

School of Science Highlights Report
July 1, 2013-June 30, 2014
<http://science.iupui.edu>

Introduction: The School of Science at IUPUI provides outstanding science education for all IUPUI students, education in depth for students in our School, and engages in fundamental and applied research in the physical, biological, mathematical, and psychological sciences to increase knowledge and advance the development of the life sciences at IUPUI and in the State of Indiana.

I. The Success of our Students

1. [IUPUI Doctoral Student Urges Congress to Support National Research Facilities](#) (July 2013) Luis Palacio, Ph.D. student in Physics, spoke recently before the U.S. Congress to promote the value of supporting national STEM research facilities. Luis was the only student from Indiana to participate in the 2013 Scientific Research Facility Exhibition.
2. [Math Assistance Center Serves Key Role in Success of Students Across Campus](#) (July 2013) Kevin Berkopes, new director of the Math Assistance Center, sees the MAC as having a direct influence on all students, especially potential math teachers, as one example of how IUPUI is addressing math education.
3. [Chemistry Major Makes the Most of Opportunities to Get Involved](#) (August 2013) Senior Stephanie Metcalf is an involved undergraduate and Science ambassador working in the radiation oncology lab of Dr. Mark Mendonca studying the effect of therapeutic drugs on pancreatic cells.
4. [IUPUI Faculty and Undergrad Researchers Evaluate Peer-led Team Learning \(PLTL\) in Cyberspace](#) (January 2014) PLTL is growing in popularity in universities across the country in STEM disciplines. New research by faculty and students from the School of Science and the Center for Teaching and Learning evaluates peer-led team learning for STEM focusing the new cyber PLTL or c-PLTL.
5. [Research Opens Student's Eyes to Mathematical Possibilities](#) (January 2014) Senior Lauren Lembcke's research experiences with Julia Arciero, Ph.D., assistant professor of math, have allowed her to work on mathematical models to investigate the inflammatory disease necrotizing enterocolitis (NEC), which affects premature infants. The goal is to understand how cell migration and intestinal wall strength impact development of NEC.
6. [CyberLab interns at IUPUI develop smartphone app for CourseNetworking](#) (February 2014) A new android smartphone app developed by CyberLab interns Manpreet Singh and Phillip Heebner, in the Department of Computer and Information Science at IUPUI opens a mobile, global doorway to CourseNetworking, a free academic social networking site.
7. [Dedicated and Tenacious: Student Charts New Territory in Her Passion to Explore Physics](#) (Feb 2014) Anna Mirza, an undergraduate student majoring in both physics and mathematics comes from a background where not many women pursue higher education, but she aspires to become the first female in her family to earn a Ph.D. and would like to become a research scientist searching for dark matter.
8. [Love for Learning Leads Computer Science Alum to Meaningful Career Using Technology to Improve Healthcare](#) (March 2014) Since graduating in 2004 from IUPUI with a B.S. degree in computer science and a minor in mathematics, Syed Jaffery is applying his knowledge of computer science to help create new ways of improving medical and healthcare information at the new Eskenazi Health.

9. [Research on Campus and Service through Timmy Global Health Play Pivotal Role in Career Path](#) (March 2014) Spending a week in the Dominican Republic shadowing physicians and community health leaders taught Top 100 student Anna Brenneman a lot about careers in global health care.
10. [Biology Student Abdul Karim Khan Wins Audience Choice Award at IUPUI Pitch Contest](#) (March 2014) The IUPUI Office of the Vice Chancellor for Research recently announced the winners of the third annual Ideas Solving Social and Economic Challenges student “pitch” competition. The contest encourages students to develop innovative ideas to solve real-world problems through new approaches.
11. [Science Students Prepare for Health Science Study Abroad Trip to Swaziland](#) (Jun 18 2014) Three School of Science Honors College students traveled overseas for a healthcare service learning experience in Swaziland, Africa. The three-week experience included service work in a school and hospital, while learning about healthcare systems in the African nation.
12. [IUPUI student earns Goldwater Scholarship, summer research position at New York University](#) (May 2014) Devin Bready, an undergraduate researcher, Chemistry student, Bepko Scholar and teaching assistant, was the 2nd IUPUI student selected for a prestigious Goldwater Scholarship. Devin is spending summer 2014 at the NYU Langone Medical Center to pursue his goal to enter an M.D./Ph.D. program after graduation from IUPUI.
13. [Research Provides Direction and Purpose For Undergrad’s Future Career in Neuroscience](#) (April 2014) Psychology and neuroscience major Michel Companion has found many opportunities to explore the neuroscience of addiction serving as an undergraduate research assistant for Stephen Boehm, Ph.D., director of the School of Science neuroscience program, examining genetic and physical traits and their effects on cocaine sensitization.
14. [Biology Student Builds Clear Path to Future Career in Dentistry](#) (February 2014) After a year in the Biology Freshman Work Program, sophomore Brandi Herron is now in a Life-Health Sciences Intern (LHSI), exploring the microbiology behind dentistry by examining how nicotine affects the cardiovascular system by increasing the amount of oral bacteria.

II. Advances in Health and Life Sciences

1. [IUPUI Neuroscience Research Project Examines Neural Synchronization Patterns During Addiction](#) (July 2013) A cross-disciplinary collaboration between Sungwoo Ahn, Leonid Ruchinsky, and Christopher Lapish in the Departments of Psychology and Mathematical Sciences explores the neural brain circuits simulated by drug addiction. The study could have broad implications for treating addiction and understanding brain function in conditions such as Parkinson’s disease.
2. [Forensic Biologist Discovers New Fly Species in Indiana](#) (July 2013) Christine Picard, Ph.D., assistant professor of biology, made a discovery of a species of fly not native to the Midwest, *Chrysomya megacephala Fabricius*, during a routine collection of fly samples in 2012. The local discovery could have significant implications on forensic investigations.
3. [Quantum Noise Research Published in Physical Review Letters](#) (July 2013) Zhe-Yu Jeff Ou, Ph.D., professor of physics, is one of four authors of a recent study in one of the top U.S. journals devoted to the study of physics, investigating the elimination of noise when amplifying light signals.
4. [Psychology Professor Earns National Grants to Research Treatments for Cancer Patients and Caregivers](#) (August 2013) Catherine Mosher, Ph.D., assistant professor of psychology, was awarded nearly \$1 million to study how a phone-based counseling and treatment process can help ease stress and anxiety issues experienced by lung cancer patients and families.

5. ["Desperation DNA" Synthesis Could Explain Genetic Mutations](#) (September 2013) A collaboration between biology graduate students working under associate professor Anna Malkova Ph.D has revealed how cells repair potentially devastating DNA damage via unique "desperation strategy" of DNA replication. Their work was published in the journal *Nature*.
6. [Society for Neuroscience to Host National Research Leaders/Student Poster Presentation](#) (September 2013) The Indianapolis chapter for the Society for Neuroscience highlighted the latest advances in neuroscience across Indiana and the opportunity for student researchers to represent the local chapter at the national meeting in San Diego.
7. [Graduate Ph.D. Program Highlights the Two Strengths of IUPUI Psychology](#) (September 2013) The Department of Psychology at IUPUI has renamed a portion of its graduate program to The Addiction Neuroscience Graduate Program to better emphasize its history of addiction research, strength of the faculty, and strong focus on the emerging field of neuroscience.
8. [IUPUI Research Explores How Reducing Staff Burnout for Mental Health Workers Impacts Patient Outcomes](#) (September 2013) A \$1.5 million award to Psychology faculty Michele Salyers from the Patient-Centered Outcomes Research Institute (PCORI) will support researchers in the Department of Psychology to understand the patient perspective of clinician burnout and examine how burnout is linked to processes needed to improve patient-centered outcomes in health care.
9. [Finding Occam's razor in an era of information overload](#) (November 2013) A new study by physicist Steve Pressé, Ph.D., examines a strategy for selecting mathematical models with the greatest predictive power based on the simplest line of reasoning to predict the actions and reactions of proteins so small or stars so distant they are invisible to the human eye.
10. [IUPUI Study First to Find Earlier Depression Treatment Prevents Heart Attacks and Strokes](#) (January 2014) Research led by Jesse C. Stewart, Ph.D., in Psychology, is the first to find that early treatment of depression can decrease the risk of future heart attacks and strokes by almost half.
11. [Despite Lower Levels of Drinking, African Americans Encounter More Problems](#) (February 2014) A theoretical paper by Tamika Zapolski, Ph.D., assistant professor of psychology, examines a paradox. African Americans report initiation to drinking at an older age, with lower levels of use. Nonetheless, higher levels of problems related to alcohol are seen when compared to European Americans.
12. [IUPUI Study Reveals How Dogs Detect Explosives, Offers New Training Recommendations](#) (February 2014) Dr. John Goodpaster and a research team in the Forensic and Investigative Science (FIS) program, funded by the U.S. Department of Defense (DOD), has helped determine how canines locate explosives such as Composition C-4 (a plastic explosive used by the U.S. military), using products designed to mimic the odor of C-4 for training purposes.
13. [IUPUI Researchers Use Computers to "See" Neurons to Better Understand Brain Function](#) (March 2014) A published study conducted by high school Project SEED students, Dr. Gavriil Tsechenakis from the Department of Computer and Information Science, and collaborators, revealed new information about the motor circuits of the brain that may one day help those developing therapies to treat conditions such as stroke, schizophrenia, spinal cord injury or Alzheimer's disease.
14. [Mathematics Faculty Receives 2014 IUPUI Research Trailblazers Award](#) (April 2014) Alexey Kuznetsov, associate professor, has been named a recipient of the 2014 IUPUI Research Trailblazers Award. Kuznetsov, a world leader in the mathematical modeling of neurons, is part of a USA-France collaborative to develop models of reward-based learning and behavior in drug abuse and the influence

of alcohol on the central dopamine system.

15. [IUPUI Mathematician Receives Prestigious NSF Early Career Development Award](#) (May 2014) Mathematician Roland Roeder, Ph.D., will receive \$460,000 from the Faculty Early Career Development (CAREER) award, NSF's most prestigious award in support of junior faculty. This award is one of two new CAREER awards to faculty in the School of Science, with Chemistry faculty Dr. Haibo Ge's award beginning this July. Dr. Roeder's award focuses on his research in dynamical systems, an area of pure mathematics examining theoretical underpinnings of systems that change with time.

III. Contributions to the Well-Being of the Citizens of Indianapolis, the State of Indiana, and Beyond.

1. [Central Indiana Teachers Return to IUPUI for Project Lead the Way Training](#) (July 2013) More than 100 Indiana high school biology teachers completed core teacher training for Project Lead the Way (PLTW), a national STEM education program that offers teachers the opportunity to teach new techniques and methods related to biomedical science.
2. [Pioneering education and research program leads to international conference at IUPUI](#) (July 2013) Faculty in the Department of Chemistry and Chemical Biology and the Department of Biology hosted scientists from around the world to learn Distributed Drug Discovery (D3), an innovative, student-driven research program quickly becoming a high-impact, low-cost teaching model. This research model and conference was funded by the National Science Foundation (NSF) and the campus International Development Fund to Professor Martin O'Donnell and colleagues.
3. [Center for Urban Health to Lead Research to Create a New Kind of Science Museum](#) (September 2013) The Center for Urban Health (CUH) at IUPUI, led by Professor Gabe Filippelli, will serve as the primary research partner on a \$2.9 million grant from the National Science Foundation (NSF) to create sites along Indianapolis waterways where arts and sciences will be used to educate the public about the local water system, using the city itself as a learning environment.
4. [IU Dedicates New Science and Engineering Laboratory Building at IUPUI](#) (November 2013) The Science and Engineering Laboratory Building (SELB) is a \$25 million high-tech building that provides facilities for education and research that contributes to the economic vitality of the state. The first nonmedical science academic building to open on the IUPUI campus in 20 years, SELB contains about 35,000 square feet for research and teaching.
5. [Fifth Annual IUPUI Brain Bee Tests Brain Power of Local High School Students](#) (December 2013) Twenty-five high school students from across the state competed in the fifth annual Indianapolis Brain Bee on Saturday, December 7, 2013, at IUPUI. Modeled after a traditional spelling bee, the Brain Bee is a live question and answer competition with students answering questions until only one competitor remains standing.
6. [IUPUI Hosts Water Summit](#) (February 2014) The IUPUI Office of the Vice Chancellor of Research and the School of Science Center for Earth and Environmental Science (CEES) hosted an IUPUI Water Summit that brought together water researchers across campus with leaders in Indiana's water community to learn more about water issues facing Indiana. Speakers from IUPUI shared campus efforts in the School of Science, Liberal Arts, Law, Engineering & Technology, and Public Health.
7. [More Than 125 High School Students Competed at Annual IUPUI Computer Science Day](#) (March 2014) More than a dozen high school students from Indiana and Michigan placed in the top among 127 competitors in the 2014 Computer Science Day. Through tests involving programming and problem solving, students in grades 9-12 developed an understanding of teamwork, software tools and deadlines

associated with today's computer science industry.

8. [Biology Researcher Builds on History of Patents Issued to Women Since 1809](#) (March 2014) Bonnie Blazer-Yost, Ph.D., is among a group of only 5 women at IU to receive a U.S. Patent for her work on kidney disease. She was issued a patent with GlaxoSmithKline in 2010 on the treatment of polycystic kidney disease -- a genetic disorder characterized by the growth of numerous cysts in the kidney that can result in reduced kidney function and lead to kidney failure.
9. [Chemistry Faculty Member Receives 2014 Women's Leadership Award](#) (March 2014) Dr. Pratibha Varma-Nelson, executive director of the Center for Teaching and Learning and professor of chemistry was selected for a Women's Leadership Award in observance of National Women's History Month.
10. [School of Science Honors Dow AgroSciences with the 2014 Spirit of Philanthropy Award](#) (April 2014) The Spirit of Philanthropy award recognized Dow AgroSciences' support for the School of Science, the Center for Earth and Environmental Science (CEES) and the "Discovering the Science of the Environment" (DSE) educational program.
11. [Distinguished Appointment of Chancellor's Professor Bestowed upon Biology Chair](#) (April 2014) IUPUI Chancellor Charles R. Bantz recently bestowed the prominent appointment of Chancellor's Professor upon Simon J. Atkinson, professor and chair of the Biology.
12. [Hands-on program helps young IPS students discover the science in their environment](#) (April 2014) The Center for Earth and Environmental Science (CEES) is partnering with the Indianapolis Public Schools and the Felege Hiywot Center to explore inquiry-based science through the Discovering the Science of the Environment (DSE) program, with generous funding from Dow AgroSciences. The Felege Hiywot Center is run by IUPUI alumna and former Lilly chemist Aster Bekele, who has partnered with the Joyce Kilmer Academy School 69 and Earth Science faculty member Dr. Pam Martin, Director of CEES.
13. [Math Department Announces Its Annual High School Math Contest Winners](#) (May 2014) Throughout Indiana, hundreds of high school students studied patterns, analyzed relationships, drafted and refined their solutions, and finally submitted their work to the Department of Mathematical Sciences as part of its annual High School Math Contest.
14. [Indianapolis One of Seven Cities to Win National US2020 STEM Mentoring Competition; School of Science is a Citywide Founding Partner](#) (May 2014) The national competition to encourage STEM mentoring was in response to President Obama's call to action to get students engaged in STEM. A guiding coalition of 40 founding partners, including the School of Science, collaborated with the proposal application earlier this year.
15. [Gov. Pence recognizes 2014 class of Woodrow Wilson Teaching Fellows](#) (June 2014) Ten aspiring teachers will enroll at IUPUI as new Woodrow Wilson Indiana Teaching Fellows. Now in its sixth year at IUPUI, the collaborative program prepares recent STEM graduates or working professionals to teach in high-need Middle Schools or High Schools.
16. [IUPUI Schools of Science, Medicine Partner to Offer Graduate Degree Programs to Lilly Employees](#) (June 2014) The School of Science and the IU School of Medicine have announced their collaboration with Eli Lilly and Company for the Lilly Graduate Research Advanced Degrees program. The highly selective LGRAD program helps Lilly employees obtain advanced degrees in one of the existing graduate programs in Medicine or Science.