

Research Enterprise

June 12, 2014

The Office of the Vice Chancellor for Research (OVCR) publishes the RESEARCH ENTERPRISE to keep the academic community and the community at large informed about research activities, opportunities and development on the IUPUI campus.

Research Offices:

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If you have a news item or recent noteworthy research-related achievement that you would like to share, please see the [Research Enterprise Submission Guidelines](#).

Please be aware that not all news items will be deemed appropriate or timely for publication, but each item will be carefully considered.

INSIDE THIS ISSUE:

- [Feature Story](#)
- [Announcements](#)
- [Center Spotlight](#)
- [Faculty Spotlight](#)
- [Student Spotlight](#)
- [Translational Research Impact](#)
- [Recent External Funding Awards](#)
- [Current External Funding Opportunities](#)
- [Identifying Funding Opportunities](#)

FEATURE STORY

IUPUI Receives In-kind Software Grant from Siemens PLM Software

IUPUI on Tuesday, May 20, 2014 announced that it received an in-kind software grant from Siemens PLM Software, with a commercial value of \$538 million.

"This partnership is a tremendous opportunity for IUPUI students to benefit from having access to state-of-the-art technology that will help prepare them for an evolving 21st Century advanced manufacturing economy," said IUPUI Chancellor Charles R. Bantz. "We thank Siemens for their vision and commitment and look forward to realizing the great potential of this collaboration."

The in-kind grant gives students access to the same product lifecycle management (PLM) technology that companies around the world depend on every day to develop innovative products in a wide variety of industries including automotive, aerospace, machinery, shipbuilding, high-tech electronics and many more. Graduates with this type of software training are highly-recruited candidates for advanced technology jobs.

"This partnership enables us to meet the needs of employers and prepare students for these significant high-paying STEM careers," said Dr. David J. Russomanno, dean, Purdue School of Engineering and Technology.

The in-kind grant was provided by Siemens PLM Software's academic program that delivers PLM software technology to more than one million students yearly at more than 12,000 global institutions. The software provided is used at every academic level – from grade schools to graduate engineering research programs.

The initiative, jointly spearheaded by the Purdue School of Engineering and Technology and the Office of the Vice Chancellor for Research at IUPUI, will incorporate the state-of-the-art software in both teaching and research activities.



Kody Varahramyan, Charles R. Bantz, Bill Boswell, David J. Russomanno, and Doug Bresnahan (Andretti Autosport)

"We are delighted to work with Siemens PLM Software to provide IUPUI students and researchers with a leading-edge technology platform for transforming ideas into innovative products," said Dr. Kody Varahramyan, IUPUI's Vice Chancellor for Research.

Siemens PLM Software is a leading global provider of product lifecycle management (PLM) software and services with 9 million licensed seats and more than 77,000 customers worldwide, delivering open solutions to help its customers make smarter decisions that result in better products.

The in-kind grant to IUPUI includes Siemens PLM Software's:

*Teamcenter® portfolio, the world's most widely used digital lifecycle management software

*Tecnomatix® portfolio, the industry-leading digital manufacturing software

*NX™ software, a leading integrated solution for computer-aided design, manufacturing and engineering (CAD/CAM/CAE)

*Solid Edge® software, the most complete hybrid 2D/3D CAD system

*Fibersim™ portfolio of software for composites engineering

"We know STEM jobs are on the rise and yet many of our customers today cannot find technically qualified candidates," said Bill Boswell, senior director, partner strategy, Siemens PLM Software. "This grant enables IUPUI to bridge the technical skills gap and provide industries with graduates prepared for rewarding STEM careers."

"We have met with the Purdue School of Engineering and Technology as they explore the issues and status of product life cycle management incorporation, methodologies and tools. It is really exciting to see how interested their team is in capturing the industry perspective," said Vince Newsom, engineering group manager at Delphi Automotive PLC. "I wish them every success as they establish this new initiative and look forward to working with them in the future. The initiative will be a real asset for industry in Central Indiana. "

ANNOUNCEMENTS

Library Dean's 'Landmark' Article Chosen for College & Research Libraries 75th Anniversary Issue

Readers of College & Research Libraries have selected an article written by IUPUI University Library Dean David W. Lewis as one of [seven "landmark" articles](#) to be published in a special journal for the association's 75th anniversary.

Originally published in July 1988, Lewis' article "Inventing the Electronic University" foreshadowed many of the key technologies, such as the digital collection, that University Library at Indiana University-Purdue University Indianapolis and the campus are leveraging today to effectively engage with students and the wider community.

Lewis argued that the rapid evolution of information technology employed in teaching, learning and research presages a "fundamental change" in higher education



Dean David Lewis

that will require academic libraries to be less concerned with "the automation of old systems" and more concerned with the "restructuring of institutions."

"David Lewis' innovation and leadership have a lasting legacy in IUPUI's pioneering efforts to integrate information technology across the academic enterprise, especially in University Library," said Nasser Paydar, executive vice chancellor and chief academic officer. "He is most deserving of this recognition as a national thought-leader and author from College & Research Libraries' 75-year history."

Lewis is also Indiana University assistant vice president for digital scholarly communication and as such has responsibility for advancing the university's efforts to foster open access to scholarly research by developing new models for scholarly publication that enable scholars, and their collective communities, to re-assert control over rights to scholarship literature.

In March, the editorial board and past editors of College & Research Libraries identified 30 articles from the journal's history, including Lewis', as finalists for publication in the special issue scheduled for March 2015. Readers were asked to select six articles from the 30, plus a reader's choice, for publication.

College & Research Libraries is the official scholarly research journal of the [Association of College & Research Libraries](#), a division of the American Library Association. More than 300 readers voted on the landmark articles. The chosen articles will also be a topic for discussion at the Association of College Research Libraries 2015 Conference in Portland, Ore.

"Reviewing every article published in the journal since 1939 reminded the editorial board of the incredible contributions that our authors have made to research and practice in academic librarianship over the past 75 years, and we are looking forward to reflecting on those contributions and considering what they mean for the future of research in our field with the publication of this special issue in March 2015," said C&RL Editor Scott Walter of DePaul University.

Located at 755 W. Michigan St. in the heart of the IUPUI campus, University Library is a public library, serving nearly 1 million visitors a year, 10 percent of them community users. University Library supports students and faculty across all of IUPUI's more than 200 degree programs with research expertise and a wide array of resources. Any resident of Indiana is eligible for an IUPUI University Library card.

IAHI Faculty Affiliates Applications Sought

Established in 2012, the IUPUI Arts and Humanities Institute supports the campus-wide attainment of



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excellence in research and creative activity; serves as a campus liaison to the central Indiana community; and fosters ongoing partnerships and ventures that advance arts and humanities endeavors at IUPUI and in Indianapolis.

IAHI seeks applications for its new Faculty Affiliates program. Membership is open to full-time, tenure-track IUPUI faculty who will promote arts and humanities related research and creative work, collaboration, and public scholarship as summarized in the mission of the IUPUI Arts and Humanities Institute.

To learn more about how to become an IAHI Faculty Affiliate, go to http://www.iupui.edu/~iahi/?page_id=2612. Questions can be directed to Dr. Jason Kelly at (317) 274-1689 or jaskelly@iupui.edu.

CENTER SPOTLIGHT

IUPUI Study of Project Lead The Way Indicates STEM Program's Positive Impact on High School Graduates



Project Lead The Way students at work.

A new study of Indiana high school graduates indicates that participants in the STEM curricular program [Project Lead The Way](#) are more likely to choose a college major in a science, technology, engineering or math field and to continue their education into the second year of college.

The study from the [Center for Urban and Multicultural Education](#) at the IU School of Education examined data about nearly 60,000 graduates, including nearly 4,000 who participated in Project Lead The Way, from the Indiana Department of Education and the National Student Clearinghouse. Researchers were looking for evidence that participation in the high school program had an impact on college enrollment, persistence toward a degree and pursuit of STEM majors.

[The study paper](#) is written by Dr. Gary Pike, professor of higher education and student affairs at the IU School of Education and Center for Urban and Multicultural Education research assistant Kirsten Robbins.

PLTW is a nationwide nonprofit program headquartered in Indianapolis that develops activity-, project- and problem-based curricula designed to improve student learning in the STEM disciplines. From just a dozen New York state high schools in 1997, PLTW has grown to more than 5,000 schools in 50 states and the District of Columbia. Indiana has the nation's third-largest number of schools participating at more than 300.

While several studies on PLTW have indicated positive effects on student performance and interest in STEM college majors, the research in Indiana represents one of the

largest-scale studies to date.

"The ability to put together this database is remarkable in and of itself," said Dr. Rob Helfenbein, Center for Urban and Multicultural Education director and associate professor of curriculum studies at the IU School of Education at IUPUI. The researchers examined 59,917 students who graduated from an Indiana high school in 2010.

"What we have now is a database that we can continue to compile," Dr. Helfenbein said. "We can add cohorts with each graduating year and really take a look at the impact of this program and its continuing impact on higher education, including major, retention and graduation, and perhaps employment."

"The database is among the largest compilations of data on PLTW in the U.S.," Dr. Pike said. "As data from additional graduating cohorts are added, it will become the largest and most comprehensive source of information on the PLTW program."

The authors concluded that the data indicate support for the effectiveness of PLTW as a way to increase the number of STEM graduates in Indiana. More research is required to understand the level of support. Results indicated PLTW participation significantly increased the likelihood that students would major in a STEM discipline, particularly engineering.

"PLTW participation had a strong impact on choice of major," Robbins said.

"Participants were almost three times as likely to major in STEM as non-participants, and students who had taken three or more PLTW courses were more than six times as likely to major in a STEM field."

Among the other findings:

*Generally, PLTW participants were more likely to have an honors diploma and higher ISTEP mathematics scores.

*Students taking three or more PLTW courses were more likely to enroll at a four-year college or university than a two-year institution.

*PLTW students, particularly those who took three or more PLTW courses, were more likely to go on to major in a STEM field in college.

*PLTW students, most notably those who took three or more PLTW engineering courses, had higher persistence rates from the first year of college to the second than those who did not participate in PLTW.

The findings reflect a potential "dosage effect" -- meaning that the level of participation ties directly to outcomes.

"So if you want to see major impact related to STEM outcomes at the higher ed level, you've got to have three or more courses," Dr. Helfenbein said. "So part of our next set of questions in continuing research is to take a look at the way in which schools and districts are using Project Lead The Way."

Dr. Helfenbein said the Center for Urban and Multicultural Education intends to delve further into the data as the center follows more participants to learn how particular policies and administrative practices may impact participation and results for those students.

"The data from the study are a testament to the power of Project Lead The Way as a transformational experience for students," said PLTW president and CEO Vince Bertram. "PLTW's high-quality curriculum and world-class teachers are engaging students and preparing them to be America's next generation of critical thinkers, problem solvers, collaborators, innovators and entrepreneurs."

Demographic breakdowns of the data indicated trends that may warrant further study to broaden PLTW impact. Participants were more likely to be male than non-

participants. Although the majority of participants were white and from middle to higher socioeconomic status, Dr. Helfenbein said future studies of PLTW data will examine how some schools and districts have been able to draw a broader participant base. Future studies may also include data from outside Indiana.

The Center for Urban and Multicultural Education at IUPUI was established in 1979. It has at its center the mission of creating connections between research, theory and practice with the ultimate aim of improving the quality of education throughout the P-20 continuum, focusing on the urban school setting from early childhood through graduate school levels, and including formal, alternative and community-based education.

FACULTY SPOTLIGHT

Panel of 11 Genes Predicts Alcoholism Risk, Gives New Insights into Biology of the Disease

A group of 11 genes can successfully predict whether an individual is at increased risk of alcoholism, a research team from the United States and Germany reported recently.

Alexander B. Niculescu III, M.D., Ph.D.

"This powerful panel of just 11 genes successfully identified who has problems with alcohol abuse and who does not in tests in three patient populations on two continents, in two ethnicities and in both genders," said Alexander B. Niculescu III, M.D., Ph.D., principal investigator and associate professor of psychiatry and medical neuroscience at the IU School of Medicine.



Alexander B. Niculescu III, M.D., Ph.D.

The panel of genes is highly accurate in its differentiation of alcoholics from controls at a population level, and less so at an individual level, likely due to the major and variable role environment plays in the development of the disease in each individual, the authors noted. Nevertheless, such a test could identify people who are at higher or lower risk for the disease.

"As alcoholism is a disease that does not exist if the exogenous agent (alcohol) is not consumed, the use of genetic information to inform lifestyle choices could be quite powerful," the authors wrote in the paper, published online in the journal *Translational Psychiatry*.

"We believe this is the strongest result to date in the field of alcoholism and offers a comprehensive -- though not exhaustive -- window to the genetics and biology of alcoholism," Dr. Niculescu said.

Dr. Niculescu, attending psychiatrist and research and development investigator at the Richard L. Roudebush Veterans Affairs Medical Center in Indianapolis, cautioned that genetic tests indicate risk, not certainty, and that "genes act in the context of environment."

Alcohol is legal, widely available, and subject to advertising and social pressures, he noted; but knowing one has a genetic predisposition to alcohol abuse could encourage behavioral and lifestyle changes.

The researchers incorporated data from a German genome-wide study of alcoholism with data from a variety of other types of research into genetic links to alcoholism

using a system called Convergent Functional Genomics. The work produced a group of 135 candidate genes.

The researchers then looked at the overlap between those 135 genes and genes whose expression activity was changed in a mouse model of stress-reactive alcoholism -- research mice that respond to stress by consuming alcohol. The mouse model enables researchers to zero in on key genes that drive behavior without the myriad environmental effects that are present in humans.

The mouse model analysis narrowed the candidates down to the panel of 11 genes and 66 variations of those genes called single-nucleotide polymorphisms.

The researchers then determined that the panel of 11 genes could be used to differentiate between alcoholics and non-alcoholics (controls) in three different research populations for which genetic data and information about alcohol consumption were available: a group of Caucasian subjects and a group of African American subjects from the U.S., and a third group from Germany.

Many of the 11 genes also have been implicated as associated with other neuropsychiatric disorders including cocaine addiction, Parkinson's disease, bipolar disorder, schizophrenia and anxiety -- not too surprising given that basic brain biology is involved, and links between such diseases as alcoholism and bipolar disorder have been known clinically for many years, Dr. Niculescu said.

Some of the genes also suggest possible future routes for treatment and prevention, including genes that play a role in the activities of omega-3 fatty acids, for which there is some evidence of control of alcohol consumption in laboratory tests previously conducted by Dr. Niculescu and collaborators.

Other researchers involved in this work were Daniel Levey, Helen Le-Niculescu, Mikias Ayalew, Nikita Jain, Brigid Kirlin, Rebecca Learman, Evan Winiger, Zachary Rodd and Anantha Shekhar of the Indiana University School of Medicine; Nicholas Schork of The Scripps Research Institute; Josef Frank and Marcella Rietschel of the Central Institute of Mental Health, Mannheim, Germany; Falk Kiefer of Heidelberg University; Norbert Wodarz of the University of Regensburg; Bertram Müller-Myhsok of the Max Planck Institute of Psychiatry; Norbert Dahmen of the University of Mainz; Markus Nöthen of the University of Bonn; Richard Sherva and Lindsay Farrer of Boston University School of Medicine; Andrew Smith and Joel Gelernter of Yale University School of Medicine and Henry Kranzler of the University of Pennsylvania Perelman School of Medicine.

More information about this research can be found at www.neurophenomics.info.

The research was supported by an NIH Directors' New Innovator Award (1DP2OD007363) and a VA Merit Award (1I01CX000139-01), as well as by NIH grants R01 DA12690, R01 DA12849, R01 AA11330 and R01 AA017535, and by grant FKZ 01GS08152 from the National Genome Research Network of the German Federal Ministry of Education and Research.

STUDENT SPOTLIGHT

IUPUI Liberal Arts Student Curates Photography Exhibit that Bridges Physical, Virtual Spaces

A new photography exhibit curated by Aaron Pierce, a graduate student in the IU School of Liberal Arts, brings together photographers from around the world in both a physical gallery space and a virtual

space via Instagram and blogs.

["Social Photography: Art in Progress"](#) runs through June 27 at Indy Indie Artist Colony & Gallery, 26 E. 14th St. During the exhibit, photographers will share an Instagram account. The pictures they post will be projected onto the gallery's walls, thus creating a worldwide, ever-changing art exhibit.



Aaron Pierce



Social Photography
Art in Progress

The exhibit seeks to create a dialog about the nature of photography in frequently changing social media environments.

Pierce, who also holds a bachelor's degree in English from the School of Liberal Arts, is finishing a master's degree in geographic information science at Indiana University-Purdue University Indianapolis. He describes the exhibit as a social experiment that is interactive and engages with the audience.

"We will be hosting a 'Topic of the Day' blog at our website where we will bring up topics that fit within the gallery themes, but each photographer's photographic post will work as an individual pillar of conversation to build off of and connect with other topics, themes and ideas," he said. "This will be a very fluid and active discussion; it could easily take us for completely unexpected spins.

"We are engrossed into virtual lives now, and this physical gallery serves as the place where we will get experimental with our space," Pierce said. "We will be hosting artist talks through Google Hangouts from this location as well as interacting with both virtual and physical works hosted in the gallery."

Pierce, a Carmel resident, said his interest in photography reaches back to childhood. He has also been able to incorporate photography into his academic work during study-abroad trips to Cuba and Morocco.

Pierce has also used social media platforms to showcase his photography, and he organized an IUPUI campus event where students could talk with Lauren Bohn, a journalist based in Cairo during the Arab Spring, via Skype. Bohn is among the photographers participating in the exhibit.

Other artists participating in the exhibit, some with ties to Herron School of Art and Design, include Milli Apelgren, Nabil Attia, Denise Conrady, Kevin Scott Davis, Juan Jerez, Amina Khazie, Sam Ladwig, Zun Lee, and Scott Witt.

"I saw this gallery exhibit as a way to not just show my work, but as an opportunity to use the space for a bigger role in exploring and discussing social media with photography through a collective of artists and an audience that is encouraged to engage with the exhibit," Pierce said.

["Social Photography: Art in Progress"](#) can also be viewed on Instagram at @socphotogallery and followed via the #socphotogallery hashtag. Photo prints are available for purchase.

TRANSLATIONAL RESEARCH IMPACT

Researcher at IUPUI Develops Workout Program to Help Keep

Older Adults in Their Homes

There is no place like home. Just ask the nearly 90 percent of older adults who wish to live in their current home for as long as they can. However, this wish may be compromised if they cannot manage daily needs.

A decline in muscle strength due to age and sedentary lifestyle is usually what undermines older adults' ability to live independently. Having to depend on others to complete self-care tasks places these individuals at risk for placement in a nursing home, said Dr. Chiung-ju Liu, an assistant professor of Occupational Therapy in the IU School of Health and Rehabilitation Science.



Older adults work on increasing muscle strength

Dr. Liu designed a 10-week "3-Step Workout for Life" exercise program to help older adults regain their muscle strength and maintain independence. Dr. Liu and Dr. Dan Clark, a senior scientist from the IU Center for Aging Research, are testing the feasibility of the program with funding from the IU Roybal Center for Translational Research and the Retirement Research Foundation.

Aging and the loss of muscle strength is a gradual process, Dr. Liu said.

"Older adults may not realize that they are losing muscle strength and that this loss may force them to give up things that they used to do," she said. "They give up little by little -- first making fewer trips for grocery shopping, cooking less often, and then taking fewer showers."

The phrase "Use it or lose it" applies here, she said. "The next thing you know they are far down the path to disablement."

Just as physicians prescribe medications to combat diseases, occupational therapists use everyday activities as a therapeutic medium to help people with physical, mental or developmental conditions live independently.

The first half of the "3-Step Workout for Life" program focuses on increasing muscle strength and physical fitness. The second half focuses on applying the physical benefits reaped from exercise to performing daily activities that are essential and meaningful for older adults to live independently at home, such as taking a shower.

"This is a 10-week therapeutic workout program to improve and maintain older adults' independence at home," Dr. Liu said. "In other words, my research is trying to decrease older adults' chance of developing disabling conditions and needing rehabilitation therapy."

RECENT EXTERNAL FUNDING AWARDS

The Office of the Vice Chancellor for Research recognizes and congratulates all IUPUI faculty and researchers for recent awards they have received and that help to advance the IUPUI research enterprise. The following table highlights those receiving \$100,000 or more in external grants.

Grants and Awards - May 2014

PI	Agency	Project Title	School	Department	Total
Farag, Sherif S	NATIONAL CANCER	Inhibition of PGE2 for mobilization of autologous peripheral blood stem cells	MEDICINE	HEMATOLOGY/ONCOLOGY	\$1,638,903

	INSTITUTE				
Kapur, Reuben	NATIONAL CANCER INSTITUTE	Role of p21 activated kinase in Leukemogenesis	MEDICINE	PED-NEONATAL BASIC RESEARCH	\$1,618,500
Storniolo, Anna Maria V	SUSAN G. KOMEN BREAST CANCER FOUNDATION	The Susan G. Komen for the Cure Tissue Bank at the IU Simon Cancer Center	MEDICINE	CANCER CENTER	\$1,200,000
Swigonski, Nancy L.	JOHNS HOPKINS UNIVERSITY	Development of a Child Neurofibromatosis Type 1 Health Related Quality of Life Measure	MEDICINE	PED-HEALTH SERVICES RESEARCH	\$329,421
McDonald, Brenna Cathleen	NINESIGMA, INC.	Advanced MRI Evaluation of Cerebral Blood Flow and Brain Connectivity Biomarkers in Adolescent Subacute Sports-related Concussion	MEDICINE	RADIOLOGY & IMAGING SCIENCES	\$300,000
Noonan, Doug	CHARLES G KOCH CHARITABLE FOUNDATION	POLITICAL ECONOMY AND ENVIRONMENTAL RESEARCH (PEER) INITIATIVE	SPEA	PUBLIC & ENVIRONMENTAL AFFAIRS	\$255,000
Einterz, Robert Michael	ABBOTT FUND	Academic Model Providing Access to Healthcare (AMPATH) 2014 for Diabetes and Chronic Disease Care	MEDICINE	GENERAL INTERNAL MEDICINE	\$225,000
Filippelli, Gabriel M.	BUTLER UNIVERSITY	Indianapolis/City as Living Laboratory: Science Learning for Resilient Cities (I/CaLL)	SCIENCE	EARTH SCIENCE	\$215,781
Poindexter, Brenda B	DUKE UNIVERSITY	Antibiotic Safety in Infants with Complicated Intra-Abdominal Infections	MEDICINE	PED-NEONATAL MEDICINE	\$154,000
Osili, Una O	FLAMBOYAN FOUNDATION	Giving in Puerto Rico	LILLY FAMILY SCHOOL OF PHILANTHROPY	LILLY FAMILY SCHOOL OF PHILANTHROPY	\$140,000
Markel, Troy A	INDIANA UNIVERSITY HEALTH	Human bone marrow mesenchymal stem cells protect the intestine during necrotizing enterocolitis via paracrine mechanisms	MEDICINE	PEDIATRIC SURGERY	\$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 are, instead, sent directly to IUPUI School Deans. For comprehensive coverage of funding opportunities please use the on-line search tools listed below.

DEPARTMENT OF DEFENSE

Minerva Research Initiative: The Office of Naval Research (ONR) is interested in receiving proposals for the Minerva Research Initiative, a DOD-sponsored, university-based social science research program initiated by the Secretary of Defense. This program is a multi-service effort. The program focuses on areas of strategic importance to U.S. national security policy. It seeks to increase the Department's intellectual capital in the social sciences and improve its ability to address future challenges and build bridges between the Department and the social science community. Minerva brings together universities, research institutions, and individual scholars and supports multidisciplinary and cross-institutional projects addressing specific topic areas determined by the DOD. The Minerva Research Initiative aims to promote research in specific areas of social science and to promote a candid and constructive relationship between DOD and the social science academic community. The Minerva Research Initiative competition is for research related to the 4 topics and 12 subtopics listed below. Innovative proposals related to these research topics are highly encouraged. White papers and full proposals are solicited which address the following topics:

1. **Belief Formation and Movements for Change;**
2. **Models of Societal Resilience and Change;**
3. **Theories of Power and Escalation;**
4. **Emerging Topics in Conflict and Security.**

Additional proposal topics will be considered both for single-investigators as well as larger teams. The research questions addressed should extend across a fairly broad range of linked issues where there is clear potential synergy among the contributions of the distinct disciplines represented on the team. Team proposals must name one Principal Investigator as the responsible technical point of contact. Similarly, one institution will be the primary recipient for the purpose of award execution. The relationship among participating institutions and their respective roles, as well as the apportionment of funds including sub-awards, if any, must be described in both the proposal text and the budget. **Deadlines: white paper: November 18, 2014; full proposal: February 14, 2015.**

Multifunctional Quantum Transduction of Photons, Electrons, and Phonons:

The objective of this topic is to develop a quantum technology that expands the capabilities afforded by optomechanical devices by adding active control of the mechanical degrees of freedom via electronic signals in both the classical and quantum regimes. Develop coherent electronic control of both photonic and phononic quanta using electrically-based quantum circuits such as superconducting qubits, or optical or phononic control of synthetic or naturally-occurring atomic defect spin states. Provide multi-field quantum transduction linking electronics, spintronics, mechanics and photonics, and demonstrate quantum control of phonons, enabling photon-like manipulation of this degree of freedom. This quantum transducer should yield (1) high-bandwidth transmission and reception of optically-encoded, quantum-encrypted information, providing secure high-bandwidth communication; (2) the development of coherent coupling between hybrid quantum systems; and (3) new integrated means for quantum information storage and processing.

Photonic and optomechanical structures have been largely based on Si and SiN. Other materials should be considered, e.g., SiC and AlN, which are now available as high-quality, thin films with desirable optical properties, tunable electronic spin, and which provide strong piezoelectric response. Properly harnessed, the piezoelectric response enables strong coupling of electrical signals to mechanical motion at microwave frequencies, affording a new mode for high-speed information transfer between photons and quantum-controlled phonons. A focused effort should explore the capabilities of such "3-field" systems. This will require materials processing, quantum structures, coupling modalities, theory, and simulation tools incorporating all degrees of freedom. Strong electro-optomechanical coupling, with quantum control over electronic, spintronic, photonic and phononic degrees of freedom, should be achievable. Very high bandwidths for quantum-entangled photonic states may be achieved using such devices. These also should provide new transduction mechanisms for coupling hybrid quantum systems.

Deadlines: White Paper, October, 15, 2014; Submission, December 16, 2014.

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 and a CV or biosketch to the VP for Research Office at vpr@iu.edu. Prior to submission, the IUPUI Office of the Vice Chancellor for Research is offering assistance with the 2 page summaries. For more information, contact Ann Kratz akratz@iupui.edu.

NATIONAL CENTER FOR DISEASE CONTROL

Occupational Safety and Health Research (R01): The purpose of this grant program is to develop an understanding of the risks and conditions associated with occupational diseases and injuries, to explore methods for reducing risks and for

preventing or minimizing exposure to hazardous conditions in the workplace, and to translate significant scientific findings into prevention practices and products that will effectively reduce work-related illnesses and injuries. **Deadline: October 5, 2014.**

NATIONAL INSTITUTES OF HEALTH

Translational Research Program on Therapy for Visual Disorders (R24): This program focuses on the development of novel therapies to treat visual diseases and disorders. In the context of this program, an expert develops a multidisciplinary research team that applies an integrative approach to develop rapid and efficient translation of innovative laboratory research findings into clinical therapeutic development. It involves collaborative teams of scientists and clinicians with expertise in multiple disciplines, operating according to a clear leadership plan. Such a collaborative approach is particularly appropriate for research focused on pathways that will likely be targeted by biological intervention, such as gene therapy, cell-based therapy, and pharmacological approaches. The intention is to make resources available to scientists from several disciplines to address scientific and technical questions that would be beyond the capabilities of any one research group.

Each project should have a well-defined end-point, achievable within a 5-year time frame, of developing a specific treatment for a specific ocular disease. The steps towards this goal should be clearly delineated in a series of milestones that support the development of a therapeutic, which can then be tested in a clinical trial. Highest programmatic priority will be given to applications aligned with NEI's audacious goal initiative. If successful, a project funded under this program could lead to filing an IND and a subsequent application for an NEI U10 Clinical Vision Research Grant or an R34 Clinical Study Development Grant. **Deadline: January 28, 2015.**

Social Neuroscience and Neuroeconomics of Aging (R01): This FOA is issued with special review to stimulate interdisciplinary aging-relevant research in the social, affective and economic neurosciences. The NIA invites applications examining social, emotional and economic behaviors of relevance to aging, using approaches that examine mechanisms and processes at both (a) the social, behavioral or psychological (emotional, cognitive, motivational) level, and (b) the neurobiological or genetic level. Proposals are encouraged that have an overriding emphasis on economic, social or emotional processes and associated genetic or neurobiological processes. Applications should demonstrate either relevance for aging or for age differences or age-related changes in these processes. Aging-relevant applications can address issues of importance to the well-being and health of either mid-life or older adults, and can include data spanning the entire life course.

The NIA also encourages research projects that propose advances in measurement of economic and social phenotypes. Research is needed to identify core psychological and behavioral constructs and intermediary neurobiological phenotypes responsible for individual differences in economic and socioemotional behaviors, to enhance the potential for their application to life course genetic studies. There is an increasing need for measures that are harmonizable (to enable data pooling and cross-study comparisons) and flexible (capable of application across laboratory and field contexts). **Deadline: February 5, 2015.**

NATIONAL SCIENCE FOUNDATION

Plant Genome Research Program: Since the creation of the National Plant Genome Initiative (1998), there has been a tremendous increase in the availability of functional genomics tools and sequence resources for use in the study of key crop plants and their models. Proposals are welcomed that build on these resources to

develop conceptually new and different ideas and strategies to address grand challenge questions in plants of economic importance on a genome-wide scale. There is also a critical need for the development of novel and creative tools to facilitate new experimental approaches or new ways of analyzing genomic data. Especially encouraged are proposals that provide strong and novel training opportunities integral to the research plan and particularly across disciplines that include plant physiology, quantitative genetics, biochemistry, bioinformatics and engineering.

Activities in four focus areas will be supported: 1) Genomics-empowered plant research to tackle fundamental questions in plant sciences on a genome-wide scale; 2) Development of tools and resources for plant genome research including novel technologies and analysis tools to enable discovery; 3) Mid-Career Investigator Awards in Plant Genome Research to increase participation of investigators trained primarily in fields other than plant genomics; and, 4) Advancing Basic Research in Economically Important Crop Plants to develop sequence resources that are critically needed to enable basic research resources in crop plants. **Deadline: April 28, 2015.**

Research Networks in the Mathematical Sciences: This program creates an award mechanism that supports researchers in ways that are intermediate in scale, scope, and duration to existing individual investigator awards and research institute awards. The RNMS Program recognizes that, over the past quarter century, mathematical research has become increasingly collaborative and interactive, because effectively overcoming core scientific challenges frequently requires the sharing of ideas and expertise. A Research Network is not a substitute for existing funding mechanisms. In particular, it is intended to complement (rather than replace) individual investigator awards by providing additional layers of interaction. Through the involvement of postdoctoral researchers and students and the promotion of international collaborations, the RNMS will not only focus on problems at the frontier of the mathematical sciences but also lead to robust and diverse training of the next generation of mathematicians and statisticians. **Deadline: July 28, 2015.**

Advancing Informal STEM Learning: This program seeks to advance new approaches to and evidence-based understanding of the design and development of STEM learning in informal environments; provide multiple pathways for broadening access to and engagement in STEM learning experiences; advance innovative research on and assessment of STEM learning in informal environments; and develop understandings of deeper learning by participants. The AISL program supports six types of projects: 1) Pathways, 2) Research in Service to Practice, 3) Innovations in Development, 4) Broad Implementation, 5) Conferences, Symposia, and Workshops, and 6) Science Learning+ Proposals.

Grants will be funded in two phases.

Phase 1: Planning Grants in 2015.

Short-term (1-year) Planning Grants of up to \$115,000 to enable groups of people and organizations in the UK and/or US to meet with each other and develop ideas and strategies. The plan is to fund up to five Planning Grants in FY 15. UK/US collaborations are strongly encouraged, but not essential in Phase 1.

Phase 2: Partnership Grants in 2016.

Longer-term research grants of up to \$2.4 million for up to five years. While these will typically build on relationships established in Phase 1, successful funding in Phase 1 would not guarantee funding in Phase 2. In addition, Phase 2 will be open to new applicants (and any who were unsuccessful in receiving Phase 1 grants). The plan is to fund up to three Partnership Grants in FY16.

The final details and submission date for Phase 2 will be developed once Phase 1 is underway, and released as a Dear Colleague Letter within six months after the award of the Phase 1 grants. The Partnership Grants need to address some of the

key research priorities. In addition, the Partnerships projects will require: 1) both UK and US partners, 2) experts from more than one academic area, and 3) exploration of more than one informal learning environment. We expect these grants to act as beacons for further work and development. *Deadline: **November 14, 2014.***

U.S. DEPARTMENT OF STATE

Global Undergraduate Exchange Program: The Office of Academic Exchange Programs of the Bureau of Educational and Cultural Affairs announces an open competition for the administration of the FY 2015 Global Undergraduate Exchange Program (Global UGRAD). This program is designed to promote mutual understanding by awarding outstanding, underserved undergraduate students from East Asia and the Pacific, Europe and Eurasia, the Near East, South and Central Asia, Sub-Saharan Africa, and the Western Hemisphere full scholarships for one semester of non-degree undergraduate study at accredited two- and four-year institutions of higher education in the United States. Students enhance their academic education with community service activities and professional development workshops and short-term internships. The academic component of the program begins in the spring semester of academic year 2015-2016; pre-academic English language training will take place during the fall semester. At the end of their academic programs, students are required to immediately return to their home countries.

Public Affairs Sections of U.S. embassies will be responsible for the recruitment and nomination of student participants. The Bureau, in conjunction with Public Affairs Sections, will be responsible for final selection of all applicants. Applicant organizations must demonstrate flexibility and the willingness to work with any and all countries in the identified regions. ECA reserves the right to add or remove participating countries depending on Bureau priorities and the availability of funds. *Deadline: **August 18, 2014.***

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.

The Special Handling list was created in order to communicate donor restrictions and/or preferences for managing solicitation requests from Indiana University. The list reflects special relationships that exist between donors and the university and includes corporations and foundations that the President's office wishes to review prior to submission in order to coordinate Indiana University's requests to these donors.

The Special Handling List was compiled and is maintained by the Indiana University Foundation office of Corporate and Foundation Relations. Please contact [Dee Metaj](mailto:Dee.Metaj) at 317-278-5644 if you have any questions regarding this list.

IU Authentication is required to view the following attachments:

[IUF Special Handling List and Principal Gifts Review Template](#)

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