DIMENSIONS of DISCOVERY

Around 80 visiting scholars and Purdue faculty attended a reception at Discovery Park in February to kick off the Purdue-China Visiting Scholars Network. The network is designed to help faculty maintain successful partnerships with their Chinese colleagues on promising collaborations involving sustainability.

Photography by Vincent Walter

Partnerships

Welcome

Many ideas grow better when transplanted into another mind than the one where they sprang up. —Oliver Wendell Holmes

The spectacular complexity of today's challenges — renewable energy sources, human health, sustainable technologies — require partnerships both across the planet and down the hall. In this issue, we report on some of Purdue's promising collaborations, from a visiting scholars program bridging Chinese and U.S. interests in sustainability, to an inter-college partnership that has yielded a significant finding in understanding colorectal cancer, to the myriad collaborations between information technology professionals and researchers that make high-level computations possible.

PURDUE UNIVERSITY

Purdue Ecopartnership Launches China Visiting Scholars Network to Grow Global Research Collaborations

The growing number of pins on Prof. **Tim Filley**'s large map of China tell a story: Nearly 200 Chinese professors, graduate students and professionals have ventured from their hometowns to Purdue this year, sharing their ideas, technologies, skills, culture and a thirst for discovery.

Filley hopes that someday, an equal number of Purdue faculty members and graduate students will be traveling across the globe to advance their research and learning careers in China while promoting sustainability in both countries.

"Looking at this map, it is fascinating to see all the places from within China that are represented here at Purdue," says Filley, a professor of earth, atmospheric and planetary sciences and director of the U.S.-China Ecopartnership for Environmental Sustainability (USCEES). "This geographic diversity presents different regional perspectives on our shared challenges as well as our approaches to their solutions that ultimately make our interaction stronger."

Continues on p. 7

Inside »

Electrical Engineering Professor Honored with Purdue Research Award

Andrew Weiner, the Scifres Family Distinguished Professor of Electrical and Computer Engineering, is the 2013 recipient of the Herbert Newby McCoy Award, the most prestigious research honor in the natural sciences given by Purdue University.

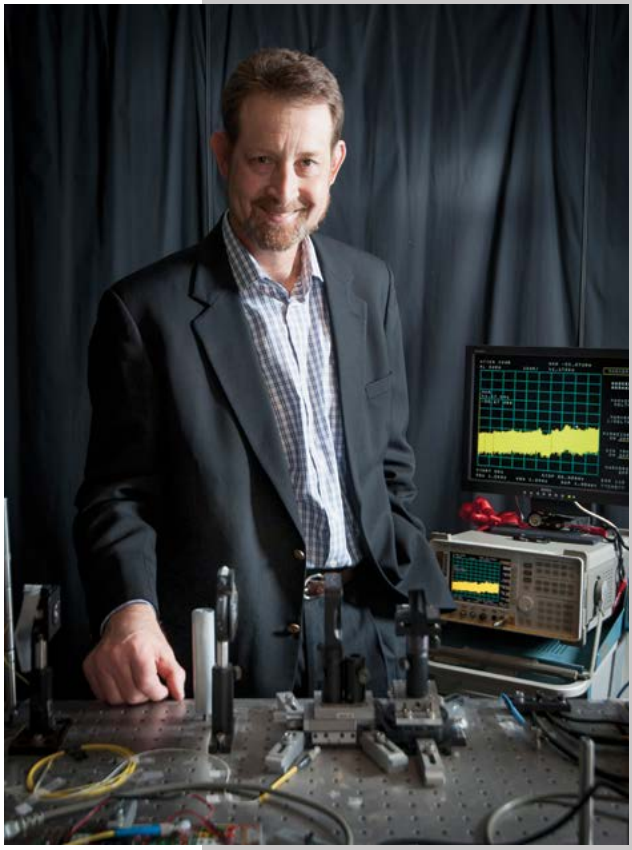
Weiner and his team have shown how to finely control the spectral and temporal properties of ultrafast light pulses, a step toward creating advanced sensors, more powerful communications technologies and more precise laboratory instruments.

The pulses could be likened to strobes used in high-speed photography to freeze fast-moving objects. These laser pulses, however, are millions of times faster, with flashes lasting as little as a quadrillionth of a second — a femtosecond.

The properties of the pulses, when represented on a graph, take on specific shapes that characterize the changing light intensity from the beginning to end of each pulse. Precisely controlling this intensity, which is called "pulse shaping," enables researchers to tune the laser pulses to suit specific applications.

"As a result of Professor Weiner's work, pulse shaping is now used in ultrafast optics laboratories around the world," said Richard Buckius, Purdue's vice president for research. "His discoveries have influenced research in fields ranging from quantum control to high-speed light-wave communications."

Weiner's recent work has focused on line-by-line pulse shaping, ultrabroadband radio frequency photonics and microresonator-based signal processing, efforts which continue to push the boundaries of optical science.



Andrew Weiner

Photography by Vincent Walter

Weiner earned his bachelor's, master's and doctoral degrees in electrical engineering from Massachusetts Institute of Technology. He joined the Purdue faculty as a professor in 1992 and was named a distinguished professor in 2002.

He is the recipient of numerous awards.

The McCoy Award, established in 1964 by Ethel Terry McCoy in memory of her husband, is presented annually to a Purdue student or faculty member for outstanding contributions to the natural sciences. The winner is nominated by colleagues and selected by faculty representatives and the university president.

Weiner will be formally recognized next fall during the McCoy Distinguished Lecture. ■

Writer: Judith Barra Austin is a communications/marketing specialist with Purdue Marketing and Media.

Clifford B. Kinley Trust 2013 Award Winners

Seven Purdue faculty members have received Clifford B. Kinley Trust awards for 2013 to pursue social sciences research. They are:


E. Bouck


E. Friedman


A. Seidl

Emily C. Bouck, College of Education, "Promoting Independence through Assistive Technology," $19,662;

Elliot M. Friedman, College of Health and Human Sciences, "Social Patterning of Chronic Illness: Moderation by Psychosocial Resources," $19,750;

Amanda H. Seidl, College of Health and Human Sciences, "Effects of Autism and Autistic-like Traits on Speech Processing," $20,000;

Linda S. Prokopy, College of Agriculture, "The Impact of the 2012 Drought on Midwestern Farm Advisors' Perceptions, Attitudes, and Willingness to Respond to Climate Change," $20,000;

Margo J. Monteith, College of Health and Human Sciences, "Female Under-representation in Positions of Power and Leadership: the Constrained Choice Perspective," $20,000;

Aaron M. Hoffman, College of Liberal Arts, and **Christopher J. Kowal**, College of Health and Human Sciences, "Terrorism Coverage and the Fear of Terrorism," $20,000.

The Clifford Kinley Trust was established in 1978 to fund research relating to human welfare and was activated in 1991 upon Mrs. Kinley's death. Exclusive to the West Lafayette campus and limited to faculty principal investigators, the endowment funds research that uses a social science perspective to explore methods for improving the human condition.

The selection committee generally recommends funding individual projects with a maximum budget of $20,000. Successful proposals stand alone as independent projects (not a dependent component of a larger program), are grounded in theory and have a clear relationship to the literature. ■


L. Prokopy


M. Monteith


A. Hoffman


C. Kowal

Computer Science Professor Wins Commercialization Award

Mikhail Atallah, distinguished professor of computer science in the College of Science, is the recipient of the 2013 Outstanding Commercialization Award for Purdue University Faculty. The award is given annually to a faculty member in recognition of outstanding contributions to, and success with, commercializing Purdue research discoveries. It was established with an endowment gift from the Central Indiana Corporate Partnership Foundation.


Mikhail Atallah

Atallah co-founded Arxan Technologies in 2001 and has served on its board of scientific advisers since then. The company has developed software protection that is used in more than 200 million computing devices. Its products provide protection by linking "guards" at different points within software code, making it far more difficult for hackers to access.

"If malware is difficult to detect and remove, so is 'goodware' injected into software that attackers will find difficult to detect and remove," Atallah said. "The result is software that detects tampering and other policy violations and can respond with appropriate defensive actions."

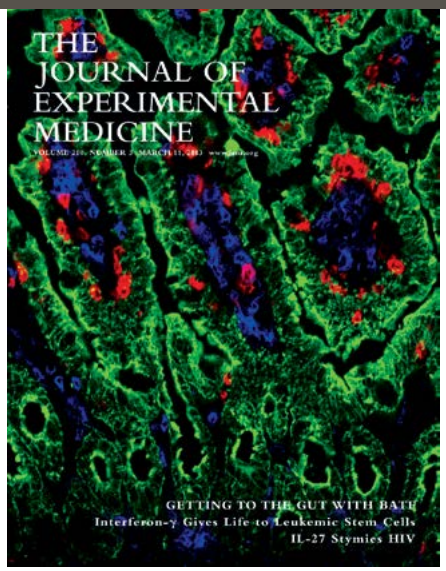
Atallah came to Purdue in 1982 after earning a doctorate at Johns Hopkins University. He is affiliated with the Center for Education and Research in Information Assurance and Security (CERIAS) and has a courtesy appointment in electrical and computer engineering.

He is a fellow of both the Association for Computing Machinery and IEEE (Institute of Electrical and Electronics Engineers). He received a Presidential Young Investigator Award from the National Science Foundation in 1985, and in 1999 he was selected as one of the best teachers in the history of Purdue University.

"Professor Atallah combines the best of both teaching and research," said Suresh Garimella, Purdue's associate vice president for engagement. "His work has resulted in a product that fights a problem threatening the technology that life in the 21st century so depends on. He has, indeed, helped make it a better world."

Atallah is the 10th recipient of the Outstanding Commercialization Award, which includes a $5,000 stipend. ■

Writer: Judith Barra Austin is a communications/ marketing specialist with Purdue Marketing and Media.



Cancer Researchers Report Significant Finding

Two Purdue University Center for Cancer Research members have discovered the importance of a particular protein in regulating immune cell migration. The research, a significant finding in the understanding of immune responses in the intestine including inflammatory bowel disease and colorectal cancer, was published on the cover of the March 11 issue of the *Journal of Experimental Medicine*.

Chang H. Kim, who is section head of microbiology and immunology and professor of immunology with the Purdue University College of Veterinary Medicine, and **Elizabeth J. Taparowsky**, a professor of biological sciences, studied intestinal T cells of BATF-deficient mice. They observed that the knockout mice had reduced numbers of T cells specifically in the intestine. The low numbers of T cells in the intestine were due to the inability of T cells to express necessary trafficking receptors and migrate to the intestine, a process regulated by vitamin A. Because T cells play central roles in the regulation of the immunologic process, "our results indicate that BATF deficiency has a significant functional consequence on the induction and regulation of immunity and tissue inflammation in the intestine," they write.

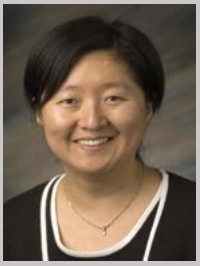
The BATF protein was discovered at Purdue, and researchers collaborated previously to demonstrate a targeted role for the protein in regulating immune system responses. The current study is a significant advance in that it has "identified a novel function for BATF in up-regulating the major gut-homing receptors on T helper cells." The authors note that further study will be needed to understand the detailed mechanism of how BATF regulates the expression of the trafficking receptor genes that direct T cells to the intestine. ■

Faculty Members Receive NSF CAREER Grants

Three more faculty members have been awarded CAREER grants from the National Science Foundation.


Niklas Elmqvist

Niklas Elmqvist, assistant professor of electrical and computer engineering, has received a $480,894 award for his proposal, "CAREER: Ubilytics: Harnessing Existing Device Ecosystems for Anywhere Sensemaking." His project addresses the fundamental question of how we can use the existing ecosystem of networked devices in our surroundings to make sense of and exploit massive, heterogeneous, and multi-scale data anywhere and at any time. Elmqvist will introduce a comprehensive new approach called ubiquitous analytics (ubilytics) for harnessing these ever-present digital devices into unified environments for analysis of data anywhere.


Li Qiao

Li Qiao, an assistant professor of aeronautics and astronautics engineering, has received a $450,000 award for her proposal, "CAREER: Understanding Spontaneous Combustion of Hydrogen and Oxygen in Nanobubbles." Her project will explore the mechanisms by which ignition and combustion can happen in water nanobubbles which are generated by electrolysis. Experimental efforts concentrate on measurements of bubble size, growth dynamics, and temperature within the bubble. Scanning laser-Doppler vibrometry is used for determining bubble size and evolution. Additionally, molecular dynamics simulations are used to determine the pressure and chemical reactions inside the water bubbles.


Pablo Zavattieri

Pablo Zavattieri, assistant professor of civil engineering, has received a $400,000 award for his project, "CAREER: Multiscale Investigation and Mimicry of Naturally-Occurring Ultra-High Performance Composite Materials." Zavattieri will study biological composite materials that can achieve high toughness without sacrificing stiffness and strength by control of nano- and microstructural features that significantly improve the mechanical performance of otherwise brittle materials. The research also will provide the rational mechanics framework for the development of high-performance and multifunctional materials for a wide range of technologically relevant applications in energy, defense, homeland security, civil, industrial safety, medicine and automotive industry.

CAREER awards are intended to aid early career-development activities of teacher-scholars who most effectively integrate research and education. As such, the research plan incorporates strategies to promote participation of undergraduate students in research, integrate results in undergraduate and graduate curriculum, and provide graduate students opportunities to interact with industrial partners. ■

Photography by Vincent Walter

Change of Heart Leads Prof to Optics Field

Nicolay Basov, Lev Landau, Pyotr Kapitsa — growing up 400 miles from Moscow, **Alexandra Boltasseva** was steeped in the Soviet Union's storied tradition of Nobel laureates in physics, men who contributed groundbreaking theories in areas such as condensed matter, quantum electronics and cryogenics. And so, like many other aspiring physicists before her, she enrolled after high school in the Moscow Institute of Physics and Technology, a prestigious institution where she could work alongside prominent scientists on a personalized curriculum.

"In the entrance interview, I said I want to do elementary particle physics — neutrons and the Higgs Boson. Even during my first years at this school, I didn't really like optics," says Boltasseva, an assistant professor of electrical and computer engineering who has received 2013 Young Investigator Awards from both the IEEE Photonics Society and the Materials Research Society for her pioneering research in such areas as advanced plasmonics, metamaterials and integrated optics devices.

The turning point in Boltasseva's education came during her third year (one and a half years before her bachelor's degree) when her department head suggested she work on some projects at the Lebedev Institute of the Russian Academy of Sciences. One of the departments of the Lebedev Physical Institute was under the direction of Basov, whose contributions to the development of the laser and maser had led to new missile defense initiatives.

Boltasseva joined a group studying quantum well semiconductor lasers, and suddenly, a light bulb went off in her head. "I realized that this was where creativity and the skills to create, measure and interpret all came together," she recalls. "Optics and photonics had revolutionized our world. This was the field that really enabled all the devices we had around us."

Her change of heart has paid off. Less than 10 years after completing her Ph.D., Boltasseva has contributed a number of innovations to the relatively new fields of plasmonics and metamaterials, including semiconductor metamaterials components and plasmon waveguides and circuits. She is now focusing on new research directions: semiconductor-compatible metamaterial devices and metasurfaces that are extremely thin films of metamaterials and are capable of ultra-efficient control of light. Such novel components could dramatically speed up processes, leading to advances in solar cells, computers, telecommunications, sensors, microscopes and quantum information technology.

"The metamaterials field is coming really close to real applications in many areas," she says. "I definitely expect and hope to see a lot of advances made in real devices in real applications during my career."■

Distinguished Professor Receives South Korea's Top Engineering Award

Purdue University distinguished professor **Sangtae Kim** has received the 2013 Ho-Am Engineering Prize from South Korea, the highest engineering research award issued by that nation.

The award, which includes a prize of around $265,000, a gold medal and a laureate diploma, is issued in five categories: science, engineering, medicine, the arts and community service.

Sangtae Kim

"This recognition is a testament to Dr. Kim's outstanding accomplishments," said Arvind Varma, R. Games Slayter Distinguished Professor of Chemical Engineering and Jay and Cynthia Ihlenfeld Head of Purdue's School of Chemical Engineering. "He has been an influential scholar in the field of chemical engineering for the past three decades and has had tremendous impact. The honor also speaks highly of Purdue research."

Kim, a distinguished professor of mechanical and chemical engineering, is an expert in mathematical and computational methods for microhydrodynamics. The work involves using powerful computers and mathematical methods to learn how proteins interact with other microstructures inside cells and to design electronic devices that may self-assemble, similar to the growth of structures in living organisms. In self-assembly, devices might eventually be fabricated using techniques based on chemical attractions, rather than the complex and expensive processes now used.

Kim currently is on leave from Purdue while serving as visiting professor of chemical engineering at the University of Wisconsin-Madison, where he was a faculty member from 1983-1997. He is the founder and chairman of ProWD Sciences Inc., a Wisconsin drug-discovery and drug-development company, a former executive with Eli Lilly and Co., and a member of the National Academy of Engineering. ■

Writer: Emil Venere is a writer/editor with Purdue Marketing and Media.

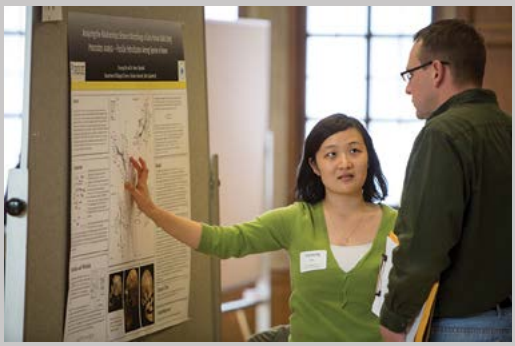
DiscoverU Website Promotes Undergraduate Research

A new website called DiscoverU (**www.purdue.edu/discoveru**) debuted in March to promote Purdue's undergraduate research to prospective students and faculty.

In addition to describing the benefits and details of undergraduate research at Purdue, it includes links to undergraduate research opportunities and events offered at the university, college and department levels. The website also offers a link to the *Journal of Purdue Undergraduate Research*, which publishes Purdue undergraduates' outstanding research papers. ■

Undergraduates Showcase Research at Annual Symposium

More than 140 large posters were on display in March at the Purdue Memorial Union Ballrooms as part of the Undergraduate Research and Poster Symposium. The annual symposium, which originated more than a decade ago, is designed to raise awareness about undergraduate research programs at Purdue while providing students with the experience of presenting their research results in a professional setting. Student-scholars from the colleges of Science, Agriculture, Engineering, Liberal Arts, Technology and Honors explained their findings and received critiques on their research and oral presentations. Abstracts are available at **http://science.purdue.edu/Current_Students/urps/**. ■



Photography by Michael Dick

U.S.-China EcoPartnership — continued from page 1

To that end, the U.S.-China EcoPartnership for Environmental Sustainability at Purdue has created the Purdue-China Visiting Scholars Network to strengthen the long-term connections between the Chinese visiting-scholars community and their Purdue hosts.

Photography by Vincent Walter

"Our objective is to create a forum where technological challenges and success related to sustainability can be discussed and collaborative opportunities for new funding and innovation are promoted long after the visiting scholar heads back to China," Filley says.

"The United States and China face the interconnected challenges of environmental degradation, climate change, and energy and food security," says **Alan Rebar**, executive director of Discovery Park and senior associate vice president for research at Purdue. "Through the Visiting Scholars Network, we hope to be open to the many pathways in addressing these challenges, including collaborations and new ideas and technologies that offer market-based solutions."

First step

As a key first step in the visiting scholars program, the EcoPartnership has launched a reciprocal travel grant program, offering $4,500 fellowships to a Purdue host, or their student, of a current or former visiting scholar from China to the institution of the Chinese visiting scholar. Eight fellowships were awarded this spring for graduate students or postdoctoral researchers wanting to partner with colleagues in China.

Photography by Vincent Walter

This travel grant program is financially supported by contributions from the centers of the Global Sustainability Institute, the Purdue Confucius Institute, International Programs, and the Colleges of Agriculture, Engineering, Science, and Technology at Purdue.

Doctoral student Ruzhen Wang of the Institute of Applied Ecology and the Chinese Academy of Sciences is working with Filley to advance his research in carbon and nitrogen biogeochemistry. "I have learned a lot from Professor Filley. It's been a great experience, doing analysis in his lab and benefiting from his expertise and mentoring. I am much more confident in my research abilities because of this opportunity at Purdue," Wang says.

Xia Wei, an associate professor of earth and environmental sciences at Lanzhou University in Gansu, is working with Purdue agronomy professor **Chi-Hua Huang**, an expert in soil surface boundary conditions and erosion processes. "I hope to apply what I am learning here at Purdue, to share my work with my students and for my projects in China," says the visiting scholar. "It's been a very enriching experience."

For more information visit **www.purdue.edu/discoverypark/ecopartnership**.■

Writer: Phillip Fiorini is a senior writer/editor with Purdue Marketing and Media.

Building Upon Success

The U.S. State Department established the U.S.-China EcoPartnership for Environmental Sustainability (USCEES) in 2011 to address environmental challenges common to both the United States and China. Six new partnerships were sanctioned at that time. One of them, a collaboration involving Purdue, the University of Tennessee, Oak Ridge National Laboratory and the Chinese Academy of Sciences, is a continuation of an existing program called the China-U.S. Joint Research Center for Ecosystem and Environmental Change (JRCEEC).

Building upon the success of JRCEEC, Filley and other members of the Purdue USCEES leadership team are working to increase opportunities for academic exchanges and joint research projects with both Chinese and U.S. partners through such initiatives as an annual symposium, workshops and faculty and student exchanges. ■

Computing Milestones at Purdue

Fifty years ago, Purdue led the nation in the founding of the 1st computer science degree program. Today, an innovative and comprehensive research cyberinfrastructure is vital to the success of any research enterprise.

1955

Alan Perlis and four others in the Purdue University Computing Laboratory begin the design of a "mathematical language compiler" for the university's newly acquired Datatron 205. Their IT language (Internal Translator) is similar to IBM's Fortran language, also under development at the time.

1962

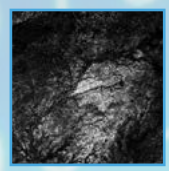
Purdue's Department of Computer Science is created — the first in the nation. Samuel Conte (left) is founding head.

John Steele and Saul Rosen (below) are among the charter faculty members. Each later serves as director of Purdue University's Computing Center, where they take Purdue to the forefront of high-performance computing.

1963

1963: The IBM 7090 and 7044 are installed.

1966



The Lab for Applications of Remote Sensing (LARS) is created to take an interdisciplinary team approach to the use of remote-sensing technology for the management of land resources world-wide. Purdue develops LARSYS software to run on an IBM 360 Model 44 to process the massive amounts of multispectral image data.

1970

1970: Purdue creates one of the first integrated circuits fabrication labs in U.S.

1976

Electrical engineering's first department-owned computer is a Digital Equipment Corporation (DEC) Programmable Data Processor (PDP) 11/70. Pictured above is a photo of a DEC PDP 9 from "A Century of Progress: The History of Electrical Engineering at Purdue (1888-1988)" by LA Geddes. PDP 11/70 computers will service electrical engineering computing needs for 10 years.

1977

Ben Coates makes computing resources available for students, launching the beginning of the Engineering Computer Network (ECN). Through a network of mini-computers and the Digital Equipment Corporation (DEC) PDP 11/70, Purdue becomes one of the first universities to use intermachine communication connecting students, faculty and staff.

1978

The Department of Computer Science installs a VAX 11/780 computer system running UNIX, the first at a university. ASCII terminals go into faculty offices and email is sent via uucp to ihnp4 protocols.

The College of Technology begins offering curricula in the field of computing and information technology which is among the first IT programs nationally to be accredited by the Computing Accreditation Commission of ABET.

1979

Above: Team members (in white lab coats) included Douglas Comer, Chris Kent, Paul McNabb, and Tim Korb. Larry Peterson looks on.

Purdue professor Peter Denning begins collaborating to connect seven universities in much the same way that ARPANET (the precursor to the Internet) is already doing.

1980

1980: The Computer & Electrical Engineering degree is established.

1981

NSF and DARPA agree to establish ARPANET nodes at the University of Wisconsin at Madison, Purdue University, the University of Delaware, BBN and RAND Corporation in order to connect ARPANET to CSNET sites. The resulting Telenet uses TCP/IP protocols just as today's internet does.

1985

In the mid 1980's Michael G. Rossmann is the first scientist to map the atomic structure of the human cold virus using Purdue's Cyber 205 supercomputer; i.e. calculations that would have taken 10 years without a computer.

In collaboration with other universities, Purdue establishes the Software Engineering Research Center (SERC). Part of the National Science Foundation's Industry-University Cooperative Research Program, it focuses on investigating the development and assessment of tools and methods for improving productivity and software quality throughout the life cycle.

1989

The Amy Facility for Chemical Instrumentation is named in 1989 in honor of Jonathan W. Amy to reflect the enormous contribution that Jon Amy made to the development of innovative chemical instrumentation using computing.

1980-1989: The Computer Science research program grows from $447,000 to $3.6 million.

Find us on Facebook

This condensed timeline of computing milestones at Purdue offers a glimpse of varied research computing contributions at Purdue. Add to a discussion of these and other computing milestones at www.facebook.com/ResearchAtPurdue.

1994

Writing Lab director Muriel Harris and graduate student David Taylor launch the world's first Online Writing Lab (OWL). It becomes a complement to classroom instruction, a supplement to face-to-face tutorials, and a stand-alone reference for thousands of writers worldwide.

1998

The Center for Education and Research in Information Assurance and Security (CERIAS) is formed at Purdue. Under the direction of Eugene Spafford, it becomes one of the world's leading centers for research and education in areas crucial to the protection of critical computing and communication infrastructure.

2002

The National Science Foundation-funded Network for Computational Nanotechnology (NCN), based at Purdue, uses Mark Lundstrom's PUNCH system to create nanoHUB. Providing web-based simulation tools, course materials, lectures, seminars, tutorials, user groups and online meetings for nanotechnology research and education, the nanoHub serves more than a quarter million users worldwide by 2013.

2006

Purdue joins other CMS Tier-2 facilities to provide the robust computing infrastructure needed to study information obtained from the Compact Muon Solenoid experiment inside the Large Hadron Collider at CERN. The CMS Tier-2 site at Purdue is a joint effort between the Department of Physics and ITaP.

2007

Purdue begins to deploy additional hubs using its HUBzero cyberinfrastructure, developed originally for nanoHUB. An open source version is released in 2010. Today, HUBzero powers more than 40 hubs, enabling virtual communities in fields ranging from nanotechnology and cancer treatment to earthquake engineering and the bonds between humans and companion animals.

2008

In an unprecedented single-day installation, ITaP (Information Technology at Purdue) staff and volunteers install the Steele supercomputer. Later that year, Steele is named the 105th most powerful high-performance computing system in the world by the TOP500 Supercomputer Sites project. By 2011, TOP500 has recognized Purdue high-performance supercomputers Rossmann, Coates, and Carter, which is ranked 54th on the latest international TOP500 list.

2010

Under the leadership of Wojciech Szpankowski, Purdue is awarded $25 million to create the first National Science Foundation Science and Technology Center in Indiana. The Center for the Science of Information, a collaboration of universities across the country, is designed to extend classical information theory to meet new challenges posed by rapid technological change.

2011

The National Science Foundation, Extreme Science and Engineering Discovery Environment (XSEDE) replaces and expands the TeraGrid project. Purdue continues to be a service provider to the XSEDE project, operating an HPC cluster (Steele), a high-throughput computing resource (the Purdue HTCondor pool, BoilerGrid) and a cloud resource (Wispy).

2012

Purdue creates PurdueHUB-U, an online education initiative based on HUBzero technology. Similar to MOOCS (massive open online courses), the initiative is aimed at large-scale participation and open access via the Web. Ananth Iyer is chosen as faculty director.

2013

The Board of Trustees approves a new $4.3 million Hewlett-Packard supercomputer. The new equipment, to be named Conte, will improve research in several areas, including nanotechnology, material sciences and high-energy physics.

2003: Purdue joins the NSF Teragrid, the world's largest, most comprehensive grid computing cyberinfrastructure for open scientific research.

Other High-Performance Computing Tools

In addition to SubmitR, DiaGrid offers these Web-based tools:

- BLASTer, a version of the popular bioinformatics tool BLAST
- Community Earth System Model (CESM), a global climate modeling tool
- Single Particle Cryo-EM 3-D Reconstruction tool for studying viruses, protein complexes and nanoparticles, developed by biology Professor Wen Jiang and web-enabled by ITaP

Other applications are in the works, including Gromacs, a molecular dynamics simulator.

For more information, email **info@diagrid.org.** ■

Purdue's DiaGrid Hub Makes High-Level Research Software Easier, Faster to Use

Agricultural economics Professor **Michael Delgado** uses computationally demanding statistical models to study questions like the effectiveness of voluntary pollution abatement and education's impact on the economies of developing nations.

"All of my statistical research is done using R," says Delgado, referring to the open source R software environment widely used by statisticians, economists, engineers, scientists and researchers in other fields. "Having a lot of computational power behind R is crucial for me."

One way Delgado has been getting the kind of computing power he needs is by using SubmitR, a Web-based R tool available to Purdue faculty and their students through an accessible graphical interface and Purdue's DiaGrid hub.

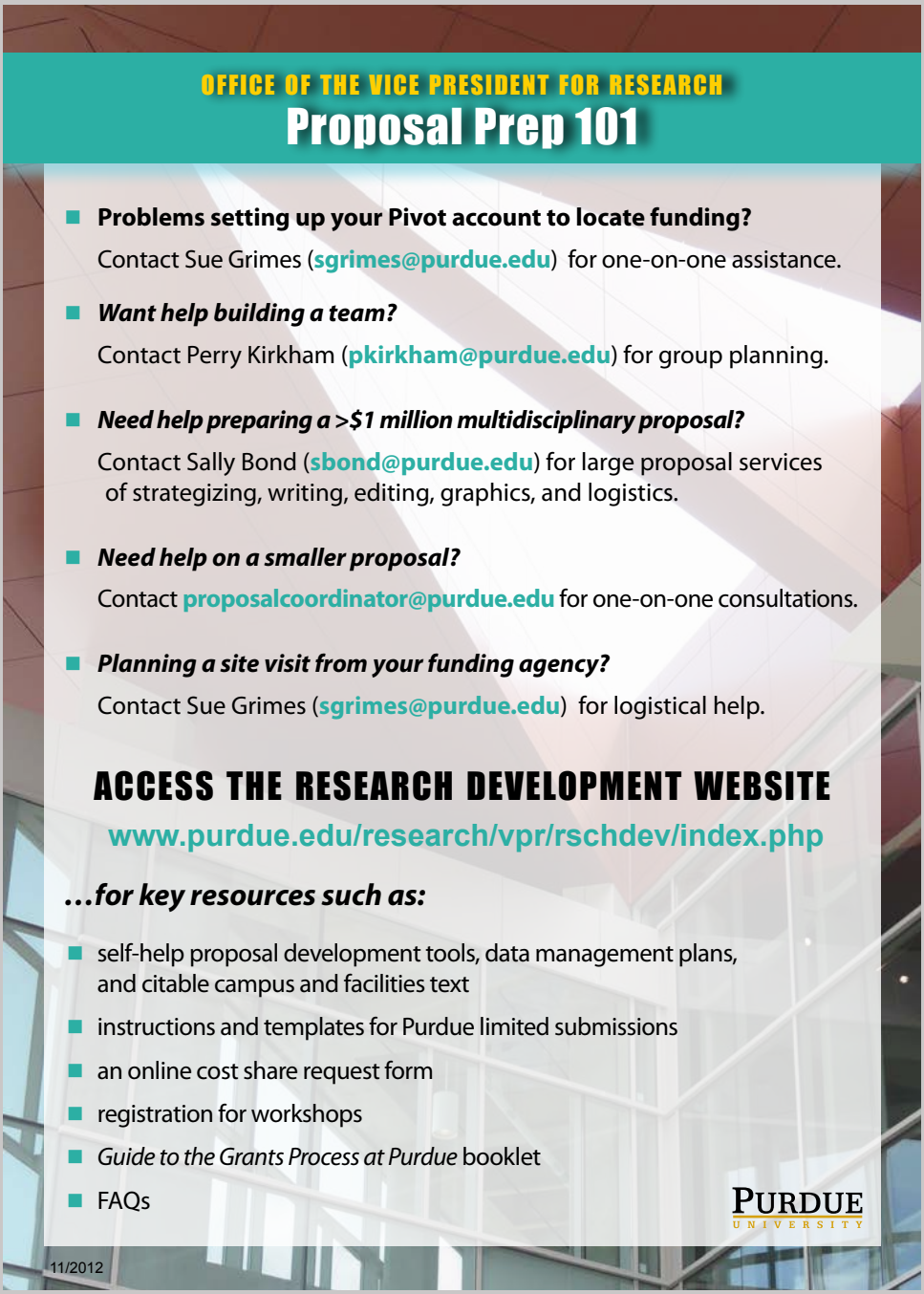
DiaGrid's SubmitR tool can make thousands of processors available for R computing jobs, great for tasks like parameter sweeps and Monte Carlo simulations, which can take advantage of a large processor pool. It's part of a growing array of Software as a Service (SaaS) tools — all available at no cost to Purdue users — on the DiaGrid hub Web portal (**http://diagrid.org**).

Built on Purdue's HUBzero platform (**http://hubzero.org**), DiaGrid is designed to make high-level computational research software and access to high-performance and cloud computing about as easy as using a Web browser.

Whatever the tool, the idea is the same: put a graphical front end on research software traditionally run by typing command lines, with the power of DiaGrid and its nearly 50,000 available processors on the back end. "That combination makes it easier and faster for Purdue researchers to get results," says Carol Song, the senior research scientist who leads the Scientific Solutions Group for ITaP Research Computing (RCAC). ■

Writer: Greg Kline is a science and technology writer for Information Technology at Purdue (ITaP).

The Office of the Vice President for Research has a new quick reference card for proposal preparation help. Download it at **www.purdue.edu/research/vpr/rschdev/proposal_prep_resources.php** or cut out below. ■



DLRC Offers SMAS Scheduling for Facilities

For several years now, faculty members across campus have taken advantage of the flexibility and available technologies in the Discovery Learning Research Center (DLRC) to pilot innovative classroom practice. Some spaces are now available through SMAS, Purdue's Space Management and Academic Scheduling.

DLRC's specialized educational research spaces include reconfigurable classrooms, a science laboratory, project laboratory, design laboratory and collaborative group work space. The variety and flexibility of the spaces provide researchers almost unlimited opportunities to explore and create innovations in educational technologies, pedagogies and learning for improved educational practices. Researchers can reconfigure spaces, vary seating arrangements, alter lighting, and make use of advanced technology — like the DLRC's 8 Smartboards. Multiple cameras and microphones permit researchers to capture classroom activities for later review, strengthening their teaching practices and contributing to educational research.

DLRC project coordinators, the lab manager and the media specialist can help researchers determine how to reinforce their work, including gathering data for education proposals and scholarships. Contact the center to meet with DLRC staff about ways that the facilities can enhance your teaching, research and scholarship: **learningcenter@purdue.edu** or 494-4555.

Writer: Amy Childress is center operations manager for DLRC.

Changes to NIH Federal Guidelines on Research Involving Nucleic Acids

In March 2013, NIH added "Synthetic Nucleic Acids" to existing guidelines on Recombinant Nucleic Acids. This addition means that use of certain molecules that are synthetically generated will need to be reported to the Institutional Biosafety Committee (IBC). The new guidelines are meant to include the following:

- molecules that a) are constructed by joining nucleic acid molecules and b) can replicate in a living cell (i.e. recombinant nucleic acids);
- nucleic acid molecules that are chemically or by other means synthesized or amplified, including those that are chemically or otherwise modified but can base pair with naturally occurring nucleic acid molecules (i.e. synthetic nucleic acids); or
- molecules that result from the replication of those described in (i) or (ii) above.

At first glance, the term "Synthetic Nucleic Acid" appears to invoke regulations on commonly utilized molecular reagents like oligonucleotide primers and probes. However, after careful consideration, NIH has clarified that the term is meant to exempt molecules that:

- can neither replicate nor generate nucleic acids that can replicate in any living cell (e.g., oligonucleotides or other synthetic nucleic acids that do not contain an origin of replication or contain elements known to interact with either DNA or RNA polymerase), and
- are not designed to integrate into DNA, and
- do not produce a toxin that is lethal for vertebrates at an LD50 of less than 100 nanograms per kilogram body weight.

If you believe that your research team will use reagents that meet the definitions above, but are not otherwise exempted, you will need to report this use to the Institutional Biosafety Committee (IBC). Please submit an amendment (Form 2A found at **www.purdue.edu/research/vpr/rschadmin/rschoversight/rdna/forms.php**) to **Bob Golden** (**rwgolden@purdue.edu**). You may also direct questions to this address. ■

Writer: Ianthe Bryant Gawthrop is regulatory administrator for sponsored programs in the Office of the Vice President for Research.

OVPR Lauches Bridge Research Funding Program

The Office of the Vice President for Research has launched an internal funding program intended to help investigators cover funding gaps in this time of uncertainty in external sponsored programs support. The Research Bridge Program will provide short-term, limited financial support for faculty research programs during periods when externally funded research programs have experienced a temporary funding gap. Funds will be used to maintain research programs at a minimum essential level for a limited time to facilitate success in re-securing external funding.

Award

The award amount will be commensurate with minimal funding levels to sustain a program and will be based on a review of the funding history and potential for future funding. A single, non-recurring award is anticipated. Any funds not expended by the end of the award period will be returned to the appropriate unit.

Matching Funds

All OVPR bridge funding support requires a 1:1 match, which can come from any combination of support from the faculty member's home unit and college or school. If awarded, such matching funds will be transferred from the source account to a separate, discrete account established for the awarded activity. For sources of funding difficult to transfer, units can capture those funds as in-kind contributions within the application budget. Any funds remaining at the end of the award period will be returned to the OVPR, home unit and/or college equitably.

Eligibility

Tenure-track, tenured and research faculty with an established record of externally funded research programs on the West Lafayette campus are eligible to apply. Before bridge funding is awarded, applicants must have expended all unrestricted start-up funds.

Submission Process

Applicants do not have to submit through their Sponsored Program Services (SPS) Pre-Award team.

For more information or to initiate the process, visit **www.purdue.edu/research/vpr/bridgefunding**.

If you have specific questions, contact Mary Millsaps, operations manager, at **millsaps@purdue.edu** or 494-0702. ■

Writer: Mary Millsaps is operations manager, Office of the Vice President for Research.

Sequestration Notices on OVPR Website

Not long after the mandatory sequestration order was signed by the President on March 1 reducing approximately $85 billion in federal spending for the remainder of FY 2013, federal agencies began issuing notices about the potential impact on sponsored programs.

The Office of the Vice President for Research is monitoring the situation, and is posting agency announcements as they become available. To access these announcements, visit **www.purdue.edu/research/vpr/**. ■

Sponsored Program Year-to-Date Activity

Awards by Sponsor

July 1, 2012 to March 31, 2013

	FY2013 (YTD 3/31/2013)		FY2012 (YTD 3/31/2012)		% Change	
SPONSOR	NO.	$ AMOUNT	NO.	$ AMOUNT	NO.	$ AMOUNT
National Science Foundation	197	59,907,001	230	75,330,138	-14%	-20%
Dept. of Health and Human Services	153	22,878,027	203	31,545,064	-25%	-27%
Dept. of Defense	174	20,170,400	214	24,892,849	-19%	-19%
Dept. of Energy	82	15,550,357	94	11,560,758	-13%	35%
Dept. of Agriculture	111	19,834,461	116	20,349,344	-4%	-3%
National Aeronautics and Space Administration	69	6,954,414	51	4,952,876	35%	40%
Other Federal	56	6,788,947	63	7,113,016	-11%	-5%
Dept. of Education	18	2,763,565	19	3,998,225	-5%	-31%
Environmental Protection Agency	15	1,207,293	20	1,510,189	-25%	-20%
Dept. of Transportation	8	629,590	24	4,426,931	-67%	-86%
Agency for International Development	15	1,520,812	5	233,713	200%	551%
Total Federal	**898**	**$158,204,866**	**1,039**	**$185,913,102**	**-14%**	**-15%**
Industrials and Foundations	1,216	56,268,787	1,276	54,611,671	-5%	3%
State/Local Governments	94	13,542,967	117	11,730,987	-20%	15%
Purdue Research Foundation/ Purdue University	307	4,427,227	405	4,546,152	-24%	-3%
Foreign Governments	37	2,621,360	25	2,171,780	48%	21%
Total Non-Federal	**1,654**	**$76,860,340**	**1,823**	**$73,060,590**	**-9%**	**5%**
Total Purdue System-wide	**2,552**	**$235,065,206**	**2,862**	**$258,973,692**	**-11%**	**-9%**

Data provided by Sponsored Program Services. This data may also be viewed at **www.purdue.edu/business/sps/data/trendshome.html.**

A comprehensive monthly awards list, including search and sort capabilities, is available online. Please visit the OVPR website at **www.purdue.edu/research/vpr/** or scan the QR code at left to view on your mobile device.

Events

MAY

8th Annual KIST/PU Global Research Laboratory Symposium: Organ-on-a-Chip

» **When** May 16, 10:30 a.m.

» **Where** Martin C. Jischke Hall of Biomedical Engineering, Room 2001

» **Contact** Stephanie Bonebrake, **stephb@purdue.edu**, 494-0497

» **Website** **www.purdue.edu/discoverypark/bioscience/index.php**

» **Facebook** **www.facebook.com/bindleybiosciencecenter**

Dr. Ali Khademhosseini, associate professor at Harvard-MIT's Division of Health Sciences and Technology, Brigham and Women's Hospital and Harvard Medical School, and associate faculty at the Wyss Institute Biologically Inspired Engineering, will be the keynote speaker discussing, "Microengineered hydrogels for tissue engineering."

JUNE

International Association of Great Lakes Research Annual Meeting

» **When** June 2-June 6

» **Where** Purdue University West Lafayette Campus

» **Contact** Tőmas Hook or Cary Troy, **13programchairs@iaglr.org**

» **Website** **www.iaglr.org/iaglr2013/**

Purdue is host for the 56th Annual Conference on Great Lakes Research, which will feature plenary speakers and focused sessions that highlight studies of restoration and resiliency of the Great Lakes. Topics will include invasive species, climate change, land-use and eutrophication, contaminants, nearshore health, fisheries, data management and modeling, foodweb and ecosystem ecology, physical processes and stakeholder engagement.

NIPTE Research Conference: The Future of Pharmaceutical Manufacturing

» **When** June 18-19

» **Where** Conference Center, Building 2, the Universities at Shady Grove, Rockville, MD

» **Website** **www.NIPTE.org**

At this conference, the National Institute for Pharmaceutical Technology & Education (NIPTE), in collaboration with the Food and Drug Administration and representatives from industry, will explore the future of pharmaceutical manufacturing in the United States and the need for research to sustain a robust pharmaceutical manufacturing sector. Graduate and post-doctoral students from NIPTE universities, including Purdue, will present posters on their research. All pharmaceutical personnel and researchers are invited to this event.

IBCN Symposium Abstract Deadline

» **When** June 15

» **Contact** Kristine Swank, **kswank@purdue.edu**, 494-4674

» **Website** **www.purdue.edu/breastcancer**

The annual symposium for the International Breast Cancer and Nutrition group will bring together global public health actors, advocates and researchers on breast cancer prevention to discuss the impact of environmental factors such as food, stress and exercise on the genome. Abstracts are being accepted through June 15. Slots are available for oral presentations for scientists and research trainees. Abstracts are limited to 300 words.

AUGUST

Overview of Services of the OVPR and SPS

» **When** August 22, 11:30 a.m.–1:30 p.m.

» **Where** Stewart Center, Room 310

» **Contact** Sue Grimes, **sgrimes@purdue.edu**

» **Register** **www.purdue.edu/research/vpr/rschdev/events.php**

The Office of the Vice President for Research and Sponsored Program Services will host a workshop to provide an overview of Research Development, Research Integrity as well as Sponsored Program Services' Pre- and Post-Award Services.

SEPTEMBER

Bindley Industry Town Hall

» **When** September 6, 8 a.m.-5 p.m.

» **Where** Burton D. Morgan Center for Entrepreneurship

» **Contact** Stephanie Bonebrake, **stephb@purdue.edu**, 494-0497

» **Website** **www.purdue.edu/discoverypark/bioscience/index.php**

» **Facebook** **www.facebook.com/bindleybiosciencecenter**

Bindley Bioscience Center will host its first annual Bindley Industry Town Hall. Industry leaders will participate in a panel discussion to identify areas of growth and strategies that can be utilized to meet that growth and upcoming challenges.

NIH Overview: Institute/Center Mission and Strategies

» **When** September 17, 11:30 a.m.-1 p.m.

» **Where** Stewart Center, Room 310

» **Contact** Perry Kirkham, **pkirkham@purdue.edu**

» **Register** **www.purdue.edu/research/vpr/rschdev/events.php**

This workshop will provide an overview and an update on the various institutions of the NIH. It will also address their individual missions and plans, possible funding mechanisms and how to position yourself for a successful NIH-funded career.

The Women's Global Health Institute Annual Meeting

» **When** September 26

» **Where** Purdue University

» **Contact** Li Yuan Bermel, **lmi@purdue.edu**, 496-9316

» **Website** **www.purdue.edu/discoverypark/WGHI**

Institute progress update since the launching in March 2012, featuring the 2013 Awardees of Mildred Elizabeth Edmundson Research Grant. Participants will meet the Institute's External Advisory Council and Internal Steering Committee, discussing opportunities in creating training programs and research teams in women's health. Pilot grant opportunities will be announced.

OCTOBER

International Breast Cancer and Nutrition Symposium

» **When** October 11-13

» **Where** American University of Beirut, Lebanon

» **Contact** Kristine Swank, **kswank@purdue.edu**, 494-4674

» **Register** **www.purdue.edu/breastcancer**

The annual symposium for the International Breast Cancer and Nutrition group will bring together global public health actors, advocates and researchers on breast cancer prevention to discuss the impact of environmental factors such as foods, stress and exercise on the genome. ■

DIMENSIONS of DISCOVERY

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» Proposal Information, Transmittal to Agency; 494-6204; proposal@purdue.edu

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 Dimensions of Discovery is published four times a year by the Office of the Vice President for Research. Comments welcome. Send email to **burroff@purdue.edu**.

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