

2015 Highlights of Major Accomplishments

Office of the Vice Chancellor for Research

July 1, 2014 - June 30, 2015

The Office of the Vice Chancellor for Research (OVCR) is dedicated to the advancement of the research enterprise at IUPUI. The primary units associated with OVCR consist of the [Office of Research Development](#) and the [Center for Research and Learning](#). These units support the campus in the achievement of its research mission. Central to this mission are the development and expansion of innovative research programs that align well with 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.

Office of Research Development

[The Office of Research Development \(ORD\)](#) consists of five main sections, identified as the Strategic Initiatives, Programs and Training, Proposal Development, Research Commercialization, and Industry Research Development sections. Through these sections, ORD supports the growth and development of the IUPUI research enterprise.

The Success of our Students

- Supported oversight of four interdisciplinary nanosystems courses taught across the Schools of Engineering and Technology and Science in five different departments.
- Successfully completed the first year of the four-year \$1.25 million NIH R25 grant entitled the IUPUI Post Baccalaureate Research and Education Program (IPREP). The primary goal of IPREP is to improve diversity in the community of graduate students and faculty for five targeted Ph.D. programs at IUPUI. Four IPREP Fellows completed one year of training. Three Fellows placed into graduate programs (2 into PhD programs) and one Fellow will remain in the lab doing research for another year. Five new Fellows were recruited for the 2015-2016 academic year, in areas of Addictions Neuroscience, Clinical Psychiatry and Medical Neuroscience.
- Continued to develop plans for an Innovation-to-Enterprise Epicenter that would provide IUPUI students with a space for innovation and discovery.
- As a means for further advancing imaging-related research activities of students, the *IUPUI Imaging Research Initiative* awarded a two-year fellowship to a student as part of the "IUPUI Graduate Student Imaging Research Fellowship" program. This program provides a stable source of funding for graduate students pursuing a doctoral degree who are primarily focused on research in imaging technology development. A second fellowship will be awarded in FY 2016.
- Developed and presented workshops tailored for graduate students and interns to support their efforts to secure external funding through grants and fellowships.
- Presented finding funding workshop to undergraduates as part of the RISE sessions through the Center for Research and Learning and created funding alerts for possible future fellowships.
- Advised faculty on strategies for integrating students into their research successfully.
- Organized and held the 4th annual Ideas Solving Social and Economic Challenges (ISSEC) competition, the IUPUI student idea pitch to solve social and economic challenges, with fifteen finalists presenting pitches in the spring 2015 event.
- Developed and presented workshops for students on intellectual property issues and on special topics related to innovation and business skills.
- Provided consultation services to students interested in entrepreneurship and innovation.
- Announced with the School of Engineering and Technology an in-kind Product Lifecycle Management (PLM) software grant from Siemens, valued at \$538 million. The grant gives students access to the same PLM technology that companies around the world depend on every day to develop innovative products in a wide variety of industries including automotive, aerospace,

machinery, high-tech electronics and many more. Graduates with this type of software training are highly-recruited for advanced technology jobs. Product Lifecycle Management software modules have been developed and integrated into various levels of Engineering & Technology courses. Moreover, students are being guided to utilize these tools for lab and capstone type projects. These classes equip students with the latest software tools presently used in industry, and address a fast growing need for systems engineering expertise.

Advances in Health and Life Sciences

- Provided significant support for the development of research proposals and funding requests by health and life sciences faculty, resulting in 19 proposals and 10 awards for \$55,528,064.
- Continued to provide project management and proposal development assistance to health and life sciences faculty, resulting in 16 proposals requesting over \$24M.
- Organized a new intercampus (IUPUI and IUB) research cluster on Addictions Neuroscience. Twelve key faculty, in addition to OVCR staff, participated in 4 face to face discussions at Bradford Woods. This resulted in the submission of a GLUE grant proposal through the combined IU-CTSI program. The cluster is preparing a P-series grant proposal for submission to the NIH in Fall, 2015, and intends to apply for one of the Signature Center grants in Spring 2016.
- Organized a new research cluster on 3D BioPrinting that involves more than 20 faculty in the Schools of Engineering and Technology, Science, Medicine, Herron, the VA Hospital, and a local industry manufacturing group involved in 3D Printing. The group met twice, including once for site visits to four facilities on and off the IUPUI campus. Smaller focus groups have been formed to pursue grant opportunities in specific areas.
- Supported the interdisciplinary HIV in Adolescents research group and recruited faculty from SPEA and the Law School to participate. The group submitted an R13 conference grant proposal to the NIH, which was scored but not funded. The group intends to pursue the goals of the R13 program while developing future proposals to submit for funding.
- Established an *IUPUI Center for Quantitative Renal Imaging* organized through the *IUPUI Imaging Research Initiative*. The mission of this research center is to develop, implement, and disseminate innovative quantitative imaging methods designed to diagnose kidney disease and evaluate efficacy of therapeutic interventions.

Contributions to the Well-Being of the Citizens of Indianapolis, the State of Indiana, and Beyond through Research and Community Engagement

- Continued development of the first IUPUI Grand Challenge Initiative on Urban Health and Wellbeing. This initiative provides the opportunity for all IUPUI schools to participate in cross-disciplinary efforts to address health and quality of life issues in an urban environment. Hundreds of faculty and staff have deliberated by various means about the initiative, including through town hall meetings and roundtable discussions about the primary topic areas under consideration. Moreover, based on the information generated, a committee, consisting of faculty and administrators from multiple academic units as well as representatives from the city of Indianapolis, over a period of several months has developed a proposed plan for the initiative, and consultations have been taking place with proper administrators at the school, campus, and university levels for its realization. Throughout these efforts there has also been close interaction with the Office of Community Engagement.
- Organized a Roundtable Discussion at the [2015 IUPUI Research Day](#) that included 10 tables and more than 100 participants to discuss IUPUI's Urban Health and Wellbeing Initiative. Focus areas included access to healthcare, public health, environmental health, education, quality of life and public safety.
- Oversaw all the centers funded under the [IUPUI Signature Centers Initiative \(SCI\)](#). This initiative has been resulting in the development of nationally and internationally known research centers of excellence at IUPUI. Activities included review and monitoring of currently funded centers, and review of 6 new proposals submitted under the Round 8 competition, resulting in two new centers selected for 3-year funding. These new centers are the Indiana Center for AIDS Research and the

Center for Spinal Cord and Brain Injury Research. New in 2015 was the addition of Signature Center Initiative planning grants. Three centers were awarded these one year grants: Center for Cachexia Research Innovation and Therapy, Institute for Product Lifecycle Innovation, and Center for Aerial Unmanned Systems Imaging. Three centers from Round 4 were also up for Signature Center designation status this year. One center was awarded Signature Center status – the Center for Pancreatic Cancer Research under the direction of Dr. Murray Korc.

- Conducted a series of workshops and training programs in support of research across campus. This included symposia and workshops on Funding from the NIH, Funding from the NSF, and the Nine Golden Rules to Succeed in Research Workshop. Delivered approximately 25 OVCR sponsored/co-sponsored workshops and presentations to over 800 participants. The topics covered have ranged from how to write top quality grant proposals, to how to find funding sources and develop successful research programs.
- Delivered 5 customized workshops in 4 schools to 75 participants, and 30 PIVOT consultations to faculty and staff.
- Provided through [Proposal Development Services](#) significant support for the development of research proposals and funding requests by IUPUI faculty, resulting in 79 proposals requesting over \$71M.
- Administered 10 [OVCR internal grant programs](#), providing seed funding in support of research and scholarly projects which have good prospects to grow and succeed, including through external funding support. A total of 131 proposals were submitted and 80 received funding. The total funding was \$1,911,250.
- Created and administered a new co-sponsored school-based internal grant program called Grant Improvement through Faculty Training (GIFT) in the School of Law. The inaugural cohort included 5 law faculty who may receive up to \$5,000 each, based on completion of specific program requirements.
- Provided funding to 7 IUPUI research commercialization projects under the Funding Opportunities for Research Commercialization and Economic Success (FORCES) program, designed to support IUPUI researchers in the successful transformation of their research findings into commercially viable outcomes. The program was launched in Fall 2011, and has provided funding to 29 projects in the first four years. Results of these projects have enabled faculty reach key research milestones leading to submission of SBIR grant proposals, and enhanced intellectual property positions for projects that hold promise for commercialization of the research outcomes.
- Organized and hosted the [2015 IUPUI Research Day](#), the largest event of its kind held at IUPUI, providing an opportunity for the entire campus and their academic, industrial, governmental partners, and the broader community, to come together and find out more about the research enterprise at IUPUI, explore new collaborations, and lay the foundation for new partnerships. The day-long event featured a keynote address by **Dr. Sally Rockey**, National Institutes of Health (NIH) Deputy Director for Extramural Research. There were over 800 participants in attendance at Research Day.
- Facilitated interdisciplinary collaborations resulting in grant proposals and funding:
 - “Novel Diagnostics and Treatment of Bone Metastasis” VOH - \$100k - Hiroki Yokota, Sungsoo Na, H Nakshatri, M. Agarwal, J. Ryu, L. Zhu
 - “Research Experiences for Teacher Advancement In Nanotechnology (RETAIN)” – NSF - \$494,571 – Funded and the inaugural summer program began in June 2015 – M. Rizkalla et al., submitted through INDI.
 - “Acquisition of X-ray Diffraction System (XRD)” – NSF – \$374,989 - Funded and a Bruker D8 Discover XRD has been purchased and is now in operation within INDI’s shared characterization facility – G. Druschel et al., submitted through INDI.
 - “Nanotechnology Experiences for Students and Teachers (NEST)” – NSF - \$600,000 – Pending - H. El-Mounayri et al., Submitted through INDI.
 - “REU Site: Multidisciplinary Research for Undergraduates in Nanomaterials for Biological and Energy Applications” – NSF - \$359,946 – Pending – M. Agarwal et al., Submitted through INDI.

- “MRI: Acquisition of Nanoindentation System (NIS) for Interdisciplinary Research and Education” – NSF - \$390,235 – Pending – H. Yokota, et al., submitted through INDI.
- “Canine-Inspired Smart Sensor for Detecting Hypoglycemia from Human Breath” – NSF – \$768,263 – Pending – K. Varahramyan, M. Agarwal, A. Faiola, P. Roach, S. Shrestha, and D. Hardin.
- Facilitated interdisciplinary collaborations resulting in several publications in high impact factor journals. Few papers are listed below:
 - “Graphene-modified nanostructured vanadium pentoxide hybrids with extraordinary electrochemical performance for Li-ion batteries” (2015), Nature Communications (J. Xie, School of Engineering).
 - “Ligand binding alters dimerization and sequestering of urokinase receptors in raft-mimicking lipid mixtures” (2014) Biophysical Journal (C. Naumann, School of Science, A. Siegel, INDI).
 - “Assisted through NSF-MRI funding the acquisition of a top of the line X-Ray Diffraction System (Bruker D8 Discover) to fulfill the need for advanced imaging capabilities on campus. This instrument has been purchased, installed within INDI’s shared characterization facility, and will be open to researchers and students across campus next month, July 2015.
- Awarded three research grants to investigators within the IUPUI research community through the “IUPUI Imaging Technology Development Program” sponsored by the *IUPUI Imaging Research Initiative*. The goal of this program is to seed pilot projects for the development of new, innovative, imaging-related technologies that enhance broader multidisciplinary research programs. Additional IUPUI Imaging Technology Development Program grants will be awarded in FY 2016.
- A successful *IUPUI Imaging Research Symposium* was hosted through the *IUPUI Imaging Research Initiative* in October 2014. The Symposium brought together investigators from diverse scientific disciplines with image technology experts to explore potential collaborative research opportunities. Dr. Kamlesh (Kam) Lulla, PhD (Chief Scientist and Director, University Research, Collaboration and Partnership Office, NASA Johnson Space Center) delivered the keynote address and met with several IUPUI faculty members regarding potential NASA-sponsored research opportunities.
- Discussions were initiated to establish an interdisciplinary water research institute at IUPUI. Areas of collaborative community-participatory research that take advantage of IUPUI faculty expertise and address the needs of the Indianapolis community are being identified.
- Held the second annual workshop on Working with Industry on Applied Research & Creative Activity. The workshop is particularly helpful for faculty researchers who desire to seek research funding from industry and do not have prior experience with developing industry-sponsored research projects. The centerpiece of the workshop is a tiered collaboration model that stress graduated levels of collaboration from; awareness to shared aspirations. In the 2015 workshop an industry panel was added to provide their perspective on how to interface with industry. Each industry expert provided brief remarks followed by a panel question and answer session. This addition to the workshop was well received, requests were made to broaden the number of industry members in the future. The industry experts also valued the direct interface with faculty.
- Expanded the Siemens – IUPUI relationship:
 - Siemens \$538M in-kind Product Lifecycle Management software grant, providing multiple opportunities for student training and faculty research.
 - [Alison Taylor](#), Siemens VP of Sustainability visited the campus and to discuss sustainability strategy and vision.
 - [Ken Geisler](#), Siemens VP of Smart Grid Strategy spoke at the Luger Center’s spring forum, a follow up meeting is planned to discuss smart grid strategies and potential joint research.
 - Held a June 30 meeting with Siemens’ Talent Acquisition Team on strategic student recruitment opportunities at IUPUI.
- Facilitated a Product Lifecycle Management (PLM) Roundtable for interested industry participants.
- Significantly supported the realization of the [Digital Lab@IU](#), as part of the [Digital Lab for Manufacturing initiative](#). As a result of this initial university-industry symposium focused on the implementation and integration of product lifecycle tools a multi-school initiative has been established with a focused on Product Lifecycle Innovation. The mission of [the initiative for product](#)

[lifecycle innovation](#) is to “work collaboratively with partners from industry, universities, and government to advance Product Life Cycle and related practice and technology in order to enhance student education, improve research and increase industry productivity and competitiveness.” Three subsequent university – industry symposiums have been held, with the following benefits: provided a forum for industry and academics to discuss best practices, gave a market perspective for researchers, and lastly it aligned industry representatives with both faculty researchers and students. An industry advisory board has been created to ensure this initiative stays relevant with market needs.

- Coordinated K-12 student and teacher outreach through the successful week-long [IUPUI Nontechnology Discovery Academy \(INDA\)](#) which introduces participants to the emerging interdisciplinary field of nanotechnology. To date, INDA has impacted over 240 students and 50 teachers. Funding to enhance INDA efforts has been secured through multiple grants, including: “Indiana Space Grant Consortium - Nanotechnology Space Consortium Summer Scholars Program,” “Indiana Space Grant Consortium - Nanotechnology Space Consortium Summer Teacher Fellows Program,” and “Bringing Nanotechnology Modules and Knowledge to High School Classrooms.”
- Assisted in coordinating, organizing, and developing introductory nanotechnology activities for IUPUI’s Research Experiences for Teacher Advancement In Nanotechnology (RETAIN) summer program (funded through a recent NSF RET Award). Annually, this intensive six week program provides ten local high school teachers with the opportunity to conduct academic research within the labs of faculty mentors. Throughout this time, participating teachers are provided with daily professional development activities and gain valuable insight into academic research and graduate school. In addition, teacher groups will work to produce nanotechnology modules that they can take back to their classrooms. Their experiences and the developed modules will be utilized to inspire high school students to pursue STEM.
- Provided funding to 7 new IUPUI research commercialization projects under the Funding Opportunities for Research Commercialization and Economic Success (FORCES) program, designed to support IUPUI researchers in the successful transformation of their research findings into commercially viable outcomes. The program was launched in Fall 2011, and has provided funding to 32 projects since its inception. Results of these projects have enabled faculty reach key research milestones leading to submission of SBIR grant proposals, and enhanced intellectual property positions for projects that hold promise for commercialization of the research outcomes.
- Planned and hosted the 2014 [IUPUI Innovation to Enterprise Showcase & Forum](#), bringing together students, faculty, and staff from across the IUPUI campus to present opportunities for collaborative business development—new ventures, R&D collaborations, and commercialization—to potential business community partners and investors. The event featured a panel on pursuit of alternative funding sources for new ventures, such as SBIR grant programs and equity-based crowdfunding.
- Engaged in meetings as requested to advise faculty on strategies and next steps for moving forward with commercialization of their research.

Activities at the National Level

- Participated in the Coalition of Urban Serving Universities (USU) and Association of Public Land Grant Universities (APLU) Biomedical Research Workforce Action Groups as a member of the Executive Committee, and recruited two IUPUI faculty to serve as Working Group members. This national group will examine the evidence in specific areas that impact university practices; identify gaps where further evidence or analysis is needed; recommend a set of immediate actions that will improve evidence, and that can be undertaken through a partnership effort of USU/APLU and AAMC with member institutions; and discuss findings with university leaders and policymakers to determine next steps. The final deliverable will be an action plan for improving evidence around institutional strategies that will increase the diversity of the biomedical research workforce.

Other Activities

- Completed and launched the updated IUPUI Research Strategic Plan. The primary goals include realization of Grand Challenge Initiatives, expansion of cross-disciplinary research in strategic areas, expansion of undergraduate research experience programs, and development of nationally recognized cross-disciplinary graduate programs in strategic areas.
- Guided IUPUI Schools in the development of their own School Strategic Plans for Research. These plans were received by December 2014.
- Implemented a proposal for sustainability of inter-school centers for return of a portion of indirect costs from Schools and the campus to support administrative and development functions of formal Centers that are interdisciplinary and involve more than one School on the IUPUI campus.

Center for Research and Learning (CRL)

The mission of the [Center for Research and Learning](#) is to promote, create, and coordinate, innovative inquiry-based learning programs that integrate research and education. Our goal is to provide students effective pathways for lifelong active learning and professional development. CRL serves students through two primary program areas, identified as *Undergraduate Research Programs* and *Diversity Research Programs*. These programs are delivered throughout the academic year as well as through intensive research experiences during the summer. The CRL has served more than 500 students either through direct sponsorship of research or by providing structured opportunities to report their research to a broader audience.

The Success of our Students

- Offered a nine-week summer research program to over 120 IUPUI and affiliated undergraduates. Programming supported students engaged in full-time sponsored (mentored) research and included weekly “skill-builder sessions” aimed at improving student understanding of best research practices, drawing on IUPUI faculty and expertise.
- Offered “RISE” linked courses as part of AY 2014-2015 and summer 2015 program (~40 students enrolled) – tied to sections of Science R225 and offered for 0-1 credit these sessions’ explored topics overviewed in the “Skill-Builder sessions” in a more in-depth and “hands-on” fashion.
- Sponsored a “Career Development Institute” for ~120 summer research students that included workshops on preparing for graduate school, preparing for medical school, marketing of one’s personal “brand” and striking work life-balance as well as the importance of developing cultural competency in today’s research environment.
- Supported twenty-five IUPUI students to attend the 20th annual Indiana University Undergraduate Research Conference (IU-URC) in Bloomington in November of 2014. Co-sponsored by the Indiana University Graduate School and attended by over 150 students from Indiana University campuses. Five IUPUI Scholars were awarded Poster Prizes.
- Sponsored, and traveled with five undergraduate researchers from CRL programs to attend and present at the National Conference on Undergraduate Research (NCUR) in Washington State, April 2015.
- Co-sponsored and co-directed the Innovation to Enterprise Central program for 2014-15 which included twenty-five undergraduate and graduate students exploring and developing ventures in five different entrepreneurial projects.
- Offered a pilot course through School of Engineering, “Realizing Innovation Driven Enterprise” (OLS 499/581), offered in conjunction with the Innovation to Enterprise Commercialization team projects.
- Sponsored 23 multidisciplinary faculty research (MURI) teams consisting of 110 undergraduate students, 59 faculty mentors, 2 research staff, and 7 graduate students.
- Sponsored eight students for the Clinical and Translational Sciences Institute, including four students from the University of Notre Dame, three students from IUPUI, and one student from Indiana University Bloomington.
- Sponsored 16 Undergraduate Research Opportunity Summer Fellows in 2014, including one international student (Gaza University).

- Sponsored 37 Undergraduate Research grants, including three to conduct international research in the Dominican Republic.
- Received the NASA Indiana Space Grant Consortium Award for \$15,000 to support the Multidisciplinary Undergraduate Research Institute (MURI) and \$5,000 to support DSRP.
- DSRP Program Director presented best practices for creating and sustaining undergraduate research programs for underrepresented students at the Louis Stokes Midwest Center for Excellence: LSAMP Conference, Chicago, IL, October 2014.
- DSRP scholar Darryl Watkins presented and selected as an awardee at the Louis Stokes Midwest Center for Excellence: LSAMP Conference, Chicago, IL, October 2014.
- DSRP scholar Jarred Thomas for receiving an ABRCMS 2014 Poster Award in Developmental Biolog and Genetics.
- Utilized additional campus funding of \$100,000 to expand the Diversity Scholars Research Program (DSRP) from 26 students to 36 students.
- Received the NASA Indiana Space Grant Consortium Award for \$15,000 to support the Multidisciplinary Undergraduate Research Institute (MURI) and \$5,000 to support DSRP.

Advances in Health and Life Sciences

- Recruited and trained first four post-baccalaureate students as part of grant NIH (R-25 Post Baccalaureate Research Training Grant), for \$1.25 million over four years <http://news.iupui.edu/releases/2014/03/nih-iprep-grant.shtml>
- Sponsored and traveled with five undergraduate researchers from CRL programs to attend and present at the Annual Biomedical Research Conference for Minority Students (ABCRMS) in San Antonio, TX, November 2014.
- Recruited twelve students from the 2013 IUPUI-Ivy Tech Community College Bridges to the Baccalaureate Program cohort (12 full-time minority students), with goal of successfully transferring to into IUPUI or other four-year institution as full-time students and continue to participate in undergraduate research.
- In partnership with the [IU Simon Cancer Center Summer Research Program](#) recruited, in a competitive selection process with more than 250 applicants, twelve high school and college scholars, who are underrepresented in cancer research, to conduct clinical and population-based biomedical cancer research with mentors.

Contributions to the Well-Being of the Citizens of Indianapolis, the State of Indiana, and Beyond through Research and Community Engagement

- Utilized Solution Center Grant for \$30,000 to support “Community Engaged research” in new “STEMCorp project to create a team of Public School teachers, IUPUI students and faculty to explore applications of Nanotechnology to enhance STEM education in local high schools. Engaged three public high school teachers, 3 IUPUI STEM faculty and 6 IUPUI STEM students in developing and piloting nanotechnology lesson plans (at least one per teacher.