NJIT Research Newsletter

Issue: ORN-2016-06

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: Gregory Fleishman (PI), Dale Gary (Co-PI), Gelu Nita (Co-PI)
Department: CSTR, Physics
Grant/Contract Project Title: Probing Solar Flares Using Radio Imaging Spectroscopy and Advanced Modeling
Funding Agency: NSF
Duration: 04/01/14-03/31/17

PI: Rajesh Dave (PI)
Department: Chemical, Biological and Pharmaceutical Engineering
Grant/Contract Project Title: Engineering Research Center Industrial Support
Funding Agency: NSF
Duration: 07/01/07-06/31/17

PI: Dale Gary (PI), Phil Goode (Co-PI), Wenda Cao (Co-PI), Vasyl Yurchyshyn (Co-PI)
Department: CSTR, Physics
Grant/Contract Project Title: High Resolution Studies of the Sun Using the New Solar Telescope (NST)
Funding Agency: NSF
Duration: 04/01/13-03/31/18

PI: Rajesh Dave (PI)
Department: Chemical, Biological and Pharmaceutical Engineering
Grant/Contract Project Title: Scale-up of solventless batch RAM vibratory processing for coating of pharmaceutical products
Funding Agency: Catalent Pharma Solutions
Duration: 02/10/16-02/10/17

PI: Marek Rusinkiewicz (PI)
Department: Computer Science, CCS
Grant/Contract Project Title: Networked Systems
Funding Agency: North C Technologies, Inc.
Duration: 02/04/16-09/30/16

Events and Announcements

Event: Undergraduate Research and Innovation (URI) Workshop and Information Session
When: February 17, 2016: 12.00 PM – 1.00 PM (Pizza Lunch will be provided)
Where: Ballroom B, Campus Center
Event Description: URI program invites Phase-1 and Phase 2 Student Seed proposals for funding. Undergraduate students can submit research and innovation proposals in one of the following two tracks:
Track 1: Innovation and Product Development (IPD)
Track 2: Application Based Research (ABR)
URI workshop on February 17 will provide information about the tracks and funding programs, and also discuss how to write and submit Student Seed Grant proposals.
The following topics will be discussed in the interactive workshop with undergraduate students for two tracks of URI Student Seed Grants:

Agenda: URI Workshop on Research and Innovation

1. Research and Innovation Concept Development
2. Market Research and/or Literature Review
3. Enabling Technologies and State-of-the-Art Assessment
4. Competition and Branding (Track 1) and Comparative Evaluation (Track 2)
5. Risk Management (Track -1) and Research Validation (Track 2)
6. Board Presentation and Review Criterion

Undergraduate students and faculty advisors are invited to attend the URI workshop for information of proposal submission process and meeting the URI External Advisory Board members.
Presenters:

Mr. Brian Kiernan (Chair, EAB and Executive Committee)
Angel Investor, and Executive VP and Chief Scientist (ret), InterDigital Comm. Corp.
Mr. Govi Rao (Co-Chair, EAB and Executive Committee)
President and CEO, Noveda Technologies (www.noveda.com)
Mr. Leon K. Baptiste (Executive Committee member)
Principal and CEO, LB Electric Co., LLC (www.LBElectricco.com)
Mr. Nish Parikh (Executive Committee member)
Founder and CEO, WebTeam Corporation (http://www.webteamcorp.com)
Mr. Manish Patel (Executive Committee member)
Co-Founder, The Think Cloud, LLC (www.thethinkcloud.com)
Dr. Atam Dhawan, Vice Provost for Research, NJIT

Event: IEEE Webinar: Nonlinear Magnetic Materials Modeling
When: Available on Demand
Website: http://spectrum.ieee.org/webinar/non-linear-magnetic-materials-with-comsol-multiphysics
Abstract: Nonlinear effects such as magnetic saturation and hysteresis are major challenges in the design of magnetic devices such as electric motors and transformers. They also make efficient, accurate modeling and simulation of magnetic devices difficult and demanding. This webinar will show demonstrations and tips and tricks on how to build high-fidelity finite element models of devices that include saturation and hysteresis effects using COMSOL Multiphysics®. The presentation concludes with a Q&A session.
Biographical Sketch of the Speaker: Magnus Olsson, Product Manager, Electromagnetics, COMSOL Magnus Olsson joined COMSOL in 1996 and currently leads development for the electromagnetic design products. He holds an MSc in engineering physics and a PhD in plasma physics and fusion research. Prior to joining COMSOL, he worked as a consulting specialist in electromagnetic computations for the Swedish armed forces.

Jennifer Segui, Sr. Technical Marketing Engineer, COMSOL As a Sr. Technical Marketing Engineer at COMSOL, Jennifer Segui writes and produces demos, presentations, articles, and documentation showcasing the capabilities available across the entire COMSOL® Product Suite. She is also the Program co-Chair for the COMSOL Conference in Boston. Jennifer has degrees in Medical Physics and Computer Engineering.

Event: Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE) Webinar: Program Evaluation at the Health Resources and Services Administration
When: February 16, 2016; 1.00 PM – 2.00 PM
Website: http://www.dcoe.mil/Training/Monthly_Webinars.aspx
Abstract: This webinar supports the efforts of the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE) to improve the psychological health and traumatic brain injury (TBI) system of prevention and care. This series is provided to enhance the program evaluation capabilities of attendees. The content is intended primarily for a general audience in order to better inform those who may be unfamiliar with evaluation methods. This training will provide an overview of how the Health Resources and Services Administration, a federal agency tasked to conduct evaluations of public health programs, was established, how it functions, and lessons learned from the experience. DoD program personnel should be able to compile and suggest ways that evaluation of health programs may be addressed within the Defense Department to improve psychological health and TBI care.
At the conclusion of this webinar, participants will be able to:

- Apply strategies to address common challenges that program staff encounter when seeking to establish an "evaluation culture"
- Explain how health program evaluation is conducted at the Health Resources and Services Administration
- Identify important tools and measures used to track program evaluation accomplishments
- Recognize features and contributions of an evaluation culture to organization values and operations
- Develop the means to build internal evaluation capacity.

Presenters:

Sylvia K. Fisher, Ph.D.
Director, Office of Research and Evaluation
Health Resources and Services Administration (HRSA)
United States Department of Health and Human Services
Rockville, Maryland

Capt. Armen Thoumaian, Ph.D., United States Public Health Service (USPHS)
Deputy Chief for Program Evaluation and Improvement
Office of Integrated Services
Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE)
Silver Spring, Maryland

Registration: Sign in Registration at
http://www.dcoe.mil/include/exitwarning.aspx?link=http://dcoe.cds.pesgce.com/

Event: NJIT President's Forum and 2016 Faculty Research Showcase
When: February 22, 2016: 10.00 AM – 3.00 PM
Where: President's Forum and Keynote Address: Atrium, Campus Center
Faculty Research Presentations and Poster Session: Ballroom A
President's Forum Speaker: Michael, Doyle, Founding Chairman, Eolas Technologies; Founding Chairman, National Museum of Health and Medicine; Founding Chairman, CodeAbode
Title of the Talk: Treading Water in the Digital Ocean: Diving-In Over the Head Can Sometimes Lead to Surfing the Big Waves
Biographical Sketch of the Speaker: Dr. Michael Doyle is the Chairman and CTO of Eolas Technologies Inc., and is the founder and Chairman of the National Museum of Health and Medicine Chicago. He is an active angel investor and co-founder in several Chicago-area tech startups, and is the founder of CodeAbode, the nation's first code bootcamp focused in the areas of health, medicine and fitness. Prior to founding Eolas in 1994, Dr. Doyle served as Director for the Center for Knowledge Management at the University of California, San Francisco. While at UCSF Medical Center, in 1993, Dr. Doyle led the research team that invented the fundamental web technologies which enabled Web browsers for the first time to act as platforms for fully-interactive remotely-distributed applications, in the process pioneering the revolutionary Web technologies today known as streaming media and cloud computing. Dr. Doyle successfully guided Eolas through the development of several key technologies in use throughout the Internet. Dr. Doyle's seminal research in next-generation Web applications, hypermedia navigation, mobile telecommunications, 3-D biomedical visualization, and morpho-spatial genomic activity mapping has led to advances that have gained worldwide recognition. His invention of the field of transient-key cryptography led to x9.95 ANSI National Standard for secure timestamps, and forms the basis for the revolutionary new eCheck system.

From 2000-2004, Dr. Doyle served as Chief Scientist on the Visible Embryo Project Next Generation Internet Project with NIH funding on the development of new applications to work with powerful computers over high-speed networks. As part of this project, the University team reconstructed over 30 embryos from the Carnegie Collection and made them available on computers at the San Diego Supercomputer Center at the University of California San Diego. In 2012, Dr. Doyle led the development of the Eolas vScope interactive cloud-based streaming virtual microscope system, and its adaptation to create the first neuroanatomical atlas of Albert

Einstein's brain as the Einstein Brain Atlas app in Apple's iPad app store, which received worldwide press coverage, including coverage on the Today Show and Good Morning America.

Dr. Doyle currently serves on the Board of Trustees of Beloit College, and the Advisory Council of the UIC College of Applied Health Sciences. He was the 2013 recipient of the UIC AHS Distinguished Alumni Achievement Award, and is a member of ACM, IEEE, Sigma Xi, Phi Kappa Phi, Mensa, the Triple Nine Society, and the Ultranet. He is an active philanthropist, supporting a variety of charitable causes in the sciences and the arts both personally and through his family foundation, the Buonacorsi Foundation.

Event Description: The 2016 NJIT Faculty Research Showcase will start with the President's Forum with the Keynote Address by Dr. Michael Doyle. The showcase will introduce new NJIT faculty who have joined us in academic year 2015-16 with brief presentations on their research work. New faculty presentations will be followed by the electronic posters and networking session featuring research projects with recipients of the 2015 NJIT Faculty Seed Grants. Faculty, staff and students are welcome to join us at this interdisciplinary networking event to learn about exciting ongoing research projects, and explore future collaborative opportunities.

Grant Opportunity Alerts

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

NSF: Innovation Corps - National Innovation Network Nodes Program (I-Corps Nodes); Enhancing Access to the Radio Spectrum (EARS) - Addressing Future Challenges; Expeditions in Computing

NIH: Improvement of Animal Models for Stem Cell-Based Regenerative Medicine (R01); Targets of Low Dose Alcohol in the Brain (R01) (R21)

Department of Defense/US Army/DARPA/ONR: Bone Marrow Failure Idea Development Award; Neural Engineering System Design (NESD)

Department of Energy: MEGA-BIO: Bioproducts to Enable Biofuels

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Grant Opportunities

National Science Foundation

Grant Program: Innovation Corps - National Innovation Network Nodes Program (I-Corps Nodes)
Agency: National Science Foundation NSF 16-539
RFP Website: http://www.nsf.gov/pubs/2016/nsf16539/nsf16539.htm
Brief Description: The National Science Foundation (NSF) seeks to further develop and nurture a national innovation ecosystem that builds upon fundamental research to guide the output of scientific discoveries closer to the development of technologies, products, processes and services that benefit society. The goal of the program is to dramatically reduce the period of time necessary to bring a promising idea from its inception to widespread implementation.
Through this solicitation, NSF plans to build upon the established National Innovation Network (consisting of I-Corps Nodes and Sites) to further support the needs for innovation research, education and training. NSF is seeking to expand and sustain the network of I-Corps Nodes that work cooperatively to support the development of innovations that will benefit society. The

interconnected nodes of the network are expected to be diverse in research areas, resources, tools, programs, capabilities, and geographic locations - providing the network with the flexibility to grow or reconfigure as needs arise.

I-Corps Nodes will foster understanding on how to: 1) identify, develop and support promising ideas that can generate value, 2) create and implement tools, resources and training activities that enhance our nation's innovation capacity, 3) gather, analyze, evaluate and utilize the data and insight resulting from the experiences of those participating in regional programs and 4) share and leverage effective innovation practices on a national scale - to improve the quality of life for the U.S. citizenry. In addition, Nodes must identify and are expected to implement plans for sustainable scaling of their efforts beyond the duration of NSF support.

Please Note: The solicitation has been modified to now include two tracks:

- **Track 1: *I-Corps Node Development*** - new I-Corps Node applicants, and
- **Track 2**: ***I-Corps Node Renewal*** - previously funded I-Corps Nodes.

Award amounts have changed, and are no longer dependent upon the number of institutions participating in the Node.

Awards: Approximately 4 - 7 awards are anticipated.

Track 1: *I-Corps Node Development* - new I-Corps Node awardees - to be supported at a level of up to:

- $1,200,000 (years 1 and 2)
- $900,000 (year 3)
- $600,000 (year 4)
- $300,000 (year 5)

Track 2: *I-Corps Node Renewal* - previously funded I-Corps Nodes - to be supported at a level of up to:

- $900,000 (years 1 and 2)
- $750,000 (year 3)
- $600,000 (year 4)
- $300,000 (year 5)

Letter of Intent: A Letter of Intent (LOI) MUST be submitted by the Authorized Organizational Representative (AOR) for either a Track 1 or Track 2 proposal in order to be considered for funding. Full proposals that are submitted without a LOI (that had been received by the appropriate deadline) will be returned without review (RWR). Deadline: March 10, 2016

Full Proposal Deadlines: May 10, 2016

Grant Program: Enhancing Access to the Radio Spectrum (EARS) - Addressing Future Challenges

Agency: National Science Foundation NSF 16-537

RFP Website: http://www.nsf.gov/pubs/2016/nsf16537/nsf16537.htm

Brief Description: The National Science Foundation's Directorates for Computer and Information Science and Engineering (CISE), Engineering (ENG), and Mathematical and Physical Sciences (MPS) are coordinating efforts to identify bold new concepts with the potential to contribute towards significant improvements in the efficiency of radio spectrum utilization, protection of passive sensing services, and the ability for traditionally underserved Americans to benefit from current and future wireless-enabled goods and services. This EARS program solicitation seeks to fund innovative collaborative research addressing large-scale challenges that transcend the traditional boundaries of existing programs.

Awards: Approximately 6 - 8 awards are anticipated, each up to $1,500,000 total and up to 3 years in duration, subject to the availability of funds and quality of proposals received.

Letter of Intent: Not Required
Full Proposal Deadlines: May 03, 2016
Contacts:

- Wenjing Lou, CISE/CNS, telephone: (703) 292-8950, email: wlou@nsf.gov
- Thyagarajan Nandagopal, CISE/CNS, telephone: (703) 292-8950, email: tnandago@nsf.gov
- Chengshan Xiao, ENG/ECCS, telephone: (703) 292-4753, email: cxiao@nsf.gov

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Grant Program: Presidential Awards for Excellence in Science, Mathematics and Engineering Mentoring
Agency: National Science Foundation NSF 16-534
RFP Website: http://www.nsf.gov/pubs/2016/nsf16534/nsf16534.htm
Brief Description: The Presidential Awards for Excellence in Science, Mathematics and Engineering Mentoring (PAESMEM) is a Presidential award established by the White House in 1995. The PAESMEM program is administered by the National Science Foundation (NSF) on behalf of the White House Office of Science and Technology Policy (OSTP).

Nominations, including self-nominations, are invited for "Individual" and "Organizational" PAESMEM awards. Individuals and organizations in all public and private sectors are eligible including industry, academia, K-12, military and government, non-profit organizations, and foundations. Exceptional STEM or STEM-related mentoring in both formal and/or informal settings is eligible for the PAESMEM award.

Nominations are encouraged from all geographical regions in the U.S. including its territories and particularly jurisdictions designated by Congress under NSF's Experimental Program to Stimulate Competitive Research (EPSCoR). NSF EPSCoR-designated jurisdictions are: Alabama, Alaska, Arkansas, Delaware, Guam, Hawaii, Idaho, Kansas, Kentucky, Louisiana, Maine, Mississippi, Montana, Nebraska, Nevada, New Hampshire, New Mexico, North Dakota, Oklahoma, Puerto Rico, Rhode Island, South Carolina, South Dakota, Vermont, Virgin Islands, West Virginia, and Wyoming. Nominations from the U.S. Territories are particularly encouraged. Each "Individual" or "Organizational" PAESMEM awardee will receive a $10,000 award and a commemorative Presidential certificate. Awardees are also invited to participate in an award recognition ceremony in Washington, DC that includes meetings with STEM educators, researchers and policy leaders. Up to 16 awards may be made from the nominations received on or before June 17, 2016.
Awards: Approximately 16 nominees total from both categories will be recommended to the White House for award recognition from the 2016-2017 competition. These awardees will represent the 2017 cohort of PAESMEM awardees. Anticipated Funding Amount: $160,000.
Letter of Intent: Not Required
Full Proposal Submission Window: January 25, 2016 - June 17, 2016
Contacts:

- Martha L. James, Program Officer, Division of Human Resource Development, 815, telephone: (703) 292-7772, fax: (703) 292-9019, email: mjames@nsf.gov
- Nafeesa Owens, Program Officer, Division of Human Resource Development, 815, telephone: (703) 292-5120, fax: (703) 292-9019, email: nowens@nsf.gov
- Nicole Gass, Program Specialist, Division of Human Resource Development, 815, telephone: 703-292-8378, fax: 703-292-9019, email: ngodwin@nsf.gov

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Grant Program: Expeditions in Computing
Agency: National Science Foundation NSF 16-535
RFP Website: http://www.nsf.gov/pubs/2016/nsf16535/nsf16535.htm
Brief Description: The far-reaching impact and rate of innovation in the computing and information disciplines has been remarkable, generating economic prosperity and enhancing the quality of life for people throughout the world.

The Directorate for Computer and Information Science and Engineering (CISE) has created the *Expeditions in Computing* (*Expeditions*) program to provide the CISE research and education community with the opportunity to pursue ambitious, fundamental research agendas that promise to define the future of computing and information.

In planning *Expeditions* projects, investigators are encouraged to come together within or across departments or institutions to combine their creative talents in the identification of compelling, transformative research agendas that promise disruptive innovations in computing and information for many years to come.

Funded at levels up to $2,000,000 per year for five years, *Expeditions* represent some of the largest single investments currently made by the directorate. Together with the Science and Technology Centers CISE supports, *Expeditions* form the centerpiece of the directorate's center-scale award portfolio. With awards funded at levels that promote the formation of research teams, CISE recognizes that concurrent research advances in multiple fields or sub-fields are often necessary to stimulate deep and enduring outcomes.The awards made in this program will complement research areas supported by other CISE programs, which target particular computing or information disciplines or fields.
Awards: Up to $30,000,000 total for each competition, subject to the availability of funds.
Expeditions projects with annual budgets up to $2,000,000 for durations of five years will be supported.
Letter of Intent: Preliminary Proposal Due: May 03, 2016
Full Proposal Deadlines: January 18, 2017
Contacts: Mitra Basu, Program Director, 1115, telephone: (703) 292-8910, email: mbasu@nsf.gov

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National Institutes of Health

Grant Program: Improvement of Animal Models for Stem Cell-Based Regenerative Medicine (R01)
Agency: National Institutes of Health PAR-16-093
PAR-16-094, R21 Exploratory/Developmental Research Grant,
PAR-13-252, R24 Resource-related Research Project Grants
RFP Website: http://grants.nih.gov/grants/guide/pa-files/PAR-16-093.html
Brief Description: The field of stem cell research experienced a dramatic new direction with the isolation of iPSCs, derived by reprogramming somatic cells to a pluripotent state. Several studies on various animal systems suggest that the basic pluripotency network appears to be conserved among different species, allowing derivation of iPSCs from a variety of animals. Significant efforts are needed to improve reprogramming methods to generate safer iPSCs with higher efficiency and better quality.

MSCs, a type of somatic stem cell, were originally identified as a subpopulation of bone marrow cells with osteogenic potential. The properties of MSCs have been examined extensively over the past decade. Studies using animal models have shown promising results following MSC therapy for induced injury in the musculoskeletal, cardiovascular, digestive and nervous

systems. In addition, many clinical trials have been initiated to test the efficacy of MSC infusion for treating various human diseases. Given the wide range of tissue sources, the recognition of subpopulations with specific properties, and the frequent production of genomic alterations upon expansion in cell culture, extensive characterization of MSCs and development of improved techniques are required. Most importantly, there is relatively limited understanding of the normal biological functions of MSCs and the mechanisms by which they participate in tissue repair.

GSCs are another type of somatic stem cell of great interest for regenerative medicine. They are an essential component of reproductive biology. Genetic manipulation of GSCs provides a powerful tool for producing transgenic animals, for elucidating mechanisms underlying germ cell development and differentiation and for understanding the interactions between stem cells and their niche. Further development of the methods for unlimited production of GSCs (for producing either sperm or eggs) will impact the ability to investigate the molecular basis of germ cell differentiation, explore the potential for germline stem cell therapy and treat infertility by transplantation. Numerous reports using animal and human GSCs have shown generation of pluripotent cells during in vitro cultivation, which potentially can solve a number of issues. However, it remains difficult to isolate, derive and maintain stable cultures of these cells from humans and model animal species. Furthermore, the mechanisms that determine the reprogramming of GSCs into pluripotent stem cells are not well understood and efficient methods for directed reprogramming of these still have to be developed.

Along with rodents, several other animal species are being developed as models for various studies in the field of regenerative medicine. Understanding the properties and capabilities of stem cells derived from animals such as fish, rabbits, dogs, pigs, sheep, goats and monkeys will increase the potential for the use of the most appropriate systems for modeling particular human disease conditions or for other medical applications. Non-rodent species, especially "large animal models" provide important advantages for transplantation studies, including large size, similarity to human physiology and pathology and longer life span, thus facilitating translation to studies in humans. The use of animal stem cells as a model for human cells in procedures related to regenerative medicine requires in-depth understanding of common regulatory pathways as well as species-specific properties and their impact on potential therapeutic applications.

Animal experiments have historically made a significant contribution to understanding human disease. However, animal studies need to be improved in order to increase reproducibility of the studies and better predict the effectiveness of treatment strategies in clinical trials. Several possible causes of the disparity between the results of animal studies and clinical trials have been identified, including failure to acknowledge the limitations of animal models, inadequate animal data, less than optimal disease models and overestimation of treatment efficacy due to the preferred publishing of positive results. These problems should be addressed in the design and execution of preclinical, animal-based studies involving stem-cell based therapies.

Awards: Application budgets are not limited, but need to reflect actual needs of the proposed project.

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 Targets of Low Dose Alcohol in the Brain (R01) and (R21)
Agency: National Institutes of Health RFA-AA-16-008
RFA-AA-16-009, R21 Exploratory/Developmental Grant
RFP Website: http://grants.nih.gov/grants/guide/rfa-files/RFA-AA-16-008.html
Brief Description: This Funding Opportunity Announcement (FOA) solicits research grant applications that define molecular targets and neuropathways mediating alcohol effects at concentrations of 10 mM and below. Although previous studies have established that alcohol at relatively high concentrations modulate a variety of neurobiological systems and neurocircuits, significant gaps remain in understanding the targets of low dose alcohol (10 mM or less) in the brain. Recent advances in neuroscience techniques and methods allow precise detection of neuronal activity and regulation of specific neuronal populations and neuronal pathways both in vivo and in vitro. These advances provide an unprecedented opportunity to understand effects of low-dose alcohol at molecular, cellular, and circuit levels. Research supported by this announcement will advance the mechanistic understanding of alcohol–sensitive circuitry. One potential benefit of the validation of low dose causal target(s) will be the ability to block alcohol effects by inactivation of one or multiple molecular targets.

The sensitivity of neurons and the associated neuronal pathways to alcohol stems from the modulatory actions of alcohol on its molecular targets. Alcohol allosterically modulates a variety of receptors, channels, and signaling molecules with a wide range of sensitivity. Although numerous studies have used relatively high concentrations of alcohol to obtain the maximal and consistent alcohol effects, a few studies, using recombinant systems or brain slices, have shown that low doses of alcohol modulate several types of receptors and ion channels in a subunit dependent manner. For example, alcohol modulates subtypes of NMDA receptors, glycine receptors, nicotinic receptors, GABAA receptors, BK channels, T-type calcium channels, and BDNF at 10 mM in vitro. However, there are often mismatches between the sensitivities in heterologous systems and that detected in brain slices or in vivo, suggesting that factors present in intact neuronal networks play an important role in alcohol sensitivity. Thus, studies are needed to define which types of receptors or channels mediate sensitivity to low dose alcohol in which cells and circuits in vivo. In addition, given that diverse protein subunit compositions exist in different sub-populations of neurons, in vivo studies will be a critical step in identifying the most sensitive targets to low dose alcohol. Recent advances in molecular, structural and functional analyses have identified the amino acid residues that are critical for alcohol's action and have revealed potential alcohol binding sites in several receptors and channels. These advances in combination with powerful new techniques for manipulating protein structure, as well as in vivo approaches, which enable one to detect and manipulate gene expression and neuronal activity in real time with high temporal and/or spatial resolution, will provide a great opportunity to identify the targets mediating effects of low dose alcohol at the molecular, cellular, and circuit level and to achieve mechanistic understanding of alcohol and the target interaction.

In summary, although substantial information has been gained on neurobiological mechanisms contributing to alcohol use disorders, significant challenges remain in understanding how the brain responds to low doses of alcohol and what molecular and cellular targets mediate the low dose effects of alcohol. Recent emerging neuroscience techniques, which allow the detection of neuronal activity with high temporal and/or spatial resolution in vivo, in combination with other research tools, will provide a great opportunity to address this challenge.

Research Objectives

NIAAA encourages applications that define the targets of low dose (≤10mM) alcohol at the molecular, cellular, and circuit level. Research areas of interest include, but not limited to:

- Determine the dynamic responses of neurochemically defined neuronal activity with high temporal and spatial resolution to low doses of alcohol in real time in vivo.
- Define specific types of neurons and associated neural pathways that are most sensitive to alcohol.
- Investigate how changes in neural pathways and circuits orchestrate the sensitivity to low dose alcohol.
- Identify specific subunit compositions of receptors, channels, or other signaling molecules that mediate the high neuronal sensitivity to alcohol in vivo.
- Understanding the molecular mechanisms underlying the interactions of alcohol with the most sensitive targets.

The goal of the FOA is to identify molecular targets of low dose alcohol. Applications that propose to study alcohol effects during the developmental stage and aging process are not responsive to this FOA. Validation that tissue alcohol concentration is at 10 mM or less is required, and blood alcohol measures must be included to allow consideration of applications. Applicants are *strongly* encouraged to consult the Scientific/Research Contact listed below to discuss the alignment of their proposed work with the objectives of this FOA.
Awards: Applications for an R01 award need to reflect the actual needs of the proposed project. Application budgets are limited to $250,000 direct costs annually.
Letter of Intent: March 21, 2016
Deadline: April 21, 2016, 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.
No late applications will be accepted for this Funding Opportunity Announcement.
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: Bone Marrow Failure Idea Development Award
Agency: Department of Defense, US Army W81XWH-16-BMFRP-IDA
RFP Website: http://www.grants.gov/web/grants/view-opportunity.html?oppId=281487
Brief Description: The BMFRP Idea Development Award is intended to support innovative ideas and high-impact approaches based on scientifically sound evidence to move toward the BMFRP vision of understanding and curing BMF syndromes. This award mechanism is designed to support new ideas. Proposed research studies should have a high probability of revealing new avenues of investigation. Research projects should include a well-formulated, testable hypothesis based on strong scientific rationale and a developed and well-articulated research approach. Personnel on the proposed team should have a strong background in BMF research. This funding opportunity is open to established and early career investigators. The FY16 BMFRP has included an opportunity for one or more scientifically meritorious applications from applicants fitting the outlined description of an early career investigator. All early career investigators will be assessed using different criteria for Personnel during the review process (Section III.B.1, Personnel). The definition of an early career investigator for the BMFRP is an investigator within 10 years of completing a terminal degree (doctorate or any medical degree), excluding time spent in medical residency, or during family medical leave. Time spent as a postdoctoral fellow is not excluded and must be within the 10-year span from the time of terminal degree. This should be clearly articulated by the applicant in the biographical sketch. Postdoctoral fellows are not eligible to apply as early career investigators. The following are significant features of this award mechanism: 1. Research Approach: The scientific rationale and

experimental methodology should demonstrate critical understanding and in-depth analysis of BMF. Experimental strategies may be novel or may be based on strong rationale derived from previously published data, presented preliminary data, or literature review. The feasibility of the research design and methods should be well defined, and a clear plan should be articulated as to how the proposed goals of the project can be achieved. Additionally, resources should be identified and supported through documentation. Identification of potential problems and pitfalls is strongly encouraged, with alternate approaches addressed. A statistical analysis of the proposed research should be included, if applicable, as well as a power analysis to support the design and sample size. 2. Preliminary Data: Preliminary data, such as unpublished results from the laboratory of the Principal Investigator (PI) or collaborators named on this application and/or data from the published literature relevant to BMF and the proposed research project, may be included but are not required. If preliminary data are not included, the proposed research should be based on a strong rationale with sound logical support from published literature. 3. Innovation: Innovative research may introduce a new paradigm, challenge existing paradigms, look at existing problems from new perspectives, or exhibit other creative qualities. This may include high-risk, potentially high-gain, approaches to BMF research, provided that the application demonstrates the potential for significant impact on the field of research, and/or patient care and/or quality of life. Research that is only an incremental advance is not considered innovative. 4. Impact: Proposed research projects should address a central critical issue or question in BMF research or clinical care. High-impact research will, if successful, significantly advance current methods and concepts for the prevention, detection, diagnosis, and/or treatment of BMF. 5. Personnel: Personnel are considered a crucial element of the BMFRP Idea Development Award. The application should demonstrate the investigator's expertise in BMF through the PI's background, research team, or through collaboration. Collaborations should be documented. a. An established investigator (EI) applying for the Idea Development Award should be at or above the level of Associate Professor (or equivalent). The established investigator should have BMF-related expertise and background as demonstrated by funding and publication records. The EI should plan research collaborations and dedicate a level of effort appropriate for the successful conduct of the proposed work. b. An early career investigator (ECI) applying for the Idea Development Award should be an independent investigator at the level of Assistant Professor, Instructor, or Assistant Research Professor (or equivalent) and less than 10 years from their terminal degree (excluding time spent in medical residency, or during family medical leave). This should be clearly articulated by the applicant in the biographical sketch. Postdoctoral fellows are not eligible to apply as ECIs. The early career investigator's training (postdoctoral or clinical) should demonstrate that the ECI will be able to accomplish the proposed work. Institutional commitment beyond financial backing such as, but not limited to, independent laboratory space, dedicated research time, and potential collaborations should be demonstrated. The level of effort dedicated to the proposed work by the ECI should be appropriate for the successful conduct of the research project.
Awards: Standard grants.
Deadline: July 13, 2016

Grant Program: Neural Engineering System Design (NESD)
Agency: Department of Defense DARPA - Biological Technologies Office
DARPA-BAA-16-09
RFP Website: https://www.fbo.gov/spg/ODA/DARPA/CMO/DARPA-BAA-16-09/listing.html

Brief Description: DARPA seeks proposals to design, build, demonstrate, and validate a neural interface system capable of recording from more than one million neurons and stimulating more than one hundred thousand neurons in proposer-defined regions of the human sensory cortex (e.g., visual cortex or auditory cortex). The complete system must demonstrate high-precision detection, transduction, and encoding of neural activity.
Awards: Cooperative Agreement.
Letter of Intent: Contact David Swan III, BAA Coordinator; DARPA-BAA-16-09@darpa.mil .
Deadline: April 14, 2016

Department of Energy

Grant Program: MEGA-BIO: Bioproducts to Enable Biofuels
Agency: Department of Energy DE-FOA-0001433
RFP Website: https://eere-exchange.energy.gov/default.aspx#FoaIdc37136da-600d-465e-b92d-ab4eca48e513
Brief Description: The U.S. Department of Energy (DOE), Office of Energy Efficiency and Renewable Energy (EERE) announces a notice of availability of funds for financial assistance addressing the development of flexible biomass to hydrocarbon biofuels conversion pathways that can be modified to produce advanced fuels and/or products based on external factors, such as market demand. These pathways could consist of a route to a *platform* chemical that could be converted to products or fuels or a route that *coproduces* chemicals and fuels.

BETO has a goal of meeting the 2022 cost target of $3/gallon gasoline equivalent (gge) for the production of renewable hydrocarbon fuels from lignocellulosic biomass. One approach BETO has taken previously to achieve this goal is to focus on conversion pathways that produce biofuels, with little or no emphasis on coproducing bioproducts. As BETO increasingly focuses on hydrocarbon fuels, it is examining strategies that capitalize on revenue from bioproducts as part of cost-competitive biofuel production.

A variety of technology pathways can be used to produce renewable hydrocarbon biofuels, but many of them require the production of value-added chemicals and products in the near-term to achieve an attractive rate of return on cost-competitive fuels. Value-added chemicals and products can also incentivize the de-risking of "front end" processes (from feedstock logistics through to deconstruction) which are also necessary for fuel production. It is important to note that while bioproducts are seen as a valuable strategy for enabling fuels, the BETO is **not** interested in pursuing R&D solely on bioproducts without a fuels component. The intent of this FOA, therefore, is to identify R&D projects that develop biomass to hydrocarbon biofuels conversion pathways that can produce variable amounts of fuels and products based on external factors, such as market demand. These pathways could consist of a route to a platform chemical that could be converted to products or fuels or a route that coproduces chemicals and fuels. Successful applications will include a clear justification for producing the target molecule(s) from biomass, a compelling narrative explaining how the target product(s) will enable biofuels, and supporting techno-economic analysis and life cycle analysis.
Awards: Up to $8,000,000. Minimum: $1,000,000
Deadline: April 15. The FOA is contained in the EERE eXHANGE system.
