April 27, 2016

INSIDE THIS ISSUE:

FEATURE STORY

Innovate Indiana Fund part of $18M financing for PrecisionHawk, maker of unmanned aerial vehicles

The Innovate Indiana Fund is among more than a half-dozen investors to participate in an $18 million funding round for PrecisionHawk Inc., a rapidly expanding maker of unmanned aerial vehicles -- also known as UAVs -- and software that collects and analyzes terrestrial data for commercial use.

A PrecisionHawk unmanned aerial vehicle is launched on a data-gathering mission | Photo by PrecisionHawk

The Series C capitalization includes new investors Verizon Ventures, NTT DoCoMo Ventures, Yamaha Motor and a subsidiary of insurer USAA. The Innovate Indiana Fund, which led PrecisionHawk's $1 million Series A financing and took part in $10 million of Series B funding in 2014, joined existing investors Intel Capital and Millennium Technology Value Partners in this latest round.

The latest investment round brings PrecisionHawk's total funding to $30 million as it continues to improve and expand its data-analysis platform and its low-altitude flight safety system.

"Since the start of our investments in PrecisionHawk, we have watched this company literally shape a new industry," said Ken Green, managing director of the Innovate Indiana Fund and a PrecisionHawk director. "Its innovative technology is being applied in many ways, as demonstrated through the companies coming on board."

PrecisionHawk will use part of the proceeds to expand its DataMapper analysis platform, which allows any UAV operator to process, manage, and analyze aerial data. DataMapper currently receives such data from all UAV systems but soon will allow information from satellites and manned aviation to be managed, analyzed, and compared with UAV-gathered data on a single platform, said PrecisionHawk spokesman Lia Reich.

In 2015, DataMapper processed information gathered from more than 1 million acres and licensed more than 200 analysis algorithms across industries ranging from agriculture and insurance to energy and mining, she said

The company also plans to develop and commercialize its Low Altitude Tracking and Airspace Safety platform, or LATAS, which is designed to allow safe and rapid integration of UAVs into regulated airspace.

Through use of Verizon's LTE wireless network, LATAS has been demonstrated under NASA's Unmanned Traffic Management project and the Federal Aviation Administration's Pathfinder program. The system has already won contracts with state and national governments, Reich said.

"Individuals and organizations across the world need better and more accurate data to manage the resources of our planet, and we are delighted to receive such a strong level of support and confidence from this group of investors to help us build out a platform for the industry," said PrecisionHawk CEO Bob Young. "This team of

partners and investors is collaborating to better serve the need for managing terrestrial change data by providing a safe and reliable platform for managing aerial data. This is both an exciting and an important project for our engineers and our partners."

PrecisionHawk currently has more than 100 employees, with at least 10 based in Terre Haute, Reich said. Many of the latter are graduates of Indiana University, as well as Indiana University-Purdue University Indianapolis, Indiana State University and Purdue University, she said.

The company's presence in the Hoosier State is key to its day-to-day operations and its ability to effectively serve clients throughout the Midwest, Reich said: "Whether it's agriculture, insurance, responding to a catastrophe or another application, they are ideally located to offer a quick and efficient response."

Domestic expansion is ongoing and includes research and development partnerships with such institutions as Indiana State University, Kansas State University and Texas A&M University. PrecisionHawk is also working directly with the FAA to provide data that will aid the development of processes for UAV registration and regulation.

Managed by the Indiana University Research and Technology Corp., which is part of IU's Innovate Indiana initiative, the Innovate Indiana Fund provides early-stage capital to companies with an IU connection. It also advises in such areas as technology assessment, market analysis and planning, management recruitment, product development, sales strategy, customer acquisition, and next-stage capital.

In 2014, PrecisionHawk won an Indiana Innovation Award and was a finalist for TechPoint's Mira Awards as Tech Startup of the Year. Among other awards, the company was named to TiEcon's list of Top 50 technology startups and recognized as a Top 100 Global Sustainable Solutions company by Sustainia.

ANNOUNCEMENTS

2016 Trailblazers named at Research Day

Two Indiana University-Purdue University Indianapolis researchers were named recipients of the 2016 Research Frontiers Trailblazer Award during the IUPUI Research Day earlier this month.

Established in 2010, the Research Frontiers Trailblazer Award recognizes outstanding IUPUI researchers who are showing great promise in becoming nationally and internationally known for their accomplishments in advancing the frontiers of knowledge.

Specifically, the award is for outstanding accomplishments in research and creative activity by an associate professor within the first three years of promotion or appointment in the given rank.

This year's Trailblazer Award recipients are:

Dr. Carmella Evans-Molina, M.D., Ph.D., Associate Professor, Department of Medicine, Indiana University School of Medicine

Dr. Carmella Evans-Molina is associate director of development of the Center for Diabetes and Metabolic Diseases, one of only 16 NIH-funded Diabetes Research Centers in the U.S. Her research focus is islet dysfunction in diabetes. At IU School of Medicine, Evans-Molina holds two major NIH grants as a principal investigator, a VA Merit Award and a major grant from JDRF, the leading global organization funding Type 1 Diabetes research. She has published more than 40 papers in the highest regarded medical journals.


Dr. Carmella Evans-Molinak

The combined syndromes of Type 1 and Type 2 diabetes mellitus affect nearly 387 million people worldwide. If current trends continue, 1 out of every 3 persons born in the U.S. after 2000 will develop diabetes during his or her lifetime.

"As a physician scientist and endocrinologist at the IU School of Medicine, I am committed to reversing these trends and improving the health of those affected by diabetes through basic, translational, and clinical research," Evans-Molina said.

"Carmella is a rising superstar, an academic leader, and role model for young trainees. She is actively publishing, gathering exciting data, writing successful grants, and training students and postdoctoral fellows," said Dr. Anantha Shekhar, Indiana University associate vice president for clinical affairs, in a letter of recommendation. "She represents IUSM and IUPUI on a national and international level. Carmella is diligent, methodical, and careful, but importantly, she is personable. I have no doubt that she will rise to hold significant leadership positions within academic medicine."

"Carmella's research has provided novel insights into the common pathways leading to beta cycle dysfunction in Type 1 and 2 diabetes. She pioneered the concept that dsyregulation of calcium homeostasis contributes to β cell dysfunction in both disorders," said Dr. Stephen R. Hammes, from The University of Rochester Medical Center, in another letter of recommendation. "Her work is basic, translational, elegant, and unique."

Evans-Molina holds a bachelor's degree in pharmacy from West Virginia University and an M.D. degree from Marshall University School of Medicine.

Gavriil Tsechpenakis, Associate Professor, Computer and Information Science Department, School of Science at IUPUI

"Dr. Tsechpenakis is an energetic, visionary and hardworking researcher. His expertise is in computer vision, biomedical imaging, and computational biology," Simon Rhodes, dean of the School of Science and professor of biology, said in his letter of recommendation.


Gavriil Tsechpenakis

The human brain has an amazing capacity to functionally recover from strokes that damage local neuronal circuitries, but little is known about the principles of such a highly adaptivesystem, according to Rhodes. Recent advances in imaging and computational technologies allow for visualizing and processing the small insect brain in its entirety.

"Using data acquired with state-of-the-art imaging techniques at two Drosophila" (fruit flies, an important model organism in biology) "neuroscience laboratories, Dr. Tsechpenakis seeks to pattern the detailed morphology and dynamics of individual neurons during development, and reconstruct neuronal circuits and model their changes during brain development," Rhodes said.

Tsechpenakis received a $573,000 NSF Career Award for his "Modeling the Structure and Dynamics of Neuronal Circuits in the Drosophila larvae using Image Analytics" project. Tsechpenakis's research focus on the bottom-up reconstruction of a model brain is "an impressive line of research," said UCLA computer science professor Demetri Terzopoulos. "It goes beyond the application of computer vision methods – it requires knowledge of basic neuroscience and a deep understanding of the biological problem, the data, and data acquisition issues. In this domain [Tsechpenakis] is already considered a pioneer."

"Given Dr. Gavriil Tsechpenakis' scientific curiosity, creativity, critical thinking, research drive, strong work ethic, and technical skills as a computer scientist, I am confident that he will continue to have a fruitful academic career at IUPUI, continuing to produce trailblazing research achievements that promise to bring international recognition to your university," Terzopoulos said in a letter of recommendation.

Gavriil Tsechpenakis earned his undergraduate and doctorate degree in electrical and computer engineering from the National Technical University of Athens, Greece.

Class spots still available for IUPUI nanotech camp for high school students, teachers

Class spots are still available for high school students and teachers interested in attending the first summer session of the Nanotechnology Experiences for Students and Teachers program at IUPUI.

NEST, designed to provide STEM education for underrepresented minorities, will introduce students and teachers from area high schools to the field of nanotechnology via a concentrated two-week summer camp, coupled with academic-year mentoring, support and research


IUPUI nanotechnology experiences

opportunities for students, as well as a two-week professional-development program for teachers.

A three-year, $1.1 million grant from the National Science Foundation is funding the camps. The program includes monetary stipends, in addition to funds for camp tuition and supplies, for certain students and teachers.

Students from disadvantaged families will receive a $500 stipend, in addition to tuition to attend the two-week camp. Teachers from school districts with disadvantaged student populations who attend the two-week teacher camp will receive a $2,000 stipend as well as an additional $2,000 to cover costs for classroom supplies and conference fees and travel during the school year.

"For students, the camp provides opportunities to work with real college professors and gain hands-on experience during the summer," said program director Dr. Mangilal Agarwal. "We also find a mentor for them to continue projects in the following school year.

"The program promotes university research projects and brings local students to campus," Dr. Agarwal said. "Once they experience learning on campus, they realize that attending could be a reality for them and that a STEM career is exciting and challenging, not boring."

"Upon completion, participants will be connected to Integrated Nanotechnology Development Institute faculty to support follow-up activities, including independent research projects by students and the development and implementation of integrated STEM modules by teachers," said David Russomanno, dean of the School of Engineering and Technology. "The program is well-defined to improve STEM learning, retention, and opportunities for traditionally underserved students."

The summer camp for students will take place June 20 to July 1.

The teacher session will run July 11 to 22.

During the three-year grant program, IUPUI will host a total of 60 high school students and 45 high school teachers. Approximately 3,000 additional students will participate in the program using teacher-developed classroom modules.

Faculty from the schools of science, engineering and technology, medicine, and dentistry at IUPUI are staffing the camps.

In addition to impacting camp participants, the NEST program will address the need for STEM education and teacher development across the nation. Curriculum materials developed for the program will be widely available to all educators through the NEST website, the TeachEngineering digital library website, the I-STEM network, and the Hoosier Association of Science Teachers Inc.

CENTER SPOTLIGHT

IU cancer researcher finds lung cancer screening barriers among smokers

An Indiana University cancer researcher's work on smokers has yielded clues as to why many don't undergo lung cancer screening.

Lisa Carter-Harris, Ph.D., assistant professor at the Indiana University School


Lisa Carter-Harris, Ph.D.

of Nursing and a researcher at the Indiana University Melvin and Bren Simon Cancer Center, found three key barriers among smokers for not being screened for lung cancer. Those barriers, in turn, need to be examined to better improve communications between healthcare providers and patients, according to Dr. Carter-Harris.

Her research was published in *Health Expectations*. It also caught the attention of the Lung Cancer Alliance, which recently invited her to speak at "The Impact of Stigma on Public Health and Public Health Policy" Congressional briefing on Capitol Hill.

Her research found these three overarching barriers that keep smokers from being screened:

- A sense of stigma that may stem from a generational divide that exists between patients, who are typically older, and today's younger health care providers. The older generation grew up in an era in which smoking was glamorized, while the younger generation has repeatedly been told about the dangers of tobacco use. People feel they would be blamed for their disease because of their smoking history, according to Dr. Carter-Harris.
- There is a sense of distrust among patients about the health care system, tobacco industry, and government.
- People struggle with time constraints and scheduling conflicts, saying they simply do not have the time to be screened.

This new knowledge could lead to designing new communications between healthcare providers and patients about the importance of lung cancer screening, according to Dr. Carter-Harris.

"Health care provider recommendation has long been supported as a strong predictor of adherence to cancer screening," Dr. Carter-Harris said. "But equally important is the patient-provider communication when making decisions about cancer screening to ensure the provider has the opportunity to share the best evidence available and the patient has the opportunity to explore the decision with their values and preferences taken into account."

Dr. Carter-Harris is a scientist with the cancer center's Cancer Prevention and Control research program. The goals of that program are to prevent cancer occurrence and increase effectiveness and adherence to cancer screening. The program's researchers also work to educate the public about both the importance of stopping tobacco use and never starting its use.

"The invitation of Dr. Carter-Harris to speak on Capitol Hill is a credit to her commitment and seriousness in addressing the destigmatization of lung cancer among patients," David Haggstrom, M.D., co-leader of the Cancer Prevention and Control program, said. "We are grateful for the contributions she makes to the scientific community in the Cancer Prevention and Control program."

Lung cancer is the leading cancer cause of death. It will kill more people than colorectal, breast, and prostate cancer -- the second-, third-, and fourth-leading cancer killers – combined each year.

INSTITUTE SPOTLIGHT

New low-cost workforce extends primary care to homes of older adults

A new study from the Indiana University School of Medicine and the Regenstrief Institute has found that person-centered dementia care, which involves both patients and their caregivers, can be effectively provided by an engaged low-cost workforce -- care coordinator assistants.

Under the close supervision of clinical professionals, the care coordinator assistants, known as CCAs, work as integral health care team members


Mary Guerriero Austrom, Ph.D.

conducting home and phone visits with dementia patients and family caregivers. CCAs, who typically have at most two years of post-high school education, are selected through a rigorous and innovative screening process. Once hired and trained, CCAs are assigned tasks focused on patient engagement and caregiver support that require less training and expertise than that of nurses or social workers.

As the number of older adults increases and health care resources cannot keep pace, the question of how to provide good care for this growing population has become increasingly pressing.

"We have shown that with good management, supervision, and support, CCAs can be effective primary care extenders enabling many tasks important to providing best practice care for older adults to be “shifted” down," said social psychologist and Alzheimer's disease educator Mary Guerriero Austrom, Ph.D., who led the study. "The key is screening to select the right people -- people who are comfortable with older adults with cognitive issues -- and then teaching and training them [CCAs], and giving them the resources and support they need to do the job. If you take care of your people, they will do an excellent job of taking care of patients.”

CCAs are the health care team's eyes and ears in the community and the homes where patients and their caregivers live.

"If something happens, the CCAs handle it or, when appropriate, bring it to the team's attention," said Dr. Austrom, the Wesley P. Martin Professor of Alzheimer’s Education at the IU School of Medicine. "This is a bare-bones model that others can adopt and replicate. Care of older adults cannot be restricted to the clinic or physician’s office. CCAs, the least expensive member of the health care team, can extend best-practice care in a cost-effective manner."

During the period of the study, CCAs working for Eskenazi Health's Aging Brain Care (ABC) Medical Home mobile memory care clinic were divided into teams under the shared supervision of nurses and social workers with whom the CCAs met regularly. Some CCAs were staff of CICOA, the local Area Agency on Aging. These CCAs provided expertise to others on accessing Meals on Wheels, identifying transportation options, procuring durable medical equipment and other services of critical importance to the population they serve. Over 1200 patients received an average of about 16 home and phone CCA visits during a one-year period.

In addition to extending the reach of the clinic, task shifting to CCAs provided the medical team with a population health overview of all of the older adults with dementia and their caregivers in the study. The electronic tracking system in place at the ABC Medical Home supplied information on an individual patient who did not appear to be stable or a caregiver who was experiencing stress or depression. This allowed the medical team to provide timely patient/caregiver-centered care as well as giving the team a better perspective of what was working well across the entire population -- and what was not.

"Workforce Development to Provide Person-centered Care" has been published online ahead of print in the journal of the peer-reviewed journal *Aging & Mental Health*. The paper describes the development of an extremely competent workforce committed to person-centered care for patients with dementia or depression and their caregivers. The authors discuss the importance of providing person-centered care, the significance of support by hospital leadership, as well as staff support and professional development of CCAs.

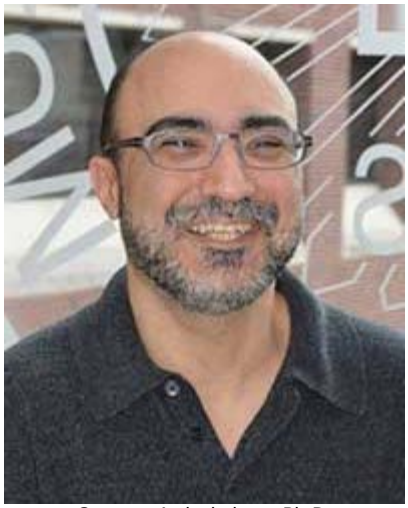
"CCAs are problem solvers – helping with access to needed services and problems that may be daunting to the older adult or their caregiver," said study senior author Michael LaMantia, M.D., MPH, an IU Center for Aging Research and Regenstrief Institute investigator and an IU School of Medicine assistant professor of medicine. "The CCAs also provide physicians and other members of the medical team with insight into how patients and their caregivers live and cope, helping the medical team provide high quality health care that addresses the specific needs and problems of each patient and their caregiver."

The study was funded by Centers for Medicare & Medicaid Services grant 1C1CMS331000-01-00. Drs. Austrom and Goa also were supported, in part, by NIH P30 AG010133.

In addition to Drs. Austrom and LaMantia, co-authors are Carly A. Carvell, M.D., and Sujuan Gao, Ph.D., of the IU School of Medicine; Catherine A. Alder, MSW, J.D., of the Regenstrief Institute, IU Center for Aging Research and Eskenazi Health; and Malaz Boustani, M.D., MPH, of the Regenstrief Institute, IU Center for Aging Research, IU School of Medicine and the Center for Health Innovation and Implementation Science.

FACULTY SPOTLIGHT

IUSM Faculty Receives $2.6 Million Grant to Study the Motility of a Human Parasites Engine


Gustavo Arrizabalaga, Ph.D.

Dr. Gustavo Arrizabalaga, Associate Professor in the Department of Pharmacology and Toxicology at the Indiana University School of Medicine, has been awarded a $2.5Mgrant ($2M in direct cost) from the National Institute of Health (R01 AI123457).

The grant will last five years and will allow Arrizabalaga and his colleagues to further analyze how the motility of the *Toxoplasma gondii* parasite is regulated by the unique kinase TgCDPK3 and a related network of proteins. This grant is a collaborative effort with the laboratory of Dr. Moritz Treeck at the Francis Crick Institute in London.

Arrizabalaga explained, “This grant supports a new international collaboration for my lab and the IUSM. Through this ongoing synergistic relationship, the technological advances Dr. Treeck is developing that look at protein modification will enhance our studies of how the parasite moves in and out of cells.”

Toxoplasma gondii is a ubiquitous parasite that infects a third of the world’s population and can cause devastating disease during pregnancy and in those affected by AIDS and other immunosuppressive conditions. Humans typically contract this parasite by ingesting parasite ‘eggs” that are released into the environment in the feces of infected cats, or by ingesting undercooked or raw meat from infected animals.

Toxoplasma needs to be inside of a cell in order to divide and evade being killed by the immune system. Therefore, its ability to enter and exit cells is crucial to its survival and propagation within the infected organism.

“For the last 15 years, my laboratory has been investigating the processes and proteins that control how the parasite gets out of cells with the goal of discovering novel ways to pharmacologically attack this important microbe,” said Arrizabalaga. “Through this effort we discovered that the protein Calcium Dependent Protein Kinase 3 (CDPK3) controls egress from the cell by modifying the Myosin motor, which drives the motility of the parasite.” Indeed, CDPK3 is essential and unique to the parasite as it represents an Achilles Heel for the parasite and constitutes an excellent target for drug development.

“Since lack of CDPK3 results in defects that go beyond motility and egress, we hypothesize that it is central to a large regulatory network,” he said. “Thus, the large award we have received from the NIH will allow us to study the other proteins that CDPK3 regulates.” Additionally, this grant will fund the collaboration efforts to identify the protein that acts as the “off” switch to turn down the effects of CDPK3 once the parasite needs to stop moving.

STUDENT SPOTLIGHT

Annual JagStart competition brings out the best in student entrepreneurs

Will people turn off their smartphones if it means more money for a favorite charity? And is a virtual reality game a better tool to assess aggression among children than a current method?


2016 JagStart Winners

The answer is "yes" to both questions, say entrepreneurial-minded students at Indiana University-Purdue University Indianapolis, who competed to win part of the $5,500 purse at JagStart, the IUPUI student idea pitch competition.

A smartphone application to encourage people to moderate their phone usage as a way to give to charity won first place in the 2016 edition of the annual contest, which took place in March in the Lilly Auditorium at University Library on the IUPUI campus.

A service to better integrate people with disabilities into the workplace, particularly into higher-level positions, won both second place and the audience choice award, and a virtual reality program to treat aggression among children won third place.

The JagStart program rewards IUPUI students for their innovative ideas to solve challenges facing the nation and the world. The students present three-minute "elevator" pitches proposing original solutions to pressing social and economic issues.

"Take a look at the winners," said JagStart judge Brian Gawor, vice president for research at Ruffalo Noel Levitz. "These pitches were not only great business ideas; they also do good in the world. We should be proud of these students."

This year, 11 teams made pitches during the competition. Gawor and other volunteers from the business community served as judges.

"The pitches were excellent, and it was very difficult for us to choose the winners," Gawor said. "This competition truly showcases the incredible talent, passion, and skill of IUPUI students -- and the world-class faculty who teach and mentor them every day. Entrepreneurism is changing the world, and these students are our future."

The 2016 winners and their creative solutions were:

LookUp: Away from mobile for good -- 1st place, $2,500
Team members: Preethi Srinivas and Yuan Jia, human-computer interaction majors, School of Informatics and Computing

Project description: "LookUp uses a business model where advertisers pay to display their company's advertisement after the completion of every smartphone-free period, while charity organizations capitalize on the times when users decide to go smartphone free," according to the project's written abstract.

Distinctive Potential -- 2nd place, $1,500; Audience Choice winner, $1,000
Team members: Amna Sohail, chemistry major, Purdue School of Science

Project description: Distinctive Potential is a not-for-profit venture idea that seeks to make the inclusion of disabled populations through integrated workplaces a priority. In a 2014 U.S. Bureau of Labor Statistics report, only 17.1 percent of persons with a disability were employed compared to 64.6% of persons without disabilities. Distinctive Potential will provide recruiting services with its trained human resources staff to help local small businesses hire qualified and trained disabled clients served at state-funded vocational rehabilitation centers.

Virtual Reality to Treat Childhood Aggression -- 3rd place, $500
Team members: Riley Mineart, media arts and science major, School of Informatics and Computing

Project description: Virtual Reality to Treat Childhood Aggression takes existing paper forms of assessment for youth aggression and interprets them into an immersive 3-D experience using a medical device called the Oculus Rift. The virtual reality assessment addresses two flaws of the paper tests: lack of consistency of execution between patients and lack of integrity in test results.

In addition to the new pitches, this year's presentations included an update from last year's winning pitch project, SafeBay, which provides a parking and storage solution for the motorcyclist and financial gains for

owners by offering plenty of surface area for art/graphics/advertising.

The annual pitch competition "definitively helps young women and men in preparing themselves for the odds to be faced in the job market," said Rodrigo Cotelo Iriart, JagStart business mentor volunteer and business development manager at Cornerstone Information Systems in Bloomington. "Moving forward, they will have gained invaluable experience to pursue their ideas and the understanding that building a business case and defending it is part of the day-to-day of any entrepreneur. Hats off to IUPUI to care to develop its students in this fashion."

TRANSLATIONAL RESEARCH IMPACT

IUPUI ecohydrologist studies fog, dew and other novel water sources for dryland vegetation


Lixin Wang, Ph.D.

As fresh water becomes scarcer due to population growth and climate warming, both of which are projected to increase over the coming decades, ecohydrologist Lixin Wang of the School of Science at Indiana University-Purdue University Indianapolis is investigating how non-rainfall water sources, especially fog and dew, impact drylands with important implications for their agriculture. His work is supported by a new CAREER award from the National Science Foundation.

Drylands, which are expanding, currently cover nearly 40 percent of the globe and are home to approximately 2.5 billion people. In the United States, these arid areas are found in southern California, Arizona, New Mexico, and portions of the Great Plains. With global warming, more areas in the United States and around the world are becoming increasingly dry and desert-like.

"Despite existing research highlighting the importance of non-rainfall moisture on the dryland biome, we actually have little knowledge of the sources of fog and dew -- clouds, surface water or groundwater -- in dryland environments and how these non-rainfall sources of moisture contribute to ecosystem functions and interactions," said Wang, an assistant professor of earth sciences in the School of Science who works at the intersection of ecology and hydrology. "With less future rainfall amounts predicted for these already arid environments and more people to feed around the world, it is critical that we know more about non-rainfall water use for vegetation and soil moisture dynamics."

As air cools, atmospheric water vapor condenses into droplets. Fog comprises these droplets suspended in the atmosphere at or near the earth's surface. When the droplets condense on exposed, cooler surfaces, they are known as dew. Wang says that no commonly accepted method to measure amounts of fog or dew exists, and little is known about how vegetation utilizes fog and dew. Uniquely trained in hydrology, ecology and isotope geochemistry, he is among the first researchers to comprehensively investigate the ecohydrology of fog and dew.

The CAREER grant is the most prestigious award in support of junior faculty given by the NSF. Wang's new, five-year, $770,000 grant also supports community outreach, programs for elementary and middle school students through IUPUI's Center for Earth and Environmental Science, and summer laboratory research opportunities for local high school students. A high school teacher-training program on climate change and hydrological cycles will be offered each summer. The grant also provides funding for training doctoral student researchers and purchasing a new state-of-the-art laser-based isotope instrument.

Fieldwork for the project will be conducted by Wang and IUPUI undergraduate and graduate students in the Namib Desert of Namibia. This desert, which follows the Atlantic coast for 1,243 miles from Angola to South Africa, is almost completely devoid of surface water. It receives virtually no rain but has frequent fog occurrences that have been monitored for over half a century by the Gobabeb Research and Training Center in Namibia, providing unique data on this source of non-rainfall water.

"The historic information from Namibia and the information we gather ourselves in the desert there will enable us to comprehensively assess the non-rainfall moisture effects on drylands and to better predict ecosystem responses to future climate change," Wang explained. "The long-term goal is to expand our research to global

scale."

NSF CAREER grants are awarded to individuals who "exemplify the role of teacher-scholars through outstanding research, excellent education, and the integration of education and research."

"NSF CAREER awards are very competitive grants given to faculty who excel in both research and teaching," said Simon J. Rhodes, dean of the School of Science at IUPUI. "This award reflects Dr. Wang's commitment, both to outstanding research that will help the people of Indiana and beyond and to educating Indiana students from elementary school through the Ph.D."

Current School of Science at IUPUI faculty members who also have received the prestigious award include Lisa M. Jones, Lei Li and Haibo Ge (chemistry and chemical biology); Yogesh Joglekar (physics); Gavriil Tsechpenakis, Murat Dundar and Mohammad Al Hasan (computer and information science); Roland Roeder (mathematical sciences); and Gregory Druschel (earth sciences).

The School of Science at IUPUI is committed to excellence in teaching, research and service in the biological, physical, behavioral and mathematical sciences. The school is dedicated to being a leading resource for interdisciplinary research and science education in support of Indiana's effort to expand and diversify its economy.

RECENT EXTERNAL FUNDING AWARDS

Grants and Awards – March 2016

PI	Agency	Project Title	School	Department	Total
Gonzalez, Frank	NATIONAL INSTITUTE OF DIABETES, DIGESTIVE & KIDNEY	Treating Inflammation in PCOS to Ameliorate Ovarian Dysfunction	MEDICINE	OBSTETRICS AND GYNECOLOGY	$2,979,779
Arrizabalaga, Gustavo A	NATIONAL INSTITUTE ALLERGY & INFECTIOUS DISEASES	Dissecting the calcium dependent phosphorylation network of Toxoplasma gondii	MEDICINE	PHARMACOLOGY & TOXICOLOGY	$2,586,505
Haas, David M	NATIONAL INSTITUTE OF CHILD HEALTH, HUMAN DEVL.	Pharmacokinetics and modeling of betamethasone therapy in threatened preterm birth	MEDICINE	OBSTETRICS AND GYNECOLOGY	$2,376,714
Corson, Timothy W	NATIONAL EYE INSTITUTE	Ferrochelatase as a mediator of ocular angiogenesis	MEDICINE	OPHTHALMOLOGY	$1,953,080
Halverson, Paul K	THE ROBERT WOOD JOHNSON FOUNDATION	Improving population and clinical health with integrated services and advanced analytics	PUBLIC HEALTH	HEALTH POLICY & MANAGEMENT	$998,500
Foroud, Tatiana M	MICHAEL J FOX FOUNDATION FOR PARKINSONS RESEARCH	Parkinson's Progression Markers Initiative Wide Spread Recruitment Initiative (PPMI WRI)	MEDICINE	MEDICAL & MOLECULAR GENETICS	$813,099
Wang, Lixin	NATIONAL SCIENCE FOUNDATION	CAREER: The effects of non-rainfall moisture inputs on dryland ecosystem functions	SCIENCE	GEOLOGY	$779,879
Shen, Changyu	AGENCY FOR HEALTHCARE RESEARCH AND QUALITY	A unified method to study heterogeneity in treatment effect	MEDICINE	DEPT OF BIOSTATISTICS	$737,049
Chen, Yaobin	TOYOTA MOTOR ENG. & MANF. N. AMERICAN, INC.	Inventories of Roadways and Roadway Edge Conditions for Vehicle Road Departure Study	E&T	ELECTRICAL & COMPUTER ENGR	$400,001
Belecky-Adams, Teri	ELI LILLY AND COMPANY	PDGFR Signaling and Diabetic Retinopathy (DR)	SCIENCE	BIOLOGY	$240,907
Asirwa, Fredrick Chite	INDIANA HEMOPHILIA & THROMBOSIS CENTER	Indiana Hemophilia & Thrombosis Support 2016	MEDICINE	CANCER CENTER	$194,500
Ware, Stephanie	MARCH OF DIMES BIRTH DEFECTS FOUNDATION	Gene Discovery and Translational Research	MEDICINE	PED-GENETICS RESEARCH	$173,108
Pascuzzi, Robert Mark	BARRON ASSOCIATES, INC.	Robust Blink-Based Communication System for Patients in Bed	MEDICINE	NEUROLOGY	$154,022
Davis, Thomas E.	BECTON DICKINSON	BDS-MCTGCTV2 / Clinical Simulation of the BD MAX STI Plus Assay when tested with the BD MAX system	MEDICINE	PATHOLOGY AND LABORATORY MED	$118,800
McKinley, Todd Owen	BECTON DICKINSON	BDS-MCTGCTV2 / Clinical Simulation of the BD MAX STI Plus Assay when tested with the BD MAX system	MEDICINE	PATHOLOGY AND LABORATORY MED	$117,234
Spandau, Dan F	WRIGHT STATE UNIVERSITY	Wounding therapy and photocarcinogenesis	MEDICINE	DERMATOLOGY	$103,403
Bodenhamer, David J	PARKVIEW HEALTH SYSTEMS	Parkview Community Health Needs Assessment	LIBERAL ARTS	POLIS CENTER	$103,000

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 INSTITUTES OF HEALTH

Advances in Polycystic Kidney Disease (R01): The purpose of this announcement is to increase investigator interest in basic and applied investigations of the etiology and pathogenesis of Polycystic Kidney Disease (PKD), in both its autosomal dominant and autosomal recessive forms. The ultimate aim is to facilitate PKD-related research studies, which will provide the basis for new therapeutic approaches. *Deadline: June 5, 2016.* http://grants.nih.gov/grants/guide/pa-files/PA-16-159.html

Tailoring Dental Treatment for Individuals with Systemic Diseases that Compromise Oral Health (R01): This announcement encourages research to address gaps in our knowledge of how best to treat oral diseases of patients with systemic diseases or conditions known to compromise oral health, to identify factors predictive of treatment outcomes within patient groups, and to generate evidence for more precise dental treatment guidelines tailored to patient needs. It is expected that research applications will propose studies utilizing established cohorts of individuals with the disease of interest. *Deadline: June 5, 2016.* http://grants.nih.gov/grants/guide/pa-files/PAR-16-154.html

NIDCR Dentist Scientist Pathway to Independence Award (K99/R00): The purpose of the NIDCR Dentist Scientist Pathway to Independence Award (K99/R00) program is to increase and maintain a strong cohort of new and talented independent dual degree dentist scientists. This program is designed to facilitate a timely transition of outstanding dual degree dentist scientists from mentored, postdoctoral research positions to independent, tenure-track or equivalent faculty positions by providing support for two years of mentored training and three to five years of independent research. The option for five years of independent (R00) support is available to accommodate clinical specialty training at no more than 3 person-months effort (25% effort) in any year of the R00 phase.

Deadline: June 12, 2016. https://grants.nih.gov/grants/guide/pa-files/PAR-16-156.html

Adult Maturational Changes and Dysfunctions in Emotion Regulation (R01): This announcement invites applications for mechanistic research on how age- and sex-related changes in emotion processing develop over the adult life course and how these changes may interact with and inform the understanding of affective dysregulation in adult mental disorders and Alzheimer's disease. In particular, research is sought that will leverage the already established normative backdrop of generally improved emotion regulation with aging, as well as research that will expand this evidence base. One aim is to clarify the trajectories of change in emotion processing and linked neurobiological and neurobehavioral factors in aging adults who experience mood and anxiety disorders. Equally important aims are to advance understanding of the factors involved in normative maturational shifts in these processes and of sources of individual variation therein, and to clarify how such shifts (or lack thereof) may relate to irregularities in the integrative neural-behavioral mechanisms of affect regulation seen in these adult mental disorders and in Alzheimer's disease. It is anticipated that such studies may identify novel targets for mental health interventions or prevention efforts, or provide clues as to which available intervention strategies might be optimally applied to normalize emotion dysregulation or to strengthen emotional resilience at particular stages of the adult life cycle. *Deadlines: Letter of Intent: June 22, 2016; Application: July 22, 2016.* http://grants.nih.gov/grants/guide/rfa-files/RFA-MH-17-405.html

Quantitative Imaging for Evaluation to Cancer Therapies (U01): This announcement invites research project-cooperative agreement (U01) applications which are expected to enhance the value of quantitative imaging (QI) in clinical trials for prediction and/ or measurement of response to cancer therapies. One avenue for this enhancement is to emphasize the development, optimization and validation of state-of-the-art QI methods and software tools for potential implementation in single site phase 1 or 2 clinical trials. The second avenue to enhance QI methods is to address the challenges of integrating existing and or new QI methods as required for multicenter phase 3 clinical trials. This may involve evaluation of a range of multimodal imaging approaches, harmonization of image data collection, analysis, display and clinical workflow methods across imaging platforms, or testing their performance across different cancer sites.

Because this validation process is complex, a single research program cannot be expected to complete every detail from initial tool development to final integration into clinical trials. Therefore, it is anticipated that these research goals will require multidisciplinary efforts. Although the involvement of industrial partners in the development of the QI methods is not required, it is strongly encouraged. Awardees will also join the

Quantitative Imaging Network (QIN) to share ideas and approaches in order to validate and standardize imaging data and related imaging metadata for quantitative measurements of prediction and/or response to cancer therapies. *Deadline: October 5, 2016*. http://grants.nih.gov/grants/guide/pa-files/PAR-14-116.html

NATIONAL SCIENCE FOUNDATION

Biological Anthropology: This program supports basic research in areas related to human evolution and contemporary human biological variation. Research areas supported by the program include, but are not limited to, human genetic variation, human adaptation, human osteology and bone biology, human and nonhuman primate paleontology, functional anatomy, and primate socioecology. Grants supported in these areas are united by an underlying evolutionary framework, and often a consideration of adaptation as a central theoretical theme. Many proposals also have a biocultural orientation. The program frequently serves as a bridge within NSF between the social and behavioral sciences and the natural and physical sciences, and proposals are commonly jointly reviewed and funded with other programs. *Deadline: November 16, 2016.* http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5407

Improving Undergraduate STEM Education (IUSE): The IUSE program invites proposals that address immediate challenges and opportunities that are facing undergraduate STEM education, as well as those that anticipate new structures (e.g. organizational changes, new methods for certification or credentialing, course re-conception, cyberlearning, etc.) and new functions of the undergraduate learning and teaching enterprise. The IUSE program recognizes and respects the variety of discipline-specific challenges and opportunities facing STEM faculty as they strive to incorporate results from educational research into classroom practice and work with education research colleagues and social science learning scholars to advance our understanding of effective teaching and learning.

Toward these ends the program features two tracks: (1) Engaged Student Learning and (2) Institutional and Community Transformation. Two tiers of projects exist within each track: (i) Exploration and (ii) Design and Development. These tracks will entertain research studies in all areas. In addition, IUSE also offers support for a variety of focused innovative projects that seek to identify future opportunities and challenges facing the undergraduate STEM education enterprise. *Deadline: November 3, 2016.* http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf15585

U.S DEPT. of DEFENSE (CDMRP)

Extremity Regeneration Technology-Therapeutic Development Award: This program focuses on innovations to reconstruct, rehabilitate, and provide definitive care for injured Service members. The ultimate goal is to return Service members to duty and restore their quality of life. Innovations developed from research efforts are expected to improve restorative treatments and rehabilitative care to maximize function for RTD (return to duty) or civilian life. The interest is in medical technologies (drugs, biologics, and devices) and treatment/rehabilitation strategies (methods, guidelines, standards, and info) that will significantly improve the medical care provided to wounded Service members.

The area of interest for the Extremity Regeneration Technology/Therapeutic Development Award is extremity regeneration to address complex blast and other traumatic injuries to Service members. The proposed research must have a military relevance but is expected to improve both public and military healthcare outcomes. Unprotected extremities are at greatest risk for significant tissue damage and loss and often sustain damage to muscle, nerve, blood vessels, bone, and connective tissues. Applicants must specifically address one or both of the Focus Areas: 1) Treatments of soft tissue injury, specifically, nerve, muscle, and vascular injury to the extremities. The aim of these technologies is to: (a) maintain the structure and function of denervated end organs distal to a nerve injury; (b) restore functional muscle tissue; and (c) restore vascular perfusion. Both innovative definitive care solutions as well as innovative technologies that may better enable a definitive care solution to be delivered at some future time point, such as vascular shunting or stenting technologies, will be considered; and 2) Treatments for bone healing, for example, technologies that create a wound environment more conducive to bone healing following injury to the extremities. *Deadlines: Pre-Application: Dec. 15, 2016; Application: Dec. 22, 2016.* http://www.grants.gov/web/grants/view-opportunity.html?oppId=279628

LUPUS RESEARCH INSTITUTE

Novel Research Program-New Research Grants for Novel Approaches to Lupus: Novel Research Grants provide early stage support for exceptionally creative and innovative approaches to major challenges in lupus research. Successful proposals will advance novel hypotheses and/or technologies that have the potential to stimulate new research directions and propel the field forward. Rationale for the hypotheses proposed rather than amount of preliminary data will be emphasized. Continuations of long-term research projects are not appropriate for this submission.

The program goals are to stimulate investigation of underexplored pathways and generate transformative discoveries in lupus that can drive the development of safer and more effective treatments. Investigations into the fundamental mechanisms of lupus and its complications, explorations of novel targets and pathways, and applications involving novel technologies and interdisciplinary approaches are particularly encouraged. *Deadline: July 1, 2016.* http://lupusresearchinstitute.org/lupus-research/grant-application

---

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 Steven Chin schin@iupui.edu.*

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.

Office of the Vice Chancellor for Research - ovcr@iupui.edu
Indiana University Purdue University Indianapolis
755 West Michigan Street, UL1140, Indianapolis, IN 46202-2896
Phone: (317) 278-8427