

School of Science Highlights Report

July 1, 2012-June 30, 2013

<http://science.iupui.edu>

Introduction: The School of Science provides outstanding science education for all IUPUI students, education in depth for Science students, and engages in research in the physical, biological, mathematical, and psychological sciences in order to increase scientific knowledge and advance the development of the life sciences at IUPUI and in Indiana. Within the seven academic departments (Biology, Chemistry & Chemical Biology, Computer & Information Science, Earth Sciences, Mathematical Sciences, Physics, and Psychology) and the Forensic and Investigative Sciences Program, there are over 160 full-time faculty members. In Fall 2012 the School of Science enrolled 2145 undergraduate and 327 masters, and 179 Ph.D. candidates. In 2012, 573 students graduated from the School of Science with associate, bachelor's, master's and Ph.D. degrees

Teaching and Learning

1. [New Neuroscience B.S. Program Launches at IUPUI](#) (July 2012) The new neuroscience program offers students an opportunity to earn an undergraduate degree in a rapidly advancing field in a climate of strong interdisciplinary collaboration. Neuroscience majors will have opportunities for research and internship experiences in the School of Science and the Indiana University School of Medicine as well as through life science, pharmaceutical and biotechnology industries in central Indiana.
2. [Math Undergraduates Visit IUPUI for Mathematical Biosciences Institute Research](#) (July 2012) Three female undergraduate mathematics students from programs across the country completed an eight-week NSF funded research project as part of an interdisciplinary research program coordinated by the Mathematical Biosciences Institute (MBI) in Columbus, Ohio. IUPUI was one of six institutions to host students in the program and provide faculty mentors to help guide their research efforts.
3. [IUPUI Undergraduate Presents on Neural Regeneration in China](#) (Sept 2012) Senior biology major Jennifer Romine represented the IUPUI School of Science at the International Neural Regeneration Symposium in China. Romine and Dr. Jinhui Chen, her mentor and an assistant professor at the IU School of Medicine, have been studying the maturation process of neurons and the ability to stimulate neuron growth by increasing the number of neural stem cells in the brain.
4. [New B.A. in Applied Computer Science Offers Career Flexibility](#) (Oct 2012) The new applied computer science B.A. is geared toward students who want a strong computing degree and the flexibility to take that core knowledge to any industry, and requires courses in software development, data analysis and web development. The wide array of electives available with the degree will allow graduates to effectively leverage technology in any fields they are passionate about pursuing as a career.
5. [Gov. Mike Pence Names Fifth Class of Woodrow Wilson Teaching Fellows](#) (May 2013) The fellows are top recent graduates and accomplished career changers in the STEM fields -- science, mathematics, engineering and technology -- who will teach in Indiana's urban and rural schools. The fellowship has been funded with grants from Lilly Endowment Inc. State officials have given their stamp of approval on the fellowship program by establishing a line item in the state budget to allow the program up continue.
6. [IUPUI one of 11 universities nationwide selected to Offer New Computer Science Principles Course](#) (Jun 2013) The Department of Computer and Information Science will pilot an innovative new course designed to introduce students nationwide to the career advantages of computer science. The initiative also requires efforts to attract diverse students to computer science, especially women. The College Board Advanced Placement (AP) Computer Science Principles program selected only 40 high schools and 11 universities to launch the new course. Michele Roberts will teach the course beginning Fall 2013.

Research, Scholarship, and Creative Activity

1. [Health Study Reinforces What Poets and Songwriters Have Long Known](#) (July 2012) Using data from a large scale, long-term study, Jesse C. Stewart, associate professor of Psychology, and co-authors published a new study that showing that events like ending a romantic relationship, if they lead to depression, can impair heart function. Their findings are reported in a paper, entitled “Depressive Symptom Clusters and 5-Year Incidence of Coronary Artery Calcification: The CARDIA Study,” that was published in the #1 cardiology journal *Circulation*, published by the American Heart Association.
2. [Forensic Biologist Discovers New Fly Species in Indiana](#) (Sept 2012) Christine Picard, Ph.D., assistant professor of biology, discovered the fly, *Chrysomya megacephala* during a routine collection of fly samples in late September 2012. The local discovery of a species of fly not native to the Midwest could have significant implications on forensic investigations involving decomposing remains. Picard’s discovery was published in the *Proceedings of the Entomological Society of Washington* journal.
3. [Treatment by the Numbers: Math and IU Med School Explore More Efficient Treatments](#) (Sept 2012) Mathematical modeling work led by Drs. Giovanna Guidoboni, associate professor of mathematics in the School of Science, and others, has been recognized for its new approach to understanding what causes debilitating diseases like glaucoma, diabetes and hypertension. The preliminary findings were recently published in the *British Journal of Ophthalmology* and the research currently is under review in the *Journal of Mathematical Biosciences and Engineering* and the *European Journal of Ophthalmology*. The NSF recently awarded Guidoboni’s team with a three-year grant to continue their research.
4. [Two IUPUI Mathematicians Named Inaugural Fellows of the American Mathematical Society](#) (Nov 2012) Distinguished Professor Alexander Its and Professor Michal Misiurewicz have earned selection to the initial class of American Mathematical Society (AMS) Fellows for 2013 in recognition of their international excellence in mathematical science and service. They are among the 1,119 international mathematicians representing more than 600 global institutions announced as inaugural AMS Fellows.
5. [Physics Researcher Part of New Effort to Finally Complete Quantum Theory](#) (Jan 2013) A new grant will allow Le Luo, assistant professor of physics, to work with researchers at the University of Science and Technology in China (USTC), Harvard University and several European universities to advance the theory of quantum mechanics, a notion challenged by Albert Einstein and pursued by many of the top scientific minds during the past century.
6. [Virtual Reality Valuable Research Tool For Doctors Treating Chronic Pain](#) (Nov 2012) Adam Hirsh, assistant professor of psychology, whose research focuses on the biopsychosocial aspects of pain, is one of four researchers examining the treatment process for chronic pain patients. Working under an IU Collaborative Research Grant (IUCRG), the group uses virtual patients and physician interviews to better understand what influences treatment plans and how doctors respond to each patient individually.
7. [IUPUI Mathematician Honored by the International Society of Difference Equations](#) (Feb 2013) Michal Misiurewicz, professor of mathematical sciences, received the Bernd Aulbach Prize for significant contributions to the field of difference equations and/or discrete dynamical systems. Misiurewicz delivered address at the 19th International Conference on Difference Equations and Applications in May in Oman.
8. [Stem Cell Research Could Expand Clinical Use of Regenerative Human Cells](#) (Mar 2013) Research led by Jason S. Meyer, assistant professor of biology, has uncovered a method to produce retinal cells from human stem cells without the use of animal products or other foreign substances, which historically have limited the application of stem cells to treat disease and other human disorders. Meyer has been funded by an IU Collaborative Research Grant and funding from the American Health Assistance Foundation. The research was published in the April edition of *Stem Cells Translational Medicine*.

9. [Earth Sciences Professor Co-Authors New Study Highlighting Long-term Effects of Lead Exposure in Children](#) (Mar 2013) A new 9-year study of more than 367,000 children in Detroit supports the idea that a mysterious seasonal increase in blood lead levels -- observed in urban areas in the US and abroad -- results from contact with outdoor dust. Earth Science professor Gabe Filippelli and colleagues, who report in ACS's *Journal of Environmental Science and Technology (ES&T)*, say the results have implications for government efforts to control childhood exposure to lead, which can have serious health consequences.
10. [Six Indiana University Collaborative Research Grants Awarded To School of Science Faculty](#) (April 2013) The IU Collaborative Research Grant (IUCRG) funds are designed to facilitate and support outstanding research and cutting edge discoveries by teams who have not collaborated previously. Six new grants went to seven School of Science faculty and collaborators: [Gavriil Tsechpenakis](#) (Computer Science), [Leonid L. Rubchinsky](#) (Mathematics), [Andrew Kusmierczyk](#) (Biology), [Horia Petrache](#) and [Fangqiang Zhu](#) (Physics), [David Skalnik](#) (Biology), and [Chris Lapish](#) (Psychology)
11. [Collaborative Neuroscience Research Examines Neural Activity Patterns During Drug Addiction](#) (May 2013) A new collaboration between neuroscientist Christopher Lapish, Ph.D., (Psychology) and Leonid Rubchinsky (Mathematics), through their partnership in the [Institute for Mathematical Modeling and Computational Science](#) has moved scientists closer to understanding addiction and brain function by incorporating mathematical models that recreate events and reactions in the brain involved in drug addiction. The results of this work recently published in *Cerebral Cortex* (May 2013).
12. [Two Computer Science Assistant Professors awarded NSF CAREER Awards Explores How Brains Form From Single Cells](#) (May 2013) Gavriil Tsechpenakis' research is focused patterns by which neurons develop and connect to form a brain, and Murat Dundar's research is focused on enhancing machine learning technology. The NSF CAREER Award is the highest honor given by the NSF in support of faculty members early in their careers who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of the two areas.
13. [Immunology Research Helps Others Fight Disease](#) (Mar 2013) Cancer research being led by Hua-Chen Chang, assistant professor of biology indicates considerable potential for cancer patients using a synthetic version of lunasin, a natural compound found in soybeans. With support from the IU School of Medicine as well as the Melvin and Bren Simon Cancer Center, Chang is hopeful researchers across the country will begin to explore the usefulness of her synthetic lunasin. She has started a business, Immune Peptide Therapeutics, LLC, to distribute the synthetic samples to others interested in expanding on her research.

Civic Engagement

Introduction: *Along with long-standing civic engagement and outreach programs, including the annual High School Genetics Conference, Project SEED, the NSF funded GK-12 program, and Project Lead the Way (PLTW) Core Teacher Institute, the School of Science had several other highlights in 2012-2013:*

1. [Local High School Students Earn Second-Place Finish in National STEM Competition](#) (Dec 2012) Two high school students, under the guidance of IUPUI mathematicians Alexey Kuznetsov and Yaroslav Molkov, have placed second in the national finals of the prestigious Siemens Competition in Math, Science and Technology, and will share a \$50,000 scholarship as a result of their second-place finish. This will add to the \$6,000 scholarship they earned for winning the regional competition in South Bend, Ind., for their research titled, "Chaos and Robustness in a Single Family of Genetic Oscillatory Networks."
2. [Fourth Annual Brain Bee at held at IUPUI](#) (Jan 2013) Dozens of students from around the state competed in the IUPUI Brain Bee, designed to motivate students to learn about the human brain, test their neuroscience knowledge, and inspire them to enter careers in the basic and clinical brain sciences. In addition to the competition, participants took a tour of neuroscience laboratories at the School of Science and learned about the new undergraduate interdisciplinary B.S. in neuroscience at IUPUI.

3. [Four Science Students Honored With Plater Medallion for Civic Engagement](#) (April 2013) The graduating seniors were among 33 recipients named this year to receive the Plater Medallion for exhibiting personal development, intellectual growth, and positive community impact as a result of their civic engagement. The students included Eric Keller, Lindsay Lazo, Jennifer Romine, and Kristyn Seibert. These students are also among the [record](#) 39 Science Students in IUPUI Top 100 for 2013.
4. [More Than 100 High School Students Compete in Computer Science Day at IUPUI](#) (April 2013) The Computer Science Day Competition this year saw the largest pool of high school students to ever participate. More than 100 students competed in three categories: programming and problem solving, web development and game programming, coming away from the competition with a deeper understanding of teamwork, software tools and deadlines associated with today's computer science industry.
5. [Physics Doctoral Student Urges Congress to Support National Research Facilities](#) (June 2013) Luis Palacio, a Ph.D. student and NSF GK-12 fellow in the Department of Physics, was selected as the only student from Indiana to participate in the 2013 Scientific Research Facility Exhibition, hosted by the House of Representatives' Science and National Labs Caucus and the National User Facility Organization ([NUFO](#)). Palacio spoke before members of Congress to explain the value of supporting national research facilities that drive innovation in science and technology in areas such as energy, health and technology.

Diversity

Introduction: Within the School of Science, 56% of Science majors are female, 20% are minorities. Our students represent 38 countries, 27 states, and 80 of the 92 Indiana counties. Since 2007, the School has seen a 65% increase in international students, with over 200 international students currently pursuing Science degrees

1. [Biology Student Credits Experiences at IUPUI with Early Entry to Dental School](#) (April 2013) Neelam Shah, a Women in Science House (WISH) student, credits her real-world experiences at IUPUI with best preparing her to begin dental school after only three years at IUPUI. While at IUPUI she served in a Life Health Science internship with Dr. Angela Bruzzaniti at the IU School of Dentistry. Neelam has served in leadership roles with the Pre-Dental Club, Chemistry Club and the WIS House Council.
2. [Alumnus Explores Health Care and Medicine Across the Globe](#) (Jan 2013) For much of the past decade, biology alumnus Paul Nanda, M.D., has traveled the globe and treated the sick and wounded of all races, backgrounds and ages. In remote areas like Zimbabwe, Honduras, Peru, Brazil, Bolivia and New Zealand, Nanda has witnessed more heartache than he cares to explain. Each experience, however difficult it may be, confirms for him the need for more trained doctors to commit to global health initiatives.

Best Practices

1. [Professor Organizes International Physics Conference](#) (Oct 2012) Ricardo Decca, professor and director of the physics graduate program, hosted a gathering of international physicists in Ushiana, an island off of Tierra del Fuego, part of his native Argentina. Physicists came from across the globe to share their knowledge and expertise on the Casimir Effect, an extraordinary phenomenon in quantum physics.
2. [Recruitment Office partners with Science Career Development Services to Improve Experience for Prospective Students](#) (February 2013) *Explore Science: Choose your Own Adventure* is an internal partnership to enhance Fall recruitment by helping prospective students better understand the various paths students can take to obtain an undergraduate degree before entering medical school, dental school or various graduate programs in Indiana's booming life and health sciences fields.
3. [New Math Assistance Center \(MAC\) Director Serves Key Role in Success of Students Across Campus](#) (Feb 2013) Kevin Berkopes was selected as the new director of the Math Assistance Center, (www.mac.iupui.edu). The MAC employs 70 Math Scholarship Student Mentors who understand the

complexities connected to teaching and learning mathematics, and who aim to make math more accessible, enjoyable and achievable for the 1,000 students across the IUPUI campus who visit each week.

4. [Indianapolis Mayor Says IUPUI STEM Efforts Are Critical to Indiana Economy](#) (May 2013) Mayor Greg Ballard, Deputy Mayor for Education Jason Kloth and Employ Indy President and CEO Brooke Huntington visited the School of Science to celebrate the success of the Central Indiana STEM Talent Expansion Program ([CI-STEP](#)), an initiative that has increased the number of STEM graduates at IUPUI by 25 percent during the past three years. While on campus, Ballard toured the new Science and Engineering Laboratory Building (SELB) under construction that will house additional classrooms and teaching laboratories. Ballard praised the efforts at IUPUI to improve STEM education initiatives as “absolutely critical” to the long-term economic future of Indiana.

External Awards And Recognitions

1. [Physics Professor Named Scholar at Top Theoretical Research Institute](#) (Jan 2013) Yogesh Joglekar, associate professor of physics, has been named a Scholar with the Kavli Institute for Theoretical Physics (KITP), the country’s top collaborative research facility dedicated to discovering knowledge at the leading edge of science. Joglekar joins seven other scientists honored each year from universities recognized by KITP as having growing research interests and impact, especially at the undergraduate level.
2. [Psychology Faculty Member Receives 2013 IUPUI Research Trailblazers Award](#) (April 2013) Michelle P. Salyers, associate professor of psychology, has been named a recipient of the 2013 IUPUI Research Trailblazers Award, which recognizes outstanding faculty who show great promise in becoming nationally and internationally known for their research accomplishments. Salyers also is co-director of the ACT Center of Indiana, a research and training center focused on evidence-based mental health practices that support recovery in adults with severe mental illnesses.
3. [Associate Dean Jeff Watt, Biology Senior Lecturer Robert Yost Honored with Irwin Award](#) (April 2013) IUPUI presents the annual award to full-time staff and faculty who have gone “above and beyond their call of duty at work.” The award, named in honor of Dr. Glenn W. Irwin, IUPUI’s second chancellor, recognizes service that is non-reimbursed and not specifically job-related.
4. [Science Student Becomes IUPUI's First Goldwater scholar](#) (April 2013) Jason Walsman, a double major in environmental science and biology, is the first IUPUI Goldwater Scholar, considered to be the premier undergraduate award for the nation’s most promising undergraduate college students in math, science and engineering. Walsman intends to earn a Ph.D. in ecology, conduct research in theoretical ecology, work on applied ecology projects in developing nations and teach at the university level.
5. [Science Represented Well at Chancellor's 2013 Honors Celebration](#) (April 2013) [Gabe Filippelli](#) (Earth Sciences/Center for Urban Health) received the Chancellor’s Faculty Award for Civic Engagement. [Michael Yard](#) (Biology) received the Chancellor’s Award for Excellence in Teaching. [Leslie Ashburn-Nardo](#) (Psychology) received the Chancellor’s Award for Excellence in Multicultural Teaching. Science majors selected as Chancellor’s Scholars included Alexander Stufflebeam, John Kraihanzel, and [Eric Keller](#). [Tomas Meijome](#) earned the Chancellor’s Award for Outstanding Research. [Yogesh Joglekar](#) (Physics) was recognized with the 2013 [Kathryn J. Wilson Award for Outstanding Leadership in Mentoring Undergraduates](#) at the Center for Research and Learning (CRL) Awards Ceremony.
6. [Environmental Scientist to Serve as Senior Scientist for the US Department of State](#) (May 2013) Gabe Filippelli, Ph.D., professor in Earth Sciences, has been named a Jefferson Science Fellow, a prominent advisory position with the U.S. Department of State in which he will serve as a senior scientist on international matters related to the climate and the environment. Filippelli, director of the Center for Urban Health at IUPUI, is one of only 13 scientists and engineers from across the country to be named a fellow for 2013. He is the first faculty from an Indiana University campus to be appointed to the post.