# NJIT Research Newsletter

**Issue: ORN-2016-040**

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***NJIT Research Newsletter*** includes recent awards, and announcements of research related seminars, webinars, national and federal research news related to research funding, and ***Grant Opportunity Alerts***. The Newsletter is posted on the NJIT Research Website http://www.njit.edu/research/ . **This Newsletter features a new section on "Recent Patents".**

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## NJIT Office of Research
## Event Calendar
## Save the Date

### NJIT Faculty Research Advisory Board Meeting:
November 14, 2016; 12.00 PM – 1.30 PM; Ballroom B, Campus Center

### NJIT 2016 Research Centers and Laboratories Showcase:
November 17, 2016; 10.30 AM – 2.30 PM; Ballroom B, Campus Center
Agenda:
10.00 AM- 10.30 AM: Uploading of power-point files on individual tables
10.30 AM - 10.45 AM: Introductions and Welcome
10.45 AM - 12.00 PM: Keynote Talk and Q&A: Dr. Nora Savage, Program Director, Biological and Environmental Interactions of Nanoscale Materials, Chemical, Bioengineering, Environmental and Transport Systems (CBET) Division, NSF
12.00 PM - 12.30 PM: Lunch and Networking
12.30 PM - 2.30 PM: Poster Session and Networking

**Keynote Title: NSF– Nine Strategies for Funding**
**Abstract:** The development and use of nanotechnology could have a dramatic impact on our global society, due to the potential to substantially improve the characteristics and performance of a number of systems and commercial products. Potential applications include medical imaging and therapies, environmental restoration and protection, electronics, energy storage, generation and distribution, food protection and production and water remediation and conservation. The Biological and Environmental Interactions of Nanoscale Materials is focused on enabling these advances through the acquisition of fundamental scientific knowledge elucidating the mechanistic behavior of nanoparticles. As society moves away from passive employment of nanoparticles in composites and materials towards active devices and structures, embedded with intelligence, this understanding becomes increasingly important.

This presentation will provide a description of the National Science Foundation funding opportunities, highlighting the Biological and Environmental Interactions of Nanoscale Materials Program within the Chemical, Bioengineering, Environmental and Transport Systems (CBET) Division in the Engineering Directorate. Tips for successful proposals will be offered. Details about specific programs offered by the Foundation will be shared as well as opportunities to interact with NSF. In addition, information concerning the National Nanotechnology Initiative will be provided along with unique opportunities to engage with the National Nanotechnology Coordination Office.

**Speaker Biographical Sketch:** Dr. Nora Savage obtained her bachelor's degree in Chemical Engineering in 1992 from Prairie View A&M University located in Prairie View, Texas. She received two Masters Degrees (in Environmental Engineering and Environmental Science) from the University of Wisconsin-Madison, located in Madison, Wisconsin in1995, and a doctoral degree in Environmental Science from the same institution in 2000. Nora has worked for the U.S. federal government for almost twenty years. In this capacity she has served the environmental nanotechnology research community through her contributions to strategic research direction. Nora served as a Team Lead for nanotechnology within the Office of Research and Development within the U.S. Environmental Protection Agency. She currently serves as Program Director within the Engineering Directorate of the National Science Foundation.

Nora has authored and co-authored numerous articles on nanotechnology and emerging technologies in leading journals, including the Journal of Nanoparticle Research and Toxicological Sciences. She served as lead editor for the books "Emerging Technologies: Socio-Behavioral Life Cycle Approaches" and for "Nanotechnology for Water Applications") now in its second edition) and has contributed chapters to several other books, including the Oxford Handbook of Nanoscience and Technology, vol. III.

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## Grant Opportunity Alerts

Keywords and Areas Included in the Grant Opportunity Alert Section Below

**NSF: Long Term Research in Environmental Biology (LTREB); Algorithms for Threat Detection (ATD); Training-based Workforce Development for Advanced Cyberinfrastructure (CyberTraining);**
**NIH:** Systems Biology Approaches to Alzheimer's Disease Using Non-mammalian Laboratory Animals (R01); Common Mechanisms & Interactions Among Neurodegenerative Diseases (R01)
**Department of Defense/US Army/DARPA/ONR:** DoD USAMRMC FY17 Broad Agency Announcement for Extramural Medical Research; Biological Technologies
**Department of Energy:** PNDIODES
**NASA**: ROSES 2016: Solar System Working

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## Recent Research Grant and Contract Awards

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

**PI:** Zhi Wen (PI)
**Department:** Computer Science
**Grant/Contract Project Title:** Targeted Therapies in Melanoma
**Funding Agency:** NIH
**Duration:** 09/01/13-08/31/17

**PI:** Alexander Haimovich (PI)
**Department:** Electrical and Computer Engineering
**Grant/Contract Project Title:** GMTI by Multi-platform Airborne Distributed MIMO Radar
**Funding Agency:** Matrix Research Inc.
**Duration:** 08/31/15-12/31/17

**PI:** Wen Zhang (PI)
**Department:** Civil and Environmental Engineering
**Grant/Contract Project Title:** I-Corps: Multifunctional Ceramic Reactive Electrochemical Membrane Filtration
**Funding Agency:** NSF
**Duration:** 08/29/16-03/18/17

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## Recent NJIT Patents

### NEW PATENTS ISSUED: July 1, 2016 – September 30, 2016

**Title:** TCDA/ZINC OXIDE NANOCOMPOSITES AND FILM SENSORS
**Inventors:** Federici, John / Iqbal, Zafar / Wu, Aide
**US Patent: 9,428,685** Issued on 8/30/16
**Abstract:** Novel TCDA/ZnO compositions in which the ZnO particles have an average particle size less than 100 nm are disclosed. Reversible thermochromatic sensors employing the TCDA nanocomposites and methods of printing TCDA/ZnO nanocomposite thin films forming the reversible thermochromatic sensors using inkjet printing techniques are also disclosed.

**Title:** METHODS AND APPARATUS FOR THE NON-DESTRUCTIVE MEASUREMENT OF DIFFUSION IN NON-UNIFORM SUBSTRATES
Inventors: Federici, John F
**US Patent: 9,389,172** Issued 7/12/2016
**Abstract:** Non-invasive THz spectroscopic apparatus and methods are provided for measuring the average diffusion coefficients for a structure such as cork. The methods may be used to image the localized presence of water in the structure to produce time-dependent images of liquid propagation in the structure.

**Title:** DETERMINATION OF DOWNLOAD THROUGHPUT OF WIRELESS CONNECTION WITH COMPOUND PROBES
**Inventors:** Rojas-Cessa, Roberto / Salehin, Khondaker
**US Patent: 9,392,475** Issued 7/12/2016
**Abstract:** Technologies are generally described to determine a download throughput of a wireless connection in an environment hosting multiple wired and wireless connections. According to some examples, a compound probe may be transmitted from a source to a wireless destination. Another compound probe may also be transmitted from the source to the wireless destination. The compound probes may include multiple packets without any dispersion gap. Next, an average intra-packet gap (AIPG) and a minimum intra-packet gap (MIPG) may be determined from the first compound probe. Furthermore, another MIPG may be determined from the later compound probe. The download throughput from the source to the wireless destination may be computed from the AIPG and the MIPGs.

**Title:** SYSTEM AND METHOD FOR FACILITATING USER-GENERATED CONTENT RELATING TO SOCIAL NETWORKS [Jones, Quentin, Ricken, Stephen / Laws, Nathaniel
**US Patent: 9,424,549** Issued 8/23/2016.
**Abstract:** A system and method for facilitating user-generated content relating to social networks are provided. The system provides an online environment which poses questions to users, and which allows the users to answer such questions by identifying appropriate contacts of the user. The system automatically identifies the user's contacts by consulting one or more electronic accounts of the user on one or more social networking sites/services, and/or one or more e-mail accounts. The user can respond to questions posed by clicking on appropriate contacts, dragging them, and dropping them in an answer area in the online environment. The user can manage his/her contacts by creating one or more groups and/or tags associated with each contact. The grouped/tagged contacts can be imported into a contact management system, and can be used by researchers to conduct social network visualizations or to achieve other research objectives.

**Title:** NEW POLYESTERS ETHERS DERIVED FROM ASSYMETRICAL MONOMERS BASED UPON BISANHYDROHEXITOLS
**Inventors:** East, Anthony / Jaffe, Michael / Hammond, Willis / Feng, Xianhong
**US Patent: 9,447,230** Issued on 9/20/2016
**Abstract:** A process for producing a copolyester through the production of an AB monomer of isoidide - Isodide 2-(4-carbomethoxyphenyl) ether. In certain aspects, the AB monomer is produced by performing the steps of: protecting the 2-position of isosorbide with a protecting group; functionalizing the 5-position of isosorbide with a suitable leaving group to form a reactive ester; nucleophilicly displacing the leaving group in a reaction with an alkali metal alkoxide or phenoxide to give an isoidide ether through a stereochemical inversion of the 5-position; and removing the protective moiety to create the AB monomer. In certain embodiments, the copolyester is produced by melting the AB monomer and a polyester, optionally with a catalyst.

**Title:** SYSTEMS AND METHODS FOR SUPERDISINTEGRANT-BASED COMPOSITE PARTICLES FOR DISPERSION AND DISSOLUTION OF ACTIVE PHARMACEUTICAL AGENTS
**Inventors:** Ecevit, Bilgili / Bhakay, Anagha / Azad, Mohammad / Dave, Rajesh
**US Patent: 9,452,107** Issued on 9/27/2016
**Abstract:** The present disclosure provides improved systems and methods utilizing colloidal/ultrafine superdisintegrant-based composite particles for dispersion and/or dissolution of active pharmaceutical agents. In general, the present disclosure utilizes a surfactant-free or near surfactant-free formulation by incorporating a wet milled SDI as a dispersant in the formulation. As such, the present disclosure provides for the preparation of surfactant-free or substantially surfactant-free formulations (e.g., nano-composite micro-particle formulations) by incorporating a wet-milled superdisintegrant (SDI) as the dispersant in the formulations. The advantageous SDI particles (e.g., colloidal/ultrafine SDI particles) of the present disclosure can be used to break-up the aggregates (e.g., nanoparticle aggregates) of the active agents (e.g. poorly water-soluble drugs) in the formulations (e.g., micro-particle formulations) and enhance the recovery of the nanoparticles of active agents during aqueous re-dispersion and their dissolution rate in vitro and in vivo.

**Title:** SYSTEM AND METHOD FOR CONTINUOUS POLYMER COATING OF PARTICLES
**Inventors:** Sirkar, Kamalesh / Chen, Dengyue / Singh, Dhananjay / Pfeffer, Robert
**US Patent: 9,452,930** Issued on 9/27/2016

**Abstract:** The present disclosure relates to the field of polymer coating. The present disclosure provides improved systems and methods for continuous polymer coating of particles (e.g., nanoparticles). The present disclosure provides for a solid hollow fiber cooling crystallization (SHFCC) technique to continuously coat the nanoparticles with polymer. In certain embodiments, the present disclosure embraces continuous coating of particles from about 1 nm to about 10 microns. A polymer solution containing a suspension of submicron particles flows in the lumen of a solid polymeric hollow fiber, and controlled cooling of the polymer solution allows for polymer nucleation on the surface of the particles, and the precipitated polymer forms a thin film around the particles (the thickness of which can be varied depending on the operating conditions). The systems, methods and assemblies of the present disclosure are easily adaptable for coating nano-sized drug particles as well.

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## In the News…

(National and Federal News Related to Research Funding and Grant Opportunities)

**Intelligence Advanced Research Projects Activity (IARPA):** The Intelligence Advanced Research Projects Activity (IARPA) is seeking information on using genetic information to predict facial structure phenotype. This request for information (RFI) is issued solely for information gathering and planning purposes; this RFI does not constitute a formal solicitation for proposals. The following sections of this announcement contain details of the scope of technical efforts of interest, along with instructions for the submission of responses.

DNA is used by multiple components of the United States (U.S.) government for identifying individuals, detecting and diagnosing medical conditions, and for determining family relationships. Depending on the circumstances, DNA samples can be obtained through consent from a witting individual, or they can be forensically recovered from left behind cells. All cells (e.g., skin, hair, blood, saliva, etc.) contain DNA. In support of scenarios where a forensic DNA sample is recovered from an unknown person, IARPA would like to investigate using genetic DNA phenotyping to provide investigative or intelligence leads for identifying the person by providing a possible face structure and appearance of the unknown person. Advancements in genetic phenotyping suggests the possibility of predicting a human's facial structure or other attributes from DNA sequences. IARPA is interested in knowing whether single nucleotide polymorphisms (SNP) yield sufficient information for making such prediction or if the whole genome sequence is required. If it is possible to develop a robust genotype to phenotype face prediction model, additional information will be required to determine the required sample size of the training dataset. The DNA training dataset would be used for developing the technology or algorithms required to create the training models. An additional ground truth dataset that contains known face images of the individual will be required to then test the accuracy of the training models and predictive algorithms. These DNA SNP and whole genotype databases, along with the corresponding ground truth face images, would need to be created if not already available for government use. Consideration must be made for determining the appropriate population that should be solicited for developing the training and testing datasets. More information on the website https://www.iarpa.gov/index.php/working-with-iarpa/requests-for-information/dnatoface .

**Public Access To Research:** The White House says 19 departments and agencies now have plans to give the public access to peer-reviewed publications resulting from federally funded research. The latest additions are the Department of Education, Agency for International Development, and Office of the Director of National Intelligence. "Together, agencies with approved public access

plans account for more than 98 percent of U.S. Federal expenditures on R&D." The 16 agencies whose plans were previously approved require researchers to ensure access "not more than 12 months after the publication date.". More information on: https://www.whitehouse.gov/blog/2016/10/28/federally-funded-research-results-are-becoming-more-open-and-accessible.

**NSF Research Experiences for Undergraduates (REU) Supplemental Funding:** The NSF Directorate for Computer and Information Science and Engineering (CISE) invites grantees with active CISE awards to submit requests for **Research Experiences for Undergraduates (REU) Supplemental** funding, following the guidelines in the NSF REU solicitation (see Research Experiences for Undergraduates (REU): Sites and Supplements; NSF 13-542). Awards under no cost extension (NCE) are not eligible for this supplement. A student must be a US citizen, or a permanent resident of the US. The duration for new requests is typically one year. The proposed start date for a supplement must be after the conclusion of all existing REU supplements on the corresponding active CISE award. Priority will be given to requests submitted before March 30, 2017; the potential for funding requests after this date will be limited. If requests for REU supplemental support exceed funds available in CISE, requests will be considered in the order received. REU supplement funds can be used at any time during the year. Annual and final reports for a project receiving REU supplements should provide a brief description of activities, impacts and outcomes (including number of support-months for each student) of REU supplement support.

Investigators are encouraged to refer to the REU program solicitation (NSF13-542) for detailed information concerning submission requirements. **Since supplemental funds requests are handled by the cognizant program officer overseeing the active award requesting the supplement, grantees should contact the cognizant program officers of their awards if they have questions or need additional information.**

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## Webinar and Events

**Event: Amazon Web Services: Storage with Amazon S3 and Amazon Glacier**
**When: November 4, 2016 12.00 PM – 1.00 PM**
**Website**:
https://attendee.gotowebinar.com/register/6145335792024941316?source=Website%20Listing&utm_source=ieee&utm_medium=webinar%20campaign&utm_term=msda%20nov%202016%20webinar%20ieee&utm_content=msda%20nov%202016%20webinar%20ieee
**Brief Description:** Data Science is not just about programming and math; the field also heavily relies on intellectual curiosity, creativity, and exploration. By creating and combing through variables from different types of data sets, data scientists can reveal new and interesting relationships, in addition to different avenues for future research.
In this webinar, we will discuss how empirical evidence supporting a new theory about the relationship between organizational values and industry automation was discovered, as well as demonstrate how the public availability of diverse types of data expands opportunities for innovative ideas.
**Speaker Bio:** Arthur J. O'Connor is the Academic Director of the MS in Data Analytics, BS in Information Systems, and BA in Communication and Media degree programs at CUNY SPS. He has served as a senior corporate officer of two Fortune 500 corporations, and for the past decade, worked in risk analytics and systems implementation roles at Reuters, Citigroup, and most recently, Mitsubishi UFJ Financial Group. He has published research studies in the areas of

behavioral finance, organizational practices, and political polarization, and presented his work at both the third and fourth annual meetings of the Academy of Behavioral Finance & Economics.

**Event: Multiplexed immunohistochemistry: Illuminating the tumor microenvironment to study cancer-immune mechanisms**
**When: November 2, 2016 12:00 PM - 1:00 PM**
**Website**: http://webinar.sciencemag.org/?et_rid=79460182&et_cid=935382
**Brief Description:** As immuno-oncology takes center stage in the battle against cancer, the need for biomarkers has become even more acute, with response rates continuing in the 20%-30% range and the menu of options, including combination therapies, growing at an accelerating pace. The specific immunoarchitecture characteristics of the microenvironment in which a particular tumor grows may be both prognostic and predictive of response to these new immunotherapies. Multiplex immunofluorescence is the most effective, efficient way to identify specific immune cell types, their location, and their state of activation, as well as the presence of immunoactive molecular expression, all at the same time. This method is highly beneficial for exploring immune evasion mechanisms and finding potential biomarkers that allow researchers to assess the mechanism of action and predict and track response. This live, online seminar will take the viewer through validation of this multiplexing technique, including a comparison with singleplex immunofluorescence and standard (chromogenic) immunohistochemistry, as well as an assessment of intersite reproducibility and the influence of staining order on quantitation.
**Presenters:** Janis Taube, M.D., M.Sc., Johns Hopkins Hospital, Baltimore, MD
Cliff Hoyt, PerkinElmer, Inc., Hopkinton, MA.

**Event: 2016 NRT (NSF Research Traineeship) Program Information Webinar**
**When: November 9, 2015 1:00 AM to December 9, 2016 11:45 PM**
**Website**: http://www.nsf.gov/events/event_summ.jsp?cntn_id=134466&org=NSF
**Brief Description:** The NSF Research Traineeship program (NRT) prerecorded informational videos to provide an overview of the NRT program and describe the key similarities and differences of the two tracks. The aim of these webinars was to give potential principal investigators information on program announcement 16-503 by emphasizing several key features and requirements of each track.

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## Grant Opportunities

### National Science Foundation

**Grant Program: Long Term Research in Environmental Biology (LTREB)**
**Agency: National Science Foundation NSF 17-513**
**RFP Website**: https://www.nsf.gov/pubs/2017/nsf17513/nsf17513.htm
**Brief Description:** The Long Term Research in Environmental Biology (LTREB) Program supports the generation of extended time series of data to address important questions in evolutionary biology, ecology, and ecosystem science. Research areas include, but are not limited to, the effects of natural selection or other evolutionary processes on populations, communities, or ecosystems; the effects of interspecific interactions that vary over time and space; population or community dynamics for organisms that have extended life spans and long turnover times; feedbacks between ecological and evolutionary processes; pools of materials such as nutrients in soils that turn over at intermediate to longer time scales; and external forcing functions such as climatic cycles that

operate over long return intervals. The Program intends to support decadal projects. Funding for an initial, 5-year period requires submission of a preliminary proposal and, if invited, submission of a full proposal that includes a 15-page project description. Proposals for the second five years of support (renewal proposals) are limited to a ten-page project description and do not require a preliminary proposal. Continuation of an LTREB project beyond an initial ten year award will require submission of a new preliminary proposal that presents a new decadal research plan.
**Awards:** Standard Grants. Anticipated funding amount: $5,000,000
**Letter of Intent:** Not Required
**Preliminary Proposal Submission Due Date:** January 23, 2017
**Full Proposal Submission Due Date:** August 02, 2017
**Contacts:**

- Mary Beth (Betsy) Von Holle, telephone: (703) 292-4974, email: mvonholl@nsf.gov
- Elizabeth R. Blood, telephone: (703) 292-4349, email: eblood@nsf.gov

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**Grant Program: Algorithms for Threat Detection (ATD)**
**Agency: National Science Foundation NSF 17-510**
**RFP Website**: https://www.nsf.gov/pubs/2017/nsf17510/nsf17510.htm
**Brief Description:** The Algorithms for Threat Detection (ATD) program will support research projects to develop the next generation of mathematical and statistical algorithms for analysis of large spatiotemporal datasets with application to quantitative models of human dynamics. The program is a partnership between the Division of Mathematical Sciences (DMS) at the National Science Foundation (NSF) and the National Geospatial Intelligence Agency (NGA).
**Prospective PIs are strongly discouraged from submitting identical or substantially similar proposals to RED and IUSE: EHR**.
**Awards:** Standard Grants. Anticipated funding amount: $3,000,000
**Letter of Intent:** Not Required
**Full Proposal Submission Due Date:** February 21, 2017
**Contacts:**

- Leland M. Jameson, Program Director, NSF MPS/DMS, telephone: (703) 292-4883, email:ljameson@nsf.gov
- Robert Lund, Program Director, NSF MPS/DMS, telephone: (703) 292-2407, email:rlund@nsf.gov
- John Greer, Program Director, National Geospatial Intelligence Agency, telephone: (571) 557-2944, email: John.B.Greer@nga.mil

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**Grant Program: Training-based Workforce Development for Advanced Cyberinfrastructure (CyberTraining)**
**Agency: National Science Foundation NSF 17-507**
**RFP Website**: https://www.nsf.gov/pubs/2017/nsf17507/nsf17507.htm
**Brief Description:** The overarching goal of this program is to prepare, nurture and grow the national scientific workforce for *creating, utilizing,* and *supporting* advanced cyberinfrastructure (CI) that enables cutting-edge science and engineering and contributes to the Nation's overall economic competitiveness and security. For the purpose of this solicitation, advanced CI is broadly defined as the resources, tools, and services for advanced computation, data handling, networking and security. The need for such workforce development programs are highlighted by the (i) *National Strategic Computing Initiative* announced in 2015 (NSCI), which is co-led by NSF and aims to advance the high-performance computing ecosystem and develop workforce essential for

scientific discovery; (ii) 2016 National Academies' report on *Future Directions for NSF Advanced Computing Infrastructure to Support U.S. Science and Engineering in 2017-2020;* and (iii) *Federal Big Data Research and Development Strategic Plan*, which seeks to expand the community of data-empowered experts across all domains.

This solicitation calls for developing innovative, scalable training programs to address the emerging needs and unresolved bottlenecks in scientific and engineering workforce development of targeted, multidisciplinary communities, at the postsecondary level and beyond, leading to transformative changes in the state of workforce preparedness for advanced CI in the short and long terms. A primary goal is to broaden CI access and adoption by (i) increasing or deepening accessibility of methods and resources of advanced CI and of computational and data science and engineering by a wide range of *institutions* and *scientific communities* with lower levels of CI adoption to date; and (ii) harnessing the capabilities of larger segments of diverse underrepresented groups. Proposals from and in partnership with the aforementioned communities are especially encouraged. For student training, a key concern is not to increase the time to degree; hence the emphasis shall be on out-of-class, informal training.

**Awards:** Standard Grants. Anticipated funding amount: $4,500,000

**Letter of Intent:** Not Required

**Full Proposal Submission Due Date:** January 18, 2017

**Contacts:**

- Sushil K. Prasad, CISE/ACI, telephone: (703) 292-5059, email: sprasad@nsf.gov
- Almadena Y. Chtchelkanova, CISE/CCF, telephone: (703) 292-8910, email: achtchel@nsf.gov
- Victor P. Piotrowski, EHR/DGE, telephone: (703) 292-8670, email: vpiotrow@nsf.gov

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**National Institutes of Health**

**Grant Program: Systems Biology Approaches to Alzheimer's Disease Using Non-mammalian Laboratory Animals (R01)**

**Agency: National Institutes of Health RFA-AG-17-057**

**RFP Website**: http://grants.nih.gov/grants/guide/rfa-files/RFA-AG-17-057.html

**Brief Description:** Conceptually,a pathway to Alzheimer's disease or related dementias can be envisioned in three steps: proximal causes à neurodegeneration à dementia. Neurodegeneration can encompass anything from synaptic failure to neuronal death, and might originate within the neurons or associated cells such as the diverse types of glia. Discoveries of candidate proximal causes of neurodegeneration and candidate amplifying or protective factors are the primary goals of this FOA. Alzheimer's disease dementia is one outcome of neurodegeneration, and other outcomes of neurodegeneration have different clinical presentations and affect more than neuronal tissues, including amyotrophic lateral sclerosis, Parkinson's disease, Huntington's disease, and Frontotemporal Dementia, among many others. Significant research effort has been focused on proteinopathies (dysregulated protein homeostasis) as a leading mechanism for neurodegeneration, but other events upstream (proximal causes) have been less studied. Several mutations in specific proteins that can be linked to the proteinopathies and account for a portion of heritability of some diseases such as amyloidosis, tauopathy, synucleinopathy, prion disease and aggregation of other specific proteins have been identified. However, it is not yet conclusively established that proteinopathies, per se, are the root cause of most dementias. In addition, there are possible gene x environment interactions that could lead to neurodegeneration and which could be explored using established non-mammalian laboratory animals with the capacity for

high-throughput data collection and screening. Because these remain testable hypotheses it is therefore appropriate to consider a search to discover additional proximal causes upstream of neurodegeneration, as well as amplifying and protective factors.

This FOA is intended to support discovery of candidate causes or amplifiers of, or protections against, neurodegeneration, and not studies on mechanisms of neurodegeneration which may or may not be specific to neurons and their associated cells. One approach to generating candidate proximal causes of any biological process, including disease, is systems biology. The use of non-mammalian laboratory organisms often allows for the recapitulation of many cellular and molecular aspects of human conditions, eventually facilitating the study of molecular mechanisms and testing of interventions in the context of multiple cell types. Furthermore, multiple readouts – both biological and molecular – are available from powerful genetic tools such as reporter constructs and high-throughput technologies. The door is now open to studies using systems biology to generate hypotheses through the discovery of candidate proximal causes of neurodegeneration. Such studies could also address whether causes of cellular degeneration in non-neuronal tissues might also apply to neurodegeneration, and whether causes of neurodegeneration are not shared with other cell types, perhaps implying protective mechanisms in other cell types or selective responsiveness to environmental triggers. Thus, systems biology may also be an important tool to implicate protective factors against established causes of neurodegeneration, when examined at low-to-moderate levels of causal factors (e.g., disrupted proteostasis) within the context of aging.

**Awards:** Application budget requests should reflect the actual needs for the proposed project. NIA intends to commit $3.3 million in FY 2017 to fund up to 5 awards.

**Letter of Intent:** December 18, 2016

**Deadline:** January 18, 2017, by 5:00 PM local time of applicant organization. All types of non-AIDS applications allowed for this funding opportunity announcement are due on this date.

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.

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**Grant Program: Common Mechanisms and Interactions Among Neurodegenerative Diseases (R01)**

**Agency: National Institutes of Health PAS-17-028**

**RFP Website**: http://grants.nih.gov/grants/guide/pa-files/PAS-17-028.html

**Brief Description:** Etiologic and therapeutic research on dementia has focused on either individual disease syndromes (e.g., Alzheimer's disease, AD; Lewy Body Dementia, LBD, Frontotemporal Dementia, FTD; or Vascular Dementia, VD) or distinct neurodegenerative processes (e.g., beta-amyloid, HPF-Tau, alpha-synuclein, TDP-43, small vessel disease). Aside from descriptive, postmortem neuropathology, different neurodegenerative diseases have generally been investigated in isolation from one another. There are few models for studying whether and how neurodegenerative disease processes relate to one another. At autopsy, many patients with dementia, particularly older individuals, exhibit multiple neuropathologies: in addition to tau tangles and beta-amyloid plaques, vascular changes, Lewy bodies, and TDP-43 inclusions are often present. We know that the likelihood of antemortem dementia increases with co-occurring postmortem neuropathology. However, despite considerable evidence of interactions between different neuropathologies (see below), we do not understand how different neurodegenerative processes interact and relate to one another.

Co-occurring pathology complicates both pathophysiological investigation and treatment development. For instance, therapies to increase beta-amyloid clearance may be less effective if there is coincident VD or LBD. At the same time, commonalities between neurodegenerative

diseases may provide clues to pathophysiological mechanisms. Can multiple neuropathologies interact synergistically to increase disease burden and worsen cognitive impairment? Could there be common pathways leading to synapse loss and cell death that might become targets for drug development? If either speculation is the case, what molecular, cellular, or organismic processes are involved?
**Awards:** Application budgets are not limited but need to reflect the actual needs of the proposed project.
**Letter of Intent:** 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.

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**Department of Defense/US Army/DARPA/ONR**

**Grant Program: DoD USAMRMC FY17 Broad Agency Announcement for Extramural Medical Research**
**Agency: Department of Defense Dept. of the Army – USAMRAA W81XWH-17-R-BAA1**
**Website**:
https://www.fbo.gov/index?s=opportunity&mode=form&id=bacdeb99dc1cf27e8dcd920b1fe751ac&tab=core&_cview=0
**Brief Description:** The USAMRMC mission is to provide solutions to medical problems of importance to the American Service member at home and abroad, as well as to the general public at large. The scope of this effort and the priorities attached to specific projects are influenced by changes in military and civilian medical science and technology, operational requirements, military threat assessments, and national defense strategies. The extramural research and development programs play a vital role in the fulfillment of the objectives established by the USAMRMC. General information on USAMRMC can be obtained at http://mrmc.amedd.army.mil/index.cfm. This FY17 BAA is intended to solicit extramural research and development ideas and is issued under the provisions of the Competition in Contracting Act of 1984 (Public Law 98-369), as implemented in Federal Acquisition Regulation (FAR) 6.102(d)(2) and 35.016 and in DoD Grant and Agreement Regulations (DoDGARS) 22.315. In accordance with FAR 35.016, projects funded under this BAA must be for basic and applied research to support scientific study and experimentation directed towards advancing the state of the art or increasing knowledge or understanding rather than focusing on development of a specific system or hardware solution. Research and development funded through this BAA are intended and expected to benefit and inform both military and civilian medical practice and knowledge. The selection process is highly competitive and the quantity of meaningful submissions (both pre-proposals/pre-applications and full proposals/applications) received typically exceeds the number of awards that available funding can support. This BAA provides a general description of USAMRMC's research and development programs, including research areas of interest, evaluation and selection criteria, pre-proposal/pre-application and full proposal/application preparation instructions, and general administrative information. Specific submission information and additional administrative requirements can be found in the document titled "General Submission Instructions" available in Grants.gov along with this BAA. **This FY17 BAA is continuously open for a 12-month period, from October 1, 2016 through September 30, 2017, at 11:59 p.m. Eastern Time**. Submission of a pre-proposal/pre-

application is required and must be submitted through the electronic Biomedical Research Application Portal (eBRAP) (https://eBRAP.org/). Pre-proposals/pre-applications may be submitted at any time throughout the 12-month period. If the USAMRMC is interested in receiving a full proposal/application, the PI will be sent an invitation to submit via eBRAP. A full proposal/application must be submitted through Grants.gov (http://www.grants.gov/). Invited full proposals/applications can be submitted under this FY17 BAA through September 30, 2017.
**Awards:** Various
**Deadline:** Open until September 30, 2017
**Contact:** Technical POC: RA Coordinator, DARPA/DSO • Solicitation Email: YFA2017@darpa.mil

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**Department of Energy**

**Grant Program: Power Nitride Doping Innovation Offers Devices Enabling SWITCHES (PNDIODES)**
**Agency: Department of Energy ARPA-E DE-FOA-0001691**
**Website**: https://arpa-e-foa.energy.gov/#FoaIdbd858bf1-0a35-4ab2-9a64-6490fd8ec1c7
**Brief Description:** The PNDIODES (Power Nitride Doping Innovation Offers Devices Enabling SWITCHES) program seeks to fund transformational advances and mechanistic understanding in the process of selective area doping in the III-Nitride wide band gap (WBG) semiconductor material system and the demonstration of arbitrarily placed, reliable, contactable, and generally useable p-n junction regions that enable high-performance and reliable vertical power electronic semiconductor devices. The microscopic mechanistic understanding and transformational technologies will address the major obstacle in the fabrication of vertical GaN power electronic devices experienced by most of the teams in the ARPA-E SWITCHES (Strategies for Wide Bandgap, Inexpensive Transistors for Controlling High-Efficiency Systems) program. This challenge has been the lack of a viable GaN selective area doping or selective area epitaxial regrowth process that yields material of sufficiently high quality to enable a defect-free p-n junction on patterned GaN surfaces. Success in this area will allow further development of a revolutionary and powerful class of vertical GaN power electronic devices suitable for 1200V to 10kV broad range of applications (consumer electronics, power supplies, solar inverters, wind power, automotive, motor drives, ship propulsion, rail, and the grid).
**Awards:** Up to $2,500,000
**Submission Deadline for Full Proposal:** January 4, 2017

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**NASA**

**Grant Program: ROSES 2016: Solar System Working**
**Agency: NASA NNH16ZDA001N-SSW**
**Website**:
https://nspires.nasaprs.com/external/solicitations/summary.do?method=init&solId={BA231B0B-067C-9D42-D770-848B361FC4CA}&path=init
**Brief Description:** The Solar System Workings program solicits proposals for innovative scientific research related to understanding the atmospheric, climatological, dynamical, geologic, physical, and chemical processes occurring within the Solar System. This program is open to investigations relevant to surfaces and interiors of planetary bodies, planetary atmospheres, rings, orbital dynamics, and exospheres and magnetospheres. The Solar System Workings program values the potential of interdisciplinary efforts to solve key scientific questions. The

program also values research in comparative planetology. Research supported by this call may include data synthesis, laboratory studies that examine physical or chemical properties and processes, studies of sample or analog materials of other Solar System bodies, field studies of terrestrial analogs of planetary environments, or theoretical and numerical modeling of physical or chemical processes. This program seeks to understand processes that occur throughout the Solar System, as well as those specific to individual objects and systems, but inform our understanding of the fundamental processes at work. A nonexhaustive list of areas of research called for in this solicitation follows. For conciseness in this list, the term 'planetary' refers to Solar System objects other than the Sun (ranging in size from small objects, like comets and asteroids, through natural satellites, and up to planets) and structures (such as atmospheres, ionospheres, and ring systems).

**Awards:** $9 - $10M

**Proposal Deadline:** Step-1 Proposal: November 17, 2016

**Contact:** hq-ssw@mail.nasa.gov

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