President's National Mathematics Panel will issue the final report within the next month. The panel's recommendations will help teachers teach all K-7 students pre-algebraic concepts so that every student can take and pass more rigorous courses in middle and high school, particularly Algebra I in middle school and Algebra II in high school.

Science, Technology, Engineering and Math (STEM) education programs in the COMPETES Act and ACI are but a small subset of the total number of such programs – roughly 100 at 12 Federal agencies for which the President is proposing \$3.6 billion in FY 2009. The 12 agencies are continuing to work together to implement the recommendations of the Academic Competitiveness Council to improve coordination and effectiveness of these STEM education investments.

National Aeronautics and Space Administration (NASA):

The President's 2009 Budget for NASA is \$17.6 billion, a three percent increase over FY 2008, reflecting a steady commitment by the Administration to the continued pursuit of the Vision for Space Exploration and to using the Shuttle to assemble the International Space Station until the Shuttle retires in 2010. Maintaining NASA budget appropriations is extremely important for the continued viability of its programs.

In 2009, NASA requests \$3.5 billion in direct costs for exploration systems including the Orion Crew Exploration Vehicle (CEV) and the Ares I launch vehicle that will carry astronauts to the Moon. 2009 will see the Ares I-X test flight, the first test flight of the Ares I launch vehicle. Ares I-X will involve a first stage with a functional four segment solid rocket booster and an inactive fifth segment, and an upper stage mass simulator. Ares I-X will test first-stage flight dynamics, controllability, and separation of the first and upper stages. Having already initiated the acquisition process for certain elements of this architecture during 2006, NASA now has all Orion CEV and Ares I elements under contract with the first crewed-flight planned to occur in 2015.

The 2009 Budget requests \$4.44 billion in direct costs to continue operating the nearly 60 spacecraft of NASA's Science Mission Directorate and to support investments in future Earth and space science missions, vital technologies, and frontier research. NASA will launch seven new Earth observing missions in the next several years, including projects such as the Landsat Data Continuity Mission and the Global Precipitation Measurement mission. In a significant new initiative, NASA also will embark upon a series of high-priority, space-based Earth observing missions, informed by the recommendations of the National Research Council's recent Decadal Survey on earth sciences. At the same time, NASA will continue its roles in the interagency

Climate Change Science Program and the international initiative on the Global Earth Observing System of Systems. NASA will expand its program of scientific exploration of the Moon through a new series of low-cost robotic missions that will advance our knowledge of Earth's closest neighbor as we prepare for a human return to the Moon. Following up ongoing missions to Mars, Saturn and Mercury, NASA also will send ever-more-capable spacecraft to Mars and other outer planets. In addition, NASA will continue its vibrant astrophysics and astronomy efforts through programs such as Beyond Einstein and the Great Observatories, and will upgrade the Hubble Space Telescope in late 2008 to provide five more years of productive on-orbit life. NASA also will maintain its important heliophysics research through projects such as the Radiation Belt Storm Probes.

In December 2007, the President approved the Nation's first National Plan for Aeronautics R&D and Related Infrastructure. Consistent with this Plan, the 2009 NASA aeronautics budget prioritizes fundamental aeronautics research, the improvement of aviation safety, and research supporting the development of the Next Generation Air Transportation System. In addition, NASA will continue to address infrastructure upgrades and maintenance requirements for aeronautical test facilities across NASA centers that are of vital importance to the Nation. The 2009 budget requests \$447 million for NASA aeronautics direct costs.

National Oceanic and Atmospheric Administration (NOAA):

For NOAA in the Department of Commerce, the 2009 Budget provides \$383 million for Oceanic and Atmospheric Research (OAR), 22 percent more than in FY 2001. OAR provides for ongoing research on climate, weather, air quality, and ocean processes.

The FY 2009 NOAA budget again requests \$20 million for oceans science and research (with another \$20 million from NSF and USGS) as part of a \$40 million interagency effort to implement the Ocean Research Priorities Plan called for in the President's U.S. Ocean Action Plan. Unfortunately, the 2008 Omnibus provided about 25 percent of the \$40 million requested. Nevertheless, the President remains committed to enhancing ocean science that will make our oceans, coasts and Great Lakes cleaner, healthier and more productive and is again requesting new funding to support efforts in these areas. The \$20 million will address the four near-term ocean research priorities established by the Ocean Research Priorities Plan and Implementation Strategy, published in January 2007. The NOAA Budget also proposes \$8 million to continue extended continental shelf scientific analysis to define and map its U.S. outer limits and an additional \$21 million to develop an operational ocean monitoring network.

National Institutes of Health (NIH):

The Budget sustains biomedical research at the current FY 2008 level of \$29.3 billion in the FY 2009 NIH budget. The Budget includes an additional \$38 million, an eight percent increase, for the NIH Common Fund, bringing the total to \$534 million for this interdisciplinary incubator for new ideas and initiatives that will accelerate the pace of discovery across the NIH Institutes and Centers. The 2009 Budget also includes increased funding to assist young scientists as they begin their independent research careers. The Pathway to Independence program is funded at a total of \$71 million to lower the age at which young scientists get their first grant award and to encourage future generations to pursue careers in science. With the 2009 Budget, NIH

discretionary budget authority is up \$8.9 billion since FY 2001; that's 44 percent - more than the 31 percent average for overall Federal S&T.

U.S. Geological Survey (USGS):

The FY 2009 request for the USGS in the Department of the Interior is \$969 million, 10 percent more than FY 2001. The USGS portion of the Landsat Data Continuity Mission remains steady at \$24 million, while a new National Landsat Imaging Program office is established. \$31 million is targeted for climate change; an \$8 million increase is proposed for the Water for America initiative, including a national water census; and for the interagency ocean science initiative referred to in NOAA, \$3 million is requested for the Ocean Research Priorities Plan and \$4 million for extended continental shelf mapping. Since State and local governments, industry and universities should pay for their own mineral assessment products, the Minerals Resources Program is again proposed for reduction by half to \$25 million and accounts for most of the difference with FY 2008.

Environmental Protection Agency (EPA):

The FY 2009 budget for science and technology funding at EPA is \$790 million, \$4 million more than FY 2008. Research priorities include supporting the agency's nanotechnology program, funded at \$15 million, an increase of \$5 million over 2008 enacted. Additionally, to ensure EPA's ability to attract and retain the highest caliber scientists, the budget proposes expanded special authority that will allow EPA to hire up to 40 scientists quickly and competitively. \$35 million is also requested to support high priority Water Security activities.

Department of Agriculture (USDA):

USDA science and research programs total \$1.95 billion in the 2009 Budget, a \$235 million reduction from FY 2008 mostly due to the removal of earmarks and lower priority projects and a reduction of formula grants. Still at nine percent more than FY 2001, the Administration favors competitive research grants which are allocated based on an objective peer-reviewed process. This is reflected in a requested 74 percent increase for the National Research Initiative since FY 2001.

Department of Transportation (DoT):

The FY 2009 Budget request for highway-related research is \$430 million, the same as current funding and consistent with the level in the multi-year surface transportation research authorization. Highway research includes the Federal Highway Administration's transportation research and technology contract programs as well as some programs administered by the Research and Innovative Technology Administration. These research programs include the investigation of ways to improve safety, reduce congestion, improve mobility, reduce lifecycle construction and maintenance costs, improve the durability and longevity of highway pavements and structures, enhance the cost-effectiveness of highway infrastructure investments, and minimize negative impacts on the natural and human environment.

The 2009 Budget request for Federal Aviation Administration (FAA) Research, Engineering, and Development is \$171 million, 16 percent more than current funding and includes \$56.5 million

focused on the advancement of the Next Generation Air Transportation System (NextGen). FAA's Air Traffic Organization account also includes \$41.4 million for NextGen R&D. This NextGen R&D is coordinated by the inter-agency Joint Planning and Development Office.

In addition, the 2009 Budget requests \$12 million for the Research and Innovative Technology Administration to coordinate and advance the pursuit of transportation research that cuts across all modes of transportation, such as hydrogen fuels, global positioning and remote sensing. DoT research programs also support the National Nanotechnology Initiative, the U.S. Climate Change Technology Program, and the President's Hydrogen Fuel Initiative.

Department of Defense (DoD):

DoD's FY 2009 R&D budget (including pay for military personnel engaged in the research, development, test and evaluation enterprise) is over \$80 billion. This level of funding will support the Department's transforming commitment to reorient its capabilities and forces for greater agility, while enabling effective responses to asymmetric and uncertain challenges of future conflicts. These funds will also help address emergent threats through countermeasures to biological agents and novel technologies to detect and neutralize improvised explosive devices, mines, rockets and mortars.

The Science and Technology (S&T) component of the overall DoD R&D budget includes basic research (6.1), applied research (6.2), and advanced technology development (6.3). At \$11.5 billion in the 2009 Budget, DoD S&T exceeds the 2001 enacted level by \$2.5 billion. From 2000 to 2008, Congressional "adds"—almost all of which would be classified as earmarks according to Congress' and the Administration's definitions—to DoD S&T quadrupled. For 2008, there were 999 adds (totaling over \$2.3 billion) that must be identified and tracked down, advertised in a way specific to the Congressional mark, evaluated, negotiated and awarded, all separate from other potential awards. This means that those awards consume several times the staff and management resources of the average research award, and may not even target a military-specific research need. The large number of such additions creates impediments to the creation of effective research programs throughout the Department, and, when seen in the big picture, should be cause for concern to Congress as well as to the Administration.

A record \$1.7 billion is provided for DoD basic research (6.1) in 2009. That's \$270 million or 19 percent above the 2008 request, consistent with the ACI and the FY 2009 OSTP-OMB Federal R&D Priorities Memorandum. \$1.7 billion is also \$65 million over the nominal basic research (6.1) appropriated level in FY 2008 even with non-program earmarks included. In the 2009 Budget, DoD basic research represents 14.8 percent of the DoD S&T budget, more than last year's 13.3 percent share.

Department of Homeland Security (DHS):

The President's FY 2009 request includes \$869 million for the DHS Directorate of Science and Technology. \$564 million is also requested for the Domestic Nuclear Detection Office, \$79 million or 16 percent over FY 2008 funding. R&D continues to play a key role in securing the Nation against the terrorist threat. The President's 2009 Budget maintains an aggressive investment in scientific research, technology development, and research infrastructure aimed at continuing to enhance our Nation's security. Priority research areas include: \$360 million

government-wide in transformational R&D aimed at enhancing our ability to detect, identify, prevent and attribute nuclear and radiological materials; \$96 million at DHS for explosives countermeasures research; \$691 million in USDA, HHS and DHS to improve food and agriculture defense, and \$280 million government-wide to fund cyber security and information assurance R&D.

CONCLUSION

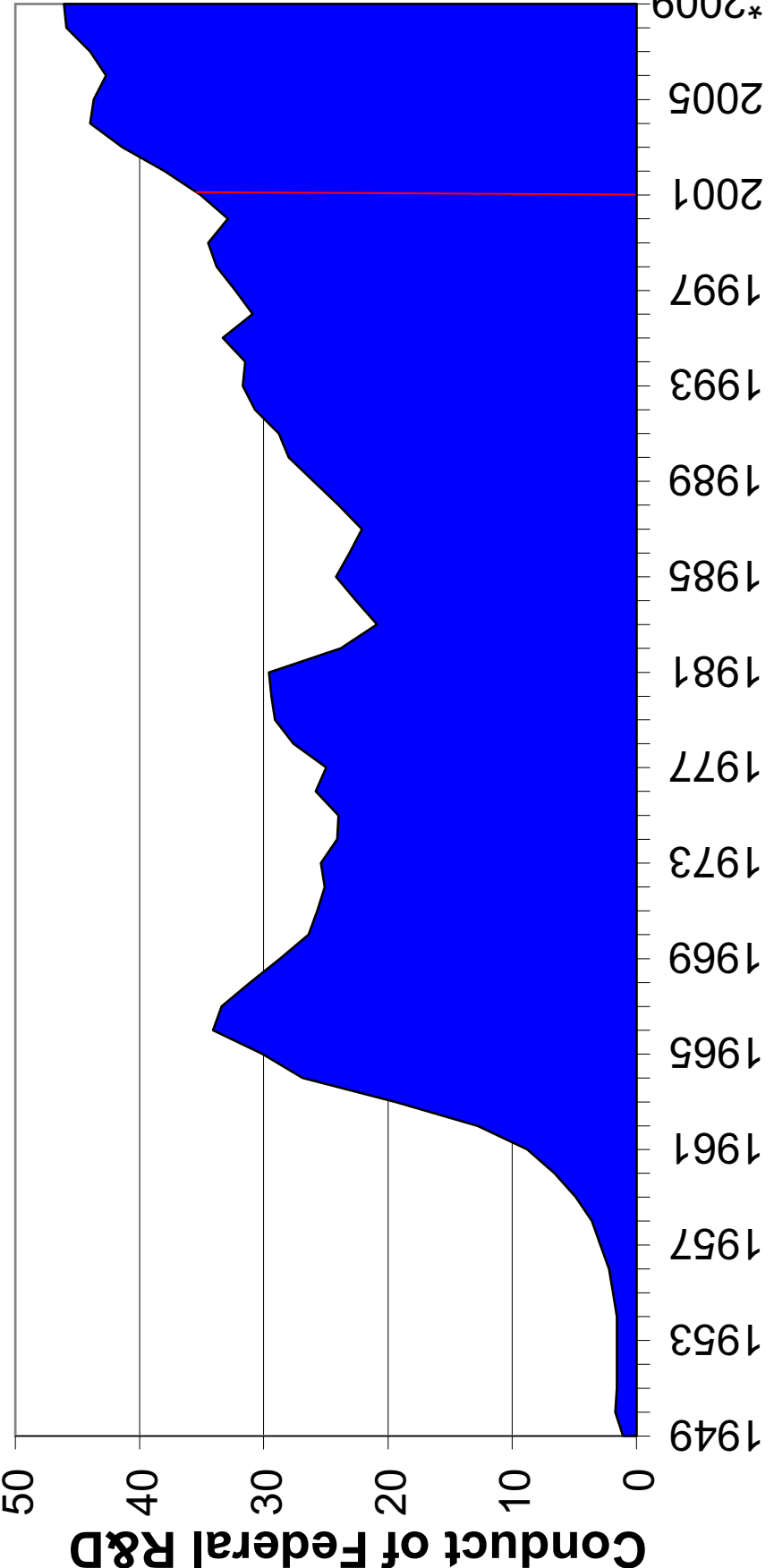
Making choices is difficult even when budgets are generous, but tight budgets require focused priorities and strong program management. This year's R&D budget proposal provides robust levels of investment that allow America to maintain its leadership position in science and move ahead in selected priority areas. The ACI properly focuses R&D investments in areas that will increase our economic competitiveness.

America leads all nations in research and development expenditures. In 2006, U.S. R&D investment at \$340 billion exceeded that of all the other G7 nations combined. After a worldwide slowing in R&D expenditures in the early 1990's, R&D spending rebounded in the late 90's, with the United States experiencing the most robust growth. Our scientists collectively have the best laboratories in the world, the most extensive infrastructure supporting research, the greatest opportunities to pursue novel lines of investigation, and the most freedom to turn their discoveries into profitable ventures if they are inclined to do so. Combined with the merit review process that has ensured the quality of American science in the past half century, these factors make American science the strongest in the world.

This budget will sustain this leadership and maintain science and technology capabilities that are the envy of the world. I ask that Congress fully fund the R&D initiatives advanced in the President's 2009 Budget.

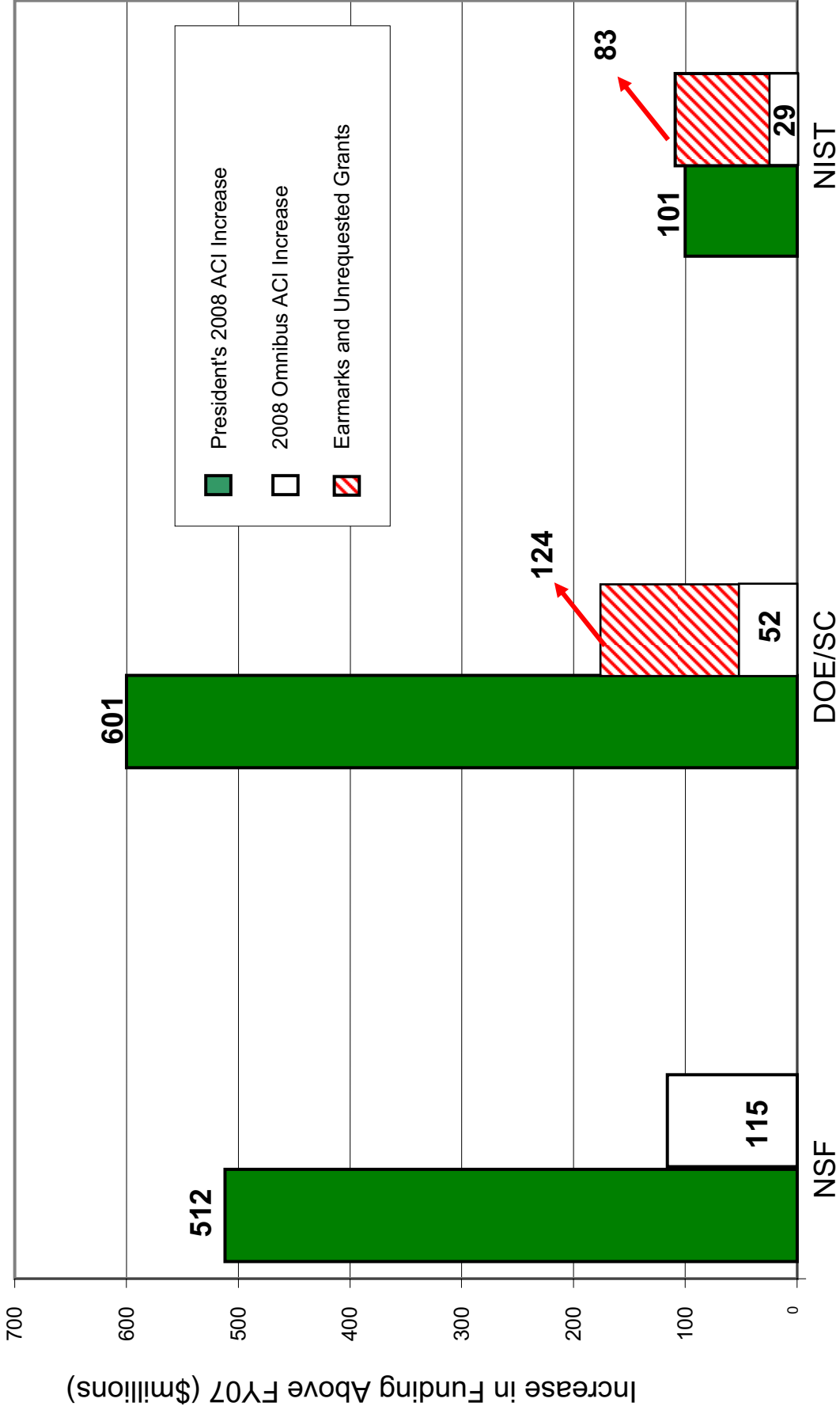
I would be pleased to respond to questions.

Federal Non-Defense R&D Spending (Outlays in billions, constant 2000 dollars)



*President's 2009 Budget

FY 2008 ACI Research Funding



President Bush's ACI Research Commitment

(in millions of dollars)

ACI Basic Research Agencies	FY 2006 Funding	President's FY 2007 Request	FY 2007 Funding	President's FY 2008 Request	FY 2008 Omnibus	President's FY 2009 Budget	FY 2009 Budget Above FY 2008 Omnibus
NSF	5,582	6,020	5,917	6,429	6,032	6,854	+822
DoE Office of Science	3,596 ²	4,102	3,797	4,398	3,973 ⁵	4,722	+749 ⁸
NIST Core ¹	568 ³	535	493	594	605 ⁶	634	+29 ⁹
ACI Total	9,747 ⁴	10,657	10,207	11,421	10,610 ⁷	12,210	+1,600 ¹⁰

¹ NIST Core consists of NIST lab research and construction accounts

² Includes \$135 million in earmarks

³ Includes \$137 million in earmarks

⁴ Includes \$272 million in earmarks

⁵ Includes \$124 million in earmarks

⁶ Includes \$83 million in earmarks and unrequested grants

⁷ Includes \$207 million in earmarks and unrequested grants

⁸ +\$873 million after accounting for earmarks.

⁹ +\$112 million after accounting for earmarks and unrequested grants

¹⁰ +\$1,807 million after accounting for earmarks and unrequested grants

American Innovation Proclamation

We, the leaders of American business and higher education, call on Congress to act quickly on an innovation agenda that will ensure continued U.S. competitiveness, enabling Americans to succeed in the global economy.

Innovation leadership creates high-wage jobs and rising incomes for Americans. Innovation drives productivity and economic growth, giving American workers the tools to remain the most productive in the world and creating products, processes—and even new industries—that expand employment and boost living standards.

The United States has remained the world's innovation leader through a commitment to basic research, a world-class workforce and a climate that rewards innovation. But America cannot rest on past economic success. Our competitors are investing in innovation, improving their competitive position and, in some respects, surpassing us.

Therefore, Congress must act to:

Renew America's commitment to discovery

by doubling the basic research budgets at the National Science Foundation, the National Institute of Standards and Technology, the Department of Energy's Office of Science and the Department of Defense;

Improve student achievement in math and science

through increased funding of proven programs and incentives for science and math teacher recruitment and professional development;

Welcome highly educated foreign professionals,

particularly those holding advanced science, technology, engineering, or mathematics degrees, especially from U.S. universities, by reforming U.S. visa policies;

Make permanent a strengthened R&D Tax Credit

to encourage continued private-sector innovation investment.

We, the signatories, hereby proclaim our support for these initiatives and stand ready to do our part.



Craig Barrett
Chairman
Intel Corporation



Richard K. Templeton
President & CEO
Texas Instruments



Carl F. Kofert
President & CEO
Battelle



Arthur F. Ryan
Chairman & CEO
Prudential Financial, Inc.



Harold McGraw III
Chairman, President & CEO
The McGraw-Hill Companies, Inc.



Norman R. Augustine
Former Chairman & CEO
Lockheed Martin Corporation



Charles O. Holliday, Jr.
Chairman & CEO
Dierpont



Nicholas M. Donofrio
Executive Vice President,
Innovation & Technology
IBM Corporation



Robert C. Dynes
President, University of California

Additional Signatories on the Back.

Comparison of America COMPETES Act of 2007 with the 2008 Omnibus and the 2009 President's Budget

(\$ in millions)

	FY 2008			FY 2009		
	FY08 COMPETES	FY08 OMNIBUS	Omnibus vs. COMPETES	FY09 COMPETES	FY09 Budget	Budget vs. COMPETES
Title 1, Sec 1002, Study on Services to Innovation	1	0	-1	1	0	0
Title 3, Sec 300-A-1, Laboratory Activities, I&ST	502	467	-35	512	520	-7
Title 3, Sec 300-A-2, Coastal and Marine, I&ST	115	95	20	105	95	10
Title 3, Sec 300-B-1, Industrial Technology Services, MEP	110	90	20	122	4	-11.8
Title 3, Sec 300-B-1, Industrial Technology Services, TP	100	46	54	132	0	-32.4
NIST Subtotal	883	742	141	882	638	244
Title 5, Sec 5014, DOE, M&E, I&M Programs	14	0	14	0	0	14
Title 5, Sec 5015, DOE Superconducting Seed Learning Ops	8	0	8	0	0	8
Title 5, Sec 5016, DOE Summer Institute ¹	65	2	63	55	26	29
Title 5, Sec 5018, National Energy Education Development	1	0	1	0	0	1
Title 5, Sec 5004-1, Nuclear Sci Program Expansion Grants	4	0	4	0	0	4
Title 5, Sec 5004-2, Nuclear Sci Competitiveness Grants	3	0	3	0	0	3
Title 5, Sec 5005-F-1, Hydrocarbon Systems Sci Prog. Grants	4	0	4	0	0	4
Title 5, Sec 5005-F-2, Hydrocarbon Systems Sci Competitiveness Grants	3	0	3	0	0	3
Title 5, Sec 5009-H, DOE Early Career Awards	25	8	17	25	10	15
Title 5, Sec 5007, DOE Early Career Awards	4,596	3,973	623	5,201	4,722	479
Title 6, Sec 6008, Discovery Sci and Engineering Innov. Inv ²	90	0	90	0	0	90
Title 6, Sec 6009, NRC, I&M, I&ST	8	13	-5	240	12	-232
Title 6, Sec 6011, Distributed Scientist Program	15	0	15	0	0	15
Title 6, Sec 6012, ARALE ³	300	0	300	0	0	300
DOE Subtotal	4,984	4,003	981	5,041	4,737	304
Title 6, Sec 6113, Programs for Social Awareness in Sci/Tech	101	1	100	1	0	99
Title 6, Sec 6114, Programs for Women in Sci/Tech	125	1	124	1	0	123
Title 6, Sec 6121, Frontiers in Practice ⁴	75	44	31	55	70	-15
Title 6, Sec 6201, Meth. Adv. for Heritable Sci. Program ⁴	97	0	97	0	0	97
Title 6, Sec 6202, Summer Term Education Marks	0	0	0	0	0	0
Title 6, Sec 6203, Meth. Adv. for secondary school students	95	0	95	0	0	95
Title 6, Sec 6204, Foreign Language Partnership Program	28	0	28	0	24	4
Title 6, Sec 6401, Alignment of education programs	100	0	100	0	0	100
Title 6, Sec 6502, Meth and Science Partnership Grants	0	0	0	0	0	0
EO Subtotal	890	49	841	7	886	-95
Title 7, Sec 7002, National Science Foundation Research and Related Activities	6,000	6,022	-22	6,000	6,054	-54
NSF Subtotal	5,956	4,071	1,885	5,942	5,994	-52
NSF Research and Related Activities	105	94	11	58	60	-2
NSF Research Infrastructure Program	168	168	0	168	168	0
NSF Early Career Development Program	65	65	0	65	65	0
NSF Special Programs for Undergrad. Prog.	500	500	0	500	500	0
NSF Department Program to Stimulate Competitive Research	47	38	9	47	38	9
NSF Integrative Graduate Education and Research Training Program	9	8	1	9	8	1
NSF Professional Sci. Masters degree program (Sec 703-4)	0	0	0	0	0	0
NSF Education and Human Resources	881	729	152	881	784	97
NSF Math&Stat partnerships under Sec. 9, NSF Auth Act 2002	100	49	51	100	51	49
NSF Robert Noyce Scholarship, NSF Auth Act 10	0	11	-11	0	11	-11
NSF Science and Technology Talent Search program, NSF Act	40	30	10	40	30	10
NSF Advanced Techn. Education Program (NSF Auth Act of 1982)	82	52	30	82	52	30
NSF Integrative Graduate Education and Research Training Program	27	25	2	27	25	2
NSF Graduate Research Fellowship Program	97	88	9	97	117	-20
NSF Research Equipment and Facility Consortium	245	221	24	245	145	100
NSF Agency Operations and Award Management	206	202	4	206	202	4
NSF Office of the National Science Board	4	4	0	4	4	0
NSF Office of the Inspector General	12	11	1	12	12	0
NSF Title 7, Sec 7001, Laboratory Science Risk Program ⁴	0	0	0	0	0	0
NSF Subtotal	6,000	6,022	-22	6,000	6,054	-54
Title 8, Sec 8005, Study of the Provision of Online Degrees Programs	13,052	10,022	3,030	13,052	12,428	624
TOTAL	12,464	10,776	1,688	13,857	12,249	1,608

¹ Denotes American Competitiveness Initiative programs. Omnibus funding of ACI activities includes \$124 million and \$88 million of earmarks and unrequested grants at DOE and NIST, respectively.

² Funded through DOE Academies Creating Teacher-Scientists Program.

³ Though not included in table, total Budget funding for DOE research center partnerships similar to those in Section 6008-Energy Frontier Research Centers, Biomimicry Research Centers, and SciDAC Institutes--is \$183 million.

⁴ When applicable, authorized levels of "such sums" are assumed to be equal to the prior year amount.

America COMPETES Act Funding

