

**IUPUI Research and Creative  
Activity** — *Fulfilling the Promise*



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## Report Overview

## IUPUI **Research** and **Creative Activity** — *Fulfilling the Promise of Endless Possibilities.*

### MESSAGE FROM THE VICE CHANCELLOR FOR RESEARCH

Welcome to the 2014 IUPUI Annual Research Report. This has been a remarkable year for research at IUPUI, as evidenced by the accomplishments highlighted in this report, and by the impact that the resulting research outcomes and creative activities are generating. IUPUI is emerging as a top urban research university and establishing a reputation as a national leader in many areas, from health and life sciences to arts and humanities. Our researchers are expanding the frontiers of knowledge, with emphasis on addressing important national and global needs, and on taking knowledge generated from scientific inquiry and humanistic scholarship and transforming it into practices and solutions that improve people's lives, generate economic growth and contribute to social well-being.

This report is organized around key strategic initiatives, including the Translating Research into Practice initiative, the Signature Centers Initiative, the Indiana Clinical and Translational Sciences Institute, the IUPUI Arts and Humanities Institute, the STEM Education Research Institute, and the IUPUI Imaging Research Initiative. Moreover, it contains sections that provide a glimpse into the broad spectrum of innovative research programs and initiatives that have been realized, in areas ranging from philanthropy to student innovation and entrepreneurship.

Accomplishments include the five-year \$30 million renewal of the Indiana Clinical and Translational Sciences Institute from the National Institutes of Health, a three-year \$30 million award for concussion research from the Department of Defense and NCAA, the third-year \$15 million funding from IU Health in support of the School of Medicine's Strategic Research Initiative, and nearly \$15 million in awards from federal agencies and other sources for leading-edge ophthalmology research. Moreover, IUPUI researchers sustained significant growth in research commercialization, and industry and community partnerships. There has also been considerable impact on student success through innovative undergraduate experiential learning programs that integrate research and education to provide students effective pathways for lifelong active learning and professional development.

To learn more about the innovative research conducted at IUPUI, I invite you to visit our research webpage at [research.iupui.edu](http://research.iupui.edu), or contact us at [OVCR@iupui.edu](mailto:OVCR@iupui.edu).

**Kody Varahramyan, Ph.D.**  
Vice Chancellor for Research

### Mission Statement

**To develop and expand innovative research programs that align well with the institutional mission and strategic plan, address important national and global needs, and through technology transfer and commercialization, noticeably support the economic development of Indiana and the nation.**



Chancellor Charles Bantz and Dr. Sandra Petronio established the Bantz-Petronio Translating Research into Practice Award because translational work is core to IUPUI schools.

Dr. Jeffrey Kline

In 2013, Chancellor Charles Bantz and Dr. Sandra Petronio established the Bantz-Petronio Translating Research into Practice Award because translational work is core to IUPUI schools. The award recognizes outstanding faculty research that is interdisciplinary and/or cross-disciplinary, and is intentionally directed toward positively impacting people's lives within and beyond the State of Indiana. In addition to generating knowledge through scientific inquiry or humanistic scholarship, the award recognizes faculty that actively endeavor to transform knowledge into practices or solutions, by demonstrating innovative ways to improve the lives of individuals and the communities in which they live.

Jeffrey Kline, M.D., was awarded the 2014 Bantz-Petronio Translating Research into Practice Award based on his outstanding translational research. Dr. Kline has transformed the way physicians think about, diagnose, and treat pulmonary embolism (PE). The direct application of his work has saved countless lives and prevented unnecessary testing in hundreds of thousands of other patients who present with high risk medical situations. For instance, if you ask an Emergency Medicine physician how they think about PE, you will hear about the PERC rule (Pulmonary Embolism Rule out Criteria). This was created by Dr. Kline and has fundamentally changed the approach to the patient who presents with chest pain

or shortness of breath. The elegance and rigor of his studies, coupled with the clarity of his language, has enabled his work to be translated into clinical practice around the world.

Dr. Kline's diagnostic research interests focus on human affect analysis, pretest probability, and novel breath-based instruments to reduce overuse of medical imaging. His human treatment research includes randomized trials of fibrinolysis and inhaled nitric oxide to reduce heart damage from blood clots in the lungs. Dr. Kline's current work focuses on using the human face as a diagnostic instrument to further help doctors make informed decisions about diagnostic testing for blood clots. His laboratory work focuses on the mechanisms and treatment of acute pulmonary hypertension from pulmonary embolism, animal models of pulmonary embolism, and a nanoparticle-delivered enzyme, plasmin, to promote clot lysis without increasing risk. He helped set up an advanced hospital treatment program for patients with severe PE, and also created and currently runs a clinic designed specifically to allow patients diagnosed with blood clots in the emergency department to receive treatment at home, rather than in the hospital.

Dr. Kline's work on an interdisciplinary team, including faculty and students, focusing on the human face as a diagnostic instrument is an excellent example of the translational research efforts of IUPUI. Dr. Kline is Professor of Emergency Medicine, Professor of Physiology, and Vice Chair of Research in the Department of Emergency Medicine, IU School of Medicine.

### FEATURED TRANSLATIONAL SCHOLARS

Translational research solves problems people face in their everyday lives by using meaningful, evidenced-based information to address complex social, health, governmental, cultural, and relational issues. This process is more than just application. Translational research intentionally targets a problem and constructs an answer based on evidence. IUPUI Translational Scholars generate and take knowledge where it can be used to make lives better.



Dr. Tamara Leech



Dr. Sarah Wiehe

#### TAMARA LEECH, PH.D.

Associate Professor | Public Health

#### Influence of the Grassroots WISE program on Teen Mothers

Women's Information and Support Exchange (WISE) across Generations was a direct result of an Indiana State Department of Health-sponsored Community Conversation on Adolescent Pregnancy and Parenting conducted in 2011. These large-scale community conversations brought sixty community members from the Indianapolis Mapleton-Fall Creek neighborhood together in focus groups and conversations to safely and openly address taboo issues and share experiences related to teen pregnancy. Analyses of conversational data revealed that community members were more likely to draw on informal, rather than formal, sources of support, specifically networks of women-mothers, grandmothers, aunts, and family friends. These sources of support fulfill needs related to the well-being of teen mothers, teen fathers, and their children. In response, Dr. Leech's research team collaborated with participants who wanted to take the lead in designing and implementing the WISE across Generations program. WISE formalizes relationships between mature women and adolescents through an intentional program of reciprocal communication. A pilot program of WISE across Generations was implemented in the community and evaluated using a pre-test/post-test design with comparison in outcomes across levels of participation. Results indicate that the program has the potential to be an important resource for younger adolescent mothers from

very low income families. This is promising as those are characteristics that represent both a high-risk population for undesirable parenting outcomes and difficult to reach populations. Through reliance on both qualitative and quantitative measures in collaborative design, implementation, and assessment, WISE effectively translated academic and community knowledge to meet pressing public needs. Findings from the program support extended implementation of the program in specific, low-income neighborhoods.

Dr. Leech is an Associate Professor in the Richard M. Fairbanks School of Public Health. She is an Investigator in the Center for Urban Health (an IUPUI Signature Center), an adjunct faculty member of the IUPUI Sociology Department, and is the Chair of the Society for the Study of Social Problem's Community Research and Development Division.

#### SARAH WIEHE, MPH

Associate Professor | Pediatrics

#### Engaging the Community to Inform Patient-Centered Outcomes Research

Despite well-known associations between where a person lives and his/her health, few patient-centered approaches have been used to develop and implement place-based health interventions. For the first time in the United States, Avondale Meadows, a Purpose Built Community in Indianapolis, is incorporating health as part of its community development strategy.

Avondale Meadows is an 800-unit, mixed income housing development with a key emphasis on housing, education, and health. Now, nearly all units have been leased and health-related amenities, including a Health and Wellness Center, are about to be implemented. Dr. Wiehe, with a team of academic and community partners, have engaged all stakeholders, including current and future residents, to discuss how to improve the community's health. Through mixed-methods and participatory design, the team has elicited and engaged residents to develop health-promoting interventions in their community. These ideas were presented back to the larger community for validation and further resident engagement. Now, as community members are incorporated into the 'research team,' they will work together to translate their ideas into action.

Dr. Wiehe is a pediatrician and public health researcher in the Children's Health Services Research at Indiana University School of Medicine, an affiliated scientist at the Regenstrief Institute for Health Care, and adjunct assistant professor of Geography and Public Health. She is co-director of the Community Health Engagement Program of the Indiana Clinical Translational Sciences Institute.





CENTER FOR CIVIC LITERACY

The mission of the Center for Civic Literacy is, first, to increase scholarly and public understanding of the dimensions of our civic deficit and the effect of that deficit upon democratic decision-making and civil society, and second, to identify, develop, and disseminate evidence-based best practices to help educators and others address and correct the problem. In 2014, the Center published the first issue of *The Journal of Civic Literacy*, a new peer-reviewed academic journal. Also in 2014, Georgetown University Press published “Talking Politics? What You Need to Know Before You Open Your Mouth.” The book, written by center director Dr. Sheila Suess Kennedy, identified essential elements of civic knowledge.

Dr. Sheila Suess Kennedy

The Signature Centers Initiative constitutes a cornerstone of the IUPUI research enterprise, fostering the development of research centers that are advancing IUPUI’s research standing nationally and internationally.



Left to right:  
Dr. David Marrero,  
Dr. Tamara Hannon,  
and Dr. Aaron Carroll



Left to right: Dr. Dennis Fortenberry and Dr. Gregory Zimet

CENTER FOR HUMAN PAPILLOMVIRUS RESEARCH

The overall mission of the Center is to improve understanding of Human Papillomavirus (HPV) transmission and infection, and prevention of HPV infection and its consequences. The Center brings together researchers from multiple health and life sciences disciplines. These researchers are engaged in the realization of multiple collaborative projects ranging from transmission to prevention of HPV infection.

Members of the Center for HPV Research published 18 peer-reviewed research papers on HPV from July of 2013 through June of 2014 and presented 14 papers at regional, national, and international conferences. Most of these papers represent collaborations among center members, as well as collaborative work with researchers throughout the U.S. and around the world.

CENTER FOR PEDIATRIC OBESITY AND DIABETES PREVENTION RESEARCH

The primary mission of the Center is the performance and translation of research in obesity and diabetes prevention among children and adolescents. The Center is dedicated to advancing the health of vulnerable populations through internationally recognized obesity and diabetes prevention research focusing on mechanisms of progression from obesity to type 2 diabetes, defining best practices for obesity/diabetes prevention among youth, and cost-effective translation of the research to the community.

In the past year, the Center has launched clinical research in the “Youth Diabetes Prevention Clinic (YDPC)”, an innovative program designed to evaluate and assess the needs of adolescents who have evidence of prediabetes or obesity in combination with multiple risk factors for the development of diabetes. Not only does the YDPC address a significant unmet clinical need, but it also allows for advanced pediatric obesity patient-centered outcomes research and comparative effectiveness research in adolescent obesity / diabetes prevention. Through the YDPC, the Center for Pediatric Obesity and Diabetes Prevention Research is executing the “Dietary Intervention for Glucose Intolerance in Teens (DIG-IT) Study” that evaluates the impact of glycemic control, in adolescents who have pre-diabetes, of an individually-tailored wellness coaching strategy used to modify lifestyle habits, including dietary, physical activity and sedentary behaviors.



STRATEGIC RESEARCH INITIATIVE QUICKLY LEAVES ITS MARK ON PATIENT CARE AND RESEARCH PROGRESS

In less than three years, the Indiana University School of Medicine-IU Health Strategic Research Initiative (SRI) has made its mark on patient care, supported a broad range of basic science and clinical research initiatives, and helped bring sixteen top scientists to IU to join the medical school's research and patient care team.

With each contributing \$75 million, the IU School of Medicine and IU Health created the five-year initiative in 2012 to strengthen resources and produce innovative treatments from research in neuroscience, cancer and cardiovascular disease.

Much of the impact of the SRI has come from the growing ability of scientists and physicians to apply an understanding of the human genome to patient care:

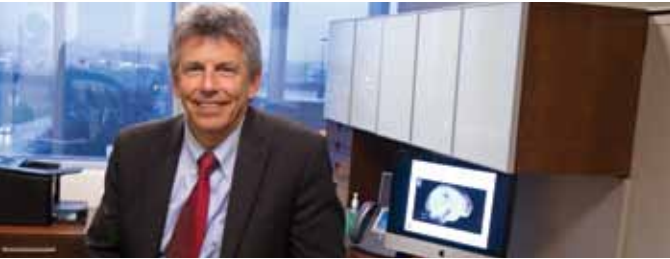
- SRI support for personalized medicine activities led to a \$3.75 million NIH grant for clinical implementation of a pharmacogenomic test developed at IU School of Medicine to guide prescribing of at least 24 widely used drugs.
- At the IU Simon Cancer Center, the Precision Genomics Program began in April 2014, providing genetic analysis to patients with difficult-to-treat metastatic cancer in order to identify the most effective and least toxic treatments.
- SRI-supported implementation of a cardiovascular genetics clinic has enabled more than 180 genetic consultation sessions to patients at the Krannert Institute of Cardiology.
- SRI support also enabled development of a stroke outcomes database and implementation of PowerTrials, software that enables clinicians to be aware of patients' participation in clinical trials.

"In a little more than two years, we're already seeing important research discoveries and transformations in patient care as a result of the SRI investments," said Jay L. Hess, M.D., Ph.D., dean of the IU School of Medicine and IU vice president for university clinical affairs.

"Our goals with the SRI were to continue developing the School of Medicine's research enterprise and leverage that development into better patient care," said David S. Wilkes, M.D., executive associate dean for research affairs. "I'm pleased that we're making progress on both goals."



Left to right: Dr. David Wilkes and Dr. Jay Hess



Dr. Thomas McAllister

IU'S CONCUSSION EXPERTISE LANDS \$30 MILLION GRANT FROM DEFENSE DEPARTMENT AND NCAA

The U.S. Department of Defense and the National Collegiate Athletic Association recognized Indiana University School of Medicine's broad expertise in traumatic brain injury and concussion in May 2014 when they selected IUSM to lead a three-year, \$30 million concussion research and education alliance.

The Concussion Assessment, Research and Education Consortium, which will involve athletes from as many as 30 universities, is a collaboration with researchers at the University of Michigan and the Medical College of Wisconsin.

The alliance, which gathered national attention when it was unveiled at a news briefing by President Barack Obama, will fund long-term research seeking a much deeper understanding of concussion injuries; how they impact the brain; how and to what extent the brain recovers; and how treatment and prevention can be improved. It will also develop education programs meant to change the culture of concussion reporting and management.

The Defense Department and the NCAA will contribute \$15 million each to the project.

"Although we and many other researchers have been studying concussions for years, there is much we still don't understand about what happens to the brain when someone has a concussion, and we're not sure how long those changes in the brain may last," said Thomas W. McAllister, M.D., chairman of the Department of Psychiatry, who will lead the project's administrative and operations center.

EXPANDING THE OPHTHALMOLOGY MISSION

The research mission of the IU School of Medicine's Department of Ophthalmology has expanded dramatically since the opening of the Eugene and Marilyn Glick Eye Institute in 2011, particularly with the 2013 recruitment of Michael Boulton, Ph.D., Merrill Grayson professor of ophthalmology and director of basic science and translational research, and Maria Grant, M.D., Marilyn K. Glick senior professor of ophthalmology.

In the most recent fiscal year, the Institute's researchers have successfully competed for nearly \$15 million in research awards, with nearly \$10.5 million of the funding from federal government agencies.

The expanding research enterprise at the Institute was recognized in 2014 by Research to Prevent Blindness, Inc. (RPB), which awarded a five-year, \$575,000 unrestricted grant that will help expand the ophthalmology department's research programs. The funding can be used for such activities as funding development projects by junior and mid-level faculty, expanding the Institute's bioimaging core and recruiting new faculty. This award also allows departmental faculty to be eligible for many prestigious awards and grants from Research to Prevent Blindness.

Of \$15 million in research awards,\$4.1 million is derived from several National Institutes of Health grants received by Dr. Maria Grant for her diabetic retinopathy and related research. Dr. Michael Boulton received approximately \$3 million in federal grants for his research in age-related macular degeneration and related work.

Among other faculty, Rajashekhar Gangaraju, Ph.D., assistant professor of ophthalmology, received grants totaling \$1.9 million for his diabetic retinopathy research and Yang Sun, M.D., Ph.D., assistant professor of ophthalmology, received grants totaling nearly \$829,000 for his work in glaucoma.

"I fully believe that we are now on track and becoming one of the leading vision research institutes in the United States," Dr. Boulton said.

Left to right: Dr. Michael Boulton and Dr. Maria Grant



Dr. Bryan Schneider, Vera Bradley Investigator in Oncology

PLEDGE OF \$15 MILLION FROM VERA BRADLEY FOUNDATION EXPANDS CANCER RESEARCH ACTIVITIES

The Vera Bradley Foundation for Breast Cancer brought its total support for breast cancer research at the Indiana University Melvin and Bren Simon Cancer Center to \$35 million when it announced a pledge of \$15 million in January 2014.

The new pledge added to the previous \$20 million in commitments completed in November 2013 and continued funding for the Vera Bradley Foundation for Breast Cancer Research Laboratories, named for the foundation in 2010.

Catherine Hill, executive director of Vera Bradley Foundation for Breast Cancer, said the foundation believed in the IU team's focus on precision therapeutics, "giving the right medicine to the right patient at the right time based on genetic factors of both the patient and the tumor."

The gift will support IU researchers as they:

- Search for gene alterations that drive specific subtypes of breast cancer and look for new or existing drugs that are more likely to be effective,
- Identify genetic markers that will allow them to predict, with a high level of accuracy, who will suffer from life-changing and life-threatening side effects to treatment, or whose cancer is likely to metastasize, and
- Combine this knowledge to deliver clinical trials to patients with the goal of improving cure rates and quality of life.

The gift also established the Vera Bradley Foundation Scholars Program to train scientists and physicians who will be the future leaders in breast cancer research and care. As a result of support from the Vera Bradley Foundation for Breast Cancer, the number of IU researchers focused on breast cancer has grown to 38, up from six in 1999.



SPARKING TRANSLATIONAL RESEARCH ACROSS STATE LINES

After six years of successfully building a translational research pipeline across Indiana’s top research universities, the reach of the Indiana Clinical and Translational Sciences Institute (CTSI) has extended beyond state borders.

The Indiana CTSI — a collaboration among Indiana University, Purdue University and the University of Notre Dame and one of over 60 centers established by the National Institutes of Health across the U.S. to speed the translation of basic research into clinical applications that improve human health — recently launched the Strategic Pharma-Academic Research Consortium for Translational Medicine (SPARC).

SPARC spans multiple universities with CTSA-funded centers — The Ohio State University, Northwest University and Washington University in St. Louis are the first to join — and two major pharmaceutical companies: Indianapolis-based Eli Lilly and Co. and Japan-based Takeda Pharmaceuticals International Inc.

Under the consortium, Eli Lilly and Takeda will provide about \$400,000 each to several innovative team science projects led by SPARC scientists. The university partners will contribute technology, labs and other resources.

The creation of SPARC was driven by Jay McGill, Ph.D., a translational science officer at BioCrossroads and senior director at Eli Lilly, who is serving as a senior project manager at the Indiana CTSI. Anne Nguyen is the project manager for SPARC.

“SPARC builds upon the unique strengths of academia and industry to create a highly effective research platform,” said Anantha Shekhar, M.D., Ph.D., director of the Indiana CTSI and associate vice president for university clinical affairs at IU. “We want to unlock the new model of innovation by bringing together the two traditional models of research.”

Left to right: Dr. Jay McGill and Anne Nguyen



Left to right: Dr. Padma Portonovo and Dr. Jaipal Singh

CONNECTING RESEARCHERS AND INDUSTRY TO CATALYZE DISCOVERY

The average time it takes for a lab discovery to reach the health care consumer is 17 years. The average cost is \$1 billion.

Discovery alone isn’t enough to turn new research into a product with the potential to help thousands — or hundreds of thousands — of patients. For that, scientists need to partner with companies that have the resources necessary to create and launch new products into the health care market.

Established in April, the Industry Collaboration Portal (ICP) aims to connect faculty conducting cutting-edge research or producing innovative technologies with corporate partners and venture capitalists focused on commercialization. The project is supported by the Indiana CTSI and IU School of Medicine.

The director of the ICP is Jaipal Singh, Ph.D., a former research director at Eli Lilly, an advisor to multiple biotech companies and founder of Prana Biotech, a drug discovery firm that aims to develop “first-in-class” therapies to treat pulmonary arterial hypertension. ICP’s project manager is Padma Portonovo, Ph.D., an experienced technology development officer.

The ICP team also includes over 10 IU medical faculty with their own spin-off companies and an external advisory board with leaders from drug companies AstraZeneca, Eli Lilly, Merck and Takada, and venture capitalists from 5AM Ventures and Medimmune Ventures. Its innovative, team-based implementation structure is modeled on the highly effective Indiana CTSI Project Development Teams program.

“Our aim is that ICP will provide a single point of contact for any industry sponsor that wants to collaborate with the outstanding researchers here,” Dr. Shekhar said.



Left to right: William F. McConnell Jr. and Dr. Richard Kovacs

ADVANCING CLINICAL STUDIES THROUGH INFORMATION TECHNOLOGY

Over 1,000 clinical research studies are conducted by physician-researchers across IU, Purdue and Notre Dame. But finding patients to benefit from these cutting-edge treatments isn’t easy.

Currently, about 80 percent of clinical trials are delayed due to inadequate enrollment, with 15 to 20 percent never enrolling a single participant.

With \$725,000 from the Strategic Research Initiative — a joint venture of the IU School of Medicine and IU Health — the Indiana CTSI Translational Informatics Program and the IU Health Information Services aim to improve those numbers by connecting the separate software systems that manage and execute clinical research across the medical school and the hospital system.

The project — which leaders say will be the first such system in the state — is led by Richard J. Kovacs, M.D., the Q.E. and Sally Russell Professor of Cardiology at the IU School of Medicine, and William F. McConnell Jr., CIO at IU Health.

After implementation is complete, IU Health Electronic Medical Records will indicate whether a patient is already enrolled in a clinical research study, as well as provide doctors the ability to quickly search open trials that match a patient’s condition.

Rollout started this year as a pilot project at the Methodist Research Institute and the Krannert Institute of Cardiology. Other academic divisions and clinics will join the system in the coming months and years.

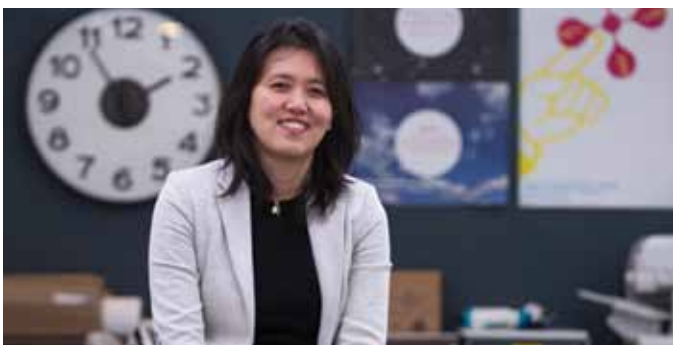




Dr. Jason Kelly (seated) and members from the IAHI Advisory Committee

PROFESSOR JASON KELLY AND THE NEW IAHI SPACE

In 2011, the IUPUI Arts & Humanities Institute (IAHI) was founded to facilitate, fund, and promote cutting edge, cross disciplinary approaches to research in the arts and humanities on the IUPUI campus. In August of 2014, the IAHI found a home that matches the lofty vision that director, Jason Kelly, has instilled in the Institute. An organization dedicated to collaboration and forward thinking in the arts and humanities could not ask for a more appropriate physical representation. Located on the fourth floor of the campus library, the IAHI’s new head office, with its broad spaces, clean lines, and pristine glass, embodies the modern and inviting philosophy of “open-access” championed by Dr. Kelly. Part classroom, part head-quarters, and part gallery the new IAHI office has been home to events ranging from state-wide library conferences to digital humanities workshops covering new methods of data visualization. In October, the IAHI and its new offices were the point of origin for the first inaugural Entanglements Lecture that brought famed science writer and literary critic Dr. Katherine Hayles together with two-time Pulitzer Prize winning biologist Dr. E.O. Wilson for a moderated discussion on what makes us human. While the lecture certainly proved entertaining for the more than two hundred and eighty guests, it represented a large step for the IAHI’s plan to bring awareness and visibility to the intersectionality of science and the humanities.



Youngbok Hong

“MIGRATING FOR A BETTER LIFE: RETHINKING SOCIAL SERVICE DESIGN FROM A PEOPLE CENTERED PERSPECTIVE”

Professor Youngbok Hong was struck by the stark difference between the visibility of produce in supermarkets and the relative invisibility of the population that brings that produce to the community. In that realization, her project: “Migrating for a Better Life: Rethinking Social Service Design from a People Centered Perspective”, was born. Professor Hong, of the Herron School of Art and Design, recognizes that our society is a complex, layered system, acted out by forces that are both collective and individual. This fact is why she focuses on, what she calls a “people oriented” approach to system design. The individual voice and experience are humanizing factors that can enrich the institutional approaches to problem solving that are often based on dehumanizing data points.

When Professor Hong considered relationship between farm and supermarket, she began to reimagine the way that the Indiana community and its population of migrant farmworkers engage one another. In the summer of 2014, Hong and three students from Herron’s Design School visited more than 35 farms throughout the state producing a social service design document that contains over sixty field notes and more than three thousand images. Concerning the social engagement and visibility of migrant laborers, Hong sees her work not in terms of political issues, but in terms of human issues. She wants to facilitate a broad conversation by replacing the public’s vague notion of migrant farm labor with a more concrete, substantiated, and contextualized story. It is her sincere hope that her work may someday be used to construct more informed policies surrounding the underrepresented members of Indiana society.

For this initial research phase, Professor Youngbok Hong received funding from the IAHI. Moving forward, Hong does not see a specific “endpoint” for her work but rather an ongoing responsibility to her data. Through contacts she made in her work, the Indiana Department of Health is offering continued funding and she will be able to continue her work, with added focus on female migrant laborers and their health.



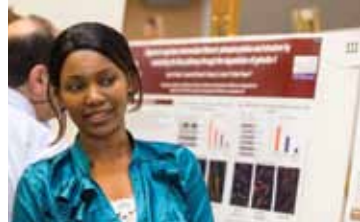
Sonja Staum, Director of the Herron Art Library

AL-MUTANABBI STREET STARTS HERE

On March 5, 2007, in the midst of the Iraq war, a car bomb exploded destroying al-Mutanabbi Street, a busy avenue of cafés and bookstores that had served as a literary and intellectual nexus for generations of middle-eastern writers and thinkers. In response to the attack, a San Francisco bookseller, Beau Beausoleil, rallied international artists and writers to respond to the event through various media. The coalition, called “Al-Mutanabbi Street Starts Here”, has created a unique collection including works on paper, artists’ books, and an anthology of writing, all focused on expressing solidarity with Iraqi booksellers, writers and readers.

The Herron Art Library, a branch of the IUPUI University Library, had the honor of entering an agreement with the international coalition of artists and writers to preserve and showcase a collection of printed materials remembering the destruction of al-Mutanabbi Street. Only three libraries worldwide will hold complete runs of the “Al-Mutanabbi Street Starts Here” collection. The effort to digitize the collection was made possible by an IAHI grant.

The coalition will donate a complete run of the collection to the Herron Art Library, with the understanding that the library will preserve and act as a loan agent, provide a digital presence for the collection, as well as sponsor three biennial conferences that foster conversations around the themes of the Coalition with scholars, artists and writers from a range of disciplines. The first symposium took place on November 17-18, 2014 at IUPUI, which was co-sponsored by the IAHI.



Left to right: Dr. Wei-Hua Lee and Dr. Edgar Huang

FIRST GENERATION OF CHINESE MEDICAL EDUCATORS: LOST STORIES

One of the great narratives of the 20th and 21st century has been the rise of China on the world stage. As with many aspects of Chinese society, medicine and the medical sciences are experiencing rapid advancement. Today’s innovations are largely possible because of the first-generation Chinese medical educators – pioneers who brought Western medicine to their homeland in the early 1900s – and who are in danger of fading from the public memory. Peking Union Medical College (PUMC), founded by the Rockefeller Foundation in 1917, has remained the best medical school in China and its staff has played a vital role in transferring Western medicine to the country. These incredible professionals, including Dr. Chung-Un Lee, PUMC’s first Chinese president, laid the foundation upon which China’s current medical growth has been based. Without their extraordinary efforts, the development of Western medicine in China would not have been sustained through mid-century periods of war and the politically tumultuous establishment of the People’s Republic of China in 1949.

Dr. Edgar Huang from the IU School of Informatics and Computing and Dr. Wei-Hua Lee from the IU School of Medicine are collaborating on a documentary project to keep these first-generation educators from losing their place in history. With funding from the IAHI, Drs. Huang and Lee have traveled to multiple cities in the US, China, and Europe to study archived materials and interview eyewitnesses, students, and relatives of Dr. C.U. Lee. Through these uncensored, genuine personal stories, the movie intends to answer a lingering question in the world as to whether PUMC symbolizes extraordinary philanthropy or cultural imperialism. This project will be the first attempt to reveal such personal stories regarding this history before they permanently disappear.

Through the eyes and words of individuals close to Dr. C.U. Lee, Drs. Lee and Huang will shed light on his life, challenges, and contributions. His dreams, ideals, and sacrifices between 1894 and 1962 represent a generation of extraordinary Chinese medical professionals who built the foundation for and made possible the contemporary medical system in China. This exciting project is expected to be completed within the year.





Dr. Ahmed Ghoneima

3D IMAGING: REVEALING THE HIDDEN INFORMATION

Dr. Ahmed Ghoneima is an assistant professor in Orthodontics and Oral Facial Genetics and the director of the 3D Orthodontic Imaging Laboratory at the Indiana University School of Dentistry. His research interests include three-dimensional (3D) imaging analysis, registration, segmentation and superimposition techniques for orthodontic patients with dentofacial and craniofacial deformities, and the application of virtual reality in dental education. He is particularly interested in the development of novel 3D airway analysis methods for sleep apnea patients. In collaboration with his colleagues in the Department of Mechanical Engineering, School of Engineering and Technology, Dr. Ghoneima is working on developing a prototype for an automated dental appliance that can be used to improve orthodontic treatment. Dr. Ghoneima and his colleagues have also developed software that analyzes 3D laser scanned images of dental impressions acquired through orthodontic treatment to monitor orthodontic tooth movement and root position with no radiation exposure. His research was recognized by the Charley Schultz Resident Scholar Award at the American Association of Orthodontists annual meeting in 2014. He also received both the Orhan Tuncay and Michael Matlof Memorial Teaching Fellowship Awards from the American Association of Orthodontists Foundation in 2013 and 2014 as well as the Junior Faculty first place award during the 2014 Moyer Symposium at University of Michigan School of Dentistry.

TRANSLATING TODAY'S INNOVATIONS INTO TOMORROW'S IMPACTS ...

Dr. Paul Territo is a comparative physiologist and biophysicist with a long-standing interest in molecular imaging applied to translational experimental animal models. During his career in both the pharmaceutical industry and academia, Dr. Territo's research has led to the development of translational imaging biomarkers for oncology, neuroscience, and cardiovascular disease. At the Indiana University School of Medicine, his research encompasses both Tracer Development and Validation (TDVL) and Pre-Clinical Imaging (PCI), where the latter research is made available to the IUSM research community through the CTSI In-Vivo Imaging Core Facility. A key component of Dr. Territo's translational imaging research is the validation of methodologies to serve as a springboard for mechanistic studies and/or therapeutic testing. This research utilizes autoradiography, optical (bioluminescence, fluorescence, immunofluorescence), Positron Emission Tomography (PET), X-Ray Computed Tomography (CT), and/or Magnetic Resonance Imaging (MRI) methods. The TDVL lab was established to aid in development of novel imaging tracers/systems via the tight integration of molecular methods, physiology/pharmacology, imaging, and mathematical modeling. Recently, these methods have been brought to bear for models of glioblastoma, hepatocellular carcinoma, neurofibromatosis, pancreatic ductal adenocarcinoma, retinoblastoma, diabetes, kidney fibrosis, polycystic kidney disease, atherosclerosis, hydrocephalus, traumatic brain injury, and schizophrenia, to name a few.



Dr. Paul Territo



Dr. Joseph Wallace

Future directions include development of neuro-inflammatory and matrix metalloproteinase tracers, that once validated, will have broad clinical applications in neurodegeneration, oncology, and cardiovascular disease.

SEEING AND FEELING TISSUES AT THE NANOSCALE

Dr. Joseph Wallace is a biomedical engineer whose research focuses broadly on structure/function relationships in bone and other musculoskeletal tissues. An element common to many of these tissues is collagen, the most abundant protein in our bodies. In bone, collagen forms the structural template upon which mineral is deposited. The combined properties of collagen and mineral provide the strength and toughness that allow our bones to do what they do best. Unfortunately, many diseases strike these foundational elements and, given their extremely small size, it may not be possible to see damaging changes until a fracture occurs.

For this, Dr. Wallace has turned to Atomic Force Microscopy (AFM). AFM can be thought of as the world's smallest record player. While other microscopes focus photons or electrons on a sample to produce an optical image, AFM utilizes a different principle: it drags a sharpened probe over a surface and measures tiny, atomic level interactions to produce a 3D "image" of surface topography. This technique allows us to see the tiny building blocks of tissues like the collagen and mineral in bone. Over the past several years, Dr. Wallace has used AFM to pioneer new methods to characterize the nanoscale state of bone and other tissues in the hope of finding new and earlier ways to diagnose and treat musculoskeletal disorders.



Dr. Lin Li and his Research Team

HYPERSPECTRAL REMOTE SENSING – A CUTTING EDGE TECHNOLOGY FOR PLANETARY AND ENVIRONMENTAL SCIENCES.

Dr. Lin Li, associate professor in the Department of Earth Sciences and the director of the Planetary and Environmental Remote Sensing Laboratory (PERSL) leads an interdisciplinary research team to perform experimental, theoretical and applied hyperspectral remote sensing studies. Dr. Li has been working on the development of a hyperspectral remote sensing system, which can be used for monitoring blue-green algae in inland water bodies. He has been collaborating with Dr. Susan Ustin from the University of California at Davis to monitor vegetation water content with satellite and airborne remote sensing. Dr. Li and his team have mapped lunar surface compositions with spacecraft images and investigated space weathering on the Moon, which resulted in new perspectives on the evolution of lunar crust and surface soils. The PERSL's research interest also involves the improvement of digital image processing algorithms for detection, classification and discrimination of materials as well as applying hyperspectral remote sensing for addressing the effects of global climate change. The PERSL's mission is to provide leadership in developing hyperspectral imaging techniques to understand terrestrial ecosystems and fundamental processes that have shaped extraterrestrial planets.





IUPUI undergraduate student working with high school teachers on hands-on project to build solar cells using nanotechnology.

**IUPUI RECEIVES \$500,000 TO PROVIDE NANOTECHNOLOGY RESEARCH EXPERIENCES AND PROFESSIONAL DEVELOPMENT TO TEACHERS FROM HIGH NEEDS SCHOOLS.**

The Integrated Nanosystems Development Institute (INDI), in partnership with the STEM Education Research Institute (SERI) and the Center for Research and Learning (CRL), were awarded a three year, \$500,000 National Science Foundation Research Experience for Teachers grant to establish Research Experiences for Teacher Advancement In Nanotechnology (RETAIN). RETAIN is an immersive research education program for high school STEM teachers from high-needs schools that provides:

- 1) knowledge of topics and careers in nanotechnology;
  - 2) hands-on laboratory experiences in inquiry-based science;
  - 3) participant-designed teaching modules developed to meet existing state and national standards;
  - 4) a connection to a professional network of teachers and scientists, as well as on-site support during module implementation; and
  - 5) professional development and college credit.
- RETAIN is guided by Drs. Mangilal Agarwal (INDI director), Maher Rizkalla, Charles Feldhaus (SERI co-director), Likun Zhu, and Jomo Mutegi (SERI co-director). “Local demand for STEM-field graduates is as high as the national demand and RETAIN will provide a platform to impact teachers across STEM disciplines and the “wow-factor” needed to boost student interest” said Dr. Agarwal who also directs the IUPUI Nanotechnology Discovery Academy (INDA). RETAIN will have its first cohort of teachers during the summer of 2015.



Metropolitan School District of Washington Township Teacher Training



The STEM Education Research Institute Team (left to right front row) Dr. Charles Feldhaus, Dr. Jomo Mutegi, Dr. Andy Gavrin (left to right back row) Dr. Brandon Sorge, Grant Fore, and John Buckwalter

**STEM PATHWAYS ADULT EDUCATION PARTNERSHIPS**

The STEM Education Research Institute (SERI) is working on a project to develop adult education curriculum that specifically addresses pressing needs in Indiana’s Science, Technology, Engineering and Mathematics (STEM) workforce. Employ Indy, partnering with Project Lead the Way (PLTW), solicited SERI to design a competency-based curriculum and to create career pathways for adult learners that addresses the workforce development concerns of Indiana business and industry leaders.

PLTW offers a dual credit, rigorous, P-12 engineering program and has provided SERI with access to four of its courses. The program is to be piloted in 2015. Course work will be self-paced, and participants will be required to pass both academic and performance assessments based on PLTW competencies. Upon completing one or more courses, participants should be prepared to gain certifications in the manufacturing industry such as Certified Production Technician, Certified Logistics Technician, and the National Career Readiness Certification. College credits are available through several dual credit programs and pilot study participants will be given counseling towards a specific pathway based on academic and performance measures.

**IMPROVING STUDENT PERFORMANCE**

As scientific knowledge continues to increase, the demand for K-12 teachers to master this knowledge also increases. Nowhere is the demand more pressing than for elementary and middle school teachers who are expected to master a full range of academic disciplines, including: Social Studies, English, Science, and Mathematics. To keep up with this increasing demand and also to better meet the needs of an increasingly diverse student population, the Metropolitan School District of Washington Township (MSDWT) partnered with the Urban Center for the Advancement of STEM Education (UCASE) to provide teachers with targeted professional development aimed at improving student performance in science and mathematics. According to Dr. Crystal Hill Morton, assistant professor of Mathematics Education at IUPUI, “One of our goals is to help practicing teachers to identify and present science and mathematics in ways that are culturally meaningful to their students.”

The three-year professional development program, called “From Standards to STEM: Integrating Science and Math in the Classroom,” is supported by the Indiana Department of Education (DOE) Math Science Partnership (MSP) program. The primary goals of the grant are to (a) increase teachers’ content knowledge, (b) strengthen instructional practices, and (c) build capacity to design STEM units of inquiry. Now in year two of the grant, 45 teachers have each committed greater than 300 hours to various professional development experiences. Participating teachers spend two weeks each summer in full day intensive workshops, participate in evening workshops throughout the academic year, participate in classroom evaluations with IUPUI mathematics and science education faculty, conduct lab work with IUPUI science faculty, and develop integrated science and mathematics curriculums.

Early indicators suggest that the effort is helping teachers to address many of the critical needs that were identified when the proposal was written, as well as some that were not realized until work began. According to Allyson Smith, director of Curriculum and MSP project director, “MSDWT teachers have benefitted immensely from this three year program. The teachers have gained content knowledge and confidence in the areas of math and science, which they are able to take back to their classrooms to increase student achievement. In addition, the pedagogy enhanced teachers’ understanding of inquiry-based instruction.”





Left to right:  
Dr. Sara Konrath, Dr. Lehn Benjamin,  
Dr. David King, and Dr. Catherine Herrold

FROM ALTRUISM TO THE ARAB SPRING

Four outstanding researchers joined the Lilly Family School of Philanthropy’s faculty. Assistant Professor Catherine Herrold’s dissertation, Bankrolling the Arab Spring: The Role of Philanthropy in Egypt’s Political Transition, won the 2014 Association for Research on Nonprofit Organizations and Voluntary Action Gabriel G. Rudney Memorial Award for Outstanding Dissertation in Nonprofit and Voluntary Action.

Assistant professor Dr. Sara Konrath is an experimental social psychologist conducting studies on whether giving and volunteering cause better health through the research lab she brought with her, the Interdisciplinary Program for Empathy and Altruism Research.

Associate professor and director of Ph.D. Programs Lehn Benjamin began her career gathering information for South African human rights organizations during the nation’s transition to democracy. Building on an IU Center on Philanthropy dissertation grant, she has created an impressive body of work on nonprofit performance focused on the work of frontline staff, publishing in nonprofit, public administration, evaluation and urban affairs journals.

Dr. David King, assistant professor and Karen Lake Buttrey director of Lake Institute on Faith & Giving was named one of Ten Young Scholars in American Religion. His Lake Fellowship-funded dissertation about World Vision is part of his research exploring how faith-based nonprofits’ religious identity shapes their motivations, rhetoric, and practice.



WOMEN’S PHILANTHROPY INSTITUTE LEADS THE NATION IN RESEARCH ON GENDER’S ROLE IN CHARITABLE GIVING

Do women give and volunteer more than men? Why? How does that affect the charities they support? Although women are a dynamic force in philanthropy, until recently these fundamental questions remained unanswered. Through Women Give, a signature series of groundbreaking research studies that finds significant gender differences, the Women’s Philanthropy Institute (WPI) led by director and professor Dr. Debra Mesch is changing the way donors and nonprofits think about and practice philanthropy.

The latest report, *Women Give 2014*, released in November, is the first study to examine how the combined influences of gender, age and religiosity affect how much and where men and women give. The study was led by Dr. Mesch and Dr. Mark Ottoni-Wilhelm, who in 2014 was named the first scholar to serve as visiting chair holder for the Irene Lamb O’Gara Chair in Women’s Philanthropy. The world’s first chair of its kind, it is a gift from Maureen and Jim Hackett in honor of Maureen’s mother and will significantly advance research on women’s powerful role in giving, volunteering and leadership of philanthropic organizations.

Dr. Debra Mesch



Left to right: Dr. Una Osili (director of research), Dr. Patrick Rooney (associate dean for academic affairs and research), and Dr. Mark Ottoni-Wilhelm from the Lilly Family School of Philanthropy

“GENEROSITY FOR LIFE” FOCUS OF A \$2.8 MILLION JOHN TEMPLETON FOUNDATION GRANT TO THE LILLY FAMILY SCHOOL OF PHILANTHROPY

The School of Philanthropy has received more than \$2.8 million from the John Templeton Foundation for its research project, Generosity for Life: The Science and Imagination of Living Generously. The project will link generosity scholars across all disciplines to expand philanthropy research design, data collection and data access in order to deepen research on philanthropy over the life-course and across generations. Parents, children, educators, nonprofits and researchers will have access to interactive online resources to better understand philanthropy and to discover, reflect on and practice generosity.

The project expands and builds upon the school’s Philanthropy Panel Study, the most comprehensive longitudinal study of generosity within and among American families. It incorporates the philanthropic behaviors of the same nearly 9,000 families and its database is made available free of charge to researchers worldwide.





**HUMBLE HOMEOPATHIC SLIME SPAWNS AWARD-WINNING DISCOVERIES**

Richard Gregory, Ph.D., of the IU Schools of Dentistry and Medicine, and 2008 laureate of Center for Research and Learning’s Director’s Award for Outstanding Leadership and Mentoring of Undergraduate Research was drawn to this service by, “the opportunity to help them to achieve their goals.” He and Dentistry colleagues L. Jack Windsor, Ph.D., and Fengyu Song, D.D.S., M.S., Ph.D., co-mentored a MURI project titled, “Determination of the Effect of Fulvic Acid on Oral Bacteria and Human Tissues.” Undergraduates Ali Tahir, Emily Parker, Ghayasul Syed, Mark Botros and Phillip Witcher participated, the latter garnering awards both from the Indiana Branch of the American Society of Microbiology (IBASM) and, at IU School of Dentistry Research Day, Johnson & Johnson.

Using material harvested from Himalayan peat bogs, Phillip determined that fulvic acid, an active component of the homeopathic remedy shilajit, inhibits the growth of both *Streptococcus mutans* — a common cause of dental caries—and of *squamous cell carcinoma* (SCC-25) cells. Phillip’s research question, for which he was first author, was, “Evaluating the Effect of Fulvic Acid on Oral Bacteria and Cancerous Oral Cells.” He also will be an author on a manuscript resulting from his summer project in Dr. Gregory’s laboratory, on the influence of tea polyphenols and nicotine on *Streptococcus mutans* growth. Dr. Gregory, his colleagues and students continue to research the effects of fulvic acid, (0.5%) on matrix metalloproteinase expression and collagen degradation ability in SCC-25 cells.

Left to right: Dr. Richard Gregory and undergraduate researcher Phillip Witcher

**INNOVATION-TO-ENTERPRISE CENTRAL (ITEC) STUDENT COMMERCIALIZATION PROJECT**

Dr. Chen Lin, Associate Professor of Clinical Radiology at the IU School of Medicine, is interested in clinical MRI techniques to improve image quality. Thus, Dr. Lin believes MRIs can get better. In order to examine this, a team of students are conducting research exploring the viability of a new MRI technique that will enable improved motion correction for Dynamic Contrast Enhanced (DCE) MRIs. DCE-MRI utilizes contrast agent (CA) to track and analyze the functionality of the vascular system within tumors and nearby tissues. Therefore, it provides a non-invasive solution to quantify tissue vessel density, integrity and permeability and assess organ structure and function.

Nicole Johnson, doctoral student in Health Communication, Meng Zhang, master’s student in Human Computer Interaction, Megan Bryant, senior in Biomedical Engineering, and Abhijit Ravindra, junior in Electrical Engineering, have combined their skills and academic backgrounds with Clayton Nicholas’ mentorship to explore the market value of Dr. Lin’s new technique. This technique is one that reflects technology currently being used for research such as Dr. Paul Salama’s prototype software. This innovation will help doctors not only see organs more clearly, but also allow doctors to better understand how the organ functions. This idea will provide opportunities for physicians to diagnose tumors and lesions, less chance for uncertain diagnoses, and shorter times in which patients must be inside the MRI machine.

ITEC Commercialization Faculty/Student Team (left to right) Dr. Lauren Christopher, Meng Zhang, Megan Bryant, Abhijit Ravindra, Clayton Nicholas, Nicole Johnson, and Dr. Chen Lin



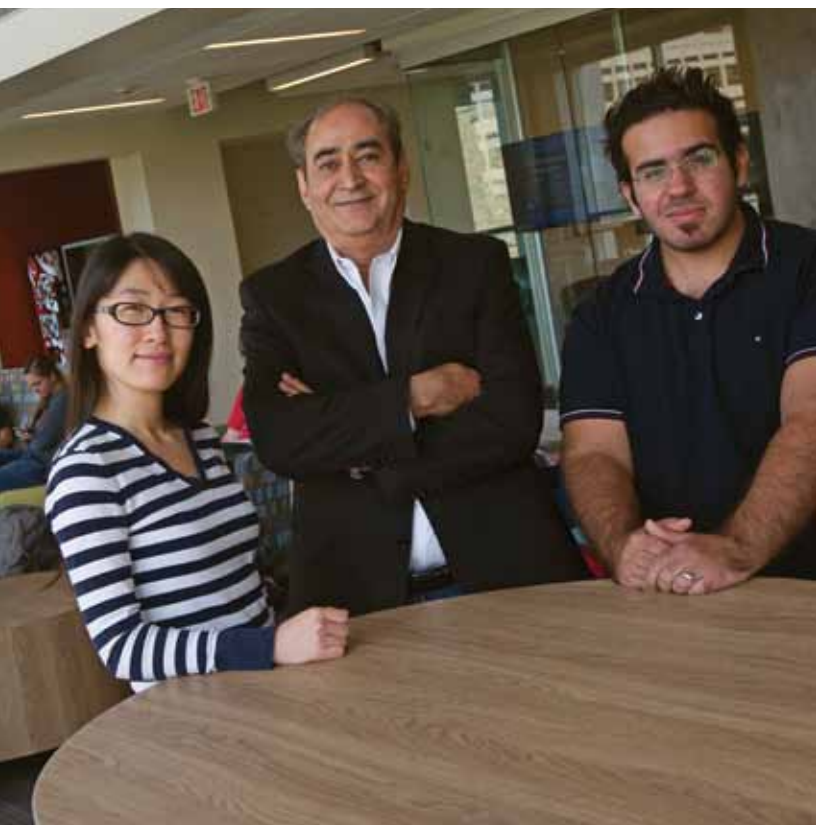
2014 IPREP Fellows Ross Nelson, Sage Bates, Alan Tyson II and Michel Companion

**CRL WELCOMES INAUGURAL COHORT OF IPREP FELLOWS**

The Center for Research and Learning’s programming expanded in the summer of 2014 with the launch of the IUPUI Post-baccalaureate Research Education Program (IPREP), funded by the National Institutes of Health. With the primary objective of improving the diversity of IUPUI graduate students and the professoriate in the United States in the biomedical and behavioral sciences, IPREP will prepare four to six recent college graduates each year from underrepresented-minority populations, including students with disabilities, for admission to graduate programs in five areas of interest to the nation’s healthcare industry, i.e., biomedical engineering, clinical psychology, human performance and kinesiology, medical neuroscience and addictions neuroscience. Each of the 2014 IPREP fellows—Sage Bates, Michel Companion, Ross Nelson and Alan Tyson II—will complete a full-time paid twelve-month research internship with a faculty mentor in a field relevant to the individual student’s career interests. The fellows will also receive additional training and support to help them to prepare competitive dossiers for graduate-school admission. The CRL is in the process of recruiting fellows for the 2015-2016 cohort. Selection announcements are expected in early 2015.



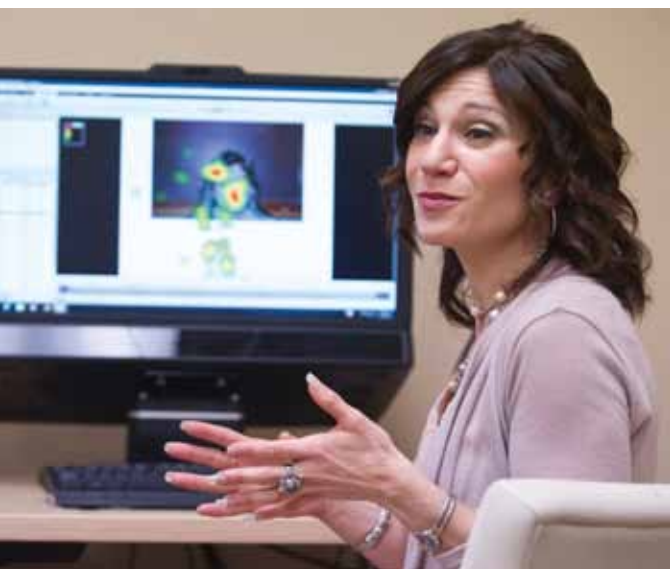




Dr. Ali Jafari (center) and CyberLab Research Associates

ADVANCING EDUCATIONAL TECHNOLOGIES

The IUPUI CyberLab is a research and development center for advanced educational technologies, under the School of Engineering and Technology. Directed by Professor Ali Jafari, the CyberLab has developed multiple learning systems including Oncourse, Angel Learning and Epsilon. Currently, the CyberLab is working on the development of CourseNetworking (the CN), representing the next generation of learning environments. There are internship positions available for undergraduate and postgraduate students to work with the CyberLab on the CN; an exciting opportunity providing the interns with unique experience to learn more about their field while working with partner technology companies. The Office of the Vice Chancellor of Research has provided half of the funding necessary to hire a postdoc to develop intelligent mechanisms to search for specific educational resources targeted towards each user’s academic interests within the CN. It is likely that through this applied research, another successful technology transfer and licensing agreement will be generated from the IUPUI Research and Sponsored Programs. In the hope of enhancing collaboration between IUPUI and teaching scholars, the CyberLab has formed a Teaching Scholars’ Think Tank (TST) Group that meets bi-weekly to discuss research opportunities and new pedagogical solutions.



Dr. Dawn Neumann

EMOTED: SERIOUS GAMES FOR THERAPEUTIC INTERVENTION

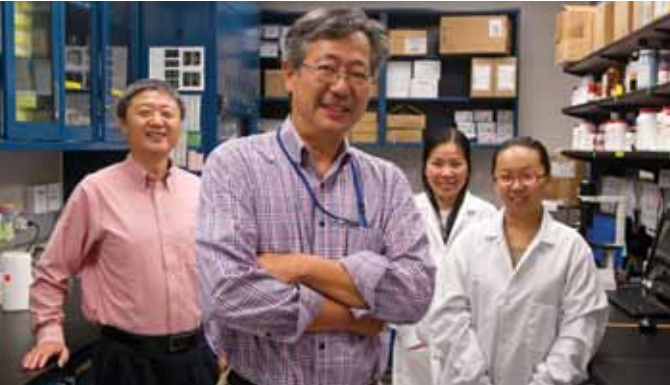
Professor Dawn Neumann’s research aims to improve the lives of patients with neurological conditions that make it difficult for them to respond normally to their own emotional responses or those of others, also known as Alexithymia. This may affect people with conditions such as traumatic brain injury or post-traumatic stress disorder. When faced with ordinary social interactions or common incidents, people with Alexithymia may react inappropriately, expressing inordinate anger or aggression in response to a mild criticism. This may be due to their failure to recognize the emotions of others or because they cannot identify or understand their own emotional responses.

Dr. Neumann’s approach is to explore a therapeutic role-playing intervention to teach these patients how to recognize an emotion (anger, anxiety, sad) and then understand how they might respond. This work is now under development as an electronic game, through a new venture called EmotEd.™ The game will simulate real-world scenarios to trigger specific emotions in patients, and provide players with cues to help them identify what emotion they are experiencing. The game play further allows them to select from different options for their response, so they can experience the results of these choices.

The company will bring together the talent of local developers and experienced clinical teams to design serious games that will be the first validated, structured clinical intervention to improve emotional awareness in patients with neurological disorders. EmotEd recently received a \$194,575 grant from the National Institutes of Health, to fund testing of the game in a clinical setting.



Dr. Anantha Shekhar



Left to right: Dr. Stanley Chien, Dr. Hiroki Yokota, and Research Staff

FACULTY VENTURE PURSUING COMMERCIALIZATION OF PIONEERING NEW ANALYTICAL DEVICE

In 2012, Dr. Stanley Chien and Dr. Hiroki Yokota worked with the Indiana University Research and Technology Corp.’s Spin Up Program to co-found a new venture, YC Bioelectric, LLC. The company was formed to move forward with commercialization of their work on a technically advanced analytical device that simultaneously detects and analyzes protein samples. They first invented this technology at IUPUI within the School of Engineering and Technology and built a prototype of the instrument for product validation with initial funding from an internal grant through the FORCES commercialization fund. The Multi-Blot™ Western Device produces multiple copies of proteins from a single protein separation process by generating a uniform protein transfer speed regardless of protein size. The patented technology utilizes an innovative non-uniform voltage profile.

In 2013, YC BIO received a Phase I STTR award of \$308,000 to develop a next generation prototype with the added predictive analytics functionalities. The company has executed, with Indiana University Research & Technology Cooperation, an option to take an exclusive license to the intellectual property covering the Multi-Blotting Western Device. The company is currently pursuing Phase II STTR grant to further the development of the product.

DEVELOPING AN APPROACH TO THE TREATMENT OF POST-TRAUMATIC STRESS DISORDER

Collaboration between researchers at the IU School of Medicine and IU’s Department of Psychological and Brain Sciences in Bloomington has developed a promising approach to treatment of post-traumatic stress disorder, commonly known as PTSD. Dr. Anantha Shekhar, a leader in the field of stress-induced psychiatric and medical conditions, is working with Dr. Yvonne Lai, an expert in early drug discovery, target validation, and initial lead optimization, in both an academic setting and as co-founders of a new venture, Anagin, to spearhead commercialization of their work.

The research aims to develop an alternative therapeutic strategy for those prone to develop PTSD, because current options for treatment are not always effective and patients are subject to serious side effects. Their preliminary studies focused on the formation of fear memories following a traumatic event, aiming at disruption of that process to prevent the development of long-term PTSD symptoms. The team has identified compounds that block the target mechanism of the disease without triggering other mechanisms that cause side effects. Thus, this opens up the potential to prevent the onset of PTSD rather than treating the symptoms associated with development of PTSD (anxiety, depression, etc). The new treatment could be safely administered to all individuals who have experienced traumatic incident, such as an accident, engagement in military action, or other episodes of extreme violence.

The pre-clinical results so far have been promising, and the start-up company has attracted interest from both the scientific and business community. This year, Anagin was awarded a small business SBIR grant for \$698,000 to fund R&D efforts, and \$50,000 in matching funds from Elevate Ventures, a nonprofit organization that provides state dollars to promising, early-stage entrepreneurs who have received funding through small business grants. Most recently, the company was recognized as the first-place winner of the third annual BioCrossroads New Venture Competition. The contest was held in conjunction with the 2014 Indiana Life Sciences Summit, with the winner receiving a \$25,000 cash prize and in-kind business planning and early strategic support from the Indiana Seed Fund II, as well as the opportunity to present their business to the fund’s investment committee.





**NEW INITIATIVE FOR PRODUCT LIFECYCLE INNOVATIONS (IPLI) LAUNCHED IN SUPPORT OF LIFE SCIENCES AND ADVANCED MANUFACTURING**

The mission of the Initiative for Product Lifecycle Innovation (IPLI), supported by the Office of the Vice Chancellor for Research and the Purdue School of Engineering & Technology, is to be recognized as a world class university-industry institute for product life cycle practice in advanced manufacturing and the life sciences. The mission of IPLI is to work collaboratively with partners from industry, universities, and government to advance product life cycle and related practices and technologies in order to increase industry productivity and competitiveness while improving research and enhancing student education. The initiative aims to facilitate excellence in the life sciences and advanced manufacturing fields through Product Lifecycle Management (PLM), digital manufacturing and design, and advanced engineering.

The IPLI initiative follows a large in-kind software grant, worth \$538M, from the Siemens PLM Software academic program that provides PLM software to more than 12,000 global institutions. This software, with 9 million licenses and over 77,000 customers worldwide, is used to develop innovative products in a wide variety of industries such as automotive, aerospace, and high-tech electronics, among others. The ubiquitous global use of Siemens PLM software will enable IUPUI to bridge a commonly noted technical skills gap in STEM graduates to produce highly-recruited candidates for advanced technology jobs in the industrial market. Access to this software will also provide impetus for IUPUI faculty to research PLM incorporation, methodologies and tools to maximize productivity, efficiency and competitiveness in product development.

IPLI, in combination with the Siemens in-kind PLM software, will strategically position IUPUI to conduct industry-relevant research and development, while producing technically qualified graduates with real-world experience in PLM software.

*Left to right: Dr. Kody Varahramyan (IUPUI Vice Chancellor for Research), Dr. Charles Bantz (IUPUI Chancellor), Bill Boswell (Senior Director Siemens PLM Software), David Russomanno (Dean of School of Engineering and Technology), and Doug Bresnahan (Vice President Andretti Autosport), at the IUPUI announcement of the in-kind Siemens PLM software grant*



IUPUI Research  
Commercialization  
Metrics



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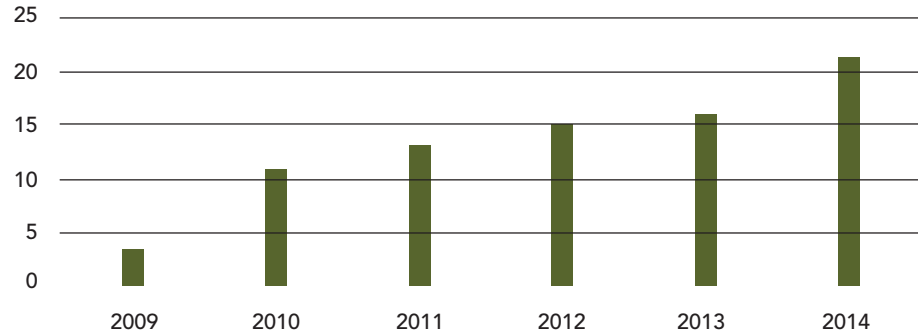
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INVENTION DISCLOSURES 2009–2014

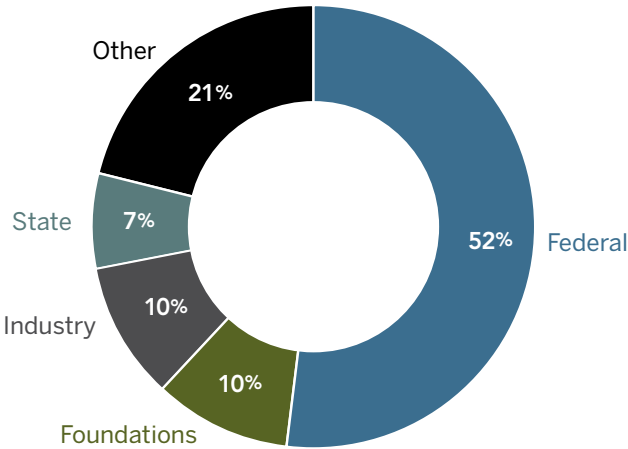


IUPUI PATENTS ISSUED 2009–2014



IUPUI RESEARCH  
EXPENDITURES FOR  
FISCAL YEAR 2014

TOTAL: \$271,093,483



IUPUI TOTAL RESEARCH EXPENDITURES 2005–2014

