2014 Highlights of Major Accomplishments

Office of the Vice Chancellor for Research
July 1, 2013 - June 30, 2014

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, the Center for Research and Learning, and the Solution Center. 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

- Oversaw four interdisciplinary nanosystems courses taught across the Schools of Engineering and Technology and Science in five different departments.
- Successfully competed for an NIH R25 grant of $1.25 million over four years for the IUPUI Post Baccalaureate Research and Education Program (IPREP). This program prepares recent college graduates, who are members of underrepresented minority populations, including students with disabilities, for admission to graduate programs in the biomedical and behavioral sciences. 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.
- As a means for further advancing imaging-related research activities of students, the IUPUI Imaging Research Initiative developed a proposal for an "IUPUI Graduate Student Imaging Research Fellowship" program. This program will provide a stable source of funding for graduate students pursuing a doctoral degree who are primarily focused on research in imaging technology development. The goal is to implement this program beginning in FY 2015.
- Developed and presented workshops for graduate students and interns on funding issues, proposal development, and grants management.
- Provided on-demand email and phone consultations to graduate students and postdocs preparing grant applications for funding.
- Advised faculty on strategies for integrating students into their research successfully.
- Organized and held the 3rd annual Ideas Solving Social and Economic Challenges (ISSEC) competition, the IUPUI student idea pitch to solve social and economic challenges, with thirteen finalists presenting pitches in the 2014 event.
- OVCR and the School of Engineering and Technology announced 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.
- Participated in the Germany Today 2014 visit to German universities and research organizations which was hosted by the German Academic Exchange Service agency, DAAD, to foster international research collaborations at the student and faculty level.
**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.
- Organized through the **IUPUI Imaging Research Initiative** a multidisciplinary group of IUPUI investigators to form the basis for establishing an **IUPUI Center for Quantitative Renal Imaging**. 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.
- Initiated development of the first IUPUI Grand Challenge Initiative on Urban Health and Wellbeing. This initiative will involve all IUPUI schools in cross-disciplinary efforts to address health and quality of life issues in an urban environment. Nearly 100 faculty participated in 9 Roundtable discussions of the six primary topic areas during Research Day 2014. The comments and feedback received have been taken into consideration, as the initiative is getting fully developed for implementation.
- Established partnerships among the Schools of Engineering & Technology, Science, and Medicine in order to boost interdisciplinary research in Health and Life Sciences and acquire preliminary results for submission of competitive proposals to external funding agencies. Seed funding has been provided to collaborative groups, including: "Bone Healing Using Romiplostim & Thrombopoietin (TPO) Study, Team: Hiroki Yokota (BME) and Tien-Min Gabriel Chu (Dentistry); Designing a Drug Delivery System for Targeting Cancers in Bone, Team: Dr. Christoph Naumann (CHEM) and Dr. Hiroki Yokota (BME); Computational Strategies for Multi-scale Analysis of Hippocampal Morphometry, Team: Dr. Maher Rizkalla (ECE) and Dr. Li Shen (Medicine); Nanopattern-Driven Cell Migration: An Integrated Approach, Team: Dr. Jong Ryu (ME) and Dr. Sungsoo Na (BME), Canine-inspired Smart Sensor for Detecting Hypoglycemia from Human Breath, Team: Dr. Dana Hardin (Lilly), Dr. Mangilal Agarwal (INDI), Dr. Sudhir Shrestha (ECE); Self-Limiting Mechanisms Inhibiting Thrombus Growth, Team: Dr. Horia Petrache (PHY) and Dr. Elliot Rossen (Medicine).
- Facilitated IUPUI becoming a member of the OrthoWorx consortium, promoting collaboration between the orthopaedic device industry in Indiana and universities and colleges within the State. Representatives from OVCR and at least three other IUPUI units/departments attended the first OrthoWorx conference, in May 2014.
- Participated in State-wide conferences working towards the development of an NIH proposal for a Developmental Center for AIDS Research (DCFAR). This initiative is spearheaded by the CTSI.

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

- Oversaw all the centers funded under the **IUPUI Signature Centers Initiative (SCI)**. This initiative has been resulting in the 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 5 new proposals submitted under the Round 7 competition, resulting in two new centers selected for 3-year funding. These new centers are the Indiana Diabetes Research Center and the IUPUI Center for Quantitative Renal Imaging.
- 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, an interactive day presenting research to NASA representatives, and the Nine Golden Rules to Succeed in Research Workshop. Delivered approximately 30 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.
- Provided through **Proposal Development Services** significant support for the development of research proposals and funding requests by IUPUI faculty, resulting in 87 proposals requesting $116,838,690 and 24 awards for $60,117,435.
Delivered 7 proposal development and/or funding search workshops in 6 schools/departments on campus to over 270 participants.

Extended support to IUPU-C faculty for developing research agendas and funding proposals via an on-site workshop and extended consultations.

Communicated with IU Foundation gift officers on faculty expertise and PDS services through an invited presentation.

Administered 8 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 114 proposals were submitted and 80 received funding. The total funding was $1,339,133.

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 23 projects in the first two 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 2014 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 Richard Blanco, President Barack Obama’s choice to be the fifth annual inaugural poet during Obama’s 2013 inauguration celebration. A newly formed Research Day Faculty Advisory Sub-committee helped to develop two programming strategies to encourage greater faculty participation. The Grand Challenges Initiative Research Roundtable Discussions brought nearly 100 faculty together for facilitated conversations about six topics associated with the IUPUI Grand Challenge Initiative on Urban Health and Wellbeing. There were over 700 participants in attendance at Research Day.

Hosted in May 2014, in coordination with NASA, Destination Station at IUPUI. This is NASA's International Space Station Program national awareness campaign that promotes research opportunities, educates communities about activities performed on the International Space Station, and communicates the real and potential impacts of the station on our everyday lives. NASA representatives met with IUPUI faculty, staff, and students, and talked about possible opportunities to conduct research aboard the space station.

Facilitated interdisciplinary collaborations resulting in grant proposals and funding:

- “Nanotechnology Experiences for Students and Teachers (NEST)” – NSF - $600,000 – Pending - H. El-Mounayri et al.
- “Acquisition of X-ray Diffraction System (XRD)” – NSF - Considered for Funding – G. Druschel et al.

Facilitated interdisciplinary collaborations resulting in several publications in high impact factor journals. Few papers are listed below:

- “Proteomic profiling of halloysite clay nanotube exposure in intestinal cell co-culture” (2013), J. of Appl. Toxicol. (M. Agarwal, School of Engineering; F. Witzmann, School of Medicine).
“Polymer-tethered lipid multi-bilayers: a biomembrane-mimicking cell substrate to probe cellular mechano-sensing” (2014), Soft Matter (C. Naumann, School of Science; D. Minner, INDI)

“Ultrasensitive photoreversible molecular sensors of azobenzene-functionalized plasmonic nanoantennas” (2014), Nano Letters (R. Sardar and G. Joshi, School of Science)

“Strong Casimir force reduction through metallic surface nanostructuring” (2013), Nature Communications (R. Decca, School of Science).

Assisted through NSF-MRI funding the acquisition of a top of the line Field Emission Scanning Electron Microscope (JEOL 7800F) to fulfill the need for advanced imaging capabilities on campus. This tool is being extensively used for research and student training.

Identified through the IUPUI Imaging Research Initiative the need to advance research activities within the IUPUI community which are focused on the development of imaging-related technologies. To address this need, the IUPUI Imaging Research Initiative developed a proposal for an “IUPUI Imaging Technology Development Program” with the intent to seed pilot projects for the development of new, innovative, imaging-related technologies that enhance broader multidisciplinary research programs. The goal is to establish this program during FY2015.

Hosted through the IUPUI Imaging Research Initiative a successful IUPUI Imaging Research Symposium in October 2013. The Symposium brought together investigators from diverse scientific disciplines with image technology experts to explore potential collaborative research opportunities. Invited outside speakers included Daniel C. Sullivan, MD (Duke University Medical Center) and Andrew J. Bowling, PhD (Dow AgroSciences, Indianapolis).

Assisted the Working Group on HIV/AIDS in adolescents to receive a $55,416 grant from the Solutions Center Venture Fund for “Preventing HIV Infection among 10-17 Year Olds: A Demonstration of Best Practices.” Dr. Dennis Fortenberry is the PI of the grant, which partners several IUPUI units and departments with community partners, such as the Bethlehem House, Damien Center, Women in Motion and other local community groups.

Identified water research as a Faculty Cluster of Excellence at IUPUI. A related Water Summit was co-organized and co-hosted by OVCR in February 2014 with presentations by IUPUI faculty and state and federal stakeholders from various government offices and industry.

Collaborated with Women of Color Research Network (WoCRN) and NIH staff in establishing an IU chapter and planning activities.

Suggested potential funding opportunities to two community teams developing funding requests.

Established two advisory councils for both OVCR and INDI, which will provide a market and industry perspective to both entities and communicate to industry the attributes of OVCR and INDI.

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.

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.
- 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.

Coordinated speakers to provide content for the Young Investigators Quest program, which provides hands-on activities and workshops for talented high school students.

Coordinated speakers to provide content for the Project Lead the Way (PLTW), which provides hands-on activities and workshops for talented high school teachers.
Coordinated K-12 student and teacher outreach through the successful week-long [IUPUI Nontechnology Discovery Academy (INDA)](http://www.indiana.edu/~inda) which introduces participants to the emerging interdisciplinary field of nanotechnology. To date, INDA has impacted over 200 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.”

Planned and hosted the 2013 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.

Provided funding to nine 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 25 projects since 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, including award of SBIR/STTR grants to at least two companies that are leading the commercialization for the projects:

1. Emphymab Biotech Total $ 381,473.00
2. YC Bioelectric Total $ 312,923.00

**Other Activities**

- Finalized the research portion of the overall IUPUI campus Strategic Plan (i.e. section on “Innovation and Discovery in Research and Creative Activity”).
- Developed a more extensive Research Strategic Plan for IUPUI that coordinates with the university-wide research plan by the Vice President for Research and with the IU School of Medicine research plan. A draft of the plan was provided to VPR Jorge Jose in April. Three Town Hall meetings were held for members of the IUPUI campus to comment on a draft of the Strategic Plan. The Plan is expected to be completed and launched by the 2014-15 academic year.
- Guided IUPUI Schools in the development of their own School Strategic Plans for Research. Initial versions of the plans drafted by most schools have been received, and the process is expected to be completed by December 2014.
- Developed 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. This new policy is intended to solve the problem that Centers have no funds to help them sustain their activities once the initial funds that established the Center is expended, even if the members of the Center are receiving extramural support from federal and other agencies. The proposal was developed by a Task Force appointed by the Vice Chancellor for Research, and received the endorsement of the Council of Associate Deans for Research. The proposal also has been presented to the Council of Deans for comment, and has received its first reading at the IUPUI Faculty Council (IFC). The proposal is scheduled for a second reading and a vote to approve at the September meeting of the IFC.
- Collected and analyzed institutional data from 2008-12 to gauge the status of IUPUI women faculty in STEM. These data are being used to apply for funding from the NSF ADVANCE program.

**Center for Research and Learning (CRL)**

The mission of the [Center for Research and Learning](http://www.indiana.edu/~crl) 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 100 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. [http://crl.iupui.edu/news/newsletters/2013/july-august2013.asp](http://crl.iupui.edu/news/newsletters/2013/july-august2013.asp)
- Offered two "RISE" linked courses as part of summer 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 ~100 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.
- Supported thirty-five IUPUI students to attend the 19th annual Indiana University Undergraduate Research Conference (IU-URC) in Bloomington in November of 2013. Co-sponsored by the Indiana University Graduate School and attended by over 150 students from Indiana University campuses. [http://www.crl.iupui.edu/events/iuurc/](http://www.crl.iupui.edu/events/iuurc/)
- Sponsored, and traveled with four undergraduate researchers from CRL programs to attend and present at the National Conference on Undergraduate Research (NCUR) in Nashville, Tennessee, April 2014.
- Co-sponsored and co-directed the Innovation-to-Enterprise Central program for 2013-14 which included twenty-five undergraduate and graduate students exploring and developing ventures in five different entrepreneurial projects. [http://crl.iupui.edu/programs/ITEC/index.asp](http://crl.iupui.edu/programs/ITEC/index.asp)
- Sponsored 37 Undergraduate Research grants during the 2013-2014 academic year. [http://crl.iupui.edu/programs/UROPgrant/index.asp](http://crl.iupui.edu/programs/UROPgrant/index.asp)
- Received base-funding increase of $100,000 from campus to expand the Diversity Scholars Research Program (DSRP) from 26 students to 34 students. [http://crl.iupui.edu/programs/DSRP/index.asp](http://crl.iupui.edu/programs/DSRP/index.asp)

Advances in Health and Life Sciences

- Received a grant from NIH (R-25 Post Baccalaureate Research Training Grant) for $1.25 million over four years to increase under-represented minority success in biomedical PhD programs [http://news.iupui.edu/releases/2014/03/nih-jprep-grant.shtml](http://news.iupui.edu/releases/2014/03/nih-jprep-grant.shtml)
- Sponsored four students for to attend the Annual Biomedical Research Conference for Minority Students.
- 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 IUPUI or other four-year institution as full-time students and continue to participate in undergraduate research toward careers in the Life and Health Sciences. [http://crl.iupui.edu/programs/Bridges/index.asp](http://crl.iupui.edu/programs/Bridges/index.asp)
- In partnership with the IU Simon Cancer Center Summer Research Program recruited, in a competitive selection process with more than 200 applicants, twelve high school and college
scholars, who are underrepresented in cancer research, to conduct clinical and population-based biomedical cancer research with mentors. [http://crf.iupui.edu/programs/IUSCCSRP/index.asp](http://crf.iupui.edu/programs/IUSCCSRP/index.asp)

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

- Obtained a Solution Center Grant for $30,000 to support “Community Engaged research” in new “STEM-Corp” 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.

**Solution Center**

The [IUPUI Solution Center](http://solution.iupui.edu/) reflects IUPUI’s commitment to its community. Created in 2004 to serve Indiana and IUPUI as a “front door” to the campus, the Solution Center connects the university’s intellectual capital to the interests of the external community and raises the campus’s external profile through internships, service-learning and classroom projects, faculty research, and business development projects. For ten years, the Solution Center also administered a community engagement grant program called the IUPUI Community Venture Fund (VF). The VF was created with support from two Lilly Endowment grants, the most recent of which ended in December 2013.

The VF was used to award match funding to community partners and faculty members to seed and enhance community-based and community-serving research, practica, and technical assistance projects. During the 5-year grant period (2009-2013), the Solution Center leveraged more than $4.9 million for engagement by awarding $1,575,601 from the Venture Fund that was matched by $3,325,808 from community partners. Since 2009 the Solution Center worked with 727 community partners to create 1,404 internships, 726 projects and 125 research activities.

**The Success of our Students**

- In 2013, community-based projects facilitated by the Solution Center involved 243 students and 164 faculty members in not-for-profit engagement activities. Over three-quarters of the students working with not-for-profit organizations (189 students; 77 percent) benefited from $378,025 in Venture Fund grants. Fifty-nine (59) students and 17 faculty members participated in for-profit engagements, of which 25 students (42 percent) were supported by the Venture Fund for a total of $61,852.84. Additionally, in 2013 the Solution Center facilitated 54 projects and 14 research initiatives and identified 41 projects that were entrepreneurial in nature.

- In the first quarter of 2014, Solution Center projects involved 315 students and 16 faculty mentors in not-for-profit engagement activities, of which 289 students (92 percent) were supported by Venture Fund grants totaling $78,890. During this time, 1 student participated in a for-profit internship with total Venture Fund support of $2,880. Additionally, in the first three months of 2014 the Solution Center facilitated 4 projects and 4 research initiatives and identified 1 project that is entrepreneurial in nature.

- The Solution Center also administers the campus’s online jobs board and internship posting system. Employer reports indicated that IUPUI students had access to 26,380 full-time and part-time positions, internships, service projects, volunteer opportunities, and research projects advertised on IUPUITalent.net in 2013-2014.

**Advances in Health and Life Sciences**

- In 2013 the Solution Center involved 11 students and 10 faculty mentors in 13 Health and Life Sciences engagements, of which 9 students were supported by 9 Venture Fund grants totaling $111,213. These VF grants leveraged an additional $122,000 in community support for health and life sciences internships, research, and technical assistance projects. The Partner organizations involved included 8 nonprofits, 4 governmental agencies and 1 for-profit company.
In 2014 the Solution Center involved 3 students, 3 faculty mentors and 3 nonprofit partners in 3 Health and Life Sciences engagements, of which 3 students were supported by 3 Venture Fund grants totaling $15,125. The VF grants leveraged an additional $19,441 in community support.

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

In 2013 the IUPUI Solution Center engaged 191 community partners in internships, projects, and research activities. Of the total number of engagements (552), 43% (238) benefited from Venture Fund grant and campus matching support for a combined total investment by the campus and community in excess of $940,000. The students and faculty involved in the Venture Funded projects contributed nearly 90,000 hours of student, faculty, and staff time to the community through internships, business assistance and other projects, and research initiatives in 2013.

Partnering for innovation and engagement: Among its numerous engagements in 2013 below are five representative initiatives coordinated by the Solution Center:

- Supported 11 graduate museum studies internships in Indiana’s museums in partnerships with the Allen Whitehill Clowes Charitable Foundation.
- Partnered for the third year with IUPUI’s Center for Research and Learning to support entrepreneurship through the Innovation-to-Enterprise Central (ITEC) Initiative, a program that matches future entrepreneurs with faculty inventors and community experts.
- Engaged IUPUI faculty and multiple community partners to launch the Get Large, Get Loud and Get Back to Zero Coalition, a university-community collaboration that is developing a demonstration project to prevent HIV infections among youth.
- Managed a two-year, $75,000 grant from JPMorgan Chase Foundation to increase the quality of life and healthy habits on the Near Eastside of Indianapolis. Ending in December 2013, and with match support from the Venture Fund, the Solution Center engaged a total of 80 students and 13 faculty members from 12 IUPUI schools with 11 Near Eastside community organizations in the development of 17 community projects.
- Participated in an IUPUI Strategic Plan task force. Served on the steering committees of the Strategic Research Plan and the Community Engagement Plan. Assisted in the planning for a campus-wide Grand Challenge and a new office for community engagement and economic development.