Research Enterprise

June 23, 2016

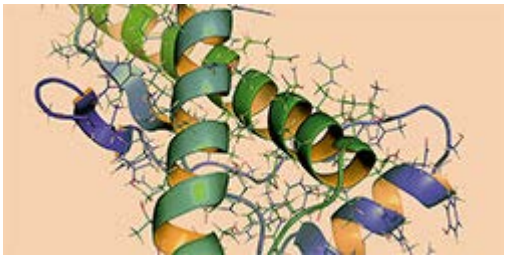
INSIDE THIS ISSUE:

- Feature Story
- Announcements
- Center Spotlight
- Faculty Spotlight
- Student Spotlight
- Translational Research Impact
- Events and Workshops
- Recent External Funding Awards
- Current External Funding Opportunities
- Identifying Funding Opportunities

FEATURE STORY

$1M grant from NIH fuels discovery and analysis of proteoforms

Opening the door to a better understanding of proteins and our ability to treat and prevent diseases, the National Institutes of Health awarded $1.18 million to faculty at the Indiana University School of Informatics and Computing at IUPUI and the IU School of Medicine for a research collaboration that unites two cutting-edge technologies in the discovery and analysis of proteoforms.



The structure of a protein

Professor Xiaowen Liu from the Department of BioHealth Informatics at the School of Informatics and Computing and professor Yunlong Liu from the Department of Medical and Molecular Genetics at the School of Medicine are principal investigators on the project, which combines their respective expertise in mass spectrometry-based top-down proteomics data analysis and RNA sequencing.

The research team for the project titled "Computational tools for top-down mass spectrometry-based proteoform identification and proteogenomics" also includes professor Harikrishna Nakshatri from the School of Medicine and professor Si Wu from the University of Oklahoma.

In tandem, the technologies represent an enormous leap in discovering and analyzing proteins that can now be seen "top-down," or intact, through mass spectrometry -- a bird's-eye view that presents a new world in comprehending the number and classification of proteins, as well as a challenge in grasping their breadth and complexity.

The limitations of previous tools necessitated breaking the proteins into pieces, and the data models used to analyze them don't translate to the comprehensive top-down view. Xiaowen Liu is one of the few researchers creating algorithms that accommodate the intricacy of the top-down mass spectrometry data.

His novel data model, the "mass graph," will incorporate Yunlong Liu's expertise in RNA sequencing modeling to further aid in accurate identification at the proteome level. RNA sequences provide information that enables more precision in creating a data template for targeting proteins. The team will also develop a software pipeline that utilizes these technologies.

How many proteoforms might be discovered? There may be hundreds of thousands, said Yunlong Liu. "The proteins are more than just a sequence of amino acids," he said. "Some amino acids can be modified, and this technology will allow us to see those modification patterns as well."

"Getting a better picture of proteoforms will enhance our understanding of living organisms -- and present the opportunity for advances in diagnosing patients," said Xiaowen Liu. "Comparing the protein forms for healthy samples and patient samples could reveal biomarkers that will improve medical prognoses."

Yunlong Liu said there are very promising translational benefits for treatments. "We need to understand the form of the protein before we design a drug to target it," he said. "And so there is great therapeutic potential."

ANNOUNCEMENTS

IU technologies promoted to biotech, pharma executives at 2016 BIO International Convention

Jennifer Finefield

Technologies discovered and developed by Indiana University researchers were promoted to biotechnology and pharmaceutical executives June 6 through 9 at the 2016 BIO International Convention in San Francisco.


Katherine Moynihan

Jennifer Finefield and Katherine Moynihan of the Indiana University Research and Technology Corp. planned to promote the technologies and build relationships within the biotechnology and pharmaceutical sectors at the conference. IURTC protects, markets and licenses intellectual property developed at Indiana University so it can be commercialized by industry.

Finefield, a senior technology manager, said the conference attracts thousands of leaders in the biotechnology and pharmaceutical sectors.

Both researchers planned ahead of time to meet with more than 30 companies that have asked about Indiana University technology. "We have also proactively targeted companies based on some of the outstanding technologies that we want to market. These networking meetings will increase the visibility of the IURTC technology portfolio," Finefield explained.

Some IU technologies that were promoted during networking meetings include:

*A therapeutic for polycystic kidney disease created by Bonnie Blazer-Yost, School of Science at IUPUI
*A therapy for healing bones created by Melissa Kacena, School of Medicine
*Diagnostic markers for longevity created by Dr. Alexander B. Niculescu, School of Medicine
*Diagnostic and predictive markers for diabetes created by Dr. Raghu Mirmira, School of Medicine
*Immunotherapy for acute leukemia created by Dr. Sophie Paczesny, School of Medicine

Moynihan, an IURTC technology manager, and Finefield also met with consultants and venture capitalists at the event.

"These experts could strengthen the companies developed through IURTC's Spin Up program, which helps IU researchers license and commercialize their work," she said. "Some of the attendees of the conference have funds to invest in that kind of company."

To learn more about IURTC and the resources they provide to IU researchers, go to http://iurtc.iu.edu/about/index.shtml.

IUPUI faculty can also contact Karen White, in the Office of the Vice Chancellor for Research, at 317-274-1083 or kfwhite@iupui.edu to explore how to prepare and move concepts and technologies along the "invention pipeline", and when to engage the expertise at the IURTC.

CENTER SPOTLIGHT

Wells Center researchers uncover signaling pathway interactions that help pattern the lower jaw

Cranial facial defects are a commonly encountered birth defect in newborns. Many of these encountered abnormalities require surgical interventions. Disruption of the patterning on the developing lower jaw (the mandibular arch) account for many of the craniofacial defects observed in newborns and gaining an understanding of how the lower jaw is patterned is paramount to developing prophylactic steps to reduce the frequency of cranial facial defects in infants.


Anthony Firulli, PhD

In a new study published in *the Proceedings of the National Academy of Science*s a research team led by Anthony Firulli, PhD at the Wells Center for Pediatric Research has uncovered a complex molecular mechanism allowing the lower jaw to pattern correctly at the facial midline. The work focuses on the transcriptional regulation of a basic Helix-loop-Helix (bHLH) transcription factor called HAND1 and how this gene is regulated in a tightly focused pattern within midline of the developing mandible.

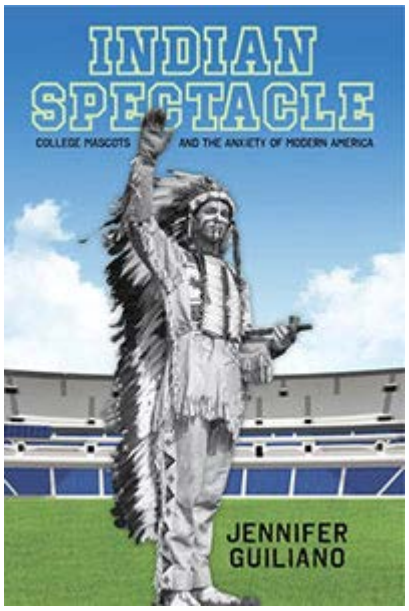
The team found two signaling programs that either enhance or inhibit *Hand1* expression by regulating a small evolutionarily conserved transcriptional enhancer. Bone Morphogenetic Protein (BMP) and Endothelin1 (Edn1) signals, which initially work in concert, take on antagonistic roles in regulating mandibular gene expression and this antagonism is directly reflected by changes in *Hand1* expression. Authors show that both BMP and activation of HAND2, a related bHLH transcription factor, augment *Hand1* expression – expanding to more proximal jaw domains. In contrast, Edn1-induced Distal-less Homeobox 5 (DLX5) and DLX6 expression transcriptionally turn off *Hand1* completely. The expression domains of *Hand1* and *Dlx5/6* genes appear as an inverse image of each other within the mandible and by manipulating BMP signaling activity *Hand1* expression expands while *Dlx5/6* retracts, thus re-patterning mandible gene expression. The Authors also show that reducing *Hand* gene dosage within the forming jaw results in a fusion of the lower incisors, a phenotype that is also observed when BMP signaling is disrupted.

When you consider the diverse facial features of vertebrates, say when comparing an elephant with a with a mouse or a human, it is not surprising to observe that very small changes in the expression of conserved gene regulatory networks can alter facial features in dynamic ways. The majority of the encountered variations within humans are deleterious so understanding which gene regulatory networks are causative of craniofacial defects, allows us to move towards formulating pharmacological strategies to lessen the need for corrective surgeries in children with an all too common congenital birth defect.

FACULTY SPOTLIGHT

Liberal Arts professor's book explores history, controversy of Native American sports mascots

The Washington Redskins. The Atlanta Braves. The Cleveland Indians. The Florida State Seminoles. The Central Michigan Chippewas. The Fighting Illini. In the world of sports-from pee wee teams to major leagues-Native American team names have long been part of the game. And controversy has often followed.



Assistant professor of history Jennifer Guiliano, author of Indian Spectacle: College Mascots and the Anxiety of Modern America (Rutgers University Press), brings light to Native American-related sports mascots and the inherent controversy. Guiliano's work covers the history and culture clash involved in choosing Native American names and images for sports franchises.

"There's a lot of history behind using native imagery as representation in America," said Guiliano. "That starts in the 18th and 19th century, when in newspapers, in articles and advertisements, you have representations of Indianness. It wasn't unusual to see illustrations of Indians. Where it becomes tied to mascotry is in the 1920s when the University of Illinois—in an attempt to create a halftime spectacle for its band performance—merges in Indian representation, and you see the origins of Indian mascotry."


Jennifer Guiliano

While the Washington Redskins continue to fight the most high-profile battle for retaining a team name, the Native American as sports mascot is slowly working its way out of sporting culture, said Guiliano. Over the past few years, high schools and colleges have worked to remove Native American-related imagery from their campuses. At Amherst College, for example, the university recently decided to do away with its unofficial mascot, Lord Jeffrey Amherst. He was an 18th-century Massachusetts military commander who, in 1763, endorsed giving smallpox-infected blankets to Native Americans. On a professional level, since the 1990s, new sports leagues such as Major League Soccer and the Women's National Basketball Association (WNBA) have opted for abstract mascots such as the San Jose Earthquakes or Indiana Fever-entirely removing culturally sensitive issues from the equation.

Guiliano knows first-hand the power of long-established Native American team names and mascots. She grew up in a family of University of Illinois Fighting Illini fans. But it wasn't until she attended college at Miami University in Ohio—entering as a freshman the year the university changed its mascot from the Redskins to the Redhawks—that she began to understand what was at stake when Native American icons and representations are used in the context of sports.

One of Guiliano's major hypotheses about the use of racial mascots involves white male anxiety in the early 20th century. That anxiety, she argues, led many in the American middle class to turn to sports as a way to define masculinity after World War I.

"I think there is still a lot of concern about who we are as Americans and what it means to be Americans in a 21st-century global way," Guiliano said. "And I think a lot of people want to

align themselves with their local communities and schools and feel that they are part of something. Mascotry and the talk of mascotry really has a lot to do with people's desires to belong to something."

But what effect do team names and images have on Native American children when they see their cultures inaccurately depicted and stripped of historical context? Research has led experts to link Native American mascots to self-esteem issues, poor school performance, and even substance abuse and suicide in Native American families and communities.

Despite the ongoing battle, Guiliano hopes this will be a non-issue in 20 years. She said one of the great assets to countering pro-mascot sentiments is the liberal arts, which allows students not only to learn and understand the issue's origins but also, critique and counter supportive arguments.

"Learning sociology, political science, English and all of these great liberal arts disciplines teaches you how to listen to someone tell you something and think, 'Do they have good evidence?', 'Is this a good argument?' Then, when you have an argument you want to make, you are much more articulate and organized and empathetic to the context," she said. "That's where the power of a liberal arts education comes into play with this. We're not just better informed about what happened in the past and what is going on in the present, but we're also more savvy consumers. We become much more engaged than we would be without the liberal arts."

STUDENT SPOTLIGHT

IUPUI undergraduate research team wins competitions for investigating plasma-assisted turbulent jet ignition for rapid-combustion applications

The plasma hot jet-ignition team project funded by the IUPUI Multidisciplinary Undergraduate Research Institute (MURI) won first place in the technical-design competition of the American Institute of Aeronautics and Astronautics (AIAA) Region III Student Conference held this spring, at the University of Illinois Urbana-Champaign.


(left to right) Jesse Burton, Zach Wozniak, Cameron Hedrick and Daniel Robinson with first-place certificate for technical design

This team of undergraduate students of diverse disciplines was composed of Zach Wozniak, a physics major; Jesse Burton, an electrical engineering major; with Daniel Robinson, Cameron Hedrick, and Qiuyu Deng from mechanical engineering. These college students, under the mentorship of Ali Tarraf Kojok, graduate student, Department of Mechanical Engineering; Mohammad Ebrahim Feyz, doctoral student, Department of Mechanical Engineering; and Associate Professor of Engineering Technology Afshin Izadian worked industriously throughout the 2015-2016 academic year at the Combustion and Propulsion Research Lab directed by Professor of Mechanical Engineering Razi Nalim to design a new ignition system. The one they successfully designed is part of an efficient combustor concept geared toward reducing fuel consumption. The plasma MURI team presented their research before a panel of judges from the aerospace industry, including The Boeing Company and Rolls-Royce Corporation, with favorable reviews. They also took part in the technical-design challenge to build the fastest flying blimp, competing against more than 10 teams from other participating universities. Their blimp broke the records, landing the team first prize.

TRANSLATIONAL RESEARCH IMPACT

Study shows tax on plug-in vehicles is not answer to road-funding woes


Jerome Dumortier

Given declining revenues from gasoline and diesel fuel taxes and the need for new ways of funding road infrastructure, state and federal policymakers are considering or have enacted annual registration fees for plug-in vehicles. In a paper to be published in the August issue of Energy Policy, researchers at Indiana University-Purdue University Indianapolis say that approach is misguided.


Seth Payton

According to the paper, the registration fees already adopted by at least eight states reflect concerns about how the growing number of electric vehicles may affect road infrastructure funding. Electric vehicles do not contribute through fuel taxes to road construction and maintenance.

Those concerns are reflected by a Washington state legislator who is quoted as saying, "electric cars will be driving on the highway right along with all the other cars … we believe they should be paying their fair share."

In the paper, "Plug-in vehicles and the future of road infrastructure funding in the United States," Jerome Dumortier and Seth Payton, assistant professors in the School of Public and Environmental Affairs, and Matthew Kent, a former graduate student, assess the magnitude of the decline in federal tax revenue caused by plug-in vehicles and quantify the revenue that could be generated from a federal plug-in vehicle registration fee.

The primary revenue-related issue for transportation infrastructure is the extent to which transportation construction and maintenance are tied to gasoline and diesel consumption, Dumortier said.

Given the erosion of the gasoline and diesel tax base, the federal Highway Trust Fund has suffered a decline in its balance and experienced significant funding shortfalls, according to the paper. Over the last seven years, lawmakers have had to transfer $65 billion from the United States' general fund to the Highway Trust Fund to keep it solvent.

One reason that erosion occurred is an increase in fuel efficiency, Dumortier said. Between 1980 and 2012, average fleet fuel efficiency increased from 15.97 to 23.31 miles per gallon, a 30 percent reduction in fuel consumption of the average vehicle.

Another reason is the non-adjustment for inflation of the fuel tax rate at the federal level and in most states, allowing the real tax rate to decline over time, Dumortier said.

On the other hand, the erosion in the tax base is only minimally attributable to plug-in vehicles, at most 1.6 percent, Dumortier said.

"The lesson for policymakers is that plug-in vehicles do not contribute significantly to the funding shortfall in the short- and medium run, and a supplemental tax on plug-in vehicles would generate only a small percentage of additional revenue," he said. "We show that the majority of the funding shortfall is due to the non-adjustment of fuel taxes and the increase in fuel efficiency. Thus a registration fee would not alleviate the funding shortfall."

Registration fees for plug-in vehicles also fly in the face of policies intended to promote their use due to concerns about energy independence, energy efficiency and greenhouse gas emissions, Dumortier said.

The researchers cite a federal income tax credit as high as $7500 to incentivize the purchase of battery electric vehicles and state and local government credits or exemptions to sales taxes, excise taxes, registration fees and parking fees.

Even with those incentives, the Energy Information Administration estimates the share of plug-in vehicles in 2040 will be 5.14 percent in its most optimistic scenario, according to the paper.

At least eight states have imposed a vehicle registration fee, ranging from $50 to $200, for alternative-fuel vehicles: Colorado, Georgia, Idaho, Nebraska, North Carolina, Virginia, Washington and Wyoming.

"We hypothesize that the impact of plug-in vehicles at the state level is as small as it is at the federal level in relative terms. Imposing an additional registration fee at the state level will likely have a very small impact on government finances coming from fuel tax revenue," the researchers said.

In the long run, the United States should shift its road infrastructure funding away from gasoline taxes to an alternative system that should be, as most research suggests, based on vehicle miles traveled, according to the paper.

EVENTS AND WORKSHOPS

Get Published, Write Winning Proposals, Produce Effective Presentations and Communicate Interculturally: A Workshop Series Organized By "Internationally Renowned" Applied Linguist *Dr. Ulla Connor*

Workshops include:
Academic Writing for Publication in English
Scientific Grant Proposal Writing
Communication Skills for Oral Presentations

All of the workshops are designed to assist international faculty, researchers and graduate students to improve their oral, written and intercultural communication strategies and to provide engaging, hands-on learning activities. For registration dates and more information, please visit https://liberalarts.iupui.edu/icic/pages/workshops/. For questions, feel free to contact Ulla Connor at 317-278 2441 or by email at uconnor@iupui.edu. Register early, space is limited!!

Sponsoring Organization:
International Center for Intercultural Communication (ICIC) at IU School of Liberal Arts

In Partnership With:
The Office of the Vice Chancellor for Research & The Center for Teaching and Learning

Communicating Science Series

Back by popular demand! This three-session series is designed to train participants to communicate complex scientific topics more effectively to non-experts like patients, learners,

lawmakers, and funders. This program is free and open to all IUSM and IUPUI faculty and graduate students.

All participants are asked to commit to the entire three workshop series, as each session builds upon the previous. Please note, if you register for this event, you will be registered for all three sessions. The workshop series includes: Connecting with your Audience, Distilling your Message, Media Training for Scientists and Physicians.

This event is sponsored by the IUSM Office of Faculty Affairs and Professional Development. The Communicating Science program is part of IU's affiliation with the Alan Alda Center for Communicating Science, in partnership with the IUPUI Center for Teaching and Learning and the IUPUI School of Science.

Questions should be directed to the Office of Faculty Affairs and Professional Development at (317) 278-3089 or email at ofapd@iupui.edu.

Click here to register.

RECENT EXTERNAL FUNDING AWARDS

Grants and Awards – May 2016

PI	Agency	Project Title	School	Department	Total
Guise, Theresa Ann	NATIONAL CANCER INSTITUTE	Novel mechanism and therapeutic target for cancer chemotherapy-induced neurocognitive impairments	MEDICINE	ENDOCRINOLOGY	$3,162,537
Clark, Daniel O.	NATIONAL HEART, LUNG AND BLOOD INSTITUTE	APP-ME: Addressing Place & People MicroEnvironments in weight loss disparities	MEDICINE	GENERAL INTERNAL MEDICINE	$2,657,804
Czachowski, Cristine Lynn	NATIONAL INSTITUTE ON ALCOHOL ABUSE AND ALCOHOLISM	Training Grant on Genetic Aspects of Alcoholism	MEDICINE	PSYCHOLOGY	2,483,195
Gregory, Richard L	KING SAUD UNIVERSITY	Indiana University School of Dentistry - King Saud University School of Dentistry Graduate Student Collaboration	DENTISTRY	DENTISTRY-RESEARCH	$1,333,333
Renbarger, Jamie L	NATIONAL INSTITUTE OF CHILD HEALTH, HUMAN DEVL.	Postdoctoral Research Training in Pediatric Clinical and Developmental Pharmacology	MEDICINE	PED-HEMATOLOGY/ONCOLOGY	$1,064,739
Watson, Dennis P	INDIANA DIVISION OF MENTAL HEALTH AND ADDICTION	Evaluation of Indianans' Medication Assisted Treatment (MAT) Program	PUBLIC HEALTH	CENTER FOR HEALTH POLICY	$394,556
Ware, Stephanie	MARCH OF DIMES BIRTH DEFECTS FOUNDATION	The Cytogenomics of Cardiovascular Malformations Consortium Registry	MEDICINE	PED-GENETICS RESEARCH	$339,102
Kwo, Paul Y.	UNIVERSITY OF FLORIDA	THE PRIORITIZE STUDY: A Pragmatic, Randomized Study of Oral Regimens for Hepatitis C: Transforming Decision-Making for Patients, Providers, and Stakeholders	MEDICINE	GASTROENTEROLOGY	$317,100
Harris, Tara L	INDIANA CRIMINAL JUSTICE INSTITUTE	Pediatric Center of Hope	MEDICINE	PED-CHILD PROTECTION PROGRAM	$191,418
Nephew, Kenneth P	NORTHWESTERN UNIVERSITY	An Epigenetic Strategy for Restoring Carboplatin Sensitivity in Ovarian Cancer	MEDICINE	MEDICAL SCIENCES PROGRAM	$161,850
Christopher, Lauren Ann	NAVAL SURFACE WARFARE CENTER CRANE DIVISION	Particle Swarm Optimization (PSO) for Asset Allocation in a Dynamic Electronic Spectrum	E&T	ELECTRICAL & COMPUTER ENGR	$149,994

Schrader, Stuart M	MARION COUNTY HEALTH DEPARTMENT	16-17 Marion County Public Health Department Professional Service Grant, Ryan White Services Program: Oral Health Fee for Dental Service and Outreach Services	DENTISTRY	DENTISTRY-RESEARCH	$137,500
McKinley, Todd Owen	JOHNS HOPKINS UNIVERSITY	A Multi Center Prospective Observational Study of Nerve Repair and Reconstruction Associated with Major Extremity Trauma	MEDICINE	ORTHOPAEDIC SURGERY	$132,300
DiMeglio, Linda A	BENAROYA RESEARCH INSTITUTE AT VIRGINIA MASON	Immune Tolerance Network	MEDICINE	PED-ENDOCRINOLOGY/DIABETOLOGY	$126,226
Noonan, Doug	CHARLES G KOCH CHARITABLE FOUNDATION	True Cost of Public Safety	PUBLIC & ENVIRONMENTAL AFFAIRS	SPEA	$112,000
Ray, Brad	INDIANA JUDICIAL CENTER	Evaluation of the Indiana Evidenced-Based Pretrial Release Pilot	PUBLIC & ENVIRONMENTAL AFFAIRS	SPEA	$100,000

CURRENT EXTERNAL FUNDING OPPORTUNITIES

Funding opportunities in this section include selected current grant announcements from federal agencies for new initiatives and changes to existing programs. Announcements with limited scope are not listed here but instead are sent directly to IUPUI School Deans. For comprehensive coverage of funding opportunities, please use the links below to search online tools.

NATIONAL ENDOWMENT for the HUMANITIES

Collaborative Research Grants: Collaborative Research Grants support interpretive humanities research undertaken by two or more collaborating scholars, for full-time or part-time activities for periods of one to three years. Support is available for various combinations of scholars, consultants, and research assistants; project-related travel; field work; applications of information technology; and technical support and services. All grantees are expected to disseminate the results of their work to scholarly and public audiences.

Eligible projects include the following: research that significantly adds knowledge and understanding of the humanities; conferences on topics of major humanities importance that will benefit scholarly research; and archaeological projects that include the interpretation and dissemination of results. *Deadline: Pre-Application (optional): October15, 2016; Application: December 9, 2016.* http://www.neh.gov/grants/guidelines/collaborative.html

NATIONAL INSTITUTES OF HEALTH

Support of NIGMS Program Project Grants (PO1): This opportunity encourages innovative, interactive Program Project grant applications from institutions/organizations that propose to conduct research which aims to solve a significant biological problem, important for the mission of NIGMS, through a collaborative approach involving outstanding scientists. The Program Project grant is designed to support research in which the funding of several interdependent projects as a group offers significant scientific advantages over support of these same projects as individual regular research grants. *Deadline: Sept. 7, 2016.* http://grants.nih.gov/grants/guide/pa-files/PAR-13-280.html

Global Network for Women's & Children's Health Research Data Coordinating Center (U24): This opportunity, issued by the Eunice Kennedy Shriver National Institute of Child Health and Human Development, invites grant applications from institutions/organizations willing to participate with the NICHD as the Data Coordinating Center under a cooperative agreement in an ongoing multi-center international research network designed to perform randomized clinical trials, using common protocols, to reduce the major risk of maternal, neonatal, infant, and early childhood mortality and significant morbidity in low income countries. *Deadlines: Letter of Intent: July 30, 2016; Application: August 30, 2016.* http://grants.nih.gov/grants/guide/rfa-files/RFA-HD-17-010.html

Household Air Pollution Health Outcomes Trial (UM1): This opportunity seeks applications from institutions/organizations for a cooperative agreement research grant (UM1) to conduct a clinical trial across three or more Low and Middle Income Country (LMIC) settings to test improved stove and fuel interventions on health outcomes in exposed populations. In addition, each application must include a biomarker center element for the development and validation of clinical, physiological, chemical, biochemical and/or microbiological markers of: a) exposure, and b) pathophysiological responses.

Components of Participating Organizations: National Heart, Lung, and Blood Institute (NHLBI), National Cancer Institute (NCI), Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), National Institute of Environmental Health Sciences (NIEHS), Fogarty International Center (FIC), Office of Strategic Coordination (Common Fund) *Deadlines: Letter of Intent: Dec. 1, 2016; Application: Jan. 19, 2017.* https://grants.nih.gov/grants/guide/rfa-files/RFA-HL-16-012.html

NATIONAL SCIENCE FOUNDATION

DEVELOPING A NATIONAL RESEARCH INFRASTRUCTURE FOR NEUROSCIENCE (NeuroNex): Understanding the brain is one of the grand scientific challenges at the intersection of experimental, theoretical, and computational investigation in the life, physical, behavioral, and cognitive sciences. Achieving a comprehensive, transformational understanding of the brain in action and in context will require an increased emphasis on systematic, interdisciplinary collaboration and team science, and the increased use of theoretical frameworks, including evolutionary ones, to explore questions that span organizational levels, scales of analysis, and a wider range of species optimal for experimental exploration of brain function.

The goal of this solicitation is to foster the development and dissemination of 1) innovative research resources, instrumentation, and neurotechnologies, and 2) theoretical frameworks for understanding brain function across organizational levels, scales of analysis, and/or a wider range of species, including humans. This interdisciplinary program is one element of NSF's broader effort directed at Understanding the Brain. The NSF envisions a connected portfolio of transformative, integrative projects that create synergistic links across investigators and communities, yielding novel ways of tackling the challenges of understanding the brain in action and in context. *Deadlines: Letter of Intent: September 2, 2016; Application: October: 21, 2016* http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505281

MacroSystems Biology and Early NEON Science: The MacroSystems Biology and Early NEON Science: Research on Biological Systems at Regional to Continental Scales program will support quantitative, interdisciplinary, systems-oriented research on biosphere processes and their complex interactions with climate, land use, and invasive species at regional to continental scales as well as planning, training, and development activities to enable groups to

conduct MacroSystems Biology and Early NEON Science research. *Deadline: October 17, 2016.* http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf16521

PFIZER, INC.

Accelerating Improvements in Medication Optimization: The goal of this opportunity is to support the development of processes and practices that optimize medication prescribing for and treatment of patients with rheumatoid arthritis (RA). Pfizer Independent Grants for Learning & Change (IGLC) and the Institute for Healthcare Improvement (IHI) are collaborating to offer a new opportunity focused on medication optimization, a concept developed by IHI that is focused on four key areas for medication management: 1) optimal medication selection (including shared decisions that incorporate patient preferences and circumstances); 2) coordinated prescribing among providers; 3) clear timeframes for medication duration and follow-up; and 4) improved adherence.

Projects that include the following factors will be given high priority: 1) Utilization of scientific improvement principles and methods (e.g., Lean, Lean SixSigma, Model for Improvement); 2) Reducing disparities in the care of patients (all proposals must indicate how the applicant will identify and address equity in the population it serves); and 3) Maximum likelihood to directly impact patient care. Projects should include an educational element to the research intervention. Deadlines: Letter of Intent: August 1, 2016; Application: Oct. 3, 2016. http://www.pfizer.com/responsibility/grants_contributions/request_proposals

SIMONS FOUNDATION AUTISM RESEARCH INITIATIVE (SFARI)

Bridge to Independence Award: The autism research community has expanded substantially in recent years and SFARI has contributed to this change by attracting outstanding established scientists to the field of autism. In order to sustain this level of scientific excellence in future years, SFARI is extending support to promising early-career investigators. One of the most salient milestones in a scientific career is the transition from formal mentorship to an independent position. Unfortunately, this transition has become increasingly tenuous in recent years, in part because of the decreasing number of tenure-track faculty positions, compounded by the increasing number of Ph.D. graduates and postgraduate traineeships. SFARI created the Bridge to Independence Award program to address this issue and to encourage continued excellence in the autism research field.

Grants awarded through the Bridge to Independence Award program are intended to invest in the next generation of top autism investigators by identifying talented early-career scientists interested in autism research and facilitating their transition to an independent research career. This RFA is aimed at senior postdoctoral fellows who intend to seek tenure-track faculty positions during the 2016-17 academic year. *Deadlines: Letters of Recommendation: August. 1, 2016; Stage 1 Application: August 8, 2016.* https://sfari.org/funding/grants/bridge-to-independence-rfa/bridge-to-independence-award-request-for-applications

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NOTE: *All faculty, researchers, and scientists on continuing contracts at IU interested in applying for Department of Defense funding are eligible for assistance by the consulting firm--Cornerstone Government Affairs-arranged by the Vice President for Research. Those interested in securing assistance from Cornerstone must submit a 2 page summary of their research project.*

IDENTIFYING FUNDING OPPORTUNITIES

On-line search tools are available to IUPUI investigators who are interested in identifying funding opportunities in their areas of interest.

Community of Science (COS): COS is a primary on-line search tool for identifying funding opportunities. To take advantage of this tool, register at http://www.cos.com/login/join.shtml. Once you have completed the short registration process, you can personalize your search by selecting the option entitled "launch your workbench". You can access federal, local, corporate, foundation, nonprofit and other funding opportunities using key terms and save the results of up to 20 searches and have them delivered to you weekly via email.

National Institutes of Health (NIH) "NIH Guide": To take advantage of this search tool, register at http://grants.nih.gov/grants/guide/listserv.htm. It allows you to receive discipline specific funding opportunities that are delivered to you weekly via email.

National Science Foundation (NSF) "MyNSF": To take advantage of this search tool, register at http://service.govdelivery.com/service/multi_subscribe.html?code=USNSF&custom_id=823. It allows you to receive discipline specific funding opportunities that are delivered to you weekly via email.

Federal Business Opportunities "FedBizOpps": FedBizOpps is the single government point-of-entry for Federal government procurement opportunities over $25,000. To take advantage of this search tool, visit https://www.fbo.gov. Opportunities found at this site include, but are not limited to, presolicitations and special notices for research and service contracts for specific projects and some national centers and surveys that would not be found in Grants.gov and may not be found in the Community of Science.

Limited Submission Funding Opportunities:

Many federal agencies and foundations offer grants, awards and fellowships that limit the number of applications that can come from one institution or require special handling. In order to comply with agency and foundation guidelines and increase the chances of Indiana University (IU) succeeding in such limited submissions and special handling opportunities, IU policies and procedures are in place and are utilized by the Office of the Vice Chancellor for Research and other IU research offices to facilitate internal coordination and competitions.

Individuals interested in responding to limited submission opportunities must inform the Office of the Vice Chancellor for Research about their intent to apply to a given limited submission opportunity, such that they can be included in the internal review and selection process. Failure to do so may disqualify individuals from consideration for submission to the funding opportunity.

Individuals interested in a limited submission opportunity or have any questions about the internal coordination process, contact Etta Ward at emward@iupui.edu or 317-278-8427. For a description of upcoming limited submission funding opportunities, as well as guidelines and application forms, go to: http://research.iu.edu/limited_sub.shtml. Please note that this is not a comprehensive list, and that any external funding opportunity that imposes any type of submission limitation is subject to the IU limited submission policy and procedures.

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