



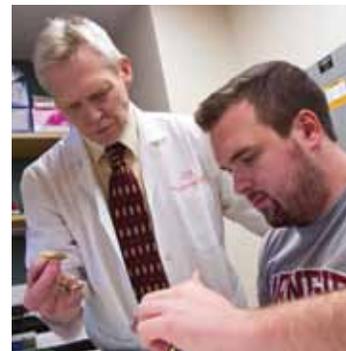
Where **Research**
and **Creative Activity**
Matter — *From IUPUI*
to the World.



IUPUI
OFFICE OF THE
VICE CHANCELLOR
FOR RESEARCH

INDIANA UNIVERSITY-PURDUE UNIVERSITY
INDIANAPOLIS

2013
RESEARCH
REPORT





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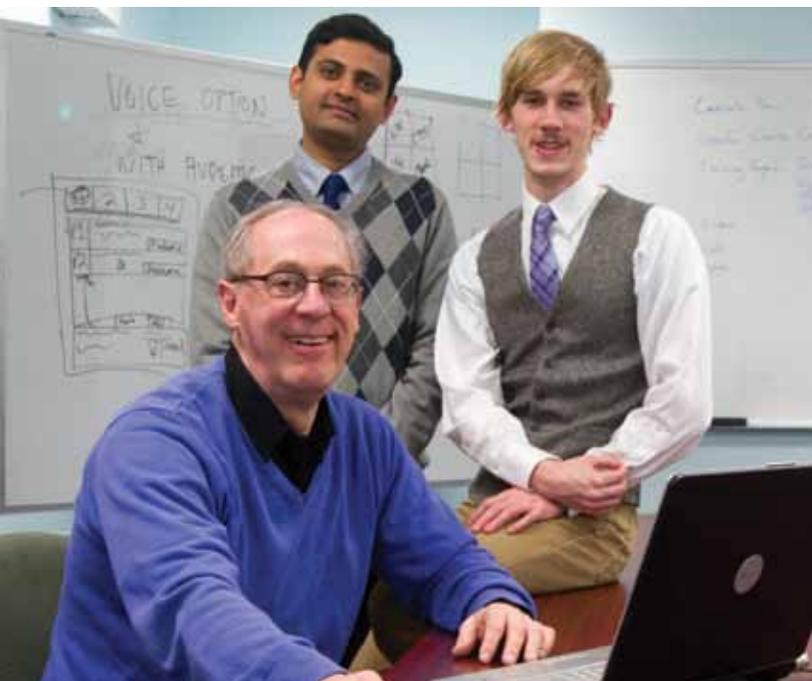
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Where **Research** and **Creative Activity** Matter — *From IUPUI to the World.*

MESSAGE FROM THE VICE CHANCELLOR FOR RESEARCH

It is my pleasure to present the IUPUI Annual Research Report for Fiscal Year 2013. During this period, the IUPUI research enterprise has continued its robust advancement, displaying significant achievements in many areas, from health and life sciences to arts and humanities. As a top urban research university, IUPUI researchers are expanding the frontiers of knowledge, addressing important national and global needs, and transforming the generated knowledge into practices and solutions that improve people's lives, generate economic growth, and contribute to social wellbeing.

The 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. The report also contains sections on innovative programs exposing undergraduate students to research and entrepreneurship experience, and on research commercialization and economic development initiatives, including through industry and community partnerships.

Accomplishments include the 5-year \$30 million renewal of the Indiana Clinical and Translational Sciences Institute from the National Institutes of Health, second-year \$15 million funding from IU Health in support of the School of Medicine's Strategic Research Initiative, and nearly \$6 million in dental research support from industry and government sources for the Oral Health Research Institute. The Institute for American Thought (IAT) and the Research in Palliative and End-of-Life Communication and Training Center (RESPECT) were designated as the latest IUPUI Signature Centers. Moreover, IUPUI faculty played a major role in the realization of the global New Oxford Shakespeare initiative (the first multi-platform and multi-format edition of Shakespeare's works). During this year, IUPUI also attained significant growth in research commercialization, as indicated by the steady increase in the number of invention disclosures generated, patent applications filed, patents issued, licenses executed, and start-up companies formed.

To learn more about the innovative research conducted at IUPUI, I invite you to visit our research website at research.iupui.edu, or contact us at OVCR@iupui.edu.

Kody Varahramyan, PhD
Vice Chancellor for Research



TRANSLATING RESEARCH INTO PRACTICE



BANTZ-PETRONIO *Translating Research into Practice* AWARD

(From Left to Right) Dr. David Marrero, Dr. Sandra Petronio, and Chancellor Charles Bantz

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

The award recognizes outstanding faculty research that is interdisciplinary and/or cross-disciplinary, and intentionally directed toward positively impacting people's lives within or 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 that knowledge into practices or solutions, demonstrating innovative ways to improve the lives of individuals and the communities in which they live. In 2013, the inaugural recipient was David Marrero, the J.O. Richey Professor of Medicine. Since joining IUPUI in 2004, Dr. Marrero has excelled at translating research into improvements of diabetes identification and management. For more than 10 years, he has been an invaluable leader for the Translating Research into Action for Diabetes study. This study has shown that improving risk factors depends upon tailoring disease management programs

to specific populations in order to better address health disparities. In a practical application of this work, he and his colleagues have developed a tablet-based program that explains which cardiovascular disease risks an individual has and then educates them on reducing those risks. He also implemented an innovative and successful YMCA program that assists in the identification of persons at risk for diabetes and follows up with educational and behavioral interventions focused on diet and exercise. This project is now the subject of a Content Management System demonstration project. Dr. Marrero exemplifies a scholar who generates knowledge through scientific inquiry and applies that knowledge to address everyday problems in our communities. Nationally, his colleagues not only describe him as a tireless and innovative researcher, but as a leader in moving results into action for improved health outcomes.



Dr. Sandra Petronio

CENTER FOR TRIP FOUNDING DIRECTOR WINS NATIONAL AWARD

Dr. Sandra Petronio, Founding Director of the Center for Translating Research Into Practice, is the 2013 recipient of the Mark L. Knapp Award in Interpersonal Communication. The Knapp Award recognizes individuals who throughout their careers have made significant contributions to the scholarly study of interaction and/or relational processes. The award also recognizes recipients for active involvement in interpersonal communication, significant mentoring of students and/or public service focused on interpersonal communication. According to a nominating letter, Dr. Petronio’s “theorizing has changed the way interpersonal communication is studied, taught, and practiced across disciplines. Her contributions have been sustained and increased in scope over her career to the point where she is now one of the most widely recognized and important communication scholars in the academy. In short, Dr. Petronio epitomizes the standards for this award.” She developed the Communication Privacy Management Theory, widely considered to be an important breakthrough in understanding how people manage private information in their everyday lives. Her book, *Boundaries of Privacy: Dialectics of Disclosure*, won the 2003 Gerald R. Miller Award from the National Communication Association and the 2004 Book Award from the International Association for Relationship Research (IARR). She is past president of IARR and past chair of the National Communication Association, Interpersonal Division. As noted by the Knapp Award committee, “Her body of work is of interest not only to scholars, but to practitioners and citizens alike, given its potential to improve the lives of all.”

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.

Yao-Yi Fu, PhD

Associate Professor of Tourism, Conventions, and Event Management, IU School of Physical Education and Tourism Management

Dr. Fu helps organizations in the tourism industry enhance their marketing efforts by more accurately measuring key aspects of the business: how people perceive their tourism offerings, determining customer motivations in visiting particular destinations or events, and overall customer satisfaction levels with their tourism experiences.



Razi Nalim, PhD

Associate Dean & Professor of Mechanical Engineering, Purdue School of Engineering and Technology

Dr. Nalim is developing a novel hybrid electric engine that would combine an electric battery and motor drive with a highly fuel-efficient and compact combustion turbine engine. His research is helping enable aircraft to be completely redesigned for electric propulsion carrying much less fuel.



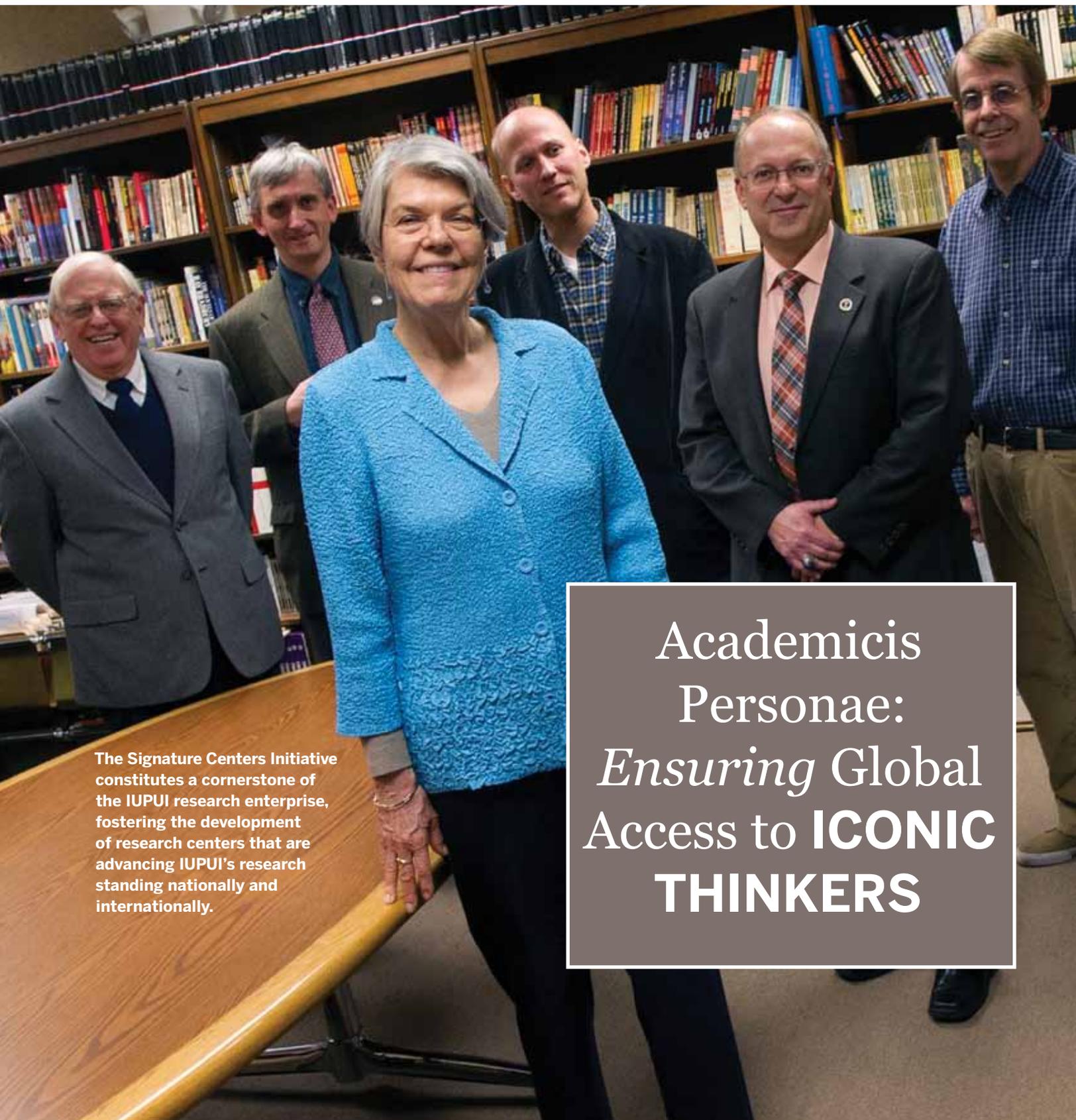
Glenda Westmoreland, PhD

Associate Professor of Clinical Medicine, Director of Geriatrics Education

Dr. Westmoreland recognizes the importance of relating to her patients and giving them the access to information and resources they need. The Geriatrics Education Network of Indiana project educates physicians on four common conditions they are likely to encounter with older adults—falls, dementia, depression, and urinary incontinence—and provides them with information to successfully support their patients.



IUPUI SIGNATURE CENTERS INITIATIVE



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.

Academicis
Personae:
Ensuring Global
Access to **ICONIC**
THINKERS

Marianne S. Wokeck, PhD (Front Center)
*Chancellor's Professor of History; Director,
Institute for American Thought*

(Left to Right)

David E. Pfeifer, PhD
*Senior Lecturer of Philosophy; Director, Josiah Royce Critical
Edition & Graduate Professional Editing Certificate*

André de Tienne, PhD
Professor of Philosophy; Director, Peirce Edition Project

Martin A. Coleman, PhD
*Associate Professor of Philosophy; Director, Santayana
Edition & American Studies Program*

Jon Eller, PhD
*Chancellor's Professor of English; Director, Center for
Ray Bradbury Studies*

John R. Kaufman-McKivigan, PhD
*Mary O'Brien Gibson Professor of History; Director,
Frederick Douglass Papers*

The Institute for American Thought (IAT) is dedicated to preserving influential contributions to the nation's intellectual legacy. Texts are central in this endeavor. The IAT focuses on the works of five very different American writers whose ways of thinking and ideas range across the humanities and sciences and that variously focus on freedom, liberty and independence—the bases for inquiry, imagination, and innovation in the future.

Based on the centrality of texts, an important goal of the IAT is to safeguard the works of Frederick Douglass, Josiah Royce, Charles Sanders Peirce, George Santayana, and Ray Bradbury against loss and corruption. It takes the collaborative efforts of specialists first to identify and collect the texts, then to analyze and interpret them, and finally to prepare them for publication in hardcopy and in electronic form for Internet access. The combined outcome of all of those elements is both investment for and promise to current and future generations of scholars, students, and readers. Using texts they know to be reliable and permanently established they are free to design their own inquiries and develop their own insights, ideas, and innovations poised for significant impact on the lives and world they inherit.



(From Left to Right Co-directors) Dr. Joan Haase, Dr. Greg Sachs,
and Dr. Susan Hickman

CLARITY WHEN HEARTS ARE HEAVY

Joan Haase, PhD, RN, FAAN
*Holmquist Professor in Pediatric Oncology Nursing,
Science of Nursing Care Department, IU School of Nursing*

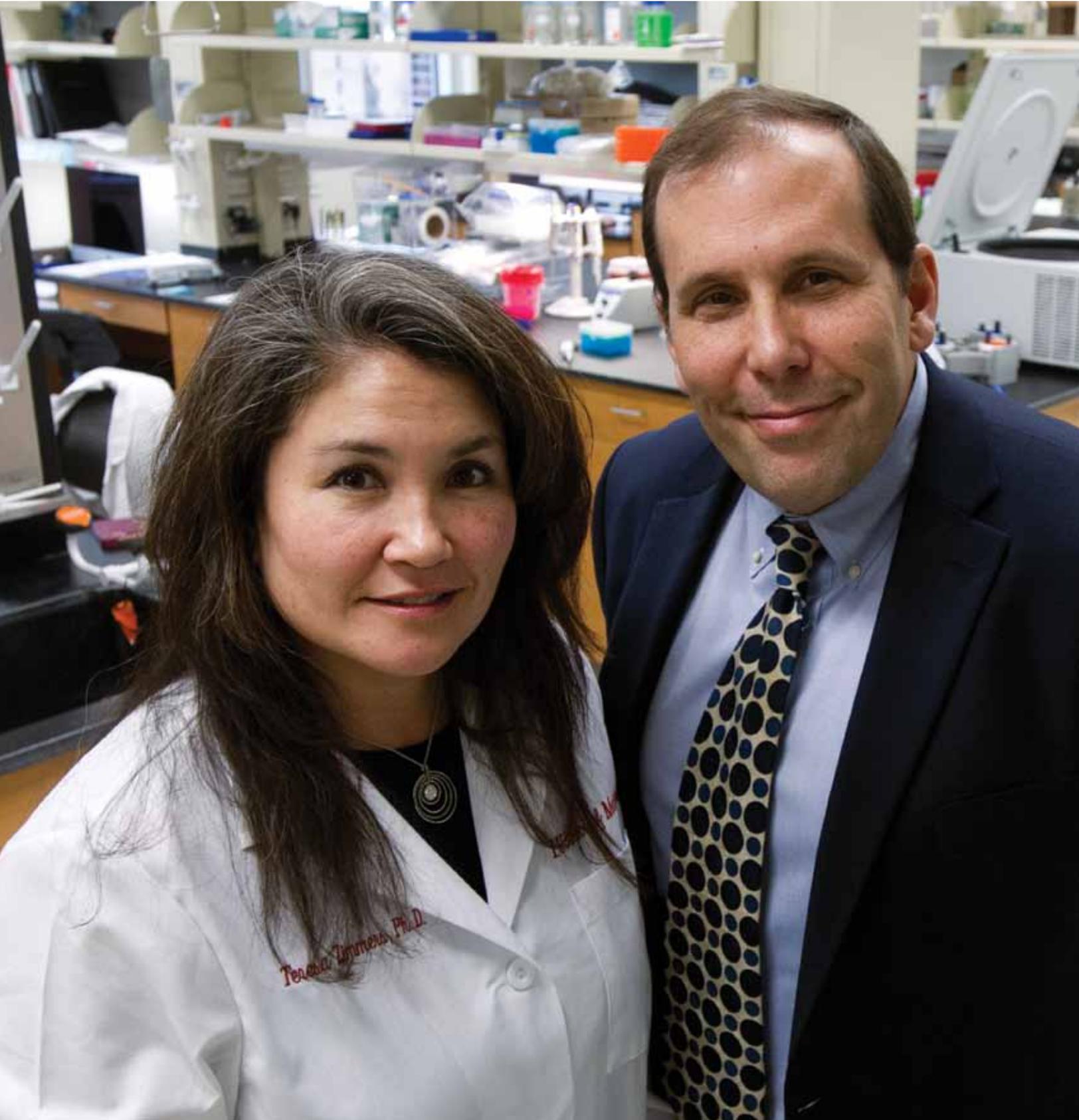
Greg Sachs, MD
*Professor of Medicine, Division of General Internal Medicine
and Geriatrics, IU School of Medicine*

Susan Hickman, PhD
*Associate Professor, Community and Health Systems,
IU School of Nursing*

The mission of the Research in Palliative and End-of-Life Communication and Training Center (RESPECT) is to build a collaborative, interdisciplinary community of researchers and clinicians who work to advance the science of communication in palliative and end-of-life care across the lifespan. The center's goals are to accelerate the development of innovative research trials relevant to communication and decision-making in children, adults, and elders with serious and/or life-threatening illnesses; develop new partnerships for translational science to enhance palliative and end-of-life care research and practice; and create mentorship opportunities for emerging scholars.

Since the center's initial funding under the IUPUI Signature Center Initiative in 2010, RESPECT Center faculty have been awarded 16 research grants representing more than \$21 million. This funding has been facilitated by core functions that include pilot funding, networking support, and internal peer review of proposals. A well-received Visiting Scholar Series has brought 7 nationally recognized experts in palliative and end-of-life care to consult with faculty and share expertise. The center also hosted a 2013, statewide conference for researchers and clinicians that was attended by 150 participants from 45 organizations. As a result of its inaugural successes and high productivity, the RESPECT Center was awarded Signature Center status in June 2013.

HEALTH AND LIFE SCIENCES IMPACT





STRATEGIC RESEARCH INITIATIVE (SRI)

Married Research Team *Tackles* PANCREATIC CANCER

The SRI is a five-year collaboration between the IU School of Medicine and IU Health, with each organization contributing \$75 million toward basic and translational research in cancer, neuroscience, and cardiovascular disease.

Now in its second year, the SRI has picked up momentum. Not only has it funded more pilot research projects in order to develop preliminary data needed to bring in new external grants, it has also recruited successful researchers who have added their talent to the School of Medicine's growing research enterprise.

Among the new investigators setting up laboratories at IUPUI are Teresa Zimmers, Ph.D., and Leonidas Koniaris, M.D., spouses with a mission to revolutionize the understanding and treatment of pancreatic cancer, among other diseases. Dr. Zimmers, Associate Professor of Surgery, has identified molecular pathways involved with cachexia, the muscle wasting that is often the actual cause of death in many cancers. She is working on the process of translating those discoveries into human trials. Dr. Koniaris, Professor of Surgery, focuses on the relationships between the cancer and other diseases or conditions in order that more patients can benefit from surgery while also helping patients recover better.



Dr. Teresa Zimmers and Dr. Leonidas Koniaris



Dr. David Kareken

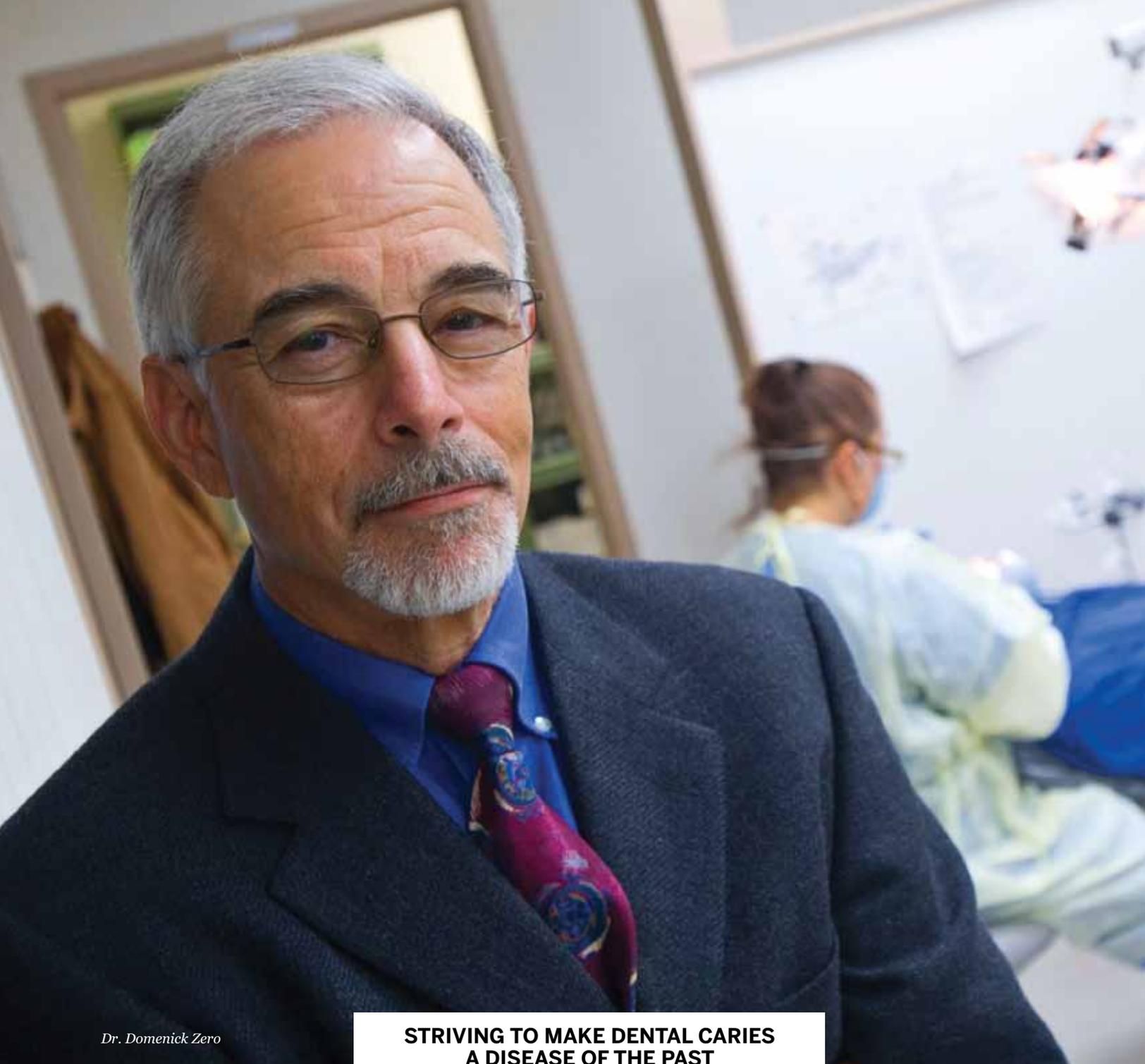
THE REWARDS OF ALCOHOL RESEARCH

Since 1987, the Indiana Alcohol Research Center (IARC) at the IU School of Medicine has investigated biomedical and genetic factors that contribute to alcohol abuse and alcoholism. It is one of the most diverse research centers on campus with investigators from a dozen departments that span the schools of medicine, social work, and science.

Perhaps the IARC is most widely known for the alcohol-preferring rat strains it has developed for worldwide research, but the center's work goes well beyond animals. For example David A. Kareken, Ph.D., Professor of Neurology and Deputy Director of the Alcohol Research Center, has incorporated imaging of the brain's reward pathways into his research on the mechanisms involved in alcoholism risk.

Not one, but two Kareken studies published in 2013 received wide notice in both scientific and media circles. In one, Dr. Kareken and his colleagues found that human response to intensely sweet tastes in the brain's reward pathway correlated with subjects' binge drinking behaviors.

In a second study, participants were scanned while tasting sports drinks and again when tasting *small* amounts of beer. The *taste* of beer alone was enough to trigger the brain's release of dopamine, a neurotransmitter associated with drinking, other abused drugs, and addiction. Interestingly, dopamine releases were stronger among participants with family histories of alcoholism, suggesting an inherited risk factor in the brain's reward system.



Dr. Domenick Zero

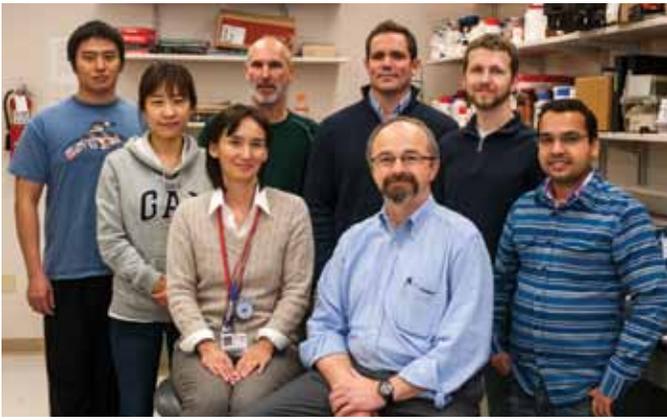
STRIVING TO MAKE DENTAL CARIES A DISEASE OF THE PAST

As director of the IU dental school's Oral Health Research Institute since 1999, Domenick Zero, DDS, MS, leads a globally prominent team of preventive dentistry researchers whose work was funded by industry and government sources for nearly \$6 million last year, representing a significant portion of the school's external research funding.

Under Dr. Zero's guidance, the institute's renowned body of work serves as a contemporary complement to IU's legendary stannous fluoride research that led in the 1950s to the development of Crest toothpaste, the world's game changer in tooth decay (dental caries) prevention. As a leader in the Modern

Management of Dental Caries movement, Dr. Zero has given a dynamic voice throughout the U.S. and abroad to a science-based approach that strives to eliminate a virtually preventable disease through early caries detection and risk assessment, and risk-based preventive measures and early-stage intervention.

Dr. Zero was recently awarded a \$1.2 million contract from the U.S. Department of Defense to conduct a dose escalation clinical trial on the safety of an antiplaque chewing gum for use by military personnel. The chewing gum contains a novel antimicrobial peptide, which will also be assessed for its ability to reduce plaque and gingivitis.



Dr. Mervin Yoder (Front Center) and his research team

FEW AND FAR BETWEEN

Distinguished professorships are the most prestigious appointments offered by IU. They honor outstanding levels of literary, artistic, or scientific contribution as well as acknowledgment from their peers that they are exemplars. In the following two cases, the world-renowned contributions are in life sciences research.

Mervin C. Yoder, Jr., MD

Richard and Pauline Klinger Professor of Pediatrics; Director, Herman B Wells Center for Pediatric Research; Assistant Dean for Entrepreneurial Research, IU School of Medicine; Associate Director for Entrepreneurship, Indiana Clinical and Translational Sciences Institute

Dr. Yoder was named a distinguished professor in recognition of his stem cell research, which has been informed by his patient care in neonatology at Riley Hospital for Children. He is working to understand the roles and related mechanisms of hematopoietic and endothelial stem cells in the development of blood cells and the blood vessels that transport them. Hematopoietic stem cells, found primarily in adult bone marrow, are responsible for producing the many varieties of blood and immune cells in the circulatory system. However, Dr. Yoder's work has established that several waves of red and white blood cells, as well as B and T immune cells, are produced in embryos prior to the formation of the first hematopoietic stem cells. These results have been paradigm shifting for the field of developmental hematopoiesis. Dr. Yoder, in collaboration with Dr. David Ingram, has also determined that human cord blood contains highly proliferative stem cells for the endothelial lineage. Endothelial stem cells are involved in the development of blood vessels and loss of these cells may account for the endothelial dysfunction that leads to some human cardiovascular diseases. Dr. Yoder's research led to the founding of *Endgenitor Technologies*, a startup company developing stem cell-based therapies based on cord blood cells for a variety of diseases.

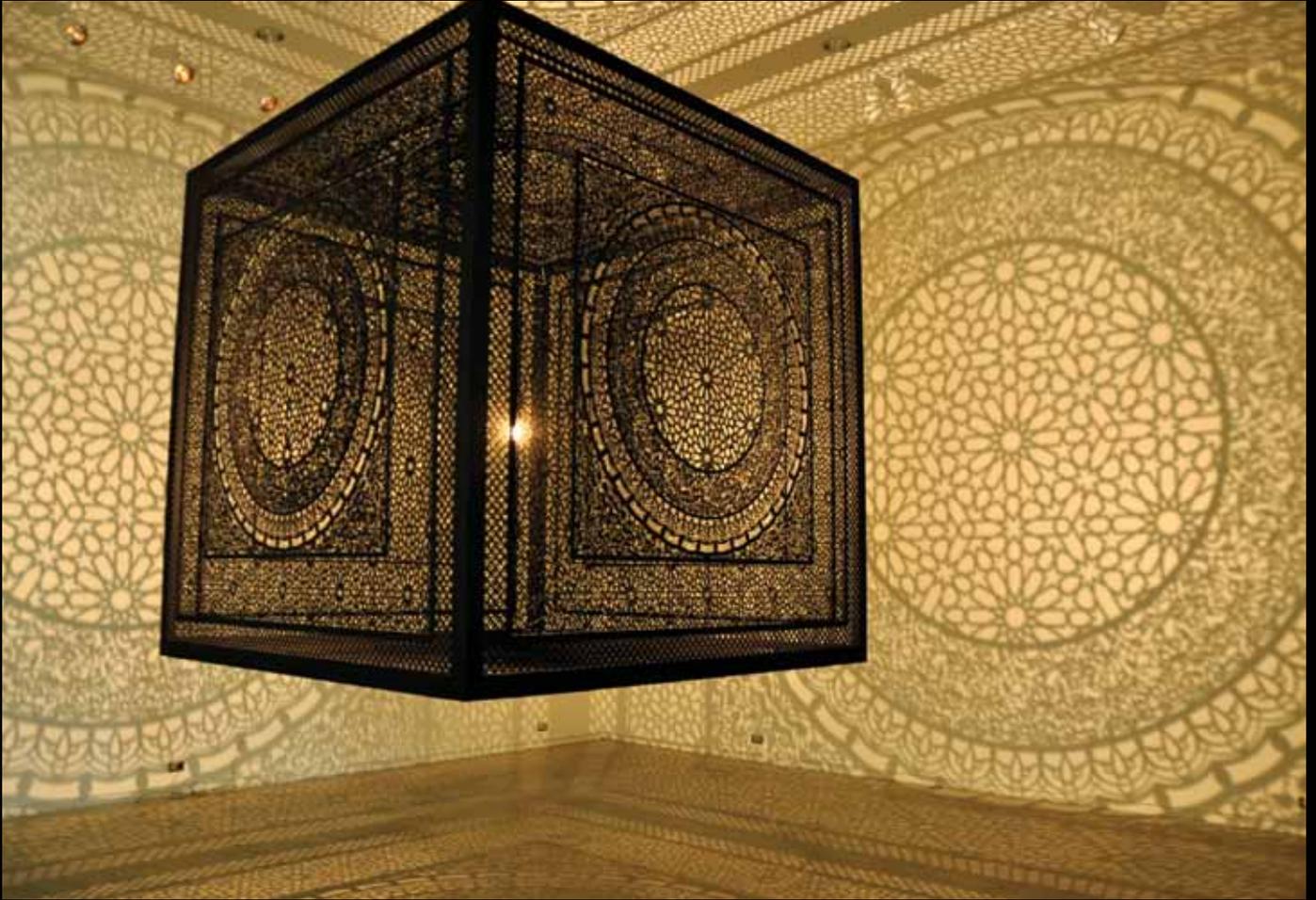


Dr. David Burr

David B. Burr, PhD

Professor, Anatomy and Cell Biology; Professor, Biomedical Engineering; Associate Vice Chancellor for Research

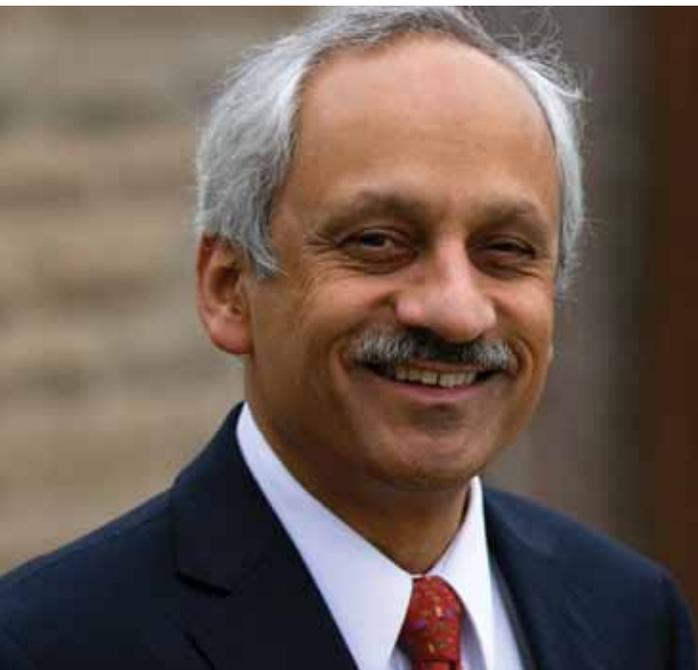
Dr. Burr is one of the world's leading experts on bone health and disease. The honor of Distinguished Professor reflects the expertise that has brought more than \$16 million in extramural research funding to his lab for work that has greatly influenced the understanding of how the body regulates bone remodeling. The results of Dr. Burr's research have changed how therapies are administered in the treatment of osteoporosis. He has also helped create a strong bone research group on campus. Dr. Burr's work has focused on two broad areas of investigation: the significance of skeletal micro-damage to bone health and metabolism, and the adverse effects, such as fragility and fracture, of current osteoporosis treatments. His research was instrumental in the 2011 FDA decision to require warning labels on products shown to result in atypical femoral fractures. His research has redefined what is taught to future scientists about cellular communication in bone and has alerted physicians to debilitating side effects. Dr. Burr is the former chair of the IU School of Medicine's Department of Anatomy and Cell Biology, and past President of the American Association of Anatomists and the Orthopaedic Research Society.



CREATIVITY MATTERS

Innovation and discovery through research and creative activity form the foundation from which IUPUI contributes to the well-being and overall quality of life for Indiana and beyond. Creativity is the fuel that powers the continual exploration this campus epitomizes. IUPUI celebrates creative activity in all its forms, including the arts, which is reflected throughout the pages of this Research Report.





A VOTE of Confidence and a **MARK** of Excellence

Dr. Anantha Shekhar

The Indiana Clinical and Translational Sciences Institute (CTSI) — a partnership of Indiana University, Purdue University, and University of Notre Dame — garnered a \$30 million renewal from the National Institutes of Health’s National Center for Advancing Translational Sciences in 2013. The announcement guarantees that the institute will continue to advance innovative health care programs and biomedical research through 2018.

Anantha Shekhar, MD, PhD

Director, Indiana Clinical and Translational Sciences Institute (CTSI); IU Associate Vice President for University Clinical Affairs; Associate Dean for Translational Research; Raymond E. Houk Professor of Psychiatry, IU School of Medicine

“I regard this award as a powerful vote of confidence in the Indiana CTSI’s success over the past five years as well as a promise on our part to achieve even greater heights going into the next phase of this project,” said Indiana CTSI Director, Dr. Anantha Shekhar.

During its first five years, Dr. Shekhar estimates the Indiana CTSI generated a 19-to-1 return on investment: \$3.5 million in grants to scientists across the state earned another \$65 million in federal research dollars and private investment. Indiana CTSI-funded researchers have advanced discoveries in areas such as Alzheimer’s, Parkinson’s, autism, traumatic brain injury, polycystic kidney disease, osteoporosis, and osteoarthritis.

“In 2009 alone, Indiana CTSI invested \$1.1 million in scientists whose work later attracted more than \$30 million in outside investment,” Dr. Shekhar added. “These numbers show that our institute has become a powerful magnet to attract innovation and research dollars to Indiana. Our focus on partnerships with groups such as Eli Lilly and Company, Roche Diagnostics, and Cook Medical Group—as well as the patents, licenses and spinoffs we’ve fostered—illustrate we’re also playing a vital role fueling the state economy.”

Indiana CTSI-funded researchers have also produced six technology licenses, 18 discovery disclosures, 22 patents, and eight start-up companies. The institute also supports about 80 professional jobs across Indiana.

Looking ahead, Dr. Shekhar noted that Indiana CTSI will maintain past programs as well as shift attention to projects that tackle real-world issues such as health care delivery, drug development, and public health policy. “The next five years will build upon our history of success to create a vehicle that breaks beyond the academic wall and starts to impact the health of the community,” Dr. Shekhar said. “It’s not only a natural growth in the scope of our goals, but also the urgency of our mission.”



Dr. Scott Denne

EACH STEP A GIANT ONE

Over the past year, the Indiana CTSI significantly expanded clinical research space at the IU School of Medicine. In May 2013, the Children’s Clinical Research Center (CCRC) opened on the second floor of Riley Hospital for Children at IU Health. The 18,500 sq. ft. facility includes both lab space and an adjoining patient care area where research physicians can meet with their young patients and caregivers in a family friendly environment. The three-year renovation project to create the center was funded by an \$8.5 million economic stimulus grant from the U.S. Department of Health and Human Services in April 2010. The CCRC is directed by Dr. Scott Denne, Associate Director, Indiana CTSI; and Professor of Pediatrics, IU School of Medicine.

The Indiana CTSI will also expand operations into a recently renovated 33,000 sq. ft., 50-patient facility at IU Health University Hospital that was previously operated by Eli Lilly and Company. Under a new agreement with Covance, Inc., the expansion aims to increase early phase clinical trials conducted on behalf of biotechnology and pharmaceutical companies.

In September 2013, the Indiana CTSI opened the Neurosciences Clinical Research Center, a 3,700 sq. ft. facility specifically focused on brain research on the fifth floor of the IU Health Neuroscience Center (Goodman Hall). All three facilities build upon the Indiana CTSI Clinical Research Center, a 13,600 sq. ft., 24-patient facility at IU Health University Hospital, and a 4,400 sq. ft. clinical research center focused on nutrition science at Purdue.

RISING STARS NAMED WATANABE SCHOLARS

Melissa A. Kacena, PhD
Assistant Professor of Pediatrics

Rachel C. Vreeman, MD
Assistant Research Professor of Medicine

Drs. Kacena and Vreeman, previous recipients of two-year, Indiana CTSI fellowships, were honored as 2013 August M. Watanabe Translational Scholars. The awards include the benefit of mentorship by Tadataka “Tachi” Yamada, MD, past president of the Global Health Program at the Bill and Melinda Gates Foundation. Dr. Yamada spoke at the 2013 Indiana CTSI Annual Meeting as the recipient of the inaugural August M. Watanabe Prize, established by the IU School of Medicine to honor scientists who have made a significant contribution to the field of translational science.

Dr. Kacena is a laboratory scientist focused on improving bone health, including a study on thrombopoietin, a compound previously used to treat blood disorders, which may have potential to re-grow broken bone with fewer side effects, such as a risk of cancer, than drugs currently on the market. Her research is supported by grants from the National Institutes of Health and Department of Defense. She is also the co-inventor on two patents filed by the IU Research and Technology Corporation.

Dr. Vreeman is a physician-scientist focused on the long-term care of HIV-infected children in developing countries. Her work, which takes place overseas through the IU-Kenya Partnership or AMPATH (Academic Model Providing Access to Healthcare), includes studying the effectiveness of the HIV drug Nevirapine in malnourished children; the use of wirelessly enabled medication bottles to electronically monitor children’s medication adherence; and evaluating a counseling intervention to help children understand their HIV status. Her research is supported by the National Institute of Mental Health and the U.S. President’s Emergency Plan for AIDS Relief.



Dr. Rachel Vreeman and Dr. Melissa Kacena

IUPUI ARTS AND HUMANITIES MATTER



Dr. Terri Bourus and the NOS-HB team preparing for theatre performances and discussing editorial cruxes.

The 21st Century **SHAKESPEARE** *Lives in* Indianapolis

In 1986, Oxford University Press published *The Oxford Shakespeare: The Complete Works*, the most authoritative edition of his plays and poems ever created. An updated edition will be published to coincide with the 400th anniversary of Shakespeare's death in April 2016. *The New Oxford Shakespeare* (NOS) is a textual-theatrical research laboratory for what will be the first multi-platform, multi-format edition of the Bard's works.

Associate Professor of English Drama Terri Bourus directs the international team of scholars that includes Gary Taylor and John Jowett, both of whom edited the 1986 edition. Professor Bourus also leads Hoosier Bard (HB), the theatrical arm of the project. Thus far, the NOS-HB collaboration has staged three of Shakespeare's most problematic plays: *Young Hamlet*, *The History of Cardenio*, and two versions of *Measure for Measure*. In April 2014, Hoosier Bard will stage *Arden of Fevershame*, a play now attributed partly to Shakespeare, in collaboration with another early modern playwright.

Bourus's most recent book *The Creation and Recreation of Cardenio: Performing Shakespeare, Transforming Cervantes* (co-edited with Gary Taylor), includes an in-depth analysis of her experience directing the play. The NOS is one of the most productive research teams on campus, publishing three books and six essays this year alone. Bourus also has a monograph on *Hamlet* and a *Measure for Measure* essay that will be published in mid-2014.

Dr. Terri Bourus



Kathryn Armstrong

BASILE CENTER FOR ART, DESIGN AND PUBLIC LIFE FOSTER EXPLORATION AND ENGAGEMENT

Kathryn Armstrong, director of the Basile Center for Art, Design and Public Life at the Herron School of Art and Design-IUPUI, aims to connect students, faculty and clients to a conversation that moves art and design outside of the traditional framework of a studio and into a larger public dialogue. Her vision is to have the Basile Center function as a resource for students, faculty and clients to investigate new avenues within the professional art and design field, while encouraging students to explore another point of view of their current working process.

As a professional artist and educator, Kathryn Armstrong brings her own creative research into the vision of the Basile Center. Recently, Armstrong completed an artist residency in Salzburg, Austria, which culminated in a site-specific exhibition, “BEYOND OBJECT AND IMAGE”. During this time, she worked with local artists as well as faculty and students from the University of Salzburg. This process is very similar to her role at Herron as both a director and educator. Armstrong also taught a graduate seminar course this fall at Herron, Interdisciplinary Collaboration. This course is designed for first-year MFA students from all disciplines to work together on a cohesive project. Her students, called “THE SUGGESTURES” became a singular unit in the exhibition, “IDIOMANTICS”. Each of these experiences shapes the way Armstrong interacts with all her collaborators, whether a student, faculty member or community partner.

The Basile Center for Art, Design and Public Life is the Herron School of Art and Design’s avenue for applying the talents and skills of Herron students and faculty to the actual, relevant needs of businesses, nonprofits organizations and government agencies. Since Fall 2008, a total of 75 community and civic engagement projects have taken place through the Basile Center providing nearly 600 students with professional practice opportunities. Approximately 50 clients and community partners have collaborated with the Basile Center, including corporations, nonprofit organizations, government agencies, campus offices, schools and private individuals.

*Dr. Sam Turner, Professor of Archaeology
at Newcastle University, speaking at the Rivers
of the Anthropocene Conference*



*Rivers of the Anthropocene Research Team participating in the
Rivers of the Anthropocene Workshop on January 25, 2014*



Dr. Jason Kelly

ENVIRONMENTAL HUMANITIES AND GLOBAL RIVERS

The environmental challenges of the 21st century will not be solved by technology alone. Solutions to humanity’s greatest problems require robust research partnerships between scholars in the humanities, social sciences, arts, and sciences. This multidisciplinary spirit is embodied in a new collaborative venture, the Rivers of the Anthropocene project.

Led by Dr. Jason M. Kelly (Director, IUPUI Arts and Humanities Institute), Dr. Phil Scarpino (Director, Public History Program), and Dr. Pam Martin (Director, Center for Earth and Environmental Science), Rivers of the Anthropocene is a transdisciplinary project examining global river systems since 1750. Approaching rivers and their landscapes not simply as natural phenomena but as human-nature entanglements, they have formed an international network of researchers, policy makers, artists, teachers, and community organizations to address one of the most pressing ecological issues of the 21st century: water security.

The core research team includes 28 researchers from 5 countries whose work focuses on 5 continents. These individuals kicked off the project at a conference at IUPUI on January 23-24, 2014. The event will focus on new transdisciplinary conceptual and methodological models for examining the geographical, cultural, social, political, historical, and scientific facets of river ecologies.

In addition to their research mission, the Rivers of the Anthropocene team has an education and outreach component. They are working with organizations across Indiana, including the Geography Educators’ Network of Indiana, Reconnecting to Our Waterways, Indiana Humanities, and more. As a component of the research plan, Rivers of the Anthropocene will emphasize a mission of public scholarship. Immediate plans are to create a web portal for K-12 educators and students, public programming, and community based projects.



Helen Sanematsu

SCHOLAR ON THE GO: DESIGN & COMMUNITY

After graduating from Yale with an MFA in graphic design, Helen Sanematsu went to work as an art director for *Martha Stewart Living* magazine. Her style of instructional graphic design fit in with the program’s aesthetic, but it wasn’t until she got to Herron School of Art and Design that she found “opportunities to marry my drive for equity and social justice with design in a truly substantial way.”

Professor Sanematsu specializes in bringing people and projects together in innovative ways using research techniques from design. She partnered with Professor Sarah Wiehe, MD, in the School of Medicine to create CLIC (Communicating Life in Our Community), which uses design related activities to learn about health perceptions in daily life. By sharing their stories through photography, interactive activities, and design projects, both community participants and researchers design infrastructures for ongoing, mutually beneficial engagements.

She also uses her community ties to train her students in the field of Visual Communication, providing them with experiential learning while exposing them to real-world design challenges, as in her partnership with Garden on the Go, the IU Health mobile produce truck, a program that targets obesity by bringing fresh produce to low-income neighborhoods. Along with Associate Professor Youngbok Hong, she led students through a user-centered research process to help teach basic principles and practices in this cutting edge field, while providing Garden on the Go with a clearer picture of the people they serve.

Helen Sanematsu is a familiar face in the community through these sorts of projects, which use her insights into imaging and messaging to help gather information about people’s behaviors, their perceptions, and how they use knowledge, and then uses those insights to help people make more informed decisions. The Translating Research into Practice (TRIP) Scholar reminds us that, “When it comes to health, we really are all in this together.”



CREATIVITY MATTERS



IUPUI IMAGING RESEARCH INITIATIVE



Dr. Mark Green

Toolmakers for Tumor **IMAGING**

Advanced imaging plays an increasingly important role in medical and pharmaceutical research. Supporting a diverse group of investigators, the School of Medicine's Department of Radiology and Imaging Sciences houses an array of state-of-the-art imaging technologies used by both the basic science and clinical faculty.

Having obtained his inorganic chemistry PhD at IU Bloomington before completing postdoctoral work in radiology at the Washington University School of Medicine in St. Louis, Professor of Radiology Mark Green also serves as Director of Radiopharmaceutical Sciences for the Indiana Institute for Biomedical Imaging Sciences.

His research focuses on the design, development, and application of radiochemical probes for PET scans (positron emission tomography). His work on copper bis(thiosemicarbazone) chelates for mapping capillary blood flow in a variety of tissues (myocardium, kidney, tumor, and brain) led to a current IU Simon Cancer Center collaboration with Drs. James Fletcher and Theodore Logan. Green and his colleagues have implemented a production procedure for ⁶⁸Ga-DOTA-NOC, a radiolabeled somatostatin-receptor-targeting peptide. This radiopharmaceutical is currently being made available for clinical patient imaging at IU under the FDA's Expanded Access program for Investigational New Drug applications. So far, it is showing outstanding performance in detection of neuroendocrine tumors.



Dr. Mark Holland (Center)

IMAGINING NEW IMAGES

The IUPUI Imaging Research Initiative (IRI) and its Leadership Council continually seek new collaborations in imaging research. Imaging has long been a point of strength in campus research and the new IRI manager is no exception. Associate Research Professor of Radiology and Imaging Sciences Mark Holland is an expert in the physics of ultrasound imaging, providing research and educational support in this area to both the School of Medicine and the rest of campus. As the IRI manager, Holland works closely with IRI director Gary Hutchins and the Leadership Council to assess strategic goals, foster collaborations among imaging investigators, and help identify potential extramural funding.

His research focuses on the use of ultrasound-based measurements to provide an assessment of the intrinsic material, structural, and function properties of normal and diseased tissues. Recent projects have included ultrasonic characterization of the developing heart as well as myocardial structure and

function. These studies range from measurements performed on excised tissue specimens to clinical investigations.

Holland's teaching activities include lectures and individual instruction on the fundamental "Principles of Ultrasonic Imaging" to junior faculty members, fellows, residents, sonographers, and students. He also provides training on the implementation of advanced quantitative ultrasound imaging techniques and analysis methods. In addition to formal instruction, he mentors undergraduates, graduate students, post-doctoral associates, and junior faculty members.



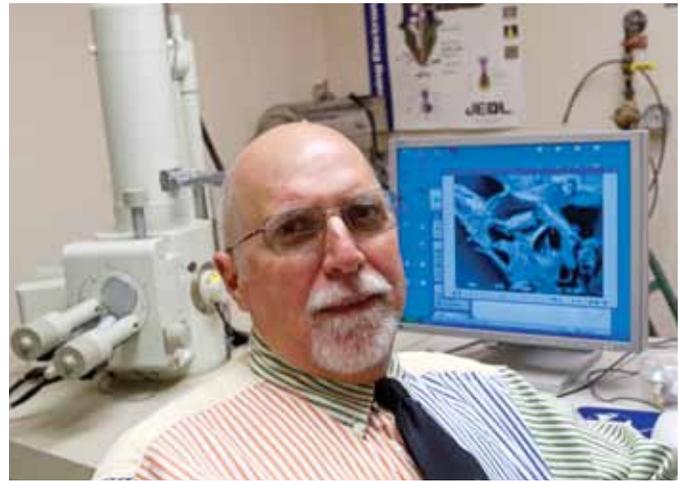
Dr. Ken Dunn

CELLULAR PORTRAITS

Dr. Ken Dunn – Associate Professor of Medicine and Scientific Director of the Indiana Center for Biological Microscopy.

Dr. Dunn is a cell biologist with a long-standing interest in the functions and mechanisms of intracellular membrane traffic. After publishing a series of foundational studies demonstrating that the membrane polarity crucial to epithelial function is actively maintained by the continuous sorting in endosomes, Dr. Dunn's laboratory has recently begun to explore the role of endocytic trafficking of liver transporters in endotoxemic cholestasis. These studies required developing novel methods of intravital microscopy, a second focus of Dr. Dunn's research.

Intravital microscopy is a powerful technique that provides investigators with a window into cellular and subcellular processes in living animals. Shortly after publishing the first example of high-resolution multiphoton microscopy of the living kidney in 2002, Dr. Dunn and colleagues in the Nephrology Division received NIH funding to establish the Indiana O'Brien Center for Advanced Microscopy, whose ongoing focus is the development and dissemination of methods of quantitative microscopy of the kidney. Since that time, Dr. Dunn has worked to bring the unique power of intravital microscopy to additional researchers, developing a network of research collaborators from campus and from Purdue University to implement novel methods of intravital microscopy for studies of bone and pancreatic islets, bone marrow, the lung, and the liver.



Dr. Vincent Gattone

NO JOB TOO SMALL

Electron microscopy (EM) is used to study subcellular changes; typically, as they relate to disease or modified cellular environments. Transmission electron microscopy allows the evaluation of intracellular and organelle structure including immunogold labeling of proteins. Scanning electron microscopy evaluates cellular surface alterations and is especially useful for evaluating structures such as cilia.

The IUPUI Electron Microscopy Center (EMC) is a core facility of the IU School of Medicine and one of the core imaging facilities associated with the IUPUI Imaging Research Initiative. Since 2006, the EMC has also been an international core facility for polycystic kidney disease (PKD). It is directed by Professor of Anatomy and Cell Biology Vincent Gattone whose mission is to update all the major equipment. A significant recent acquisition, in collaboration with the Integrated Nanosystems Development Institute, is a new field emission scanning electron microscope. The EMC can now provide ultrahigh resolution images down to a few nanometers. The EMC also provides both traditional as well as state-of-the-art services such as immuno-gold localization of proteins, high pressure freezing, and freeze substitution processing.

Dr. Gattone holds multiple patents kidney disease treatments and has extensive experience in translational research projects. Whether working on regular or translational research, his hands-on approach and expertise in EM image interpretation helps many campus investigators understand a technology with which they may not be familiar. In large part because of his contributions to understanding and providing options for treatment of PKD, Dr. Gattone was the 2013 recipient of the prestigious Lillian Jean Kaplan International Prize for the Advancement and Understanding of Polycystic Kidney Disease.

Editor's note: Sadly, Dr. Vincent Gattone passed away as this Annual Report was nearing final production. He will be sorely missed by everyone whose lives he touched.

STEM EDUCATION RESEARCH INSTITUTE



A Model for 21st Century **EDUCATION**

Project Lead the Way (PLTW) is the nation's leading STEM education non-profit, providing innovative STEM programming to more than 4,700 elementary, middle, and high schools in Washington, DC and all 50 states. Interestingly, the organization relocated its national headquarters to Indianapolis two years ago.

There have been numerous studies linking PLTW to improved academic achievement and increased graduation rates. However, most of this research has been limited to secondary-level (technical or high school) outcomes. The STEM Education Research Institute (SERI) and the Center for Urban and Multi-cultural Education (CUME) at IUPUI are working to take PLTW research one step further. Currently, no studies have yet explored PLTW's impact on higher education majors and STEM learning outcomes.

To explore PLTW's longitudinal effect on participating students, staff from SERI and CUME will use a data set on both K-12 and college experiences of all Indiana high school graduates between 2008 and 2011. In this study, the team will investigate the learning outcomes of Indiana PLTW students beyond high school by examining Indiana high school graduates' college enrollment rates, majors, first-to-second year retention rates,

(From Left to Right) Some members of PLTW study: Dr. Patrice Juliet Pinder, Brandon Sorge, Dr. Charles Feldhaus, and Caris Daily

and graduation times. PLTW student outcomes will then be compared with those of their peers via propensity score matching. Results of this pilot study will provide high-quality insight into PLTW's long-term impact on college student success and preparation for STEM-related fields.

IN PURSUIT OF EQUITY

Patrice Juliet Pinder, PhD
Post-Doctoral Fellow, STEM Education Research Institute (SERI)

Dr. Pinder focuses on underrepresented minorities in K-16 STEM Education. Specifically, her work looks at racial, gender, and immigrant equity issues in STEM Education as well as



(From Left to Right) Some members working on the STEM Database Project: Dr. Andrew Gaurin and Grant Fore

instructional “game play” and elementary students’ science and mathematics learning. She also investigates cultural/ethnic influences on achievement differences between Afro-Caribbeans, African Americans, and African students within the U.S. Dr. Pinder is currently working on three projects: 1) a SERI team collaborative analysis of IUPUI’s Center for Multicultural Education Project Lead the Way data set; 2) exploring ways in which instructional games can be incorporated into formal lectures in order to promote scientific and mathematical inquiry and improved achievement among younger elementary school students; and 3) exploring racial, gender, and immigrant equity issues in K–16 STEM Education in the U.S. and Canada. Dr. Pinder’s current projects have resulted in a STEM education book, 16 manuscript and abstract acceptance/publications, 13 conference presentations, and multiple citations by other researchers in peer-reviewed dissertations and journals.

A SUM GREATER THAN THE PARTS

There are so many independent STEM education projects on campus that keeping track of them all has become its own project. SERI, the STEM Education Research Institute, is creating a database that will consolidate information about STEM education initiatives on campus into a single, accessible clearinghouse. This resource will include both campus-funded and externally supported initiatives that promote all levels of STEM teaching and learning. Once complete, the database will enhance IUPUI’s ability to track, search, and update information on a large number of disparate STEM projects.

During Phase I, which is currently underway, SERI researchers are identifying and categorizing initiatives through IUPUI-affiliated websites, institutional reports, and funding reports and from federal agencies such as the NSF and NIH. In Phase II, the SERI team will verify and expand the data by contacting the responsible individuals and units. With Phase III, the researchers will analyze IUPUI-affiliated STEM initiatives using the database and, when necessary, conduct additional faculty and staff interviews to assess internal synergies and opportunities for resource sharing. The SERI database project will enable IUPUI to help other higher education institutions organize and optimize their respective STEM education efforts.



(From Left to Right) INDA staff members: Dr. Mangilal Agarwal, Dr. Dan Minner, and Dr. Sudhir Shrestha

IT’S A SMALL, SMALL, SMALL WORLD

Nanotechnology is science, engineering, and technology conducted at the nanoscale, which is generally 1 to 100 nanometers. A nanometer is one billionth of a meter. In everyday terms, a sheet of newspaper is 100,000 nanometers thick. There are 25.4 million nanometers to an inch.

The IUPUI Nanotechnology Discovery Academy (INDA) is a summer camp for students passionate about science. A specialized curriculum and hands-on activities inspire high school students to envision future science careers by expanding their understanding of the world to include nanosystems. And it’s working. After completing INDA, participating high school students reported a statistically significant increase in their knowledge of nanotechnology and its everyday uses.

INDA also provides “working” summer camps for high school teachers. As a professional development opportunity, INDA has received high marks. The participating teachers are rejuvenated, carrying that enthusiasm back to their classrooms. Taking part in INDA, teachers also increase their capacity to create classroom activities that are relevant to everyday life.

As director of the Science and Technology Innovation Program at the Woodrow Wilson International Center for Scholars, David Rejeski, sums up the importance of nanotechnology: “We are at the vanguard of discovering the endless benefits of nanotechnology for applications like targeted cancer treatments and more efficient solar cells. With this inventory, we also are learning that this technology is already being incorporated into our daily lives. It’s on store shelves and being sold in every part of the world.”

Over the past three years, INDA has inspired 200 students and 45 teachers from varying backgrounds and areas of interest.

ENGINEERING AUTOMOTIVE SAFETY



Smarter CARS *Safer* STREETS

Team of TASI researchers

Each year the U.S. records 4,000 pedestrian fatalities and 70,000 pedestrian injuries in traffic-related incidents, accounting for 13% of the total in each category. In pursuit of lowering those statistics, automotive engineers across the country are working on new technologies to provide automatic vehicle braking when a forward pedestrian crash is imminent. The Transportation Active Safety Institute (TASI), an IUPUI Signature Center established in 2006, is conducting a 4 ½ year research project to develop test scenarios and procedures for objectively evaluating the performance of pedestrian/bicycle collision imminent braking (CIB) features for all vehicle makes and models. This project is led by Dr. Yaobin Chen, Director of TASI.

The goal is to help the National Highway Traffic Safety Administration establish testing standards for pedestrian CIB. The TASI team arranged for 110 cars to collect street-view video and GPS data in greater Indianapolis for a year. Human, bicyclist, and vehicle behaviors were extracted from the recorded

information to aid test scenario development. Working with Dr. David Good, Associate Professor and Director of the IU Transportation Research Center in the School of Public and Environmental Affairs, the project team studies national pedestrian accident data to categorize accident types and other statistics in order to effectively configure the test site and develop test equipment. The team is currently developing articulating test mannequins and bicyclist dummies that represent the U.S. population in terms of size, speed, and gait. Collaborating with the Electrosience Lab at Ohio State, the team is creating innovative mannequin and bicycle “skins” to match—from the perspective of automotive radar—their real-life counterparts.

The multi-million dollar project is sponsored by the Toyota Collaborative Safety Research Center, which encourages TASI to publish its findings. Currently at the project’s midway point, the team has published many intermediate results along with applying for several U.S. patents.

CREATIVITY MATTERS



STUDENT RESEARCH AND ENTREPRENEURSHIP



Recycling **REINVENTED**

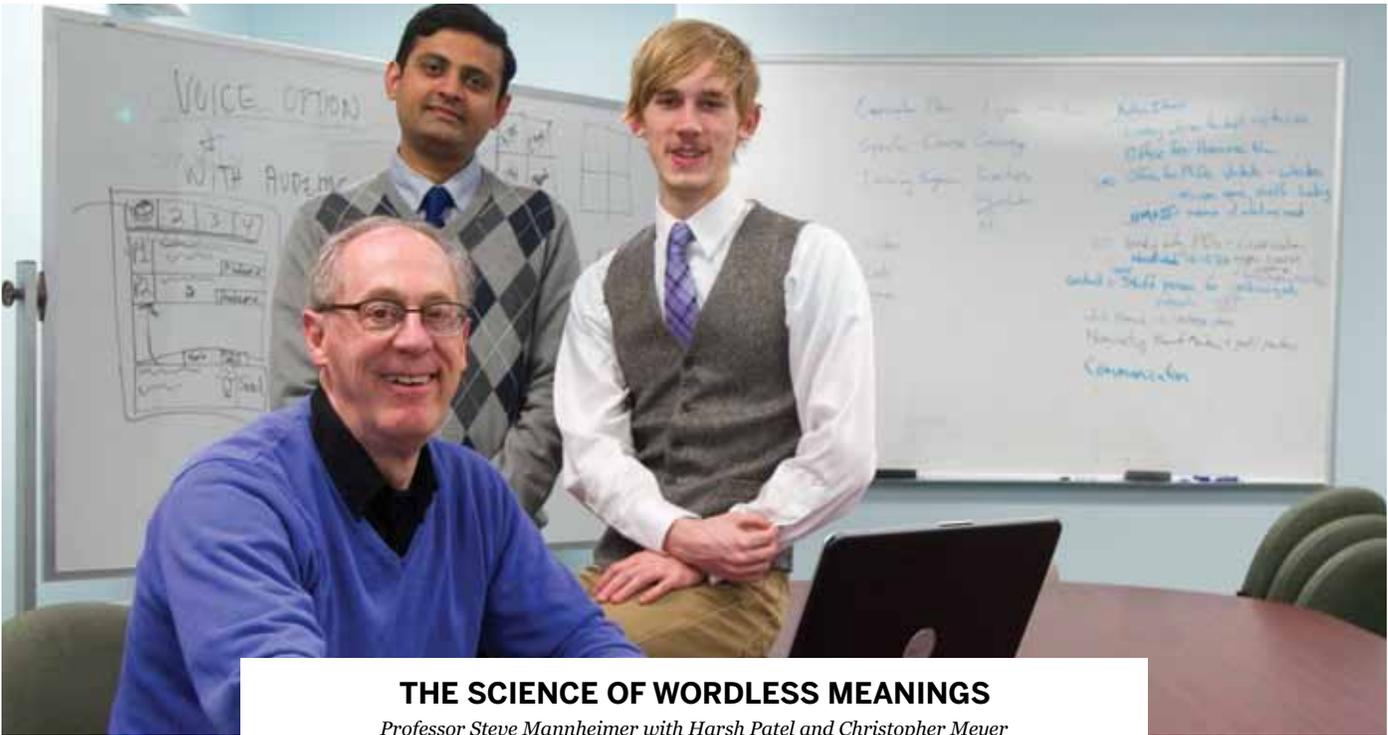
Rishi Chandra thinks big. The triple major (accounting, international studies, and supply chain management) intends to leave his mark on the world, but before he leaves campus, he's determined to change the way college students recycle. Intellectually, Rishi has been an entrepreneur, looking for ways to expand his learning beyond the classroom. As a student, he looked beyond the classroom to explore some of the many programs offered at IUPUI.

As a sophomore, he discovered the Center for Research and Learning (CRL) and the many programs it offers. He joined an ITEC team (Innovation-to-Enterprise Central) comprised of three biomedical-engineering and two business students. Their project helped IU vascular surgeon Dr. A. George Akingba ascertain how best to patent his modular arterio-venous hemodialysis shunt and whether the best means to commercialize it would be through a start-up or by licensing it.

As a junior, Rishi entered the annual elevator-pitch competition of CRL's ISSEC program (Ideas Solving Social and Economic Challenges) as an individual. One aspect of campus life that bothered him was that recycling by students seemed sporadic, himself included. He wanted to create a practical application to motivate more IUPUI students to recycle. His concept is simple: "convert" a vending machine to recycle cans and bottles. Users swipe their JagTags and accumulate points that can be exchanged for discount coupons or provide donations to their school or favorite charity. Winning second place afforded Rishi the opportunity to start implementing this.

As a senior, Rishi and CRL assembled a team—senior Maryam Qureshi (biology), junior Carlos García (business) and sophomore Bhavesh Gandhi (mechanical engineering)—and Rishi submitted an ITEC proposal. Fall 2013 found them researching feasibility, surveying students, and interviewing vendors. Rishi hopes to implement a simple system by graduation and plans on continuing the project afterwards.

Rishi Chandra



THE SCIENCE OF WORDLESS MEANINGS

Professor Steve Mannheimer with Harsh Patel and Christopher Meyer

Steve Mannheimer, Professor of Media Arts and Science and Associate Dean for Faculty Affairs at the School of Informatics, explores the possibilities of sound and meaning. A noted painter and art critic, he observes, “Art is about coming up with a new thing, a new idea, and sometimes one cannot convey meaning using words.” In this case, the new idea is audemes. Generally speaking, audemes are 4-to-7-second, multi-layered sound clips that convey specific meanings, such as a rooster crowing to signify “morning.”

“From an audio-cognition point of view, in three seconds or less I can get the cognitive equivalent of something that might take 15 seconds to explain.” Mannheimer continues, “You can learn to decode things solely through sound.” He demonstrates this by playing an audeme of a crowd cheering, shattering glass, and a man groaning: the proverbial baseball breaking a window.

Audio designers create audemes for advertising and branding, but what other purposes do these wordless sound clips fulfill? Mannheimer states that current research shows that “Audeme-riddle games improve test scores.” Alternatively, he proposes, “Imagine a three-year-old opening a cabinet full of toxic cleaning products. Are you going to expect her to read labels? You could have a sound for “danger.” He adds, “If audemes help kids learn better or keep them safe, then I’d love to see that in action even if it takes 10 or 15 years.”

Mannheimer’s research on audemes also involves students. He collaborates with the Center for Research and Learning as a faculty mentor in its Innovations to Enterprise Central (ITEC) program. ITEC is a venue for IUPUI students to formulate and refine entrepreneurial ideas. His team of four includes Christopher Meyer (public affairs management), Harsh Patel (international studies-supply chain management), Sheheryar Ahsan (media arts and science), and Vinayak A. Gupta (biology).

Team leader Meyer is blind-low vision. He says, “Audemes are at the intersection between auditory learning and the conscious mind. They are an engaging tool that makes learning fun.” He is interested in helping the blind-low vision community, but that is only part of his desire. “A person doesn’t have to be vision impaired, anyone could benefit from audeme-based learning.”

Meyer’s teammate Harsh adds, “How can we sell the idea to the community and make a difference in their lives? The end product could be learning skills, brain exercise regimens—like Lumosity.com—or e-books.” The pair’s enthusiasm is evident. Meyer leans forward, states, “This project, even with a profit motive, has inherent concerns about social responsibility. It carries a ‘Let’s give back’ mindset.” Harsh jumps in, “But also, how will it make the money? How will we use the money once it’s made? Research? Scholarships? Let’s make this marketable and then use that success in ways that matter.”

RESEARCH COMMERCIALIZATION AND ECONOMIC DEVELOPMENT



On the *Brink* of a **CURE**

(From Left to Right) Dr. Irina Petrache, Dr. Matthias Clauss,
and Dr. Brian Johnstone

Emphysema is a debilitating form of chronic obstructive pulmonary disease (COPD) that is the third leading cause of death worldwide. At the IU Innovation Center in Indianapolis, three School of Medicine professors have good reason to believe that help could be on the way for millions of patients suffering from emphysema.

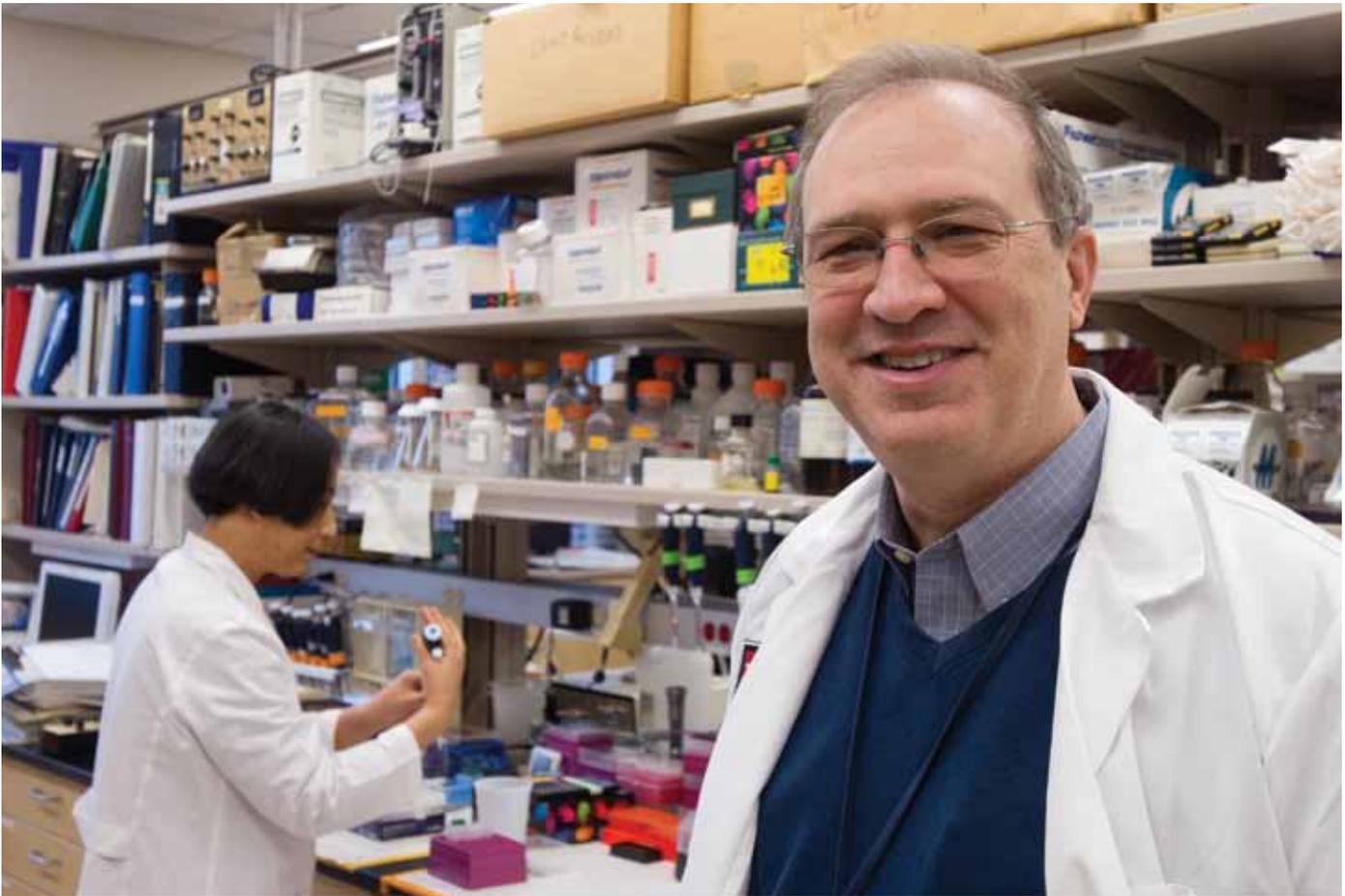
With help from the IU Research and Technology Corporation (IURTC), associate research professors of medicine Matthias Clauss and Brian Johnstone have formed a startup company with Dr. Irina Petrache, a practicing pulmonologist and the Calvin H. English Professor of Medicine. EmphyMab™ Biotech has developed a monoclonal antibody that stops progression of COPD in research trials with animals. “Our team discovered a molecular target that is central to disease progression,” says Johnstone. “The antibody specifically traps a key protein in the pathway to prevent it from damaging the lungs,” adds Johnstone. “It’s still early, but the data looks extremely promising.”

Dr. Petrache is passionate about discovering more effective ways to treat her patients. When Petrache met Clauss at the

School of Medicine, they recognized that their research paths intersected. Clauss has devoted his career to studying proteins that harm blood vessels and cause inflammation, which both contribute to COPD. However, neither Petrache or Clauss had any experience developing therapies for the market. “That’s when I jumped in,” says Johnstone, who has previous success with biotech startups. “We had a great idea, but no money to commercialize it until Joe Trebley and Spin Up gave us a much needed boost.”

Trebley is head of startup support and promotion at IURTC and Spin Up is a program that helps form IU startups. Spin Up helped the EmphyMab team with patent costs as well as securing a \$166,000 grant from the Small Business Innovation Research program. The next step, Trebley says, is preclinical testing of the drug, which has a potential market of at least \$20 billion. Trebley and the IURTC will continue to look for additional funding sources.

“We’re very hopeful,” says Johnstone. “Stopping the disease is our driving force.”

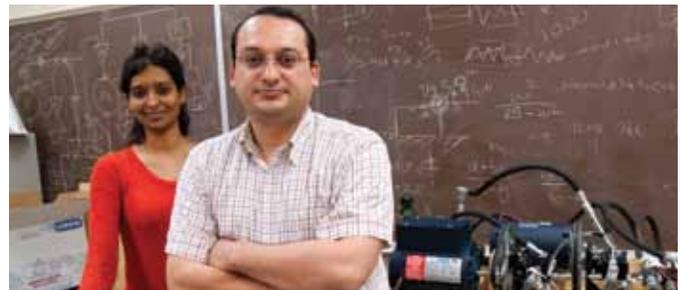


Dr. Robert Bacallao

CURING COLLATERAL DAMAGE

Diagnosing kidney problems frequently requires a CT scan, yet the contrast media used can create problems of their own. The contrast agents can have toxic effects on kidneys, such as increasing blood viscosity or vasoconstriction, resulting in contrast induced nephropathy (CIN). This is particularly serious for patients with chronic kidney disease because their preexisting abnormal vascular pathobiology is made worse by the effects of contrast media. The unfortunate truth is that diagnosing kidney issues can cause an acute kidney injury (AKI) as can surgical procedures.

Dr. Robert Bacallao, Associate Professor of Medicine, has developed a new method to treat AKI that results from CIN. He has discovered a solution to treat surgery-related AKI. Alternatively, His research also indicates that it is possible to prevent an episode of AKI following an elective procedure by administering a pre-treatment to the patient approximately 7-28 days prior to the procedure. Dr. Bacallao has founded Rene Medical, a biomedical start-up established through the IURTC Spin-Up program. Currently in pre-clinical development, his patent pending Kidni System™ utilizes a single-use catheter to deliver either Rene Treat™ or Rene Prevent™ solutions, addressing a large, undertreated market for hospital-acquired kidney injury.



Dr. Afshin Izadian

POWER TO THE PEOPLE

Dr. Afshin Izadian, Assistant Professor of Engineering Technology and a researcher at the Richard G. Lugar Center for Renewable Energy at IUPUI has co-founded (with the IURTC's Innovate Indiana Fund) Single Switch Systems. Single Switch is an energy start-up developing a highly novel AC inverter technology that promises to provide higher quality, lower-cost AC power. Potential markets include solar power, battery storage, electric vehicles, motor drives, and manufacturing robots. Currently, Single Switch is focusing on the solar panel inverter market for residential systems. With this groundbreaking technology, the solar energy market will see decreased installation costs and increased energy efficiency.

INDUSTRY AND COMMUNITY PARTNERSHIPS



Team of researchers associated with the Polis Center

Mapping the Path to a HEALTHIER LIFE

The Polis Center is a self-funded research unit in the School of Liberal Arts that is dedicated to improving clinical translational science research and the public health information infrastructure.

Its signature community information system is also the nation's largest. SAVI (Social Assets and Vulnerabilities Indicators) is an interactive data and mapping resource for individuals and organizations in Central Indiana. SAVI provides thousands of socio-economic variables that can be used to analyze community issues such as health at a neighborhood level.

Through a grant from the Richard M. Fairbanks Foundation, the Polis Center is creating new data analysis and visualization tools for SAVI, such as the Exploratory Spatial Data Analysis tool, which allows researchers to explore data for spatial patterns and relationships, detect outliers, and formulate hypotheses. These enhancements strengthen SAVI's usefulness for public health researchers and practitioners. The Polis Center also is partnering with the Regenstrief Institute, the Fairbanks School of Public Health, and the School of Medicine to develop public health indices from the Indiana Network for Patient Care (INPC) that will provide researchers the ability to link patient health data with SAVI's community data.

The overall goal of the Polis Center is to promote the methods and best practices that encourage civic engagement and positive community changes that endure. In addition to SAVI, the Polis Center hosts its annual Spirit & Place Festival, an example of its effort to promote Central Indiana as an important illustration of how communities can work together to find practical, effective, and cost-efficient ways for meaningful change.



Group of IUPUI and Siemens colleagues at the Siemens site in Indianapolis

INDUSTRY RESEARCH PARTNERS MATTER

IUPUI collaborates with numerous industry partners for research and development of products and services. These collaborations are essential for the continued growth of innovative research at IUPUI and for the commercial success of the industry partners. Collaborations range from research to clinical studies, consulting, and data validation. The relationships range from cooperative efforts to full strategic endeavors, where IUPUI and the industry partners align future objectives, goals and aspirations to offer real-world solutions and responses to market needs.

An important example of IUPUI research collaboration with industry consists of the one with Siemens Corporation. Siemens is a globally integrated technology company, operating in the industry, energy, healthcare, and infrastructure & cities sectors. The Siemens relationship with IUPUI originated with the IU School of Medicine's Indiana Institute for Biomedical Imaging Sciences, directed by Dr. Gary Hutchins. This relationship has been expanded to collaborations across IUPUI, including in Engineering and Technology with Product Lifecycle Management (PLM) software. This is a great example of leveraging and expanding a successful industry relationship, by jointly developing and executing a clear collaboration strategy. Siemens' global presence along with its multiple areas of focus aligns well with IUPUI's research expertise and resources, including in health and life sciences, engineering and technology, and informatics and computing.



Dr. Kara Wools-Kaloustian

BACK FROM THE FRONT LINES

The Division of Infectious Diseases at the School of Medicine tapped a veteran researcher from the IU Center for Global Health as its new director. Dr. Kara Wools-Kaloustian previously worked for AMPATH (Academic Model Providing Access to Healthcare), the Center’s signature program in Kenya as Co-Director of Field Research in Infectious Diseases.

AMPATH is a partnership between the IU School of Medicine, the Moi University School of Medicine, and the Moi Teaching and Referral Hospital. The internationally recognized and praised partnership provides care to more than 24,000 children and 125,000 adults with HIV. AMPATH research programs include more than \$80 million in grants that support research and training at 15 universities.

During her time with AMPATH, Dr. Wools-Kaloustian developed data collection instruments for the clinical program, advised the OpenMRS team on implementation of the database, and developed the majority of the clinical protocols under which the program operates. OpenMRS is the world’s largest free and open source electronic medical record system, used in the treatment and prevention of HIV/AIDS in Sub-Saharan Africa.

The majority of her research relates to assessing antiretroviral rollout outcomes in sub-Saharan Africa. This includes assessing the risk of renal disease in HIV-infected Kenyans, outcomes of patients enrolled in care, task-shifting models within HIV care programs as well as evaluating the integration of prevention of mother to child transmission of HIV (pMTCT) interventions into HIV-care and treatment programs.

Wools-Kaloustian is Co-PI of the International Epidemiologic Databases to Evaluate AIDS (IeDEA), East Africa Consortium, one of 7 regional consortia established to explore the epidemiology of global HIV-treatment implementation. She has also served as a mentor to many Kenyan and U.S. faculty, fellows, and residents interested in pursuing careers in global health and/or HIV. She currently serves as Associate Director on the NIH T-32 training grant: “Training in Sexually Transmitted Diseases including HIV.”



(From Left to Right) Dr. Philip Scarpino and Capitol Tours colleagues Jennifer Hodge, Nicholas Sacco, and Callie McCune

HISTORY THAT DOESN'T STAY IN THE PAST

Dr. Philip Scarpino, professor of history in the School of Liberal Arts, director of public history, and director of oral history at the Randall L. Tobias Center for Leadership Excellence, does not believe history should be relegated to textbooks. Historians, especially public historians, should be active in recording history. That is why he connects graduate students (as public history interns) with public history projects in the community. The IUPUI Solution Center has provided matching grants for several of these internships, which also are partially supported by community partners. The result, Dr. Scarpino says, “is truly a mutually beneficial relationship.”

Dr. Scarpino and his students have helped the Fall Creek YMCA, Bethel African Methodist Episcopal Church, Capitol Tours, Indiana Humanities, and the Social Health Association of Indiana recover their histories. He says, “We’ve worked on some dynamite projects that bring value to the community and at the same time train students to be good historians.”

One student, Melissa Burlock, worked with Bethel AME Church. She interviewed elderly members of the congregation about the church’s history. When asked what the project meant to her, Burlock said, “I had the opportunity to record the extraordinary acts of ordinary people who are members of a church that has been in service to the black community of Indianapolis since the 1830s as well as having been instrumental in the struggle for civil rights.”

Another student, Angela Potter, is writing a recent history of the Social Health Association of Indiana, which develops sex education curricula for Indiana Schools, a project Scarpino directed in 1990. Significant changes have taken place since then, including the AIDs crisis, disputes related to teaching sex education and controversies over family and religious values. “This experience has opened me up to subjects that I would never have investigated on my own,” Potter said.

Dr. Scarpino’s approach to experiential learning and community engagement provides IUPUI students with opportunities to advance their academic and their professional careers. Scarpino reflects, “These experiences not only prepare tomorrow’s historians, but also improve public history and build community partnerships.”

**IUPUI RESEARCH
COMMERCIALIZATION
METRICS**



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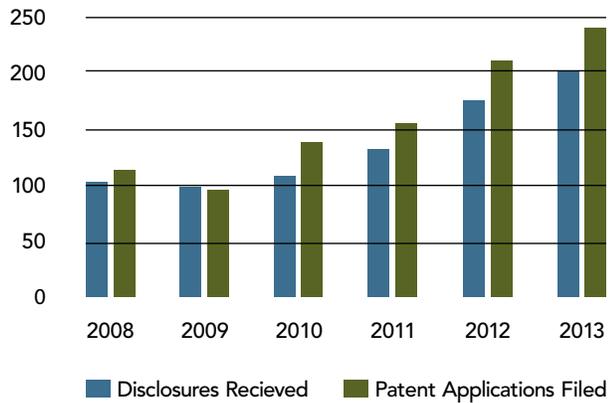
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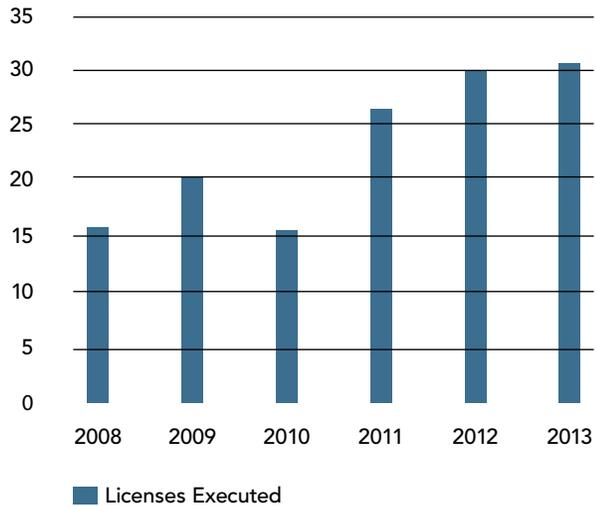
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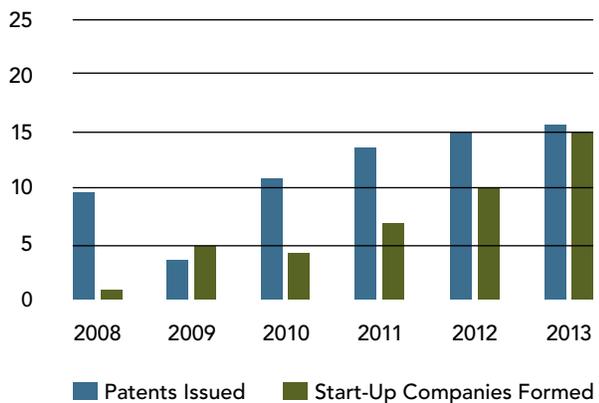
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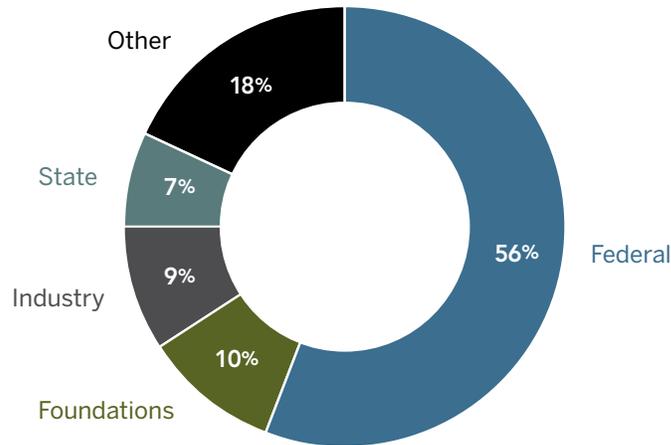
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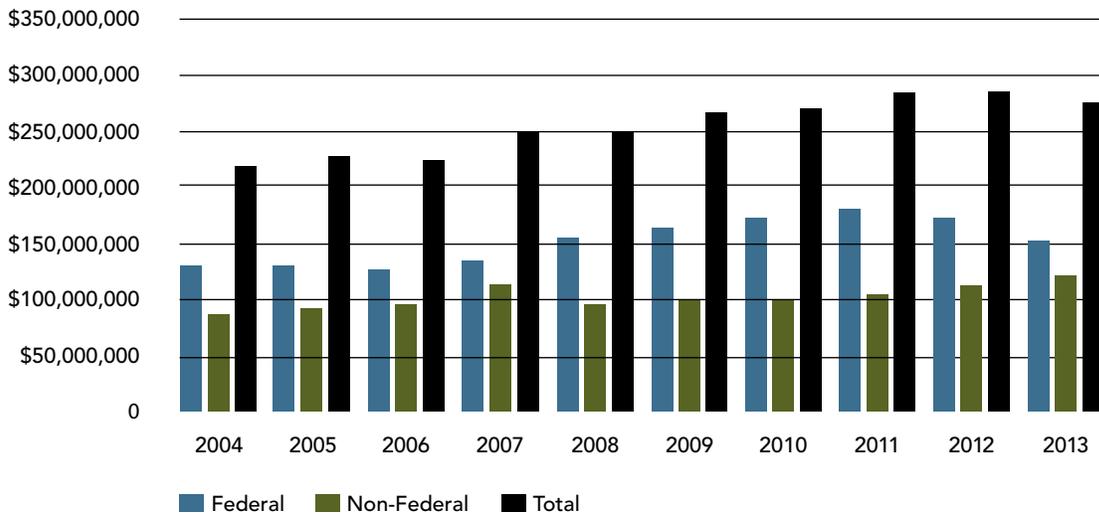


IUPUI RESEARCH EXPENDITURES FOR FISCAL YEAR 2013

TOTAL: \$274,760,316



IUPUI TOTAL RESEARCH EXPENDITURES 2004–2013





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