

This document is intended for the internal use of Tulane University and may not be distributed externally or reproduced for external distribution in any form without express written permission of Tulane.



Large Federal Funding Opportunities

October 2015

This memorandum provides an overview of signature grants across various federal agencies to assist Tulane University in its pursuit of large funding opportunities. These grants were chosen for being either highly-competitive, flagship grants at each agency, or for their large funding amounts and high-visibility. For the most part, we defined large awards as those providing over \$1 million per year in funding, though some agencies' signature center awards do not reach the \$1 million threshold but still stand as that agency's premier university funding opportunity and are therefore included. Several of the programs below have multiple tracks that vary in award size, with only the largest providing above \$1 million in funding a year. For these programs, it is often very helpful to first obtain smaller awards to build results for success with a larger proposal. Finally, the selected funding opportunities range from limited submission awards offered every few years to annual awards—some deadlines have passed, but we included the program in case it is offered again or to provide better understanding as to a particular agency's current interest.

You should note that some of the programs are more political in nature, such as DHS Centers of Excellence and several manufacturing consortia awards, and would require the support of the Louisiana delegation as well as local and regional financial and stakeholder support to maximize chances of success.

National Science Foundation

Science and Technology Centers (STC)

The STC program supports large, long-term innovative research projects across all areas of research across the scope of NSF, and both interdisciplinary projects and research that will lead to new approaches within disciplines are funded. STCs must also facilitate knowledge transfer such as commercialization of research results or sharing research to inform the formulation of public policy. The STC competition is very competitive. For example, in the 2014 competition, 260 proposals were received and NSF expects to make four new awards. In the 2010 competition, 247 preliminary proposals were received, 45 full proposals were invited, 11 sites were visited, and 5 new centers were funded.

STC partnerships vary in size and may include multi-institutional collaborations or universities partnering with research museums, state and local governments, national laboratories, industry, private sector research laboratories, and international institutions. Although not required by NSF, STCs are strongly encouraged to build "substantive and long-term" partnerships with institutions that serve underrepresented students, such as minority serving institutions and women's colleges. In reviewing the active STCs (http://www.nsf.gov/od/oia/programs/stc/active_centers/ACTIVE.jsp), most involve a partner(s) that serves underrepresented populations. This component is likely to remain very important

to NSF given that strengthening the foundation for underrepresented groups in STEM is a high priority of NSF Director France Córdoba.

Funding:

- Each Center is funded at up to \$5 million per year for five years with the possibility of a five-year renewal—pending funding availability and performance.

Timing:

- An STC competition is currently ongoing, with the solicitation released in 2014 (<http://www.nsf.gov/pubs/2014/nsf14600/nsf14600.htm>). Up to \$16 million is expected to be available in fiscal year (FY) 2016 for up to four new STCs. These will replace the six STCs from the Classes of 2005 and 2006 that will graduate in 2015 and 2016. After this competition, there are not expected to be any more STCs awarded until 2020 when the 2010 Class of STCs graduate. The solicitation will not be released until 2018 at the earliest.

Sources and Additional Information:

- The program website, including contact information, the current solicitation, and a list of existing centers is available at http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5541.

Engineering Research Centers (ERC)

The ERC program seeks to advance technology development, build a technologically-savvy workforce, and promote a culture that links scientific discovery with technological innovation through partnerships between academic institutions, industry, and government. NSF has supported ERCs since 1985. Current ERCs focus on transformational engineered systems, with solicitations sometimes focusing on specific topic areas and sometimes allowing for any engineered system.

ERCs are required to have member companies that commit to provide cash and in-kind support. In addition, partnerships are required with middle and high schools in pre-college education and with local level organizations devoted to stimulating entrepreneurship and innovation. Finally, at least one partnership is required with a domestic university primarily serving underrepresented groups and one partnership with a foreign university for both research and education.

In April 2011, NSF released a solicitation for nanotechnology-focused ERCs with three Nanosystems ERCs (NERCs) awarded in FY 2012. With these centers, NSF aims to replace retiring Nanotechnology Science and Engineering Centers (NSEC) and build on recent advances in nanotechnology research, some of which are at a stage suitable for integration into commercial products. NERCs focus on transformational engineered systems in emerging areas of nanoscale science that are ready for proof-of-concept systems within the 10-year life span of project support. These areas include such topics as: nanobio systems for healthcare delivery, nanoscale processes for sustainable development of energy and other infrastructure systems, and nanoscale manufacturing process systems.

Funding:

- Expected funding for the first year of a center is up to \$3.25 million, \$3.5 million in year two, \$3.75 million in year three, and up to \$4 million in years four and five—pending funding availability and performance.

Timing:

- Awards are expected to be announced shortly for the current competition, which began with a solicitation in 2013 for both open topic ERCs and NERCs (<http://www.nsf.gov/pubs/2013/nsf13560/nsf13560.htm>). The 2015 solicitation is expected to support three or four new ERCs, letters of intent were due September 25, 2015.

Sources and Additional Information:

- The program website, including contact information, the current solicitation, and a list of existing centers is available at http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5502&org=ENG&from=home.

Materials Research Science and Engineering Centers (MRSEC)

Materials Research Science and Engineering Centers (MRSEC) focus on interdisciplinary materials research addressing fundamental problems in science and engineering and integrating education and research. MRSECs may be located at a single institution or may involve multiple institutions in partnership. Collaboration between international research institutions and U.S. centers is strongly required as part of the program.

Funding:

- Awards range from \$2 million to \$5 million per center annually.

Timing:

- MRSECs are competed triennially. Winners of the most recent competition were announced in February 2015, and the next competition is expected in FY 2017, with a solicitation likely to be released in spring or early summer 2016.

Sources and Additional Information:

- More information about the program can be found at http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5295.

Software Infrastructure for Sustained Innovation (SI²)

The Software Infrastructure for Sustained Innovation (SI²) is intended to support a key portion of the Cyberinfrastructure Framework for 21st Century Science and Engineering (CIF21) initiative. CIF21, first proposed in the FY 2012 NSF budget request, is an agency-wide effort to develop comprehensive, integrated, sustainable, and secure cyberinfrastructure to accelerate research and education capabilities in computational and data-enabled science and engineering. The initiative encompasses four components: Data-enabled Science, Community Research Networks, New Computational Infrastructure, and Access and Connections to Cyberinfrastructure Facilities.

NSF has created the SI² program to promote new interdisciplinary processes for developing scientific software and creating a software ecosystem for use by the scientific and engineering research communities. SI² has three components. According to the program website they are:

“1. Scientific Software Elements (SSE): SSE awards target small groups that will create and deploy robust software elements for which there is a demonstrated need that will advance one or more significant areas of science and engineering.

2. Scientific Software Integration (SSI): SSI awards target larger, interdisciplinary teams organized around the development and application of common software infrastructure aimed at solving common research problems faced by NSF researchers in one or more areas of science and engineering. SSI awards will result in a sustainable community software framework serving a diverse community or communities.

3. Scientific Software Innovation Institutes (S2I2): S2I2s are an integral part of the S2I2 software ecosystems and focus on the establishment of long-term hubs of excellence in software infrastructure and technologies, which will serve a research community of substantial size and disciplinary breadth. The outcomes of S2I2 go beyond the software itself, including the software development infrastructure and process, successfully responding to science challenges, and enabling transformative new science. These institutes will provide expertise, processes and architectures, resources and implementation mechanisms to transform computational science and engineering innovations and community software into robust and sustained software infrastructure for enabling science and engineering, which in turn will transform research practices and productivity. S2I2 proposals will bring together multidisciplinary teams of domain scientists and engineers, computer scientists and software engineers, technologists and educators.”

For the current competition, NSF is only competing S2I2 awards. The solicitation includes both conceptualization awards for planning and organizing and implementation awards to pursue software infrastructure.

Several NSF units are involved in the program, including the Directorates for Engineering (ENG); Mathematical and Physical Sciences (MPS); Geosciences (GEO); Biological Sciences (BIO); Education and Human Resources (EHR); and Computer and Information Science and Engineering (CISE). Proposals should focus on software to address science and engineering research questions related to these communities.

Funding:

- Individual SSE can total up to \$500,000 over three years. **Individual SSI can total \$1 million per year for three to five years.** S2I2 conceptualization awards total up to \$500,000 while implementation awards will range from \$1 million to \$4 million per year for an initial award period of five years. For the current competition, implementation proposals are only requested in the areas of Chemical and Materials Research and Science Gateways, but NSF notes that conceptualization awards may lead to future implementation awards in other topic areas.

Timing:

- For the current competition, implementation proposals were due June 3, 2015 while conceptualization proposals can be submitted at any time. Solicitations have not been issued on a regular schedule and previous solicitations have generally focused on specific components of the program. For example, in FY 2013, NSF called for S2I2 conceptualization proposals related to the interests of BIO, ENG, and MPS. SSEs and SSIs are currently being competed and full proposals were due by February 2, 2015 for SSEs and June 26, 2015 for SSIs.

Sources and Additional Information:

- The regular SI² program page with contact information and a link to the current solicitation and award winners can be found at http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503489.

Critical Techniques and Technologies for Advancing Foundations and Applications of Big Data Science & Engineering (BIGDATA)

In March 2012, the Obama Administration announced a “Big Data Research and Development Initiative”.^[1] The Big Data initiative aims to develop new tools and techniques to manage vast and complex data sets to help address societal challenges in areas such as environmental and biomedical research, education, and national security.

As part of the initiative, NSF initiated the Critical Techniques and Technologies for Advancing Foundations and Applications of Big Data Science & Engineering (BIGDATA). Two rounds of this program have been completed while a third is in progress. The third solicitation was released in February 2015 to support research to address “critical challenges for big data management, big data analytics, or scientific discovery processes impacted by big data.” All NSF directorates are participating in the third round. Unlike the first BIGDATA competition, the 2014 and 2015 solicitations are not in partnership with the National Institutes of Health (NIH). The 2015 BIGDATA solicitation includes two categories: Foundations (F) – for projects that aim to develop broadly applicable novel techniques, theoretical analysis, or experimental evaluation of techniques - proposals should be highly innovative and focused on fundamental research; and Innovative Applications (IA) – for projects with more specific applications or adaptations of existing techniques, technologies, and methodologies to new application areas.

Funding:

- NSF plans to award a total of up to \$26.5 million to 27 to 35 projects in the current competition. Previous competitions had awards up to \$1 million per year for up to five years, but in the current competition awards will range from \$200,000 to \$500,000 per year for three to four years.

Timing:

- For the 2015 competition, full proposals were due May 20, 2015. The status of future competitions remains unclear.

Sources and Additional Information:

- Contacts and additional information are available at http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504767.

Secure and Trustworthy Cyberspace (SaTC)

NSF’s Directorate for Computer & Information Science & Engineering (CISE), along with the Directorate for Social, Behavioral & Economic Sciences (SBE), the Directorate for Mathematical & Physical Sciences (MPS), and the Directorate for Engineering (ENG), support the SaTC program which focuses on cybersecurity research projects across four themes: Trustworthy Computer Systems perspective; Social, Behavioral and Economic Perspective; Secure, Trustworthy, Assured and Resilient Semiconductors and Systems perspective; and Transition to Practice Perspective. Proposals may focus on one theme or

^[1] http://www.whitehouse.gov/sites/default/files/microsites/ostp/big_data_press_release_final_2.pdf.

integrate across multiple themes. Projects are funded across three classes, ranging from \$500,000 across three years to \$3 million across five years.

Funding:

- Small projects will be funded up to \$500,000 over the course of up to three years. Medium projects will range from \$500,001 to \$1.2 million over the course of up to four years. Large projects will range from \$1.2 million to \$3 million for up to five years.

Timing:

- Proposals are due annually in the fall: November 4-18 for small projects, September 10 – 16 for medium projects, September 18-24 for large projects, and December 3-16 for education projects.

Sources and Additional Information:

- More information about the SaTC program can be found at http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504709.

Expeditions in Computing

The Expeditions in Computing (Expeditions) program seeks to fund interdisciplinary research that will lead to transformative computer science and IT research innovations. Successful teams bring together multidisciplinary approaches across computer and information science and engineering to address ambitious research questions. The 16 existing awards cover various research areas, including computing hardware and software, verification technology, molecular programming, robotics and machine learning, wireless computing, health IT, big data, and sustainable energy.

Funding:

- The current program will fund two to four awards per 18 month cycle. NSF will support projects with annual budget of up to \$2 million dollars for five years.

Timing:

- The program hosts a competition every two years. The next round of preliminary proposals are due in March 2016 with full proposals due in December 2016.

Sources and Additional Information:

- More information about the program can be found at http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503169.

Cyber-Physical Systems (CPS)

The Cyber-Physical Systems program funds research focused on developing the core science needed to engineer complex cyber-physical systems to be used across many fields, including transportation, energy, medical technology, and advanced manufacturing. The program aims to support advances to enable, “capability, adaptability, scalability, resiliency, safety, security, and usability that will far exceed the simple embedded systems of today.” The program aims to support core system science needed to engineer complex cyber-physical systems as well as to foster the creation of a research and education community in CPS, and support the transition of CPS science and technology into engineering practice.

CPS research areas for the most recent solicitation are Science of Cyber-Physical Systems, Technology for Cyber-Physical Systems, and Engineering of Cyber-Physical Systems. Example areas of focus in the current solicitation include system design, system verification, real-time control and adaptation, manufacturing, smart cities, and the internet of things. The initiative is supported by CISE and ENG within NSF, the National Aeronautics and Space Administration (NASA), the Department of Homeland Security (DHS) Science and Technology Directorate, the Department of Transportation (DOT) Federal Highway Administration, and the National Institutes of Health (NIH).

The CPS program supports three types of projects. Breakthrough projects should address potential game-changing CPS research. Synergy projects must involve multi-disciplinary, innovative research to solve a clear goal. Frontiers projects should address a critical CPS challenge that cannot be solved with smaller-scale projects.

Funding:

- Breakthrough projects are funded up to \$500,000 for a period of up to three years. Synergy projects are funded between \$500,000 and \$1 million total for a period of three to four years. **Frontier projects are funded between \$1 million and \$7 million for a period of four to five years.**

Timing:

- Proposals for the current competition were due May 4, 2015. A new solicitation has not yet been announced, but solicitations have typically been released annually in the late fall or early winter.

Sources and Additional Information:

- More information about the program can be found at http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503286.

National Robotics Initiative (NRI)

As part of the Administration's focus on promoting manufacturing, the President launched the National Robotics Initiative (NRI) in June 2011. The NRI supports research and development proposals to advance robotics technology that works beside or cooperatively with people in areas such as manufacturing, space exploration, healthcare delivery, and farming. The initiative is supported by NSF, NASA, NIH, the U.S. Department of Agriculture (USDA) National Institute of Food and Agriculture (NIFA), and the Defense Advanced Research Projects Agency (DARPA). As part of this initiative, NSF supports large, multi-disciplinary group proposals to develop robotics technology with a level of intelligence and adaptability exhibited in humans.

Funding:

- NSF, NASA, and DARPA awards will range from \$100,000 to \$1 million in total costs per year for up to three years. NIH and USDA will consider projects with direct costs from \$100,000 to \$250,000 per year for up to three years.

Timing:

- Full proposals are due annually on the first Thursday in December (December 3 in 2015).

Sources and Additional Information:

- More information on NSF's role in NRI can be found at http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503641.

Department of Energy

Office of Science

The U.S. Department of Energy (DOE) Office of Science is the lead federal agency supporting scientific research and development in energy sciences, and the nation's largest source of funding for fundamental research in the physical sciences. The Office of Science supports these activities through six program offices: Advanced Scientific Computing Research (ASCR), Basic Energy Sciences (BES), Biological and Environmental Research (BER), Fusion Energy Sciences (FES), High Energy Physics (HEP), and Nuclear Physics (NP).

Energy Frontier Research Centers (EFRCs)

The U.S. Department of Energy (DOE) currently funds 32 Energy Frontier Research Centers (EFRCs). This program is one of the innovation models created by the Obama Administration to tackle barriers to the development of transformative energy technologies. The EFRCs are small groups of multi-disciplinary, multi-institutional researchers carrying out "use-inspired" basic research on the scientific grand challenges and basic research needs outlined in a series of DOE reports over the past decade.

A series of "Basic Research Needs" reports outline a wide range of energy-related topics that have informed EFRC solicitations, including computational materials, energy storage, and superconductivity. Additionally, the Basic Energy Sciences Advisory Committee (BESAC) identified five research "grand challenges" in its 2008 report, *Directing Matter and Energy: Five Challenges for Science and the Imagination*, one of which EFRCs must also address. While BESAC is expected to release a new grand challenge report in summer 2015, the five challenges outlined in the 2008 report are as follows:

- How can we control materials at the level of electrons?
- How do we tailor specific properties into revolutionary new forms of matter by designing and perfecting atom- and energy-efficient synthesis?
- How do we control the remarkable properties that emerge from the complex correlations of atomic and electron constituents?
- How can we manipulate energy and information at the nanoscale to create new technologies with properties rivaling those of living things?
- How do we characterize and control matter away from the equilibrium?

Funding:

- Each EFRC is funded at \$2-to-\$4 million annually for a period of four years, with the possibility of a four-year renewal depending on performance.
- Each EFRC will undergo a mid-term progress review in FY 2015, which may result in the cancellation of centers that have not adequately performed.

Timing:

- Progress reviews for existing EFRCs are likely to take place during the second quarter of FY 2016 (January-March 2016), with a Funding Opportunity Announcement (FOA) for new EFRCs expected during the same period.

Sources and Additional Information:

- Information on the current EFRCs and the EFRC program in general can be found at <http://science.energy.gov/bes/efrc/>.
- A list of the Basic Research Needs reports and the Grand Challenges reports can be found at <http://science.energy.gov/bes/news-and-resources/reports/>.

Scientific Discovery through Advanced Computing (SciDAC)

The Scientific Discovery through Advanced Computing (SciDAC) program is housed in the ASCR office, and it aims to use teams of applied mathematicians, computational scientists, and researchers from other disciplines to advance the multidisciplinary application of high performance computing. SciDAC strives to use high performance computational science and engineering to address two key challenges: broaden the community in the interest of using high performance computing to positively impact other scientific fields; and ensure that scientific progress in other fields is enhanced, not diminished, by advances in computation.

ASCR uses SciDAC Institutes to carry out the objectives of the SciDAC program. Established in FY 2011, the current four institutes comprise a total of 24 different organizations, and work to provide scientific software tools and expertise in applied mathematics and computational science to advance scientific discovery through modeling and simulation. Tools, techniques, and resources developed by the SciDAC Institutes are intended for use in computational systems in use at the Oak Ridge and Argonne Leadership Computing Facilities, the National Energy Research Scientific Computing Center (NERSC), and other world-class scientific computing facilities.

Funding:

- Funding for SciDAC Institutes averages \$15.5 million annually for five years, with funds distributed across the four Institutes; this averages out to \$3.9 in annual funding for each institute.

Timing:

- The SciDAC Institutes are expected to be recompeted in FY 2016.

Sources and Additional Information:

- More information on SciDAC is available at <http://www.scidac.gov/>.
- More information on SciDAC Institutes is available at <http://www.scidac.gov/institutes.html>.

Computational Materials Sciences

The Computational Materials Sciences initiative within the Office of Basic Energy Sciences seeks to establish multidisciplinary teams to conduct research at the intersection of computational and materials sciences. Specifically, teams are expected to devise and develop community codes and databases for the predictive design of functional materials. Teams could also develop new approaches for using

existing datasets containing information on the characterization of materials, materials synthesis, processing, and properties assessment.

This program is designed to support the Materials Genome Initiative for Global Competitiveness (MGI) established by President Obama in June 2011. MGI seeks to advance American manufacturing capabilities by reducing by half the time from discovery to deployment of new materials. Computational Materials Sciences is the BES component of the DOE-wide Exascale Computing Initiative, which aims to increase current computing capabilities by one thousand-fold to allow for revolutionary advances in many fields critical to solving our energy challenges.

Funding:

- In FY 2015, Computational Materials Sciences was funded at \$8 million, though the request for FY 2016 would increase funding for \$12 million.
- Individual awards would average \$2-\$4 million annually for a period of four years.

Timing:

- The submission deadline for the first call for proposals for Computational Materials Sciences was in April 2015.
- If more money is appropriated to the program in FY 2016, more opportunities for funding through this program may arise.

Sources and Additional Information:

- More information on the Office of Basic Energy Sciences is available at <http://science.energy.gov/bes/>.
- The most recent solicitation is available at http://science.energy.gov/~media/grants/pdf/foas/2015/SC_FOA_0001276.pdf.

Climate Model Development and Validation*

Climate Model Development and Validation is BER's component of the DOE-wide Exascale Computing Initiative. Climate Model Development and Validation would seek to incorporate new architectures, software, engineering and computational methods, and scale-aware physics into current and future Earth system modeling capabilities. This enhanced modeling and simulation capacity would allow for increased understanding of the interdependency of water, energy, and climate systems.

Timing:

- If the program were funded at the President's request and at the level appropriated by the Senate, Climate Model Development and Validation would receive \$18.73 million in FY 2016.

Sources and Additional Information:

- More information on Climate Model Development and Validation is available in the President's Budget Request for FY 2016 located at http://www.energy.gov/sites/prod/files/2015/02/f19/FY2016BudgetVolume4_5.pdf.

**Note: This program has not yet been officially established. Funding for Climate Model Development and Validation has been requested multiple times but has never been appropriated by Congress. The*

Senate would provide the requested amount for this program in FY 2016, but the future of this program is still uncertain since some congressional appropriators remain committed to rejecting it.

Advanced Research Projects Agency-Energy (ARPA-E)

The Advanced Research Projects Agency-Energy (ARPA-E) was established in FY 2009 with the goal of supporting advances in high-impact energy technologies that are too nascent for private sector investment. ARPA-E's streamlined awards process and program design allows it to rapidly stimulate development of new technologies over a clearly defined period of time. ARPA-E uses two separate award programs to solicit proposals: FOCUS solicitations call for proposals that meet clearly defined needs in specific energy technology areas; OPEN solicitations (such as the OPEN 2015 solicitation detailed below) are aimed at catalyzing advancements across the entire energy technology spectrum.

ARPA-E OPEN Solicitation

ARPA-E's OPEN solicitation offers support for high-risk, transformational energy research and development (R&D) projects that consider all conceivable transportation and stationary applications. This is the agency's third OPEN solicitation with the previous two held in 2009 and 2012.

Submissions must identify and address at least one of the Technical Categories or Subcategories listed in the full FOA. The Categories are intended to cover most major energy-related technologies and address areas such as "electricity generation by both renewable and non-renewable means; electricity transmission, storage, and distribution; energy efficiency for buildings, manufacturing and commerce, and personal use; and all aspects of transportation, including the production and distribution of both renewable and non-renewable fuels, electrification, and energy efficiency in transportation." Expected focus areas of future FOAs include transportation fuels, data center efficiencies, and phytosequestration.

Funding:

- ARPA-E anticipates providing a total of \$125 million for 30-50 OPEN awards for up to three years, with funding for individual awards ranging between \$2 million and \$10 million.

Timing:

- ARPA-E expects to issue OPEN solicitations every 2-3 years, with the most recent being released in FY 2015. The next solicitation is expected to be released sometime between FY 2017 and FY 2018.

Sources and Additional Information:

- More information on ARPA-E is available at <http://arpa-e.energy.gov/>.
- The full OPEN 2015 solicitation is available at <https://arpa-e-foa.energy.gov/#Foaldce3cc85c-75cb-4d73-baa5-3cee39bb6bc7>.

Office of Energy Efficiency and Renewable Energy (EERE)

EERE supports projects designed to enhance U.S. energy, environmental, and economic security. In contrast to the Office of Science, EERE-funded work is almost entirely applied and geared towards the commercialization of new energy technologies. Its goal is to help transition clean energy technologies to the commercial marketplace in a manner that is cost-competitive with current energy sources. EERE

pursues these goals primarily through public-private partnerships, including administration of loan guarantees for renewable energy projects. For this reason, all EERE funded projects statutorily require a non-federal cost share of at least 20 percent, often making it difficult for universities to compete for EERE awards without an industry partner.

The following EERE programs are most likely to provide funding to universities:

Biomass Research and Development Initiative (BRDI)

This joint program provides approximately \$25 to \$30 million annually to support research in advanced biofuels, bioenergy, and high-value biobased products. Recent university awardees include the University of Florida-Gainesville, the University of Kansas Research Center, and the University of Kentucky. Businesses are also regular recipients of BRDI funding.

Funding:

- Projects will be funded between \$500,000 and \$2 million over the course of up to three years.

Timing:

- The current solicitation for FY 2015 is underway. Solicitations are usually announced every year.

Sources and Additional Information:

- More information about the BRDI program is available at <http://nifa.usda.gov/funding-opportunity/biomass-research-and-development-initiative-brdi>.

Bioenergy Technology Incubator 2

The “Bioenergy Technology Incubator 2” awards cooperative agreements to entities, including universities, that represent novel or game-changing ideas that fall outside of the Bioenergy Technology Office’s (BETO) strategic plan. This is the second time this FOA has been issued, with the first occurring in February 2014.

Funding:

- Projects will be funded via cooperative agreements between \$500,000 and \$2 million over the course of one to two years.

Timing:

- The solicitation for FY 2015 was released in August, concept papers were due on September 21, 2015.

Sources and Additional Information:

- More information is available <https://eere-exchange.energy.gov/Default.aspx#Foald52c565ad-90e8-4ab4-b25b-2519bb876218>.

Advanced Manufacturing Training Program

DOE’s Advanced Manufacturing Office (AMO) recently issued a funding opportunity announcement (FOA) for new power engineering traineeship programs at U.S. colleges and universities. Successful

proposals would augment existing doctoral or masters programs designed to train the next generation of power engineers starting in fall 2016.

This opportunity was spurred by both a reported decline in power engineering programs at U.S. universities and an increased demand from manufacturers for these graduates. The need for increased training in power electronics, such as wide bandgap semiconductor technologies, is specifically highlighted in the FOA.

In addition to curriculum and program guidelines, the announcement requires universities to identify partnerships with a DOE National Lab or non-Federal organization that is sponsored by DOE or DOD.

Funding:

- DOE expects to make up to \$10 million in total funding available for this FOA, with individual proposals funded at between \$500,000 and \$1 million per year for no more than five years.

Timing:

- Letters of Intent were due August 7, 2015. The deadline for full proposal submissions was September 3, 2015.

Sources and Additional Information:

- More information is available at <http://energy.gov/eere/amo/articles/doe-traineeship-power-engineering-leveraging-wide-bandgap-power-electronics>.

Office of Electricity Delivery and Energy Reliability (OE)

OE is charged with developing the technologies necessary to ensure the safety and reliability of the nation's energy delivery system. Recently, OE has played a key role in supporting projects to speed the transition to a new smart electricity grid, and has subsequently seen increased budget requests in this area. OE consists of three divisions: the Research and Development (R&D) Division, which partners with industry, academia, and governmental entities to develop technologies that enhance the electric grid; the Permitting, Siting, and Analysis (PSA) Division, which provides technical assistance to states, tribes, and regions on electricity policies, programs, and market mechanisms that increase access to sustainable energy resources; and the Infrastructure Security and Energy Restoration (ISER) Division, which leads federal efforts to secure the electricity grid against external threats. R&D is by far the largest of the three divisions, with its budget accounting for almost three quarters of OE's total allocation.

The R&D office works most closely with universities, partnering on a variety of projects related to clean energy transmission and reliability, smart grid research and development, energy storage, and cyber security for energy delivery systems. These programs provide the best opportunities for universities to obtain OE-supported research, with FY 2012 priorities including the integration of renewable energy technologies into the smart grid, renewable energy storage, and advanced modeling of grid performance.

While opportunities for universities exist within OE, it should be noted that the majority of extramural funds have recently been allocated to industry. This reflects the Administration's desire to speed the commercialization and implementation of new smart grid technologies and has limited the role for universities within OE to performing research necessary to generate technological advances. With this

in mind, it will be beneficial for universities to develop strong industry partnerships if interested in applying for OE funds, especially those related to grid storage and security activities. Illustrating this point, OE states that partnerships are “critical to focusing federal efforts and ensuring that projects are properly aligned with public, private, local, and national needs,” on grid storage and security.

Applications for Technologies Directed at Capturing Carbon Dioxide from Low Concentration Sources to Support the Coal Industry

Part of an “all-of-the-above” climate strategy, this FOA solicits applications for a cost effective Carbon Dioxide (CO₂) capture and/or conversion technologies.

Funding:

- Projects will be funded up to \$3 million over the course of three years.

Timing:

- The solicitation closed on August 8, 2015.

Sources and Additional Information:

- The full solicitation is available at <http://www.fedconnect.net/FedConnect/?doc=DE-FOA-0001342&agency=DOE>.

Department of Defense

Scientific research funding by the Department of Defense (DOD) is provided by service branches (Army, Navy, Air Force) and the Office of the Assistant Secretary of Defense for Research and Engineering (ASD[R&E]). Performers are competed but are often selected based in part by both reputation and relationships, with program officers having significant leeway over funding decisions. To increase defense funding, it is critical for faculty to engage with extramural research program officers, in-house laboratory researchers, industry funded researchers as well as service and ASD(R&E) research leadership to enhance visibility of a university’s research strengths and potential. Universities should also encourage faculty to seek collaborative research with DOD organizations to include providing postdoc candidates to labs, conducting summer research at the labs, sponsoring government researchers to give technical lectures on campus as well as host for one year sabbaticals. These activities will provide opportunities to gain “inside” knowledge of the research efforts and strengthen relationships between the university and DOD funded research in building towards larger funding partnerships with the services and ASD(R&E).

Multidisciplinary University Research Initiative (MURI)

MURIs remain one of the signature DOD research programs for the university community and stand as the benchmark for building a defense-oriented research capability on campus. The MURI program funds multidisciplinary teams to conduct basic scientific and engineering defense research at universities. Specific topics of interest and research objectives vary by year and are determined through a process that combines input from the Office of the Assistant Secretary for Defense Research and Engineering as well as the individual offices involved in the competition: the Office of Naval Research (ONR), Air Force Office of Scientific Research (AFOSR), and Army Research Office (ARO). The competition therefore

combines central priorities and the interests of individual program officers and divisions within the services and ASD(R&E).

This year's topics include:

Army Research Office

- Sequence-Defined Synthetic Polymers Enabled by Engineered Translation Machinery
- Discovering Hidden Phases with Electromagnetic Excitation
- Modeling and Analysis of Multisensory Neural Information Processing for Direct Brain-Computer Communications
- Modular Quantum Systems
- Spin Textures and Dynamics Induced by Spin-Orbit Coupling
- Defining Expertise by Discovering the Underlying Neural Mechanisms of Skill Learning
- Media Analytics for Developing & Testing Theories of Social Structure & Interaction
- Fundamental Properties of Energy Flow and Partitioning at Sub-nanoscale Interfaces

Air Force Office of Scientific Research

- Active Ionosphere-Thermosphere Coupling: Mechanisms and Effects
- Attojoule Nanooptoelectronics
- 4-D Electromagnetic Origami
- Radiation-Balanced Lasers – New Vistas in Optical Gain and Refrigeration Materials
- Quantum Many-Body Physics with Photons

Office of Naval Research

- The Role of Epigenetics in Human Performance
- Realistic Dynamic Formalism for Advanced Cyber Interaction
- Synthetic Electronics
- Ultrahigh Thermal Conductivity Materials
- Characterization of Gas Transport through Biological Membranes
- Neural Basis of Symbolic Processing
- Prediction of Multi-Physics Sprays and their Control
- Dynamic Events in Solid Composite Materials at Ultra High Temperature and Pressure

As expected, the FY 2016 topics map largely to DOD Director of Basic Research Robin Staffin's research priorities of materials, physics, and quantum science while the solicitation decreases focus on other topics like mathematics, computer science, and geosciences compared to past MURI solicitations.

Funding:

- DOD expects \$145 million to be made available, pending congressional appropriations. Individual awards can range from \$1 million to \$2.5 million annually for up to five years, and MURI awards have typically fallen between \$1.25 million and \$1.5 million annually.

Timing:

- White papers were due on **Tuesday, September 8** at 4:00 PM Eastern.
- Full proposals are due **Monday, December 7** at 4:00 PM Eastern.
- Notification of selection for award will be made **on April 5, 2016**.

- Grants will start on **June 1, 2016**.

Sources and Additional Information:

- The full solicitation can be found on grants.gov by searching for “ONR-15-FOA-0011.”
- More information on the FY 2015 MURI program and the awards made can be found at http://www.defenseinnovationmarketplace.mil/resources/Final_DOD_MURI_Awards2015.pdf.

Army Research Laboratory (ARL) Collaborative Technology and Research Alliances (CTA/CRA)

Collaborative Technology and Research Alliances support collaborations between defense laboratories and centers, industry, and academia to ensure rapid technology transfer of new innovations and technologies. ARL uses these collaborations to address emerging technology and research areas with multidisciplinary/institution teams of academic, industry, and government researchers to drive the development of technologies to solve some of the Army’s most complex challenges with emerging technologies. While the CTA/CRA mechanisms date to the early 1990s, there are six active awards.

Funding:

- Typically through other transaction agreements (OTA) where additional performers can be flexibly added. CTAs/CRAs are funded from \$3 million to \$10 million annually.

Timing:

- Universities should engage with ARL leadership and staff about further partnering opportunities for existing CTAs/CRAs as well as research gaps where ARL might use these mechanisms to help fill research needs. Open annual reviews can be attended by contacting Ms. Kelly Foster, ARL, Office of the Director, Ofc: 301-394-5503; BB: 301-233-1178; kelly.s.fosterstratchko.civ@mail.mil.

Sources and Additional Information:

- An ARL overview of the CTA/CRA mechanisms is located at <http://www.arl.army.mil/www/default.cfm?page=93>.

Air Force Centers of Excellence

The Air Force has at times entered into partnerships with universities through their Centers of Excellence (COE) mechanism. Air Force has awarded universities a COE grant to perform multidisciplinary research on a specific topic of interest. Past COEs include a COE for Nanostructures and Improved Cognition (Georgia Tech, 2009), COE for Electric Propulsion (University of Michigan, 2010), and COE for Nature Inspired Sciences (University of Washington, 2015). Other COE awards have been made to internal partners like Maxwell AFB (software assurance, 2005) and Brooks AFB (environment, 1991).

Funding:

- Grants typically range from \$1 million to \$2 million annually over the course of several years.

Timing:

- While the COE mechanism is not a recurring funding program, it is a possible funding avenue to consider in future engagements with AFOSR.

Sources and Additional Information:

- Contact Dr. José A. Camberos, P. E., AFRL - University Relations Manager, U. S. Air Force Research Laboratory TEL: 937-904-4757; Jose.Camberos@us.af.mil.
- Information on AFRL's University Relations initiative can be found at <http://teamafrl.afciviliancareers.com/opportunities/university-relations> and <http://www.wpafb.af.mil/news/story.asp?id=123443644>.

University Affiliated Research Centers (UARC)

UARCs are DOD's signature mechanism for engaging universities in preferred contracting for research in areas of defense need. UARCs are long-term collaborations between universities, industry, and DOD research laboratories hosted at universities. While UARC awards are made directly to universities, they often serve as umbrellas for collaboration between academia and industry in support of DOD needs. UARCs are among the highest-profile DOD contacting mechanisms for universities as it enables sole-source work.

The creation of new UARCs is highly political, and it requires a very large effort from university leadership to be asked to apply. DOD must invite proposals for UARCs; the Department has recently been reluctant to create new centers given the long-term "mortgages" they create in a still austere budget environment. The newest UARC went to the University of Nebraska in 2012. There are currently 13 UARCs supported by DOD and the National Security Agency.

Funding:

- Each Center is funded at up to \$5 million per year for five years with the possibility of a five-year renewal—pending funding availability and performance.

Timing:

- There are no plans for future UARC competitions.

Sources and Additional Information:

- Information on DOD engagement for UARCs can be found at http://www.acq.osd.mil/chieftechnologist/publications/docs/20130426_UARC_EngagementGuide.pdf.
- An overview of Army UARCs can be found at <http://www.arl.army.mil/www/default.cfm?page=510>.
- An overview of all UARCs from the Defense Innovation Marketplace is at http://www.defenseinnovationmarketplace.mil/UARC_FFRDC.html.

National Security Science and Engineering Faculty Fellowship

The National Security Science and Engineering Faculty Fellowship (NSSEFF) program is intended to attract and engage the best and brightest in academia to conduct a range of basic research in areas of interest to DOD. The objectives of the program are to: support scientific research that may lead to extraordinary outcomes; educate and train outstanding student and post-doctoral researchers for the defense and national security workforce; foster long-term relationships between outstanding university researchers and the DOD; familiarize select university researchers and their students with DOD's current and future challenges; and increase the number of exceptionally talented technical experts that are

contributing to DOD's mission and are able to actively participate in its accomplishment as part of the administration of grants issued under the program.

Funding:

- Awards typically range from \$600,000 per year for five years for a total maximum award of \$3 million.

Timing:

- White Paper and Supporting Documentation submission were due on **August 10, 2015**.
- Proposal and confidential letters of recommendation (invitation only) due **November 30, 2015**.
- Award decisions are expected in the spring of 2016.

Sources and Additional Information:

- The full solicitation can be found on www.grants.gov by searching for "N0001415RFO11".
- The AcqTrak Online portal can be found at <https://acqtrak.noblis.org/applyNSSEFF>.
- More information on NSSEFF is available at http://www.acq.osd.mil/rd/basic_research/program_info/nsseff.html.

National Institutes of Health

National Center for Advancing Translational Sciences (NCATS)

Collaborative Innovation Award, Clinical and Translational Science Award (CTSA) Program (U01)

The Clinical and Translational Science Award (CTSA) hubs promote advances in translational research and training at participating medical research institutions. This opportunity will enable collaborations among CTSA hubs to overcome system-wide barriers to translational effectiveness and thus foster cross-CTSA innovation development and implementation could transform the nation's translational effectiveness in unprecedented ways. Thus, investigators who are not affiliated with a CTSA hub, but wish to bring an innovative project to the CTSA consortium, can participate in collaboration with a CTSA investigator. The purpose of this opportunity is to invite applications to stimulate innovative collaborative research in the NCATS' CTSA consortium with the goal of broadly contributing to the transformation of America's translational science enterprise. Research Project Cooperative Agreements (U01) are more narrow in scope than some of the other large Cooperative Agreements supported by NIH in that they are usually intended to support a discrete, specified project carried out by an investigator with specific scientific interests and competencies. An X02 pre-application is strongly recommended (though technically not required) first step in the application process for the U01.

Funding:

- NCATS intends to commit approximately \$9 million in FY 2016; the exact number of awards is dependent on congressional appropriations. For clinical projects, no more than \$1,000,000 direct costs annual budget should be requested. For non-clinical projects, no more than \$500,000 direct costs annual budget should be requested. Larger budgets will be considered if strongly justified. The maximum project period is 5 years.

Timing:

- Letters of intent are due for the X02 on February 8, 2016; June 6, 2016; October 8, 2016; February 7, 2017; June 11, 2017; and October 7, 2017 and the application due dates are November 10, 2015; March 8, 2016; July 6, 2016; November 8, 2016; March 7, 2017; July 11, 2017; and November 7, 2017.
- There are no letters of intent for the P01, but the application deadlines are February 3, 2016; July 7, 2016; November 10, 2016; March 9, 2017; July 13, 2017; November 9, 2017; March 8, 2018; and July 11, 2018.

Sources and Additional Information:

- More information about the Pre-Application for Collaborative Innovation Award, CTSA Program (X02) is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-15-173.html#sthash.liWH4pCh.dpuf>.
- More information on the CTSA Collaborative Innovation Award (U01) is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-15-172.html>.

National Cancer Institute (NCI)

National Cancer Institute Program Project Applications (P01)

The National Cancer Institute (NCI) is broadly seeking applications for investigator-initiated program project (P01) grants in areas of interest including (but not limited to) cancer biology, cancer prevention, cancer diagnosis, cancer treatment, and cancer control at the basic, translational, clinical, and/or population-based levels. Each Program Project application must consist of at least three projects and must share a common central theme, focus, and/or overall objective. Research Program Project Grants funded through the P01 mechanism typically support three to five collaborating principal investigators to establish a coordinated multi-project research effort that will address a specific scientific problem. The multidisciplinary teams funded by these grants should share resources and expertise to achieve research outcomes not possible by a single investigator.

Funding:

- The number of awards made by NCI is contingent upon congressional appropriations. Application budgets are not limited but should accurately reflect the needs of the proposal. The maximum project period is five years.

Timing:

- These awards are ongoing and applications are accepted in three annual cycles with deadlines of January 25, May 25, and September 25. Letters of intent are due 30 days before the application due date.

Sources and Additional Information:

- More information about the NCI Program Project P01 is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-15-023.html>.

Specialized Programs of Research Excellence (SPOREs) in Human Cancers for Years 2015 and 2016 (P50)

This opportunity is for Specialized Programs of Research Excellence (SPOREs) to support translational research to address an organ-specific or related group of cancers. The co-sponsoring institute is National Institute on Dental and Craniofacial Research (NIDCR) so the cancer of focus should be of relevance to that region. The objectives are to improve prevention, early detection, diagnosis, and treatment of these conditions. Specialized center grants, such as P50s, typically originate from the participating IC's programmatic needs. Successful applicants should therefore expect to have substantial contact with IC staff and serve as a regional or national resource. Furthermore, the SPORE program was created to be beneficial in a variety of ways so in addition to conducting a wide range of research activities, recipients must detail plans to develop specialized shared resources core facilities, improve research model systems, and engage in collaborative research projects with other institutions.

Funding:

- NCI expects to fund 8-12 SPORE awards per year and applicants may request a maximum of \$2,300,000 total costs/year which must include facilities and administrative (F&A) costs related to subcontracts to other institutions or organizations.

Timing:

- The application deadlines are January 27, 2016; May 19, 2016; and September 22, 2016. Letters of intent are due 30 days before the application due date.

Sources and Additional Information:

- More information about SPOREs is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-14-353.html>.

National Human Genome Research Institute (NHGRI)

Centers of Excellence in Genomic Science (CEGS) (RM1)

RM1 designation is intended to support unique, large-scale research projects with a complex structure that cannot be appropriately categorized into any other NIH activity code. The Centers of Excellence in Genomic Sciences (CEGS) program establishes academic Centers to address critical issues in genomic science or genomic medicine with the expectation of producing substantial breakthroughs. Thus, the research conducted at these Centers will entail high risk but potentially high payoff. The Centers may take a variety of directions to address the development of novel technological or computational methods for the production or analysis of comprehensive data sets, a particular genome-scale biomedical problem, or ways to develop and use genomic approaches for understanding biological systems. Given the scope of the investment, there is also an accompanying expectation of outstanding scientific and management plans which will help facilitate interactions between investigators from different disciplines, and provide training to grow the pool of highly-qualified professional genomics scientists and engineers.

Funding:

- The NHGRI and NIMH anticipate supporting no more than ten CEGS projects at any one time and therefore no more than two awards will be given per year. Applicants may request up to \$2 million direct costs for any year for continuing operations. The grant application may request up

to five years of support, but the total length of support for any Center under this program will not exceed ten years.

Timing:

- The deadline for applications is May 20, 2016. Letters of intent are due 30 days before the application due date.

Sources and Additional Information:

- More information about the CEGS is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-14-195.html>

Genomic Resource Grants for Community Resource Projects (U41)

To facilitate genomic research and the dissemination of its products, NHGRI supports resources that are crucial for disease studies, model organism studies, and other biomedical research. U41 grants are intended to support biotechnology resources which are available to investigators regardless of disciplinary background. Awards under this opportunity will support the development and distribution of genomic resources including informatics resources, comprehensive identification and collections of genomic features, and standard data types produced for central sets of samples. These must be made available to the broad research community in a cost-effective manner.

Funding:

- The number of awards supported by NHGRI depends upon congressional appropriations. Application budgets are not limited and applicants may request project periods of up to 5 years.

Timing:

- The deadlines for applications are January 25, 2016; May 25, 2016; September 25, 2016; and January 25, 2017. Letters of intent are due 30 days before the application due date.

Sources and Additional Information:

- More information about the CEGS is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-14-191.html>

High Quality Human and Non-Human Primate Genome Sequences (U24)

U24 Cooperative Agreements support research projects that contribute to developing resource capabilities. With this opportunity NHGRI seeks to fund efforts that will produce very high quality reference genome sequence assemblies in the next three years for human (25-50 assemblies) and select non-human primates (10-12), complementing and improving on existing assemblies, which will be in the interest of supporting the overall community. Award program recipients are expected to add value to this field by improving the methods and quality of the data as well as to develop specific scientific and practical definitions of what a very high-quality reference should be.

Funding:

- NHGRI intends to commit \$2 million in FY 2016 to fund up to two awards. Application budgets are not limited and the project period is three years.

Timing:

- Letters of intent were due July 25, 2015.

Sources and Additional Information:

- More information about High Quality Human and Non-Human Primate Genome Sequences (U24) is available at <http://grants.nih.gov/grants/guide/rfa-files/RFA-HG-15-027.html>

National Heart, Lung, and Blood Institute (NHLBI)

NHLBI Program Project Applications (P01)

National Heart, Lung, and Blood Institute (NHLBI) supports research related to fundamental processes and diseases of the heart, blood vessels, lungs, and blood, including transfusion medicine, blood resources, and sleep disorders. Research Program Project Grants funded through the P01 mechanism typically support three to five collaborating principal investigators to establish a coordinated multi-project research effort that will address a specific scientific problem or biomedical theme which aligns with the interest of the NHLBI. The multidisciplinary teams funded by these grants should share resources and expertise to achieve research outcomes not possible by a single investigator. NHLBI is looking to encourage new scientific directions with this opportunity and in particular seeks to attract scientists who have not traditionally been supported by this institute.

Funding:

- New applications may request up to \$1.5 million in direct costs for each project year. The number of awards by NHLBI is contingent upon congressional appropriations.

Timing:

- These awards are ongoing and applications are accepted in three annual cycles with deadlines of January 25, May 25, and September 25. Letters of intent are due 60 days before the application due date.

Sources and Additional Information:

- More information about the NHLBI P01 is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-13-316.html>

Translational Programs in Lung Diseases (P01)

Research Program Project Grants funded through the P01 mechanism typically support three to five collaborating principal investigators to establish a coordinated multi-project research effort that addresses a specific scientific problem. The multidisciplinary teams funded by these grants should share resources and expertise to achieve research outcomes not possible by a single investigator. The purpose of this translational program project grant (tPPG) program is to support the development of specific, novel clinical applications that will significantly improve the diagnosis and/or management of lung and/or sleep diseases. Applicants will be required to propose research that will become progressively more clinical and translational over the funding of the grant. They are expected to assemble interactive, multidisciplinary teams that have the combined expertise to formulate a plan for development of the proposed clinical application(s). Research teams are not required to have prior collaborative experience but must be able to demonstrate an integrated, practical approach that will result in the effective progression of mechanistic/basic concepts toward application in the clinic.

Funding:

- Applicants are recommended not to request a budget of more than \$1.75 million per year direct costs for a maximum of \$8.75 million direct costs over a five-year project period.

Timing:

- This is an ongoing opportunity with deadlines for applications due May 19, 2016; September 22, 2016; and May 19, 2017. Letters of intent are due 30 days prior to the application deadline.

Sources and Additional Information:

- More information on the NHLBI Translational Program in Lung Diseases is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-14-245.html>

Asthma Empowerment Collaborations to Reduce Childhood Asthma Disparities (U01)

In 2012, a Coordinated Federal Action Plan to Reduce Racial and Ethnic Asthma Disparities was created after representatives from nearly two dozen groups reviewed prior, available, and projected efforts to reduce disparities in asthma and concluded that multiple risk factors contribute to the persistence of disparities. The Action Plan advises that substantial progress in reducing disparities will require research to design, execute and evaluate implementation programs that maximize synergies among all key sectors to create a system of care that focuses on children most in need and reaches them where they live, learn and play. Investigators who participate in this Cooperative Agreement must have collaborations within their communities to create an Asthma Care Implementation Program (ACIP) that integrates interventions from at least four different sectors that contribute to the care of children with asthma: medical care, families, home environment, and the community.

Funding:

- NHLBI intends to commit funds in direct costs for up to four awards at the following levels, for a max of six years,
 - up to \$500,000 in year 1 (FY 2017)
 - \$1,200,000 per year in years 2-4 (FY 2018-FY 2020)
 - \$400,000 in year 5 (FY 2021)
 - \$1 million in year 6 (FY 2022).

Timing:

- The letter of intent is due by October 16, 2016, and the application is due November 16, 2016.

Sources and Additional Information:

- More information on the Asthma Empowerment Collaboration U01 is available at <http://grants.nih.gov/grants/guide/rfa-files/RFA-HL-17-001.html>

National Institute on Aging (NIA)

Due to uncertainty in the current congressional appropriations process, many of the awards through NIA, especially those with applications related to Alzheimer's, have budgets that are not clearly established.

NIA Program Project Applications (P01)

Research Program Project Grants funded through the P01 mechanism typically support three to five collaborating principal investigators to establish a coordinated multi-project research effort that will address a specific scientific problem. The multidisciplinary teams funded by these grants should share resources and expertise to achieve research outcomes not possible by a single investigator. Each application must include at least three related research projects that share a common central theme, focus, and/overall objective and an administrative core to lead the project and these should align with the interests of the NIA. These include: genetic, biological, neuroscientific, clinical, behavioral, social, and economic research related to the aging process, diseases and conditions associated with aging, and other special problems and needs of older Americans.

Funding:

- The number of awards is contingent upon congressional appropriations. Application budgets are not limited but to discuss the appropriate scope contact the program officer. The maximum project period is five years.

Timing:

- This is an opportunity has deadlines on January 28, 2016 and May 25, 2016. Letters of intent are due 30 days prior to the application deadline.

Sources and Additional Information:

- More information on the NIA Program Project Applications (P01) is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-13-258.html>

The Midlife in the United States Study (U19)

The purpose of this opportunity is to solicit an application for the next five year cycle of the Midlife in the United States (MIDUS) Study. MIDUS was initially started in 1995 to study aging as an integrated bio-psycho-social process. The various cohorts have focused on multiple factors, so the goals for this solicitation are to complete the third wave of longitudinal data collection which has focused on daily stress; complete the second wave of data collection which has focused on clinical biomarkers and affective neuroscience assessments; and continue innovative sub-studies such as how psychosocial influences affect gene expression as well as new methods to re-engage non-responders. The overarching goal is to connect these content areas through innovative approaches to data distribution, analysis, and integration on health, functioning, personality, cognitive status, affective functioning, economic well-being, social relationships, and well-being in the interest of disseminating and encouraging data use broadly by the scientific community.

Funding:

- The number of awards is contingent upon congressional appropriations. Application budgets are not limited, for more information on the appropriate scope contact the NIA program officer. The maximum project period is five years.

Timing:

- This is an opportunity has deadlines in cycles on January 25, May 25, and September 25. Letters of intent are due 30 days prior to the application deadline.

Sources and Additional Information:

- More information on the The Midlife in the United States Study (U19) is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-14-356.html>.

National Institute of Biomedical Imaging and Bioengineering (NIBIB)

NIBIB Quantum Program: Technological Innovation to Solve a Major Medical or Public Health Challenge (U01)

The National Institute of Biomedical Imaging and Bioengineering (NIBIB) is the main research entity for health related applications of engineering and its mission is to improve human health by supporting the development and acceleration of the application of biomedical technologies. The goal of the NIBIB Quantum Program is to support development of biomedical technology research at the interface of the engineering, physical, and life sciences to create a paradigm shift in prevention, detection, diagnosis, and/or treatment of a major disease or national public health problem.

Funding:

- NIBIB plans on funding one or two applications per year. Applicants are strongly encouraged to not request a budget of more than \$1 million per year in direct costs, for a maximum of four years.

Timing:

- Letters of intent are due December 11, 2015 for the January 26, 2016 application deadline, or December 12, 2016 for the January 26, 2017 application deadline.

Sources and Additional Information:

- More information about the Quantum Program is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-15-031.html>.

Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)

Resource Program Grants in Bioinformatics (P41)

P41 grants are Research Program Project opportunities intended to support biotechnology resources which are available to investigators regardless of disciplinary background. The mission of NICHD is to study the "complex process of human development from conception to old age." This specific opportunity is intended to support the operation, improvement, and dissemination of databases, digital information, or software related to research focused on studying embryonic developmental in animal models. Applicants should consult with the Scientific/Research Contact to ensure that the proposed project reflects the objectives of this opportunity and the programmatic interests of the NICHD.

Funding:

- The number of awards is contingent upon congressional appropriations. Requested direct costs are expected to range from \$500,000 not to exceed \$1,750,000 per year for a maximum of five years.

Timing:

- This is an opportunity has deadlines in cycles on January 25, May 25, and September 25. Letters of intent are due 30 days prior to the application deadline.

Sources and Additional Information:

- More information about the Resource Program Grants in Bioinformatics (P41) is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-14-357.html>.

National Institute on Drug Abuse (NIDA)

NIDA Research "Center of Excellence" Grant Program (P50)

Specialized Center Grants supported through the P50 mechanism usually fund a wide spectrum of multidisciplinary research and development activities to address a specific disease or topic of biomedical research. In contrast to program project grants, specialized center grants typically originate from the participating IC's programmatic needs and therefore successful applicants should expect to have substantial contact with IC staff and serve as a regional or national resource and share their findings, data, and resources. This opportunity is to provide support for research Centers that conduct drug abuse and addiction research in any area of NIDA's mission, which is the application of science to drug abuse and addiction. Proposals should be innovative and multidisciplinary and not pursue incremental changes to the field.

Funding:

- The number of awards NIDA will make is contingent upon congressional appropriations. Application budgets are not limited, for more information contact the program officer. The maximum project period is five years.

Timing:

- The deadline for the application was September 25, 2015.

Sources and Additional Information:

- More information on the NIDA Research "Center of Excellence" Grant Program (P50) is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-13-222.html>

Grand Opportunity in Medications Development for Substance-Use Disorders (U01)

U01 Research Project Cooperative Agreements are usually intended to support a discrete, specified project carried out by an investigator with specific scientific interests and competencies. The purpose of this opportunity is to accelerate the development of medications for the treatment of Substance-Use Disorders. NIDA seeks to support preclinical and/or clinical research projects focused on medication development that will yield the necessary results to advance it closer to FDA approval. These U01s will be funded short-term but large grants, with close monitoring and significant involvement of NIDA staff.

Funding:

- The number of awards is contingent upon congressional appropriations. The maximum budget is \$5 million per year for three years.

Timing:

- The deadlines for the application are March 28, 2016, and July 28, 2016. Letters of intent are due 30 days prior to the application deadline.

Sources and Additional Information:

- More information on the Grand Opportunity in Medications Development for Substance-Use Disorders (U01) is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-13-270.html>.

National Institute on Deafness and Other Communication Disorders (NIDCD)

NIDCD Clinical Research Center Grant (P50)

Specialized Center Grants supported through the P50 mechanism usually fund a wide spectrum of multidisciplinary research and development activities to address a specific disease or topic of biomedical research related to the institute's mission. In contrast to program project grants, specialized center grants typically originate from the participating IC's programmatic needs. Successful applicants should therefore expect to have substantial contact with IC staff and serve as a regional or national resource. The National Institute on Deafness and Other Communication Disorders (NIDCD) is funding Clinical Research Center Grants (P50) focused on the seven scientific programs of the NIDCD: hearing, balance, smell, taste, voice, speech and language. For the purpose of this announcement, the areas of clinical research interest include research on communication disorders or data/tissues from individuals with a communication disorder. Examples of possible areas of research include (but are not limited to) studies of prevention, pathogenesis, pathophysiology, detection, diagnoses or epidemiology of a communication disorder or disease.

Funding:

- The number of awards is contingent upon congressional appropriations. Budgets for new applications are limited to \$1,500,000 per year direct cost for a maximum of five years.

Timing:

- The application deadlines are February 2, 2016, and June 2, 2016. Letters of intent are due 30 days prior to the application deadline.

Sources and Additional Information:

- More information about the NIDCD Clinical Research Center Grant (P50) is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-13-277.html>

National Institute of General Medical Sciences (NIGMS)

Biomedical Technology Research Resource (P41)

NIGMS uses the P41 funding mechanism to support Biomedical Technology Resource Centers (BTRCs). The goal of these awards is to help develop cutting-edge technology, techniques, and methodologies for use by a wide range of biomedical investigators. An institution's BTRC could serve as a resource to multiple departments across the university and distinguishes the university as a regional or national resource for technology development. These Resources conduct research and development on new technologies and new/improved instruments driven by the needs of basic, translational, and clinical researchers. Dissemination and training members of the research community are integral features of these opportunities.

Funding:

- The number of awards is contingent upon NIH. Budgets for new applications are limited to \$1,500,000 per year direct cost for a maximum of five years.

Timing:

- The application deadlines are January 25, 2016, and May 25, 2016. New applicants are strongly encouraged to submit a pre-application. The pre-application process provides feedback regarding the appropriateness for this program and competitiveness of a potential application.

Sources and Additional Information:

- More information about the Biomedical Technology Research Resource (P41) is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-14-021.html>

Cross-NIH

Countermeasures Against Chemical Threats (CounterACT) Research Centers of Excellence (U54)

U54 programs support Specialized Centers, the solicitations for which are developed in response to a specific programmatic need and generally receive continuous attention from NIH programmatic staff as a consequence. They support any part of the range of research and development activities, from basic to clinical. In this instance, the mission of the CounterACT program is to support research and development of new and improved therapeutics for accidental or intentional exposure to chemical threats with the objective of reducing mortality and morbidity. The CounterACT program at NIH is part of the larger biodefense program that includes biological and radiation/nuclear threats. There is also an associated U01 opportunity intended to support a more discrete, specific project.

Funding:

- For the U54, the NIH intends to fund an estimate of 2-4 awards, corresponding to a total of \$7-9 million, for FY 2016. NIH plans to fund awards of \$2-3 million per year for a total of \$10-15 million over a maximum five-year project period.

Timing:

- Letters of intent are due 30 days before the application due date for the U54. This solicitation is expected to have three rounds with application due dates of September 15, 2015; September 13, 2016; and September 12, 2017.

Sources and Additional Information:

- More information about the U54 CounterACT is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-15-146.html>

Connectomes Related to Human Disease (U01)

While there has been interest in understanding the connectional organization of the human brain for a very long time, prior to the Human Connectome Project (HCP), little neural connectivity data from humans was available. This joint effort funded by six different institutes at NIH aims to fund research that will build on the data collected using the very well defined experimental protocols of the HCP and connect disease/disorder cohorts of interest to the institutes that are participating in this

program. The applicants will define these cohorts on criteria including specific symptoms or conditions, comorbid conditions, specific genetic profiles, or other criteria.

Funding:

- The number of awards is contingent upon NIH appropriations. Application budgets are not limited; for more information contact the program officer. The maximum project period is four years.

Timing:

- This solicitation has application due dates of July 14, 2016.

Sources and Additional Information:

- More information about the Connectomes Related to Human Disease (U01) is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-14-281.html>.

Blueprint Neurotherapeutics Network (BPN): Small Molecule Drug Discovery and Development for Disorders of the Nervous System (UH2/UH3)

The Blueprint Neurotherapeutics Network (BPN) is a part of the NIH Blueprint for Neuroscience Research which seeks to address several grand challenges related to drug development for nervous system disorders. The UH2/UH3 is a two-phase Cooperative Agreement funding mechanism that supports new research activity through the UH2 at the “Discovery” stage and exploratory and development research initiated by that program in the UH3 at the “Development” stage. Through this solicitation, the BPN seeks to fund small molecule drug discovery and development to help get those products into the clinic. “Discovery” stage applicants should be optimizing well-validated targets; “Development” stage should be advancing candidates through Investigational New Drug (IND)-enabling toxicology studies and phase I clinical testing. Successful participants in this program receive intellectual property rights to drug candidates developed through the grant. Research can be carried out at the home institution as well as in collaboration with NIH-funded consultants and contract research organizations that can provide specialized services such as medicinal chemistry, pharmacokinetics, toxicology, formulations development, chemical synthesis, and Phase I clinical testing.

Funding:

- The number of awards is contingent upon congressional appropriations. Application budgets are not limited but applicants should contact the program officer for more information on scope. Applicants may seek up to one year of UH2 funding for preparatory activities. The combined duration of the UH2 and UH3 award cannot exceed five years.

Timing:

- This solicitation has application due dates of February 11, 2016; August 11, 2016; and February 8, 2017. Letters of intent are due 30 days before application due date.

Sources and Additional Information:

- More information about Small Molecule Drug Discovery and Development for Disorders of the Nervous System (UH2/UH3) is available at <http://grants.nih.gov/grants/guide/pa-files/PAR-14-293.html>

Lifespan Human Connectome Project: Baby Connectome (U01)

This opportunity is issued as an initiative of the NIH Blueprint for Neuroscience Research, a collaborative framework through which 15 NIH Institutes, Centers and Offices jointly support neuroscience-related research. The goal of the Blueprint is to accelerate discoveries and reduce the burden of nervous system disorders. The Blueprint is supporting a Lifespan Human Connectome Project (L-HCP) to extend the Human Connectome Project (HCP) to map connectivity in the developing, adult, and aging human brain. The goal of this opportunity is to apply the protocols developed through the HCP to children in the 0-5 year old age range to study the structural and functional changes that occur in the brain during typical development. Two other complementary opportunities looking at other windows on the developmental timeline just closed.

Funding:

- Issuing IC and partner components intend to commit an estimated total of \$4,000,000 to fund 1 award. Application budgets are limited to \$2,700,000 direct costs over all years of the award. The maximum project period is four years.

Timing:

- This solicitation has application due dates of February 11, 2016; August 11, 2016; and February 8, 2017. Letters of intent are due 30 days before application due date.

Sources and Additional Information:

- More information on the Baby Connectome (U01) is available at <http://grants.nih.gov/grants/guide/rfa-files/RFA-MH-16-160.html>

National Aeronautics and Space Administration

Space Technology Mission Directorate

The Space Technology Mission Directorate (STMD) supports the development of groundbreaking technologies that are applicable to the mission-specific needs of other NASA directorates. Through a series of tailored programs, STMD engages with government, industry, and academic partners to rapidly design, develop, and test technologies that span the entire Technology Readiness Level (TRL) spectrum, and that are often too nascent or high-risk for the private sector to support on its own. STMD provides significant financial and technical support for university research through the following programs.

Game Changing Development

The Game Changing Development program (GCD) seeks to advance space technologies that may generate novel approaches for future NASA missions and solutions to significant national needs. GCD focuses on maturing technologies from a proof of concept stage through component or breadboard testing. GCD generally focuses on mid-TRL technologies, moving them from TRL-3 to TRL-5/6. Successful proposals will be advanced through ground-based testing and/or laboratory experimentation by multiple teams using different approaches.

Funding:

- For FY 2014, GCD awards averaged \$500,000 annually per award during Phase I, and \$2 million per award during Phase II.
- The first FY 2015 GCD solicitation anticipated selecting two proposals for Phase I, and one proposal for Phase II.

Timing:

- Future solicitations for GCD funding were expected in the fourth quarter (July-September) of FY 2015, but a solicitation has yet to be released.

Sources and Additional Information:

- More information on GCD is available at http://www.nasa.gov/directorates/spacetech/game_changing_development/index.html.
- The most recent FY 2015 solicitation is available at <http://nspires.nasaprs.com/external/viewrepositorydocument/cmdocumentid=437864/solicitationId=%7BDCBA89BB-80B3-7E64-E1D7-F6A2718573CB%7D/viewSolicitationDocument=1/Game%20Changing%20Development%20Program-UltralightweightCoreMaterialsFINALAppendix%20C1%20AMENDMENT%201.pdf>.

Space Technology Research Grants

The Space Technology Research Grants (STRG) program has three major components: NASA Space Technology Research Fellowships (NTRSF), Early Stage Innovations (ESI), and the Early Career Faculty program (ECF). The common aim of these three programs is to encourage university faculty and students to explore the theoretical feasibility of innovative ideas that could dramatically improve the effectiveness, affordability, and sustainability of space-based scientific research, space travel, and exploration.

ESI and ECF awards are made in the form of multi-year grants, while NTRSF awardees are provided smaller, one-year training grants and the opportunity to conduct research at NASA Centers. STRG programs are focused on accelerating the pace of development in specific technology areas, though proposers' efforts do not need to be oriented around a particular mission. Research topics are outlined in the solicitation, and are aligned with NASA's 15 Space Technology Roadmaps.

Funding:

- ESI awards typically average \$250,000 annually for a period of two or three years.
- ECF awards typically average \$200,000 annually for a period of no more than three years.
- NTRSF awards typically average \$74,000 annually for a period of one year, with the possibility of renewal for 1-3 years depending on the degree program in which the student is enrolled.

Timing:

- Awards for ESI are expected annually, but proposals for FY 2016 were due on July 10, 2015.
- Awards for ECF are expected biennially, with the submission deadline for the FY 2016 solicitation having already passed as well.
- Awards for NTRSF are expected annually, with the release of the FY 2016 solicitation expected in fall 2015.

Sources and Additional Information:

- More information on ESI is available at <http://www.nasa.gov/content/early-stage-innovations-esi/#.VYldDfIVhBc>.
- The full FY 2016 ESI solicitation is available at <http://nspires.nasaprs.com/external/viewrepositorydocument/cmdocumentid=461691/solicitationId=%7B14652CAA-A8D3-17A7-59B2-9700223CACA0%7D/viewSolicitationDocument=1/ESI-ST-REDDI-2015%20Appendix%20B2%20final%20rev2.pdf>.
- More information on ECF is available at http://www.nasa.gov/directorates/spacetech/strg/archives_stro.html#.VYhmD_IVhBc.
- The full FY 2016 ECF solicitation is available at <http://nspires.nasaprs.com/external/viewrepositorydocument/cmdocumentid=448642/solicitationId=%7B7A148E0E-4834-3C10-BADB-0C5060C4F961%7D/viewSolicitationDocument=1/ST-REDDI-2015%20Appendix%20B1%20-%20ECF15.pdf>.
- More information on NSTRF is available at http://www.nasa.gov/directorates/spacetech/strg/archives_nstrf.html#.VYljH_IVhBc
- The full FY 2015 NSTRF solicitation is available at [http://nspires.nasaprs.com/external/viewrepositorydocument/cmdocumentid=434499/solicitationId=%7BDC8136AA-D575-B60D-88EE-0FB3ABF6C16A%7D/viewSolicitationDocument=1/NASA%20Space%20Technology%20Research%20Fellowships%20\(NSTRF\)-Fall%202015.pdf](http://nspires.nasaprs.com/external/viewrepositorydocument/cmdocumentid=434499/solicitationId=%7BDC8136AA-D575-B60D-88EE-0FB3ABF6C16A%7D/viewSolicitationDocument=1/NASA%20Space%20Technology%20Research%20Fellowships%20(NSTRF)-Fall%202015.pdf).

Virtual Institutes

NASA recently proposed new Virtual Institutes, which would be designed to provide a virtual forum to facilitate scientific and technological research and development by U.S. academic institutions. The institutes would complement existing university-oriented STMD programs, and utilize their unique virtual platforms to facilitate collaboration among multiple institutions without the need for collocation.

NASA envisions establishing one or more virtual institutes in partnership with an academic institution or nonprofit organization. Rather than supporting system- or mission-specific qualifications or operations, the institutes would be aimed at advancing early-stage technologies by fostering more basic, interdisciplinary research collaboration among multiple academic or nonprofit institutions.

Funding:

- Funding amounts remain unclear at this point.

Timing:

- NASA released an RFI in June to garner feedback on the structure of future institutes. NASA will likely release at least one solicitation in FY 2016, perhaps in the late fall or early spring.

Sources and Additional Information:

- The full RFI is available at http://nspires.nasaprs.com/external/viewrepositorydocument/cmdocumentid=462344/solicitationId=%7BBFC2B0CE-0C8F-C9D2-99D5-EF46C2CC46C6%7D/viewSolicitationDocument=1/Virtual_Institutes_RFI_2015-05-22.pdf.

Department of Homeland Security

University Centers of Excellence

The Centers of Excellence (COE) program is the flagship research account for universities at DHS. DHS competitively awards universities COEs across various fields to meet DHS's S&T needs. DHS's main research thrusts focus on cybersecurity, resilient systems, border and maritime security, explosives, and chemical/biological defense. Centers are led by universities and bring together many university, industry, national laboratory, and non-profit partners to conduct research and development activities and training programs. DHS expects centers to address both short and long term S&T needs. There are currently 11 COEs and they are recompeted on a staggered basis; two COEs were recompeted and a new center was established in 2015. Competition is very intense for the centers and involves political backing from Members of Congress.

Funding:

- The COE program is funded at around \$39 million a year. Centers receive \$3 million to \$4 million annually.

Timing:

- Two centers are either in the final year or about to be recompeted: the Center for Visualization and Data Analytics (CVADA), co-led by Purdue University (visualization sciences – VACCINE) and Rutgers University and the National Center for Food Protection and Defense (NCFPD) led by the University of Minnesota. DHS will likely issue a solicitation to extend these centers in the coming year or two.

Sources and Additional Information:

- An overview of the program can be found at <http://www.dhs.gov/homeland-security-centers-excellence>.

Department of Transportation

University Transportation Centers

University Transportation Centers (UTC) program is DOT's signature research program for universities and funds multi-year, university-based research and education centers. DOT expects centers to advance U.S. transportation expertise and technological capability through research, education, and technology transfer while also addressing next generation transportation workforce needs. Center partners include universities, industry, state and local governments. UTCs focus on DOT's five strategic goals for the program: safety, economic competitiveness, environmental sustainability, state of good repair, and livable communities. DOT encourages multimodal, multidisciplinary centers that address rail, maritime, highway, pipeline, and transit research issues, but centers may choose to focus activities around one mode of transportation. Successful UTCs will have strong research portfolios and well-established track records in transportation research and education activities.

Funding:

- The UTC program is funded at \$72.5 million each year. For the last competition in FY 2013, DOT funded 5 National centers (at up to \$3 million per center annually), 10 Regional centers (up to \$2.75 million per center annually), and 20 Tier 1 centers (up to \$1.5 million per center annually).

Timing:

- The most recently funded centers have until September 2017 to expend awarded funds. The next competition depends on transportation authorization legislation currently being considered in Congress.

Sources and Additional Information:

- An overview of the program and current centers can be found at <http://www.rita.dot.gov/utc/home>.

Federal Aviation Administration Centers of Excellence

Another large grant funded by the DOT is the Federal Aviation Administration (FAA) Centers of Excellence (COEs) program. Like UTCs, FAA COEs combine research, education, and technology transfer activities to achieve the program's goal of enhancing U.S. air transportation expertise. Congress designated the first COE in 1992, but since 1995 all COEs have been competitively awarded. FAA funds COEs for ten years and evaluates the need for continuation after this period.

There are currently four COEs: Center of Excellence for Commercial Space Transportation (led by New Mexico State University), Center of Excellence for the Partnership to Enhance General Aviation Safety, Accessibility and Sustainability (Purdue), Center of Excellence For Alternative Jet Fuels and Environment (Washington State and MIT), and Center of Excellence in Unmanned Aircraft Systems (Mississippi State).

Funding:

- COEs typically receive \$500,000-\$1 million annually for five years, with the possibility of another five year renewal. Centers typically bring a significant non-federal match (50-100 percent).

Timing:

- FAA awarded the most recent COE in UAS earlier this summer. There are no immediate plans for future COEs. However, FAA often recompetes centers that have seen their ten year funding expire with new universities receiving awards. Recently expired COEs include centers in materials (2015), intermodal transport environment (2014), and aviation emissions (2014).

Sources and Additional Information:

- An overview of the program and current centers can be found at http://www.faa.gov/about/office_org/headquarters_offices/ang/offices/management/coe/.

Department of Commerce

National Institute of Standards and Technology Centers of Excellence

NIST launched its Centers of Excellence (COE) program in 2013. COEs involve universities, industry, and government to leverage and expand NIST's research capabilities across various science and technology

(S&T) areas. Centers are also expected to increase technology transfer activities through industry collaboration and training activities. NIST has established three centers to date: materials (Northwestern, 2013), disaster resilience (Colorado State, 2015), and forensics (Iowa State, 2015). Other focus areas for future centers NIST is considering include: advanced communications, advanced manufacturing, biomanufacturing, cyberphysical systems, regenerative medicine, photonics, human-robotic integration, and quantitative biology.

Funding:

- NIST plans to fund COEs at up to \$4 million a year for five years.

Timing:

- NIST has indicated it may compete one more COE program under an open topic solicitation; however, this will depend on congressional appropriations.

Sources and Additional Information:

- More information can be found at the COE homepage at <http://www.nist.gov/coe/>.