NJIT Research Newsletter

Issue: ORN-2016-011

NJIT Research Newsletter includes ***Grant Opportunity Alerts,*** recent awards, and announcements of research related seminars, webinars and special events. The Newsletter is posted on the NJIT Research Website http://www.njit.edu/research/

Recent Research Grant and Contract Awards

Congratulations to faculty and staff on receiving research grant and contract awards!

PI: Dirk Bucher (PI), Nadim Farzan (Co-PI), and Horacio Rotstein (Co-PI)
Department: Biology
Grant/Contract Project Title: The role of axons in neural coding
Funding Agency: NIH
Duration: 09/26/13-11/30/16

PI: Cyrill Muratov (PI)
Department: Mathematical Sciences
Grant/Contract Project Title: A spectral mass gauging concept for large-scale cryogenic propellant tanks
Funding Agency: NASA
Duration: 09/01/15-05/30/16

PI: Simon Garnier (PI)
Department: Biology
Grant/Contract Project Title: Swarm Lab RTMDx Software
Funding Agency: Rutgers
Duration: 03/01/16-04/30/16

PI: Kurt Rohloff (PI)
Department: Computer Science
Grant/Contract Project Title: "OPERA"-Safeware
Funding Agency: DARPA
Duration: 07/27/15-07/26/19

PI: Kam Moshe (PI)
Department: NCE
Grant/Contract Project Title: HAMS II Data Fusion
Funding Agency: DoD
Duration: 06/01/14-05/31/17

PI: Edgardo Farinas (PI)
Department: Chemistry and Environmental Sciences
Grant/Contract Project Title: Enzyme display for alkane oxidation
Funding Agency: NIH
Duration: 03/01/16-02/28/17

PI: Suzanne Berliner-Heyman (PI)
Department: Pre-College Programs
Grant/Contract Project Title: Academy of Applied Science (with funding supplied by the Army Research Office)
Funding Agency: US Army
Duration: 03/01/16-12/31/16

PI: Suzanne Berliner-Heyman (PI)
Department: Pre-College Programs
Grant/Contract Project Title: Army Research Office
Funding Agency: US Army
Duration: 03/01/16-12/31/16

Events and Announcements

Event: NSF Webinar: The Moral Character of Cryptographic Work
When: March 24, 2016: 12.00 PM – 1.00 PM
Where: http://www.nsf.gov/events/event_summ.jsp?cntn_id=137955&org=NSF
Brief Description: Cryptography rearranges power: it configures who can do what, from what. This makes cryptography an inherently political tool, and it confers on the field an intrinsically moral dimension. The Snowden revelations motivate a reassessment of the political and moral positioning of cryptography. They lead one to ask if my community's inability to effectively address mass surveillance constitutes a failure of our field. I believe that it does. I call for a community-wide effort to develop more effective means to resist mass surveillance. I plead for a reinvention of our disciplinary culture to attend not only to puzzles and math, but, also, to the societal implications of our work.
Speaker Bio: Phillip Rogaway studied cryptography at MIT (1991), then worked as a security architect for IBM before joining the faculty at the University of California, Davis in 1994. Co-inventor of "practice-oriented provable security," Rogaway's work seeks to meld cryptographic theory and cryptographic practice in a mutually beneficial way.
Register: Please register at http://www.tvworldwide.com/events/nsf/160324/

Event: IEEE COMSOC: Create It – Bring It Closer With Mobile Edge Computing
When: March 24, 2016 2.00 PM
Where: http://www.comsoc.org/creating-living-network
Brief Description: The wireless industry is working towards the fastest, smartest network to date – 5G. The demand for low latency and high availability required for 5G networks and services is driving the emergence of new technologies, such as Mobile Edge Computing (MEC).

MEC provides access to cloud-like computing and storage resources at the Mobile Edge. The benefits of MEC stem from the unique characteristics of the Mobile Edge that differentiate it

from a typical cloud application hosting platform. These include extreme proximity to the user; context associated with the radio access network; access to radio network information and integration with operator's core network services.

In many ways, Small Cells and networks of Small Cells may provide the strongest case for MEC, in particular because Small Cells often provide the strongest context by virtue of their deployment (in a specific venue, enterprise, etc.). However, there are challenges associated with Small Cell networks – such as security, availability, limitation of backhaul to the core.

During this 60-minute webinar, experts from InterDigital, Nokia and XCellAir will explore the challenges and benefits of Mobile Edge Computing, with an emphasis on the Small Cell Environment.

Event: NIH VideoCasting and Podcasting
Workshop on Basic and Translational Research in Cerebral Palsy (Day 1 and Day 2)
When: March 24, 2016 8.30 AM (Day 1); March 25, 2016 8.30 AM (Day 2)
Where: https://videocast.nih.gov/summary.asp?live=18384&bhcp=1
Brief Description: This workshop will be an important event for the cerebral palsy research community and will aid NIH by providing an up-to-date assessment of the science focused on cerebral palsy and planning for future scientific investments.

Event: NIH VideoCasting and Podcasting
2016 Alzheimer's Disease-Related Dementia (ADRD) Summit (Day 1 and Day 2)
When: March 29, 2016 8.30 AM (Day 1); March 30, 2016 8.30 AM (Day 2)
Where: https://videocast.nih.gov/summary.asp?live=18053&bhcp=1
Brief Description: The 2016 Alzheimer's Disease-Related Dementias (ADRD) Summit will complete Action Number 1.A.8 of the National Plan to Address Alzheimer's Disease (2015 update). The goal of the Summit, as indicated in the action description of the National Plan, is to "regularly convene an ADRD Summit to review the progress on ADRD research recommendations and refine and add new recommendations as appropriate based on recent scientific discoveries.

For more information go to https://meetings.ninds.nih.gov/?ID=11958

Event: Defense Centers of Excellence for Psychological Health Webinar on Mild Traumatic Brain Injury (TBI)
When: March 24, 2016 1.00 PM – 2.30 PM
Where: http://www.dcoe.mil/Training/Monthly_Webinars.aspx
Brief Description: Mild traumatic brain injury (mild TBI) or concussion has been identified as a hallmark injury of the Afghanistan and Iraq wars. This review addresses the impact of mild TBI on the development, course and clinical management of PTSD. Research efforts take into consideration the potential differential impact of PTSD and mild TBI with or without persistent cognitive deficits. Findings have shown the impact of mild TBI on response to existing PTSD treatment interventions, and development and examination of potential treatment augmentation strategies.

Understanding the epidemiology, diagnostic evaluation and clinical management of common physical symptoms can benefit both physical and psychological health. The goal of this webinar is to share current research and treatment practices related to post-deployment PTSD symptoms, including those attributed to mild TBI.

At the conclusion of this webinar, participants will be able to:

- Identify potential mechanisms underlying high rates of comorbidity of deployment-related PTSD and mild TBI.
- Recognize challenges in differentiating the etiology of overlapping symptoms.
- Apply treatment considerations when PTSD manifests in patients with a history of deployment-related mild TBI..

Presenter

Jennifer J. Vasterling, Ph.D.
Professor of Psychiatry
Boston University School of Medicine
Boston, Massachusetts

Moderator

Vladimir Nacev, Ph.D., ABPP
Acting Chief, Implementation Division Deployment Health Clinical Center
Silver Spring, Maryland

Continuing Education

Continuing education credit is available from Professional Education Services Group (PESG). **You must register by 3 p.m. (ET)** Mar. 24, 2016, to qualify for the receipt of continuing education credit.

The awarding of continuing education credit is limited in scope to health care providers who actively provide psychological health and traumatic brain injury care to U.S. active-duty service members, reservists, National Guardsmen, military veterans and their families.

Registration

Sign up for the webinar. Please note, registration is required for each webinar regardless if the participant has an existing PESG account. Upon completion of registration, a confirmation email will be sent providing webinar event details.

Once registered, you may use Adobe Connect or Defense Collaboration Services to attend the webinar.

Grant Opportunity Alerts

Keywords and Areas Included in Grant Opportunity Alerts**:**

NSF: Alliances for Graduate Education and the Professoriate (AGEP); Cybermanufacturing Systems (CM); US Ignite: Networking Research and Application Prototypes Leading to Smart & Connected Communities; Small Business Innovation Research Program Phase I (SBIR); Small Business Technology Transfer Program Phase I (STTR)

NIH: Emerging Questions in Cancer Systems Biology (U01); Development of Animal Models and Related Biological Materials for Research (R21); High Impact, Interdisciplinary Science in NIDDK Research Areas (RC2)

Department of Defense/US Army/DARPA/ONR: Defense University Research Instrumentation Program (DURIP)

NASA: Research Opportunities in Space and Earth Sciences 2016 (ROSES–2016) Modeling, Analysis, and Prediction; Carbon Cycle Science

National Endowment for The Humanities: Common Heritage

Grant Opportunities

National Science Foundation

Grant Program: Alliances for Graduate Education and the Professoriate (AGEP)
Agency: National Science Foundation NSF 16-552
RFP Website: http://www.nsf.gov/pubs/2016/nsf16552/nsf16552.htm
Brief Description: The **Alliances for Graduate Education and the Professoriate (AGEP)** program seeks to advance knowledge about models to improve pathways to the professoriate and success for historically underrepresented minority doctoral students, postdoctoral fellows and faculty, particularly African Americans, Hispanic Americans, American Indians, Alaska Natives, Native Hawaiians, and Native Pacific Islanders, in specific STEM disciplines and/or STEM education research fields. New and innovative models are encouraged, as are models that reproduce and/or replicate existing evidence-based alliances in significantly different disciplines, institutions, and participant cohorts.

The AGEP program goal is to increase the number of historically underrepresented minority faculty, in specific STEM disciplines and STEM education research fields, by advancing knowledge about pathways to career success. The program objectives include: To support the development, implementation and study of innovative models of doctoral education, postdoctoral training, and faculty advancement for historically underrepresented minorities in specific STEM disciplines and/or STEM education research fields; and to advance knowledge about the underlying issues, policies and practices that have an impact on the participation, transitions and advancement of historically underrepresented minorities in the STEM academy.
The AGEP Transformation Alliance projects are collaborative research projects representing new strategic alliances of institutions and organizations to develop, implement, and study evidence-based models to transform doctoral education, postdoctoral training, and faculty advancement for historically underrepresented minorities in specific STEM disciplines and/or STEM education research fields. Embedded social science and education research contributes to the knowledge base about how transformational models eliminate or mitigate negative factors and promote positive policies and practices for historically underrepresented minorities.

AGEP addresses academic workforce development in a broadening participation and institutional capacity building context. Strategic collaborations are encouraged with multiple academic partners, the private sector, non-governmental organizations, professional organizations, government agencies, national laboratories, field stations, teaching and learning centers, informal science centers, and other relevant STEM and/or STEM education research organizations. The AGEP program encourages project leadership by, and partnerships with, all types of minority serving institutions, such as majority minority serving institutions, historically black colleges and universities, high Hispanic enrollment institutions, tribal colleges and universities, and institutions serving native Hawaiians, native Pacific Islanders, and/or Alaskan natives.

Note to students and postdoctoral scholars seeking support: The AGEP program does not make awards to individual students or postdoctoral scholars to undertake their education or research activities. Undergraduates and graduate students seeking support for graduate education should review the NSF Graduate Research Fellowship program (GRFP) (http://nsfgrfp.org/). Postdoctoral scholars seeking support should review the NSF postdoctoral programs summarized at http://www.fastlane.nsf.gov/servlet/fastlane.pdoc.DisplayProgramType. Additionally, some NSF Directorates may have special funding opportunities to support students and postdoctoral trainees that contribute to broadening participation in STEM. NSF principal investigators

seeking funds to support students and postdoctoral trainees, who are members of historically underrepresented minority groups, are encouraged to contact their NSF program officer for information on potential opportunities.

Awards: 5-6 new AGEP Transformation Alliances per year, with about 3-4 awardee organizations collaborating in each Alliance, are anticipated pending the availability of funds. Anticipated Funding Amount: $6,000,000 to $8,000,000.

Letter of Intent: Not Required

Full Proposal Deadlines: June 14, 2016

Contacts:

- Mark H. Leddy, Program Director, telephone: (703) 292-4655, email: mleddy@nsf.gov
- Maurice Dues, Program Specialist, telephone: (703) 292-7311, email: mdues@nsf.gov

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Grant Program: Cybermanufacturing Systems (CM)

Agency: National Science Foundation PD 16-018Y

RFP Website:

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505291&org=NSF&sel_org=NSF&from=fund

Brief Description: The Cybermanufacturing Systems (CM) Program supports fundamental research to enable the evolution of a wide range of network-accessed manufacturing services that:

- employ applications (or "apps") that reside in the "cloud" and plug into an expansible, interactive architecture;
- are broadly accessible, guarantee reliable execution and have capabilities that are transparent to users; and
- are accessible at low cost to innovators and entrepreneurs, including both users and providers.

Current manufacturing software applications are predominantly large, manufacturer-centric, general-purpose programs with the universal applicability needed to justify their development, marketing and acquisition costs. They usually have broad capabilities, but are cumbersome to learn and often require expert intervention. There is an opportunity for researchers to pursue research and educational efforts to accelerate the creation of an interoperating, cross-process manufacturing service layer that enables the rapid, bottom-up transformation of access to manufacturing services. Such a service layer can allow creative entrepreneurs and companies to both furnish and access manufacturing apps that span the full spectrum from ideation to physical realization, giving rise to an era of "cybermanufacturing."

The cybermanufacturing service layer differs from existing Internet services in that it needs an architecture that can incrementally incorporate and organize the rich and deep semantic elements of manufacturing knowledge, requiring an almost unlimited capacity to expand the range and depth of content contributed in the form of partitioned, but interoperating, manufacturing applications. Such efforts are well-suited to incubation in universities, where potential service layer architectures and application modules can be prototyped at low cost, used in coursework and tested by students and faculty.

Of particular interest is the exploration of the tradeoffs between generality and tractability in algorithmic representations of manufacturing knowledge. In the classic example, the automation of integrated circuit manufacturing depends on restricting device design options to those that can be produced with 100% reliability by a standardized set of manufacturing processes. As a result, the problem of compiling manufacturing instructions is made tractable by limiting available design options to those that can be manufactured using proven

methods. In practice, the considerable design inefficiencies due to such limitations are more than compensated for by the cost savings due to dependable execution.
Research areas of interest include, but are not limited to, the following:

- Frameworks for partitioning the mechanical design space to ensure tractability of design-to-manufacturing translation, possibly by part type or application domain;
- Computer-Aided Design (CAD) engines that facilitate the restriction of design options, possibly by facilitating the creation of generic part designs that can be customized by entering a limited number of dimensional parameters;
- Product- and domain-focused parametric design apps that connect to manufacturing resources and incorporate process constraints to enable part design and fabrication by users who lack detailed process knowledge;
- Software systems for generating and verifying machine instructions and providing guidance in design for manufacturability;
- Model-based process and machine controls that plug-and-play in a strongly integrated and networked environment;
- Methods for selecting and efficiently allocating networked manufacturing resources;
- Process and materials selection systems;
- Methods for establishing and maintaining evidence-based certification and controlled visibility of explicit and implicit assumptions;
- System architectures that are implementable using existing Internet protocols or that aim to identify the specific changes that are needed to existing Internet protocols to improve their effectiveness;
- Software and protocols for promoting and accommodating user-developed, interoperating manufacturing apps, including hardware computing platforms, operating systems, and middleware; and
- Methods for safeguarding the security and trustworthiness of cybermanufacturing system elements and integrating them to support end-to-end assurances.

Collaborations between engineering and computer science faculty are strongly encouraged, as are collaborations with software, networking, internet service and industrial companies, including the partner institutes of the National Network for Manufacturing Innovation (NNMI, http://manufacturing.gov/welcome.html) and their member companies.
Proposals with industry collaborations can be submitted to the CM Program as Grant Opportunities for Academic Liaison with Industry (GOALI) proposals. GOALI proposals have special requirements, as specified in the most recent GOALI solicitation, https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf12513.
Awards: Various Awards
Letter of Intent: Not Required
Full Proposal Submission Due Date: Anytime
Contacts: Bruce Kramer bkramer@nsf.gov (703) 292-5348

Grant Program: US Ignite: Networking Research and Application Prototypes Leading to Smart & Connected Communities
Agency: National Science Foundation NSF 16-553
RFP Website: http://www.nsf.gov/pubs/2016/nsf16553/nsf16553.htm
Brief Description: US Ignite is an initiative that seeks to promote US leadership in the development and deployment of next-generation gigabit applications with the potential for significant societal impact. The primary goal of US Ignite is to break a fundamental deadlock: there is insufficient investment in gigabit applications that can take advantage of advanced

network infrastructure because such end-to-end infrastructure is rare and geographically dispersed. And conversely, there is a lack of broad availability of advanced broadband infrastructure for open experimentation and innovation because there are few advanced applications and services to justify it. US Ignite aims to break this deadlock by providing incentives for imagining, prototyping, and developing gigabit applications that address national priorities, and by leveraging and extending this network testbed across US college/university campuses and cities.

This solicitation builds on the experience and community infrastructure gained from initial US Ignite activities to further engage the US academic research and non-profit communities along with local cities, municipalities, and regions in exploring the challenges of developing and applying next-generation networking to problems of significant public interest and benefit. In particular, this solicitation has two focus areas: the first encourages the development of application ideas and prototypes addressing national priority areas that explore new uses for high-speed networks and give rise to the Smart & Connected Communities of the future, as well as novel networking and application paradigms; and the second pursues fundamental research advances in networking technology and protocols that will further both the capabilities and our understanding of gigabit networking infrastructure to meet current and future application demands. In 2016, NSF is also working with the U.S. Department of Justice (DOJ) Office for Access to Justice (ATJ) to identify additional application ideas and prototypes and basic research directions that may serve national priority areas of mutual interest.

Awards: Focus Area 1 proposals may request up to $600,000 for up to three years. Focus Area 2 proposals may request up to $1,000,000 for up to three years. Anticipated Funding Amount: $10,000,000

Letter of Intent: Not Required

Full Proposal Submission Due Date: June 14, 2016

Contacts:

- Jack Brassil, Program Director, CISE/CNS, telephone: (703) 292-8041, email: jbrassil@nsf.gov
- Bruce Kramer, Program Director, ENG/CMMI, telephone: (703) 292-5348, email: bkramer@nsf.gov
- Wendy Nilsen, Program Director, CISE/IIS, telephone: (703) 292-2568, email: wnilsen@nsf.gov

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Grant Program: Small Business Innovation Research Program Phase I (SBIR)
Agency: National Science Foundation NSF 16-554
RFP Website: http://www.nsf.gov/pubs/2016/nsf16554/nsf16554.htm

Brief Description: The Small Business Innovation Research (SBIR) Program is intended to stimulate technological innovation in the private sector by strengthening the role of small business concerns in meeting Federal research and development needs, increasing the commercial application of federally supported research results, and fostering and encouraging participation by socially and economically disadvantaged and women-owned small businesses.

The SBIR/STTR program solicits proposals from the small business sector consistent with NSF's mission. The program is governed by Public Law 112-81 (SBIR/STTR Reauthorization Act of 2011). SBIR/STTR policy is provided by the Small Business Administration (SBA) through the SBA Policy Directive. A main purpose of the legislation is to stimulate technological innovation and increase private sector commercialization. The NSF SBIR/STTR program is therefore in a unique position to meet both the goals of NSF and the purpose of the SBIR/STTR legislation by

transforming scientific discovery into both social and economic benefit, and by emphasizing private sector commercialization.

Accordingly, NSF has formulated broad solicitation topics that conform to the high-technology investment sector's interests. The topics are detailed on the SBIR/STTR website.

Note: The submission of the same project idea to both this SBIR Phase I solicitation and the concurrent STTR Phase I solicitation is strongly discouraged.

Awards: Anticipated Funding Amount: $45,000,000

Letter of Intent: Not Required

Full Proposal Deadlines: June 16, 2016

Contacts:

- Peter Atherton, Information Technologies (IT), telephone: (703) 292-8772, email: patherto@nsf.gov
- Prakash Balan, Chemical and Environmental Technologies (CT), telephone: (703) 292-5341, email: pbalan@nsf.gov
- Steven Konsek, Semiconductors (S) and Photonic (PH) Devices and Materials, and Internet of Things (I), telephone: (703) 292-7021, email: skonsek@nsf.gov
- Glenn H. Larsen, Educational Technologies and Applications (EA), telephone: (703) 292-4607, email: glarsen@nsf.gov
- Rajesh Mehta, Advanced Manufacturing and Nanotechnology (MN), telephone: (703) 292-2174, email: rmehta@nsf.gov
- Muralidharan S. Nair, Electronic Hardware, Robotics and Wireless Technologies (EW), telephone: (703) 292-7059, email: mnair@nsf.gov
- Ben Schrag, Advanced Materials and Instrumentation (MI), telephone: (703) 292-8323, email: bschrag@nsf.gov
- Ruth M. Shuman, Biological Technologies (BT), telephone: (703) 292-2160, email: rshuman@nsf.gov
- Jesus V. Soriano, Smart Health (SH) and Biomedical (BM) Technologies, telephone: (703) 292-7795, email: jsoriano@nsf.gov

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Grant Program: Small Business Technology Transfer Program Phase I (STTR)
Agency: National Science Foundation NSF 16-555

RFP Website: http://www.nsf.gov/pubs/2016/nsf16555/nsf16555.htm

Brief Description: NSF's STTR program provides non-dilutive funds for early-stage research and development (R&D) at small businesses. This R&D should be based on innovative, transformational technology with potential for substantial commercial and/or societal benefits. The program invites proposals from small businesses across a broad range of science and engineering disciplines in collaboration with researchers at universities, Federally-Funded Research and Development Centers, and other non-profit institutions. If you are successful, you will receive a grant of up to $225,000 for a 6-12 month development/ feasibility project. You can then compete for a second grant of up to $750,000 over a 2 year period, with the aim of advancing the technology toward commercial deployment.

The award duration is 6-12 months. STTR Phase I awards previously had a duration of 12 months. Proposers will indicate their requested duration on the Cover Sheet of the proposal.

NSF encourages proposals from a diversity of entrepreneurs – new and seasoned. What is most important is that you have a transformative idea or innovation and that your team's primary goal is the commercialization of the technology. Having no commercialization track record will not count against you – for many companies, an NSF STTR award is their first attempt at commercializing an innovation.

The NSF STTR Program is particularly interested in proposals that focus on clean energy technology including energy sources that are renewable or otherwise alternatives to traditional fossil fuels such as geothermal, solar wind, biomass, nuclear, methane and emerging sources such as water power. The program is also interested in technologies that help improve energy efficiency or reduction in energy consumption such as building efficiency, more effective distribution of electricity, and vehicle technologies that improve engine efficiency or fuel economy.

Small businesses that will be working with a research institution may also consider the Small Business Innovation Research (SBIR) program. SBIR is similar to STTR. In fact, the programs are discussed in tandem at several points throughout this solicitation and on the SBIR/STTR website. However SBIR has a separate, concurrent Phase I solicitation with a similar due date. Several important differences between SBIR and STTR are outlined on the SBIR/STTR website.

Video resources on the SBIR/STTR website provide a general program description, solicitation-specific information, and helpful proposal preparation advice. A follow-up series of Q&A webinars hosted by SBIR/STTR Program Directors will be held in the months leading up to the deadline date. Links to register for the Q&A sessions will be posted on the SBIR/STTR website.

Required Registrations. Start Now - ***These registrations take time, and if left to the last minute could jeopardize your proposal submission!*** Register the same information in the same way in each of these systems to avoid troubles later. See the Additional Eligibility section for more details.

- Dun and Bradstreet Data Universal Numbering System (DUNS)
- System for Award Management (SAM)
- Small Business Administration (SBA) Company Registry
- NSF FastLane - register company and Principal Investigator (PI)

Please note that STTR Phase I awardees may now submit a proposal for a Phase II award under the Small Business Innovation Research (SBIR) Program (see NSF 14-103 for more information).

Note: The submission of the same project idea to both this SBIR Phase I solicitation and the concurrent STTR Phase I solicitation is strongly discouraged.

Awards: Anticipated Funding Amount: $11,250,000

Letter of Intent: Not Required

Full Proposal Deadlines: June 20, 2016

Contacts:

- Peter Atherton, Information Technologies (IT), telephone: (703) 292-8772, email: patherto@nsf.gov
- Prakash Balan, Chemical and Environmental Technologies (CT), telephone: (703) 292-5341, email: pbalan@nsf.gov
- Steven Konsek, Semiconductors (S) and Photonic (PH) Devices and Materials, and Internet of Things (I), telephone: (703) 292-7021, email: skonsek@nsf.gov
- Glenn H. Larsen, Educational Technologies and Applications (EA), telephone: (703) 292-4607, email: glarsen@nsf.gov
- Rajesh Mehta, Advanced Manufacturing and Nanotechnology (MN), telephone: (703) 292-2174, email: rmehta@nsf.gov
- Muralidharan S. Nair, Electronic Hardware, Robotics and Wireless Technologies (EW), telephone: (703) 292-7059, email: mnair@nsf.gov
- Ben Schrag, Advanced Materials and Instrumentation (MI), telephone: (703) 292-8323, email: bschrag@nsf.gov

- Ruth M. Shuman, Biological Technologies (BT), telephone: (703) 292-2160, email: rshuman@nsf.gov
- Jesus V. Soriano, Smart Health (SH) and Biomedical (BM) Technologies, telephone: (703) 292-7795, email: jsoriano@nsf.gov

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National Institutes of Health

Grant Program: Emerging Questions in Cancer Systems Biology (U01)
Agency: National Institutes of Health PAR-16-131
RFA-CA-15-014 U54 Specialized Center- Cooperative Agreements
RFA-CA-15-015 U24 Resource-Related Research Projects – Cooperative Agreements
RFP Website: http://grants.nih.gov/grants/guide/pa-files/PAR-16-131.html
Brief Description: Research strategies that can integrate across molecular, genetic, and cellular events are required to understand the multivariate nature of cancer and to predict tumor behaviors, efficient treatment opportunities, and, ultimately, patient outcome. Cancer systems biology approaches provide the iterative experimental and analytical toolkit necessary for addressing complex problems in cancer research. Through development of measurement technologies, generation of rich datasets, and employment of computational, mathematical, and algorithmic tools, cancer systems biologists have made important strides in describing cancers as integrated systems of genes, networks, and intercellular interactions. Cancer systems biology is uniquely poised to address various important and/or emerging questions in cancer research that would be difficult, if not impossible, to explore fully using other, less comprehensive approaches.

Along with general cancer-related topics such as the heterogeneous nature of tumors and the widely variable genetic underpinnings of cancer, there are a variety of emerging directions in cancer research that are particularly amenable to a systems approach: (a) decoding dynamic tumor-stroma and/or tumor-immune system interactions; (b) integrating chemical, molecular, structural, network, and localization information across temporal and spatial scales to understand tumor behavior; (c) understanding how individual cell states shape the behavior of tumors and tumor ecosystems; (d) determining how the microbiome affects tumor initiation, progression or treatment; (e) forward engineering of cancer systems through the convergence of synthetic biology and systems biology; (f) bridging the many cancer hierarchies; and (g) utilizing cancer systems biology predictions to inform clinical trial design.

In addition to addressing specific biological hypotheses, the continued success of cancer systems biology depends on the development of new methodologies to address complex and multivariate questions, including new theoretical, mathematical and computational techniques, multi-scale modeling approaches capable of integrating across scales from the molecular to the population level, and new biological tools and systems for informing and testing cancer systems biology generated hypotheses.

Scope and Objectives of CSBC Research Projects

Applicants responding to this FOA should propose only one single, cohesive project that is based upon a systems biology approach to cancer research. This approach should include explicit integration of experimental biology and computational or mathematical modeling to build, test and/or validate hypotheses or ideas.

The following examples list cancer areas that are appropriate for this FOA and poised to benefit from a cancer systems biology approach. Note that the list is non-inclusive and is not meant to restrict the scope of investigator-initiated research topics.

- *Dynamics of cell-cell interactions:* The reciprocal relationship between cancer cells, the host immune system and the tumor microenvironment evolves during cancer progression. How these dynamic and unstable interactions prevent or drive tumor initiation and progression is not well understood. Projects may focus on predictive and testable hypotheses of how dynamic cell-cell (tumor-tumor, tumor-immune, tumor-stroma, immune-stroma, etc.) communication affects cancer processes (e.g. cancer development and progression, tumor evolution and/or response to therapy).
- *Integration of information across temporal and spatial scales:* State-of-the-art quantitative measurement technologies have facilitated collection of chemical, molecular, structural, interactome, and localization data within and across cell populations in the tumor microenvironment. Systems analyses and network reconstruction using single scale data (i.e. gene, mRNA, protein, metabolite, cell) do not necessarily predict behavior at another scale and translating information across space and time remains a challenge. Therefore, research projects addressing how information networks and mechanistic insights at one scale coordinate, integrate, and/or translate into tumor behaviors at lower or higher scales are warranted.
- *Tumor behaviors reflecting single cell characteristics:* Advanced quantitative single-cell measurement technologies at the genomic, epigenomic, transcriptomic and protein level of individual cells have provided significant insights into tumor heterogeneity and clonal evolution during tumor initiation, development, and adaptation in response to therapy. However, how single cells or single clones contribute to tumor biology is not well understood. Proposed research projects may attempt, for example, to explain how variations in single cell or single clone molecular characteristics or network dependencies contribute to immune system modulation or microenvironmental remodeling.
- *Systems-level analyses of the role of the microbiome in cancer:* How the human microbiota contributes to the pathogenesis of specific cancers likely reflects the interplay among the microbiome, other environmental exposures (i.e. diet, drugs, co-infection), and the underlying host genetic and/or phenotypic heterogeneity. Efforts are warranted towards mechanistic models of host-microbiome interaction in tumor initiation, progression, or treatment. For instance, Research Projects may incorporate microbe-associated peptides, ligands, or small molecules into cancer systems biology models that predict host cell survival, death or response to treatment. In addition to other mechanistic studies, systems models that address the adaptive capabilities of the microbiota to alter their host niche (e.g. microbe regulation of inflammasome signaling in intestinal epithelial cells) are encouraged.
- *The combination of systems and synthetic biology for understanding disease mechanisms in cancer:* Multivariate systems biology model predictions could be tested using synthetic biology approaches that engineer multiple controllable cellular components. Research Projects may focus on the development and/or employment of synthetic biology tools (such as engineered circuits, networks, cells) for the purposes of populating, training, or testing cancer systems biology models. Projects utilizing cancer systems biology approaches to inform synthetic biology tool design for the ultimate purpose of studying the mechanism of cancer-related processes are also encouraged. Studies should be completed in cancer-relevant experimental models, such as cancer cell lines, genetically engineered animal models, or patient-derived xenografts.
- *Hierarchical models of cancer:* In addition to integrating data across molecular, genetic, protein and cellular scales, systems biology approaches could be utilized to bridge and/or inform models at the organ, patient, and population level. Examples include using

mechanistic systems biology predictions to inform pharmacokinetic models in patients or utilizing computational, mathematical or statistical formalisms to bridge a mechanistic systems biology model at one scale and a population-level model at the other. Applicants may propose projects to address technical challenges involved in linking models and data across these cancer-related hierarchical scales.

- *Systems biology aided clinical trial design:* Precision medicine requires integrating patient-specific characteristics with knowledge gained in pre-clinical studies, such as, but not limited to, differences in multicellular or multiclonal drug response, staggered temporal dosing schedules, and/or dynamic prediction of effective combination therapies. Research projects that utilize systems biology approaches and culminate in informing clinical trial designs (to be supported under another mechanism) are appropriate under this FOA. For example, projects might utilize cancer systems biology approaches to perform *in silico* clinical trials whose outcome determines optimal patient populations for clinical trials.

Awards: Application budgets are not limited but need to reflect the actual needs of the proposed project.
Letter of Intents: 30 days prior to the application due date.
Deadline: June 24, 2016; November 18, 2016; June 23, 2017; November 24, 2017; June 22, 2018; November 23, 2018, by 5:00 PM local time of applicant organization. All types of applications allowed for this funding opportunity announcement are due on these dates.
Applicants are encouraged to apply early to allow adequate time to make any corrections to errors found in the application during the submission process by the due date.

Grant Program: Development of Animal Models and Related Biological Materials for Research (R21)
Agency: National Institutes of Health PA 16-141
RFP Website: http://grants.nih.gov/grants/guide/pa-files/PA-16-141.html
Brief Description: This funding opportunity announcement (FOA) encourages highly innovative research to develop, characterize or improve animal models and related biological materials for human health and disease or to improve diagnosis and control of diseases that might interfere with animal use for biomedical research.

Models and related biological materials to be considered must be applicable to the research interests of two or more categorical NIH Institutes/Centers (ICs). Applications to develop models that relate strictly to a specific disease or category of research will not be accepted and should be proposed to the appropriate categorical IC of the NIH. For example, investigators interested in models or model systems with a primary focus on heart disease or neurological disorders should contact the ICs most relevant to these topics. Furthermore, applications proposing studies that are related predominantly to the interest of one IC and only peripherally to the interests of other ICs are not acceptable. Another example of an inappropriate request is one exclusively involving an animal model of cancer.

Investigators considering applying are strongly encouraged to consult with ORIP program staff (see Scientific/Research Contacts in Section VII. Agency Contacts) as early as possible to be advised whether their research plans are appropriate for this FOA.

Research Objectives

The translation of basic biomedical knowledge to prevention or treatments of human diseases often requires the use of animals, tissues, or cells as models. Such models provide valuable insights into the basic biology of disease, diagnosis and treatment in humans. Although much progress has been made in this area, further studies are needed to develop new animal

models that better recapitulate human disease phenotypes and to broaden the utility of these models for biomedical research, particularly precision medicine research. It should be emphasized that measurable animal phenotypes, which may be different from, but related to, particular human disease conditions, can be very valuable for understanding the etiology of disease or for testing potential therapies. Moreover, these models should be more predictable, accessible, useable and more widely applicable for biomedical research.

The objective of this FOA is to stimulate novel areas of investigation related to model systems, which must fall within the categorical interests of two or more ICs of the NIH. Model systems include both mammalian and non-mammalian species, cell/tissue culture systems and integrative informatics models. Examples of such research include, but are not limited to,

A. New or Significantly Improved Genetically Modified Animal Models for Human Disease: The models should facilitate studying mechanisms of diseases and developing therapeutic interventions. Of particular interest are models for studying mutations identified from genome sequencing efforts in humans, synthetic biology models for translational research and models for investigating tissue homeostasis and systems defects.

B. Development of Novel Tools for Producing and Improving Animal Models: Of particular interest are genome editing tools, such as CRISPR/Cas9 and related systems, synthetic biology tools and genetically encoded probes (reporters). Preference will also be given to tools for high resolution single cell analysis and effective high-throughput screens for phenotypes. High throughput screens for single diseases or disease categories are not appropriate to this FOA.

C. Characterization of Animal Diseases: Within the scope of this FOA are new methodologies to detect, characterize, and control emerging and re-emerging pathogens that interfere with the development and use of animal models for human diseases. Of special interest are pathogens that affect animal repositories supported by the NIH.

D. Preservation of Model Systems: Of particular interest are reproductive biology projects designed to develop and improve methods for producing transgenic and genetically identical animals and for cryopreservation of biological materials, including germplasm.

E. Complementary Approaches to the Use of Whole Animals: Appropriate projects should simulate physiological and pathophysiological processes and capture the complex dynamics of interacting molecules, cells, tissues and organs outside of the organism. The goal is to maximize the predictability value of those models and to validate new in silico biosimulation models. Of particular interest are new experimental models of human disease, such as animal tissue-on-chip.

F. Informatics Tools for Mapping Molecular Interactive and Functional Networks: Urgent needs are new tools that incorporate comparative animal models for mapping physical protein-protein interaction networks, metabolic and signaling pathways and gene regulatory networks affected in human disease conditions.

G. Strategies to Increase Quality and Reliability of the Pre-Clinical Data Using Animal Models: Proposed studies can include improved statistical methods, advanced outcome assessment and approaches to improve internal validity of animal experiments. Of specific interest are projects aimed at understanding interspecies differences between animals and humans that improve predictability of animal models.

H. Animal Models to Study the Impact of Microbiota, Viruses, Fungi and Protozoa Residing in Animals or Humans on Human Health and Disease: Preference will be given to models for microbiome research aimed at understanding mechanisms of the causal effects of microbiota on human health and diseases and addressing reproducibility of animal models in biomedical research. Appropriate models also include those for studies of the virome with

diverse commensal and pathogenic viruses and the eukaryome with a repository of eukaryotes, such as fungi and protozoa.

I. Animal Models for Investigating Environmental Factors on Human Health and Disease: Of special interest are animal models for understanding how environmental factors, such as diet, stress and social interaction, modulate epigenetic signatures of key disease causing genes and affect predictability and reproducibility of animal studies.

J. Fundamental Biology of Animal Models: Of particular interest are projects to investigate basic aspects of animal models, including genetics, physiology and behavior. The intent should be to compare animal models with analogous disease-related systems in humans and to improve predictability and reproducibility of animal studies.

K. Development and Refinement of Animal Models for Newly Emerging Human Pathogens: Only newly emerging human pathogens with the potential to cause a global health threat will be considered for animal model development for this FOA.

Awards: No more than $200,000 direct costs may be requested in any single year. The combined budget may not exceed $275,000 direct costs for the two year project period.

Letter of Intents: Not required.

Deadline: Standard dates apply, by 5:00 PM local time of applicant organization. All types of non-AIDS applications allowed for this funding opportunity announcement are due on these dates.

Applicants are encouraged to apply early to allow adequate time to make any corrections to errors found in the application during the submission process by the due date.

Grant Program: High Impact, Interdisciplinary Science in NIDDK Research Areas (RC2)
Agency: National Institutes of Health PAR-16-126

RFP Website: http://grants.nih.gov/grants/guide/pa-files/PAR-16-126.html

Brief Description: The mission of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) is to conduct and support medical research and research training and to disseminate science-based information on diabetes and other endocrine and metabolic diseases; digestive diseases, nutritional disorders, and obesity; and kidney, urologic, and hematologic diseases, to improve people's health and quality of life. To that end, the NIDDK, through extramural grants programs of its Programmatic Divisions, supports a broad range of biomedical research. Previous research has enormously increased our understanding of the molecular, cellular and behavioral bases of disease and our approaches to health care. The most recent advances in technology and science create numerous opportunities for the public and private sectors to accelerate discoveries for the prevention, diagnosis and treatment of disease. The high complexity of the technologies and data systems required for this type of research, and the requirements for large interdisciplinary teams significantly limit progress and prevent private sector investments and expansions.

The purpose of the High Impact, Interdisciplinary Science grants program is to support high impact ideas that may lay the foundation for new fields of investigation within the mission of NIDDK. The interdisciplinary approach encouraged by this FOA could be used to generate a research resource for the broader community, which may include discovery-based or hypothesis-generating science. The interdisciplinary research team should be able to provide an integrative plan of working together to effectively address the complex challenge at hand. This program will support research projects that accelerate critical breakthroughs, early and applied research on cutting-edge technologies, and new approaches to improve the synergy and interactions among multi and interdisciplinary research teams. This FOA seeks novel approaches in areas that address specific knowledge gaps, scientific opportunities, new

technologies, data generation, or research methods that will advance the area in significant ways designed to accelerate scientific progress in understanding, treatment and prevention of diseases within the mission of NIDDK.

Scope and Specific Requirements

The scope of this FOA includes, but is not limited to, the following:

- Groundbreaking, innovative, high impact and cross-cutting research projects that will improve and accelerate biomedical research.
- Basic, clinical and translational projects that could fundamentally enhance the research enterprise and that require the participation, interaction, coordination and integration of activities carried out in multiple research laboratories.
- Creation of large scale unique resources, accelerated application of high throughput, and other novel technologies.
- Deployment of critical infrastructure, resources, tools, and methodologies that substantially accelerate collaborative, multi and interdisciplinary basic, translational, and/or clinical research.
- Implementation of large scale research projects that are carried out using new and creative collaborative agreements and partnerships.
- Discovery-based and hypothesis-generating science.
- Creative approaches to overcome barriers to basic, translational, or clinical research using novel tools, technologies, and services.

RC2 projects are ***not intended to support:***

- Traditional investigator-initiated and highly focused studies (best supported by the R01 or P01 mechanisms).
- Research that is a logical extension of ongoing work.
- Core (or related) services to supplement the budgets of existing R01-type efforts.
- Groups of investigators at the same institution who would normally interact and collaborate in the absence of a collaborative grant.

Prior Consultation with NIDDK

Consultation with NIDDK staff at least **3 months (and preferably 6 months)** prior to the application due date (including resubmission applications) is strongly encouraged for submission of the High Impact, Interdisciplinary Science in NIDDK Research (RC2) application. If requested, NIDDK staff will consider whether the proposed RC2 meets the goals and mission of the Institute; whether it addresses one or more high priority research areas; and whether the application is best fit to the RC2 activity code. NIDDK staff will not evaluate the technical and scientific merit of the proposed project; technical and scientific merit will be determined during peer review using the review criteria indicated in this FOA. During the consultation phase, if the proposed project does not meet NIDDK's programmatic needs or is not appropriate for this FOA, applicants will be strongly encouraged to consider other Funding Opportunities.

Awards: The number of awards is contingent upon NIH appropriations and the submission of a sufficient number of meritorious applications.

Letter of Intents: Six weeks prior to the application due date.

Deadline: June 1, 2016; November 1, 2016; June 1, 2017; November 1, 2017; June 1, 2018; November 1, 2018, by 5:00 PM local time of applicant organization. All types of non-AIDS applications allowed for this funding opportunity announcement are due on these dates.

Applicants are encouraged to apply early to allow adequate time to make any corrections to errors found in the application during the submission process by the due date.

Department of Defense/US Army/DARPA/ONR

Grant Program: Fiscal Year 2017 Defense University Research Instrumentation Program (DURIP)
Agency: AFOSR - Department of Defense AFOSR PA-AFRL-AFOSR-2016-0001
RFP Website: http://www.arl.army.mil/www/pages/8/2016_DURIP_Ann.pdf
Brief Description: The Department of Defense (DoD) announces the Fiscal Year 2017 Defense University Research Instrumentation Program (DURIP). DURIP is designed to improve the capabilities of accredited United States (U.S.) institutions of higher education to conduct research and to educate scientists and engineers in areas important to national defense, by providing funds for the acquisition of research equipment or instrumentation. For-profit organizations are not eligible for DURIP funding. This announcement seeks proposals from universities to purchase equipment and instrumentation in support of research in areas of interest to the DoD. DoD interests include the areas of research supported by the Army Research Office (ARO), the Office of Naval Research (ONR), and the Air Force Office of Scientific Research (AFOSR), hereafter generally referred to collectively as "we, our, us, or administering agency." Each administering agency will make grant awards to fund the purchase of research equipment or instrumentation costing $50,000 or more that cannot typically be purchased within the budgets of single-investigator awards. We generally cannot make any individual award that exceeds more than $1,500,000 in DoD funding unless your proposal qualifies for an exception. We intend to award approximately $47 million this competition, subject to availability of funds. DURIP awards are typically one year in length. DURIP is part of the University Research Initiative (URI). All the application forms you need are available electronically on Grants.gov. We will not provide paper copies of this announcement, or accept paper applications. All applications must be submitted electronically through Grants.gov.
Awards: Up to $1,500,000.
Deadline: Aug 26, 2016 Your proposal must be received no later than Friday, August 26, 2016 at 11:59 PM Eastern Daylight time to be considered INQUIRIES AND QUESTIONS DEADLINE Friday, August 12, 2016.

NASA

Grant Program: Research Opportunities in Space and Earth Sciences 2016 (ROSES–2016) Modeling, Analysis, and Prediction
Agency: NASA NNH16ZDA001N MAP
RFP Website:
https://nspires.nasaprs.com/external/solicitations/summary.do?method=init&solId=%7B833743BB-BD03-297F-58B4-66942F9EC3C9%7D&path=open
Brief Description: NASA's Science Mission Directorate (SMD) supports a broad portfolio of research in the Earth Science Research Program. Key questions that drive the core research efforts of the Earth Science Division within SMD include:

- How is the Earth system changing?
- What are the sources of change in the Earth system and their magnitudes and trends?
- How will the Earth system change in the future?
- How can Earth system science improve mitigation of and adaptation to global change?

Within Earth Science Research, the Modeling, Analysis, and Prediction (MAP) program seeks to develop an understanding of the Earth as a complete, dynamic system. In order to accomplish

this objective, the program funds the development of comprehensive, physically-based models of the Earth system, observation/model syntheses, and supporting research.

The modeling and data assimilation supported by the MAP program is observation-driven. That is, the direction of the modeling/assimilation work is guided by available and anticipated observations and its goal is to extract from the observations as much value as possible. This involves rigorous examination and utilization of observations in a global Earth system context. The modeling integrates across all the research activities in NASA's Earth science research program, and spans and connects the spatial and temporal scales that characterize satellite observations and observations from ground and air based campaigns. This approach facilitates the validation of the satellite observations and observationally-based improvements of Earth system model components, leading to models that accurately represent the Earth system with diagnostic and predictive skill. MAP strives to generate models and model components that are well documented, thoroughly evaluated, interoperable, robust, and consistent with current coding standards and practices.

The approximate number of proposals MAP expects to fund in each area are listed in parenthesis.

- Clouds in Earth System Models: Representations of clouds and cloud systems in Earth system models (ESMs), particularly global ESMs, remain a large source of uncertainty. This situation is exacerbated by efforts to increase resolution in models toward the cloud- permitting regime, where parameterized and explicitly represented cloud processes can coexist. Proposals addressing cloud processes and their representation in ESMs are requested. Topics of special interest include proposals to improve the representation of low clouds in ESMs, which are important to climate sensitivity, and deep convective clouds and their role in the water cycle. MAP also seeks proposals to investigate the role played by clouds in driving atmospheric circulation patterns, connecting across length scales from local to regional to global. Studies which outline a path to implementable improvements in current model representations of clouds and cloud-related processes or new parameterizations are requested, including the cloud-permitting length scales and nonhydrostatic assumptions. (~6 proposals)
- Advanced Methods for Model Evaluation: Evaluation of ESMs is complicated by the fact that simple comparisons of model variables to corresponding observations often do not identify the specific model process or processes that govern model/measurement discrepancies. Advanced diagnostic methods are needed and requested here which can identify deficiencies in specific processes and suggest a path for improved representation. Also, it is often the case that changes to modeled processes which improve the agreement between a modeled variable and a corresponding observation degrade the agreement in other situations and for other variables. Therefore, evaluation procedures which more comprehensively evaluate the representativeness of a model and can foster a more sophisticated and systematic approach to model improvements are requested. It is preferred that the diagnostics developed here be applied to NASA supported models or model output, including the Modern Era Retrospective-Analysis for Research and Applications 2 (MERRA2) reanalysis products. Preference will also be given to advanced diagnostics developed in support of the upcoming sixth Coupled Model Intercomparison Project (CMIP) exercise. Please also note the existence of a related element in appendix A.29, "NASA Data for Operation and Assessment," section 2.3.2, "Methodologies for Climate Model Improvement." (~3 proposals)
- Extremes in the Earth System: Extreme events such as hurricanes and other intense storms, floods and droughts, heat waves and outbreaks of intense cold can cause great damage and are the subject of much concern in the context of climate change. Key

questions are whether these extreme events are represented well in Earth system models, in terms of structure, intensity and frequency of occurrence. Proposals are solicited to evaluate the degree to which these phenomena and their impacts are properly represented in Earth system models and understand the interconnections in the Earth system which result in the extreme behavior. (~4 proposals)

- Constituents in the Climate System: Constituents in the atmosphere (aerosols and chemical species) will respond to climate change, and changes in constituent concentrations can have climatic consequences as well. A MAP program goal is to expand our understanding of the role of atmospheric constituents (aerosols and chemical species) in the context of the climate system, as well as utilization of constituent observations to better understand global processes and their model representation. Proposals are sought to understand the role of climate change on atmospheric constituent distributions, and the influences of constituent change on climate. This area includes proposals that address emissions parameterizations, specifically the development and implementation of physically-based interactive emissions parameterizations which can respond to climate change and other sources of variability in the Earth system. (~6 proposals)
- Coupling in the Earth System: A long-standing goal of the MAP program is developing an understanding of the Earth as a complete, dynamic system. Such an understanding would be reflected in Earth system models that accurately capture the couplings between its different interacting components. Therefore, investigations are solicited which lead to an improved understanding and representation of the interactions between different Earth system components - such as land-atmosphere, ocean-atmosphere, or the interaction of the cryosphere with other components. An additional important component of the MAP program related to coupling includes interaction of processes across spatial scales from local to global or short and long time scales. Proposals that address scale interactions are also solicited here. (~5 proposals)
- Assimilation: A long-term goal of the MAP program is the development of an Integrated Earth System Analysis (IESA) capability. IESA is the process of consistently combining all available observations of the Earth System (atmosphere, ocean, land surface, sea-ice, and biogeochemistry) at some time with a model of the Earth System in such a way to produce a best estimate of the state of the Earth System at that time. This capability is not currently available given the start-of-the-art in modeling the global Earth System and the high computational requirements necessary for such a task. This solicitation seeks proposals that are directed at addressing outstanding assimilation issues and methods for assimilating new NASA observations that are not currently assimilated in NASA data assimilation systems. (~4 proposals)
- Predictability in the Earth System: The MAP program has an interest in understanding the behavior and evolution of the Earth system on timescales spanning the weather timescale of hours to days up to multidecadal time periods. Prediction over these timescales switches from an initial value problem at the short time scales to a boundary value problem at the long end. Consequently, NASA currently is a partner in a multiagency activity with a stated goal of developing an "Earth System Prediction Capability" (ESPC), to improve our national capability for Earth system prediction (http://espc.oar.noaa.gov). Proposals specifically addressing prediction and predictability, preferably at subseasonal to interannual time scales, are requested in support of developing the ESPC. (~3 proposals)

Award: Available funds: $7,000,000.

Proposal Deadline: Notification of Intent Step 1: April 15, 2016; Proposal Due June 17, 2016

Grant Program: Research Opportunities in Space and Earth Sciences 2016 (ROSES–2016) Carbon Cycle Science
Agency: NASA NNH16ZDA001N CARBON
RFP Website:
https://nspires.nasaprs.com/external/solicitations/summary.do?method=init&solId={BDFEB327-957C-2DA8-CFB4-AABEA9A38D57}&path=open
Brief Description: This National Aeronautics and Space Administration (NASA) Research Announcement (NRA), Research Opportunities in Space and Earth Sciences (ROSES) –2016, solicits basic and applied research in support of NASA's Science Mission Directorate (SMD). ROSES is an omnibus NRA, with many individual program elements, each with its own due dates and topics. All together these cover the wide range of basic and applied supporting research and technology in space and Earth sciences supported by SMD.

Awards range from under $100K per year for focused, limited efforts (e.g., data analysis) to more than $1M per year for extensive activities (e.g., development of specialized science experimental hardware). The funds available for awards in each program element offered in this NRA range from less than one to several million dollars, which allow selection from a few to as many as several dozen proposals, depending on the program objectives and the submission of proposals of merit. Awards will be made as grants, cooperative agreements, contracts, and inter- or intraagency transfers, depending on the nature of the work proposed, the proposing organization, and/or program requirements. The typical period of performance for an award is three years, but some programs may allow up to five years and others specify shorter periods. Organizations of every type, domestic and foreign, Government and private, for profit and not-for-profit, may submit proposals without restriction on teaming arrangements. Note that it is NASA policy that all investigations involving non-U.S. organizations will be conducted on the basis of no exchange of funds.

Details of the solicited program elements are given in the Appendices of this NRA. Proposal due dates are given in Tables 2 and 3 of this NRA, which will be posted at http://nspires.nasaprs.com/ and for which links are provided below. Interested proposers should monitor http://nspires.nasaprs.com/ or subscribe to the SMD electronic notification system there for additional new program elements or amendments to this NRA through February 2017, at which time release of a subsequent ROSES NRA is planned. A web archive (and RSS feed) for amendments, clarifications, and corrections to ROSES-2016 will be available at: http://nasascience.nasa.gov/researchers/sara/grant-solicitations/roses-2016/. This NRA will be available upon its release at http://solicitation.nasaprs.com/ROSES2016.

Within DOE's Office of Science, the Climate and Environmental Sciences Division (CESD) seeks to advance a robust predictive understanding of Earth's climate and environmental systems and to inform the development of sustainable solutions to the nation's energy and environmental challenges (http://science.energy.gov/~/media/ber/pdf/CESD-StratPlan-2012.pdf). Among CESD's goals, the following three pertain to the Terrestrial Ecosystems Science (TES) program and to this solicitation:

- Develop, test, and simulate process-level understanding of terrestrial ecosystems.
- Advance fundamental understanding of coupled biogeochemical processes in complex subsurface environments to enable systems-level environmental prediction and decision support.
- Synthesize new process knowledge to advance next-generation, integrated models of the human-Earth system.

TES seeks to improve the representation of terrestrial ecosystem processes that in turn can be incorporated into the land component of Earth system models, thereby improving the quality of climate model projections and providing the scientific foundation needed to inform DOE's energy decisions. TES seeks to focus its research on ecosystems that are globally important, climatically sensitive, and comparatively understudied or underrepresented in Earth system models.
Award: Various.
Proposal Deadline: June 15, 2016.

National Endowment for The Humanities

Grant Program: Common Heritage
Agency: National Endowment for the Humanities 20160512-PY
RFP Website: http://www.neh.gov/grants/preservation/common-heritage
Brief Description: America's cultural heritage is preserved not only in libraries, museums, archives, and other community organizations, but also in all of our homes, family histories, and life stories. The Common Heritage program aims to capture this vitally important part of our country's heritage and preserve it for future generations. Common Heritage will support both the digitization of cultural heritage materials and the organization of public programming at community events that explore these materials as a window on a community's history and culture. The Common Heritage program recognizes that members of the public—in partnership with libraries, museums, archives, and historical organizations—have much to contribute to the understanding of our cultural mosaic. Together, such institutions and the public can be effective partners in the appreciation and stewardship of our common heritage. The program supports day-long events organized by community cultural institutions, which members of the public will be invited to attend. At these events experienced staff will digitize the community historical materials brought in by the public. Project staff will also record descriptive information—provided by community attendees—about the historical materials. Contributors will be given a free digital copy of their items to take home, along with the original materials. With the owner's permission, digital copies of these materials would be included in the institutions' collections. Historical photographs, artifacts, documents, family letters, art works, and audiovisual recordings are among the many items eligible for digitization and public commemoration. Projects must also present public programming that would expand knowledge of the community's heritage. Public programs could include lectures, panels, reading and discussion, special gallery tours, screening and discussion of relevant films, presentations by a historian, special initiatives for families and children, or comments by curators about items brought in by the public, workshops on preserving heritage materials, or other activities that bring humanities perspectives on heritage materials to wide public audiences. These public programs should provide a framework for a deeper understanding of the community members' shared or divergent heritage. The programs may take place before, during, and/or after the day of the digitization event. Applicants may but need not include in their proposals a topic around which the event and the public programming would be organized. Topics proposed for the public programming may also be proposed for the digitization event. The applicant institution must plan, promote, and organize the event and ensure that a wide range of historical materials can be digitized and also contextualized through public programming. Since the help of additional institutions and organizations in the community may be needed to accomplish this work, the applicant must take responsibility for enlisting appropriate organizations or institutions, such as local libraries and museums, to contribute to the project, as needed. NEH especially welcomes

applications from small and medium-sized institutions that have not previously received NEH support.
Award: $12,000
Proposal Deadline: May 12, 2016.
