DIMENSIONS *of* DISCOVERY

≫ Building a Research Infrastructure for the Future

Welcome

From philosophical questions of human purpose to practical ones on oil spills and other disasters, Purdue research pushes the boundaries of knowledge, deepening our understanding of the world around us. In this issue of *Dimensions of Discovery*, we explore what philosophy might teach us about religious skepticism, why a computer cluster is greater than the sum of its individual processors, and which formula used in everyday bionanotechnology has enlightened the world on a very big petroleum problem. Look inside and learn more. □

Research activity at Purdue is alive and well. In fact, it's thriving, thanks to our faculty and staff, whose collaborations form the building blocks for an enduring research program.

During the 2010 fiscal year, we saw the largest increase in research dollars in the University's history. Funding from research awards surged from $342 million in FY '09 to $438 million in FY '10, a 28 percent jump.

Support from the American Reinvestment and Recovery Act (ARRA) was a significant factor in the increase, with several million dollars targeted for construction of new scientific research facilities. The National Institutes of Health provided $14.9 million for multidisciplinary disease, cancer, and life sciences laboratories at the Bindley Bioscience Center, while the National Institute of Standards and Technology awarded $11.75 million for a Center for High Performance Buildings at Herrick Labs.

Buildings and laboratories support these ambitious research initiatives, bringing together investigators from various disciplines to address scientific challenges. Our world-class facilities also allow the University to spearhead such large-scale projects as the George E. Brown Jr. Network for Earthquake Engineering Simulation (NEES), a network of 14 research sites funded with $105 million from the National Science Foundation.

PURDUE
UNIVERSITY

Another vital element of Purdue's infrastructure is its impact on the nation's priorities — life and health sciences; cyberinfrastructure and information technology; security, defense and space sciences; energy and environment; and science, technology, engineering, and mathematics (STEM) education. These are global grand challenges, and Purdue researchers are well-positioned to address them. The relevance of their expertise is visible when we read on the Internet that our Community Cluster Program has become an award-winning model for other universities (page 10), or when we see on TV one of our nanotechnology professors calculating the amount of oil spilled in the Gulf Coast (page 2).

That professor subsequently was invited to serve on the interdisciplinary National Incident Command's Flow Rate Technical Group — a recognition by government leaders that complex problems require deep knowledge across a breadth of disciplines. As scientists and policy makers increasingly focus on grand challenges, we'll see more of these interconnections, from partnerships between librarians and scientists to preserve and share data (page 8), to conferences that bring together philosophers, theologians, psychologists, and cognitive scientists to discuss religion, morality, and skepticism (page 3).

Throughout this issue, you'll see evidence of not only the myriad collaborations on campus, but also the many ways that our administrators and staff support these efforts. As networks between researchers strengthen, so will the framework that supports them. It's an exciting time for the University as we build a research infrastructure for the future. □

Richard O. Buckius
Vice President for Research

Nano Professor Provides Big Numbers on Oil Spill

As a mechanical engineering professor in the Birck Nanotechnology Center, Steve Wereley has devoted his career to studying gold chips, red blood cells, and other particles too tiny to view with the naked eye.

All that changed when a very big problem landed in his inbox on May 13.

NPR science correspondent Richard Harris was looking for an expert to approximate the amount of oil that had been gushing into the Gulf of Mexico since the April 20 Deepwater Horizon blowout. Since Wereley had co-written a textbook on particle image velocimetry, a method of obtaining fluid measurements, Harris asked him to review a 30-second clip from BP.

Wereley first created freeze-frame shots of the video to track movement over time, then, after calculating the trigonometric formula on paper, ran a computer analysis for verification. He estimated the flow at an average of 70,000 barrels a day — more than 10 times what BP had been claiming.

Within a few weeks, Wereley had been quoted in more than 800 media outlets, had testified before Congress, and had joined the National Incident Command's Flow Rate Technical Group, charged with providing official numbers to the U.S. government.

Once the leak was capped and more precise measurements could be taken, the group announced that initially 62,000 barrels of oil had been spilling daily, tapering to 53,000 by the time the valves were turned off. Remarkably, those numbers are within the range of Wereley's initial estimates, even though the original video he analyzed was short and low-quality.
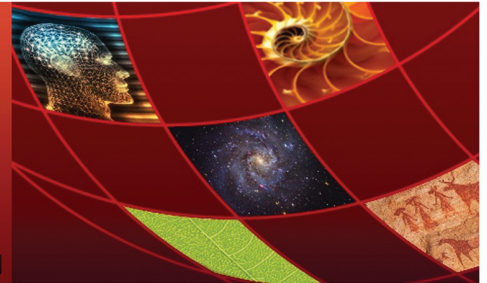
Professor Steve Wereley

"You have to be sure you're right before you go out in public with this," he says. "I came up with a number of 70,000 with my sticky pad, and wasn't sure what people were saying, but I Googled and learned the BP estimate was 5,000 per day. I thought, 'Oh man, that's a big number.' But I checked my numbers again and again and never got anything different." □

Prof. Steve Wereley (above, left) discusses his presentation on particle image velocimetry with Darion Grant, Summer Undergraduate Research Fellowship (SURF) 2010 graduate assistant, during the SURF symposium in August. Wereley was one of the keynote speakers during the symposium, which showcased the work of nearly 200 undergraduates involved in the SURF program this summer. Poster presentations (right and below) were part of the two-day event, which covered research topics ranging from biology to signal processing and networking.

Philosophy Professors Receive Templeton Award to Study Religion, Morality, and Skepticism

Is skepticism healthy in honing one's religious beliefs? Have moral ideas been shaped by human evolution? How can philosophers and theologians engage in more fruitful dialogues on religious knowledge?

Those questions and more will be addressed by two Purdue University professors through a $500,000 grant from the John Templeton Foundation.

Michael Bergmann, professor of philosophy and the project's lead investigator, will work on a 2011 summer seminar and a book entitled *Perceptual, Moral, and Religious Skepticism*, which will defend moral and religious belief against skepticism.

"Commitment to moral and religious beliefs is deep and central to people's lives, yet these same people sometimes have serious doubts about these beliefs," says Bergmann, an expert in epistemology and philosophy of religion. "One reason for such doubt is that people all over the world who are roughly equal in intelligence and goodwill have significant disagreements about moral and religious topics. These differences make people start to question their own beliefs."

Bergmann's co-principal investigator Patrick Kain, an associate professor of philosophy, will assist with a fall 2012 conference as well as post-conference publications with contributions from philosophy, theology, psychology, and cognitive science.

"The interdisciplinary aspect of the conference and the collection of papers is key to our project because it will help bring different perspectives together on this shared topic," says Kain, an expert on ethics and the philosophy of Kant. "We aim to stimulate more fruitful dialogue between philosophers and theologians on questions of moral and religious knowledge, and we believe that serious exchange with others, including psychologists and cognitive scientists, will be of mutual benefit."

For example, one area of overlapping interest concerns how moral and religious beliefs may have contributed to or been shaped by the evolution of humanity.
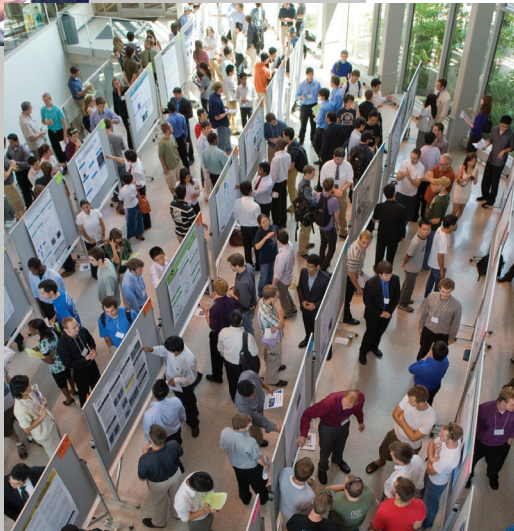
"Evolutionary psychologists have pointed out that these beliefs, such as 'murder is wrong' or 'you ought to be kind to others' have contributed to our survival as a species," Bergmann says. "What's interesting is the suggestion that these beliefs could be advantageous for the species and possess deep psychological roots even if they are entirely fictitious. This suggestion raises another skeptical challenge that deserves serious consideration." □

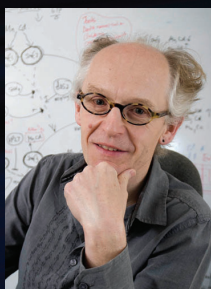*Writer: Amy Patterson Neubert is a communications/marketing specialist for Purdue Marketing and Media.*

McCoy Distinguished Lecture

David E Salt, PhD
Department of Horticulture and Landscape Architecture

IONOMICS:
A NEW APPROACH IN BRIDGING THE GAPS
BETWEEN GENOMES, ORGANISMS, AND
THEIR GEOGRAPHICAL DISTRIBUTION

David E. Salt, 2010 McCoy Award winner will lecture on Ionomics.

» **When**   November 2, 3:30 p.m.
» **Where** Fowler Hall

Reception
» **When**   November 2, 4:30 p.m.
» **Where** Stewart Center Art Gallery
             adjacent to Fowler Hall

The McCoy Distinguished Lecture was established to honor the Herbert Newby McCoy Award winner and to present to the Purdue community the nature of his or her research and its contribution to the field of science. □

Showalter Awards

Infant nutrition, retinal degeneration, and canine cancer stem cells are some of the research topics being investigated by Purdue's 2010 Showalter Award recipients.

Since 1975, Purdue researchers have benefited from grants through the Ralph W. and Grace M. Showalter Research Trust Fund. Eligible areas of research, as described by the benefactors, are air and water pollution, biochemistry, disease control and prevention, new technologies in food production, and medical and biophysical instrumentation.

This year's honorees are:

Kolapo M. Ajuwon, animal sciences, "The Role of Maternal and Infant Nutrition on Epigenetic Regulation of Metabolic Syndrome," $75,000

Gabriel J. Bowen, earth and atmospheric sciences, "Hydrological Controls on Nitrogen Dynamics in Artificially Drained Agricultural Watersheds," $75,000

David A. Colby, medicinal chemistry and molecular pharmacology, "Natural Products and Structurally-Related Derivatives for the Treatment of Parkinson's Disease," $75,000

Jennifer L. Freeman, health sciences, "Alteration of Reelin — a Nerve Growth Regulatory Gene by Low Dose Lead (Pb) Exposure: A Novel Mechanism of the Fetal Origin of Neurological Disorders," $75,000

Joseph P. Garner, animal science, "A Novel Rat Model of Pre-Diagnosis Cognitive Symptoms in Parkinson's Disease," $75,000

Julia Kirshner, biological sciences, "Nonlinear Optical Imaging to Measure Dynamics of Bone Marrow Colonization in a Novel 3-D Culture Model of Breast Cancer Metastasis," $75,000

Yuk Fai Leung and **Daisuke Kihara**, biological sciences, computer science/biological sciences, "Elucidating Genetic Pathways for Curing Retinal Degeneration," $75,000

R. Timothy Bentley, veterinary clinical science, "Canine Glioma Cancer Stem Cells as a New Translational Cancer Model," $72,000

Brian R. Overholser, pharmacy practice, "Calcium-Dependent Regulation of a Cardiac Voltage-Gated Potassium Channel: Mechanisms Underlying Atrial Fibrillation during Heart Failure," $63,000

Kinam Park, biomedical engineering, "Microcapsules for Long-Term Protein Delivery," $60,000 □

Clifford Kinley Trust Winners 2010

Six Purdue faculty members have received Clifford Kinley Trust awards for 2010 to pursue social sciences research. They are:

Azza H. Ahmed (PI) and **Jennifer A. Coddington (Co-PI)**, nursing, "Breastfeeding Outcomes and Perceived Maternal Self-Efficacy among Low-Income Mothers of Late Preterm Infants," $20,000

Jennifer Dobbs-Oats, child development and family studies, "Do Preschool Teachers' Beliefs Predict Their Students' Mathematics Learning?" $20,000

Jacob Hibel, sociology, "Examining Contextual Influences on the Special Education Placement of Immigrant Children," $20,000

German E. Posada (PI) and **Theodore D. Wachs** (Co-PI), child development and family studies, psychological sciences, "Home Chaos, Maternal Quality of Care, and Infant Attachment Security," $20,000

Laura J. Claxton, health and kinesiology, "Individual Differences in the Development of Executive Functioning and Motor Control in Preschool-aged Children," $19,214

Brigitte S. Waldorf, agricultural economics, "The Effect of Macroeconomic Shocks on the Food Stamp Program," $16,180

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. □

Birck Selects Inaugural Class of Graduate Student Ambassadors

Nine top Purdue University graduate students will form the inaugural class of the Birck Nanotechnology Center Graduate Ambassador Program. Students and their faculty advisors are:

» Drew Candebat (Prof. Joerg Appenzeller)

» Kuo-Ping Chen (Prof. Vladimir Shalaev)

» Pankaj Jha (Provost Timothy Sands)

» Sunhee Lee (Prof. Gerhard Klimeck)

» Kachi Odoemene (Prof. Marshall Porterfield)

» Lisa Reece (Prof. James Leary)

» Bob Sayer (Prof. Tim Fisher)

» Kyle Smith (Prof. Tim Fisher)

» John Wilcox (Prof. Jeff Gray)

The ambassadors will assist with Birck and Discovery Park tours, special events, presentations, research conferences, and other activities over the next 12 months. In return, they are eligible for travel grants of $250 or $500 for attending and presenting their research at technical conferences. □

Mark Your Calendar

2010-2011 Workshops Presented by the Office of the Vice President for Research

Please register online by accessing the events calendar at **www.purdue.edu/research/vpr**.

» **What** **OVPR Research Development Services and Sponsored Program Services Pre-Award Services**
» **When** September 28, 11:30 a.m. to 1:00 p.m.
» **Where** STEW 218AB
» **Speakers** Christine King, Sue Grimes, and Mike Ludwig

» **What** **Grantsmanship Workshops**
» **When** October 21

The Twelve Keys to Successful Grantwriting
8:30 a.m. to 12 noon

Successful Collaborative Projects
1:30 p.m. to 5:00 p.m.

» **Where** STEW 202
» **Speaker** Robert Lowman, University of North Carolina at Chapel Hill

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» **What** **Research Integrity and Regulatory Requirements**
» **When** November 3, 11:30 a.m. to 1:00 p.m.
» **Where** STEW 202
» **Speaker** Peter Dunn

» **What** **OVPR Industry Research Collaboration**
» **When** December 14, 11:30 a.m. to 1:00 p.m.
» **Where** STEW 322
» **Speakers** John Schneider, Jeff Gunsher, and Mary Millsaps

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» **What** **Post Award Services for Researchers: Departmental, College, SPS, and OVPR**
» **When** January 18, 2011, 11:30 a.m. to 1:00 p.m.
» **Where** STEW 322
» **Speakers** Mike Ludwig, Becky White, and Dave Kotterman

» **What** **OVPR and Discovery Park Roles in Large Interdisciplinary Proposals**
» **When** February 8, 2011, 11:30 a.m. to 1:00 p.m.
» **Where** STEW 322
» **Speakers** Christine King, Al Rebar, and Dave Kotterman

» **What** **Management of Intellectual Property**
» **When** March 15, 2011, 11:30 a.m. to 1:00 p.m.
» **Where** STEW 322
» **Speakers** Peter Dunn and Libby Hart-Wells □

→‖ DISCOVERY PARK

Discovery Park Appointments

Maureen McCann, professor of biological sciences, is the new director of the Energy Center in Discovery Park. Her appointment was effective August 1.

As director, McCann will oversee the Energy Center in advancing interdisciplinary research in areas such as bioenergy, clean-coal technologies, hydrogen, nuclear, solar, nanotechnology, wind, and water. She also serves as assistant head of the Department of Biological Sciences and director of the Center for the Direct Catalytic Conversion of Biomass to Biofuels, known as C3Bio. Affiliated with the Energy Center and the Bindley Bioscience Center in Discovery Park, C3Bio was funded with a $20 million U.S. Department of Energy grant in 2009 with the goal of maximizing the carbon and energy efficiencies of biofuel production.

McCann, who joined the Purdue faculty in January 2003, focuses her research on the molecular architecture of plant cell walls and synthetic biology approaches to incorporating catalysts in them for optimized conversion to liquid fuels. She received her PhD in botany at the John Innes Centre, a government-funded research institution in Norwich, England.

Richard Cosier, Leeds Professor of Management and former dean of the Krannert School of Management, has been named the Avrum and Joyce Gray Director of the Burton D. Morgan Center for Entrepreneurship. His appointment becomes effective January 1, 2011, following a sabbatical leave this fall.

Cosier, who served as the first director of the center when it was launched in 2004, joined Purdue in 1999 after appointments with the University of Oklahoma, Indiana University, and the University of Notre Dame. During his tenure as Krannert's dean, Business Week and U.S. News & World Report consistently ranked the school among the world's top business programs. Cosier has a PhD in business administration from the University of Iowa.

The Burton D. Morgan Center for Entrepreneurship is Purdue's premier interdisciplinary hub for entrepreneurship. Through its sponsored initiatives including the Certificate in Entrepreneurship and Innovation,

Technology Realization Program, Entrepreneurial Leadership Academy, and Business Plan Competitions, the center aims to stimulate entrepreneurship in the Purdue community and serve as a resource for the citizens of Indiana and beyond.

Elisa Bertino, professor of computer science, has been named interim director of Discovery Park's Cyber Center.

Bertino, who joined the Purdue faculty in 2004, also serves as research director for the Purdue-based Center for Education and Research in Information Assurance and Security (CERIAS). She has a doctorate in computer science from the University of Pisa and is considered a research leader in information security, database systems, and computer applications covering a range of areas from medicine to the humanities.

The Cyber Center, launched in 2005, is focused on creating systems and tools to disseminate and preserve scientific and engineering knowledge.

James Cooper, the Jai N. Gupta Professor of Electrical and Computer Engineering, has been selected as the interim director of the Birck Nanotechnology Center. He succeeds Timothy Sands, who became Purdue's new executive vice president for academic affairs and provost last spring.

Cooper served as Birck's first co-director during the $58 million facility's design, construction, and first year of operation. His research focuses on the physics of semiconductor devices, electron transport in semiconductors, interface effects, and integrated circuits. He received his PhD from Purdue in 1973, and spent the next ten years at Bell Laboratories, Murray Hill, New Jersey, before joining the Purdue faculty in 1983. ☐

Associate Deans of Research

Associate deans for research work closely with their deans, department heads, faculty, and graduate students and the Office of the Vice President for Research to facilitate research program development for their school or college.

» **College of Agriculture** — **Karen I. Plaut**, Director of Agricultural Research Programs, Associate Dean of Agriculture, Professor of Animal Science, 494-8362 or kplaut@purdue.edu

» **College of Education** — **James D. Lehman**, Associate Dean for Discovery and Faculty Development, 494-8474 or lehman@purdue.edu

» **College of Engineering** — **Melba M. Crawford**, Associate Dean of Engineering for Research; Professor of Agronomy, Civil and Electrical and Computer Engineering; Chair of Excellence in Earth Observation 496-3224 or mcrawford@purdue.edu

» **College of Health and Human Sciences** — **Tom J. Berndt**, Associate Dean for Research and Administration, Professor of Psychological Sciences, 494-7692 or berndt@purdue.edu

» **College of Liberal Arts** — **Mohan J. Dutta**, Associate Dean for Research and Graduate Education, Professor of Communication, 494-2587 or mdutta@purdue.edu

» **Krannert School of Management** — **Kwei Tang**, Allison and Nancy Schleicher Chair of Management and Associate Dean, 494-8265 or ktang@purdue.edu

» **College of Pharmacy** — **Eric L. Barker**, Associate Dean for Research, College of Pharmacy; Associate Professor of Medicinal Chemistry and Molecular Pharmacology, 494-9940 or barkerel@purdue.edu

» **College of Science** — **Joseph S. Francisco**, Associate Dean for Research and Graduate Education, William E. Moore Distinguished Professor of Physical Chemistry, 494-7851 or francisc@purdue.edu

» **College of Technology** — **Melissa J. Dark**, Professor and Associate Dean, Department of Computer and Information Technology, 494-2554 or dark@purdue.edu

» **School of Veterinary Medicine** — **Harm HogenEsch**, DVM, PhD, Diplomate ACVP; Associate Dean for Research, 496-3467 or hogenesch#purdue.edu

» **The Graduate School** — **Phillip E. Pope**, Senior Associate Dean, 494-4586 or ppope@purdue.edu

» **International Programs** — **Michael A. Brzezinski**, Interim Vice Provost for Global Affairs and Dean of International Programs, 494-5770 or mbrzezinski@purdue.edu

» **Libraries** — **D. Scott Brandt**, Associate Dean for Research, Professor of Library Science, 494-2889 or techman@purdue.edu ☐

→‖ PURDUE UNIVERSITY LIBRARIES

Purdue Libraries Host Events for Open Access Week 2010

In honor of International Open Access Week (**www.openaccess-week.org**), October 18-24, Purdue University Libraries will feature speakers, displays, and programs on open access issues relevant to the Purdue research community. The following events are planned:

Publishing for Global Impact
» **When**   October 20,
              3:30-5:00 p.m.
» **Where** Stewart Center, Room 311

A panel of faculty who edit and/ or publish in open access journals will discuss the advantages of open access, including the international dissemination of research and the fostering of interdisciplinary scholarship. Afterward, the Office of the Provost will host a reception and present the University's first Leadership in Open Access Award, created to reflect the priorities of the Committee on Institutional Cooperation and to recognize outstanding leadership in scholarly communication at Purdue.

Opening Doors to Access Data: How the Data Curation Profile can Guide Exploration of Research Outputs
» **When**   October 21, 3:00 p.m.
» **Where** Stewart Center, Room 322

Scott Brandt, associate dean for research and professor of library science, will present this program.

An Open Access Week display to promote general information about open access and Open Access Week will be showcased in a Stewart Center main hallway display case.

For more information on Open Access at Purdue, contact Beth McNeil, associate dean for academic affairs for the Purdue Libraries, at **memcneil@purdue.edu**. □

→‖ PURDUE UNIVERSITY LIBRARIES

Data Curation Profiles Shed Light on Data Management and Curation Practices

Supercomputers, the Internet, and other innovations have dramatically changed the way research is conducted, producing a nearly infinite amount of electronic data. Often that information has been gathered at great expense, and so it makes good economic sense to share it with collaborators and other researchers. But who should have access to it? How long is the data's shelf life? When should it be made available, and how will other researchers access it? Those answers can be addressed in a data curation profile.

A new tool in the field of information science, a data curation profile outlines how information can be stored and shared, based on the preferences of the researchers that collected it. Completed profiles not only govern the dissemination of the data, but also allow librarians to determine how best to build useful digital libraries. Profiles also can help academic institutions comply with the National Science Foundation's new data management plan requirement.*

Purdue University Libraries has taken a lead role in this trend, collaborating with the Graduate School of Library and Information Science at the University of Illinois, Urbana-Champaign on a $421,000 grant from the Institute of Museum and Library Services (IMLS) National Leadership. Through this project, entitled "Investigating Data Curation Profiles across Multiple Research Disciplines," researchers are analyzing data practices, comparing needs for archiving and sharing data in curation profiles, and creating formalized policies useful for data repositories.

Now Purdue Libraries has received an additional $187,000 from IMLS for a project titled "Understanding Curation through the Use of Data Curation Profiles." The grant will fund a series of workshops for around 370 academic librarians on data curation and management.

Purdue librarians, who have participated in 95 grant applications with Purdue faculty over the past five years, are using completed data curation profiles to not only determine how to appropriately store data but also to inform their own research in the library science field. Their research complements the Libraries' involvement in DataCite (**http://datacite.org**), an international consortium that promotes data sharing, increased access, and better protection of research investments.

For more information on Purdue's data curation profiles, visit **http://datacurationprofiles.org**. Or contact Scott Brandt, associate dean for research, at **techman@purdue.edu**, or Jake Carlson, data research scientist, at **jrcarlso@purdue.edu**. □

* The National Science Foundation soon will require investigators to include two-page data management plans in new proposals. The OVPR will provide more information as it becomes available.

International
OPEN ACCESS
WEEK

October 18-24, 2010
openaccessweek.org

→‖ RESEARCH INTEGRITY AND REGULATORY AFFAIRS

Investigator Disclosure of Significant Financial Interests

To comply with National Science Foundation and Public Health Service policies on research objectivity, Sponsored Program Services requires principal investigators (PI) to identify all individuals participating in their project who satisfy the definition of investigator (individuals responsible for the design, conduct, and/or reporting of proposed research). The PI and all other investigators must complete a one-page financial interest statement, noting whether the investigator or his or her dependents has a significant financial interest in the proposed research or educational project. If significant financial interests are reported, investigators must then submit a disclosure to the Office of the Vice President for Research.

A Web site with links to federal agency policies on objectivity in research, a list of PHS agencies, the definition of significant financial interest, examples of common significant financial interests, and copies of the financial interest statement and disclosure forms are available at **www.purdue.edu/research/ vpr/rschadmin/coi/index.php**. For more information, contact Voichita Dadarlat (**voichi@purdue.edu**, 496-1763) or Peter Dunn (**pedunn@purdue.edu**, 494-6840). □

Writer: Peter E. Dunn, associate vice president for research.

Satisfying the New NSF Requirement for Education in the Responsible Conduct of Research

All grant awards from proposals submitted to the National Science Foundation on or after January 4, 2010 will require grant recipients to provide education in the responsible and ethical conduct of research to all undergraduates, graduate students, and postdoctoral researchers supported by NSF grants. Institutions receiving the grants must develop a responsible conduct of research (RCR) education plan that outlines training and monitoring procedures.

To aid principal investigators (PIs) in satisfying this requirement, Sponsored Program Services will send e-mail reminders to PIs whose NSF-funded projects are subject to the new requirement. Soon, the Office of Research Integrity and Regulatory Affairs will initiate a process for identifying and monitoring training of relevant undergraduates, graduate students, and postdoctoral researchers.

Read more about Purdue's RCR plan and NSF requirements at **www.purdue.edu/ research/vpr/rschadmin/rcr/index.php**. For more information, contact Peter Dunn (494-6840 or **pedunn@purdue.edu**). □

Writer: Peter E. Dunn, associate vice president for research.

The Bindley Imaging Group (BIG) presents the first

Purdue Bioscience Imaging Symposium

When	September 8, 9:00 a.m. – 5:00 p.m.
Where	The Burton D. Morgan Center for Entrepreneurship, Room 121
Contact	Luanne Ludwig at 42276 or **lml@purdue.edu**

Purdue researchers are invited to attend this series of short talks on opportunities, capabilities and facilities for imaging in life science research. Campus experts will present a wide range of techniques and technologies along with example of biological applications. Both microscopic and whole animal imaging will be covered during the symposium, which will preview a series of imaging workshops to be held throughout the fall semester.

Visit www.purdue.edu/discoverypark/bioscience. □

A nanoscale look at an electron wavefunction bound to an impurity on a transistor — the research could aid in designing, engineering, and manufacturing nanoscale devices, as well as next-generation microchips and other electronics with nanoscale features. The image is related to Gerhard Klimeck's work performed on one of Purdue's Community Clusters.

Markus Lill
Medicinal Chemistry

"The price was excellent, but more importantly, the Rosen Center sets up and supports the computational infrastructure allowing my students and me to focus on our scientific endeavors."

→‖ INFORMATION TECHNOLOGY AT PURDUE

ITaP, Faculty Partnership Provides Ample, No-Hassle Research Computing

Norbert Neumeister doesn't hesitate when asked about the advantages of the Community Cluster Program operated by ITaP.

"It's the price and it's the convenience of having the cluster operated for you," says the physics professor, whose lab focuses on data from the Large Hadron Collider, the international particle accelerator that may expand knowledge of basic physics and the universe.

ITaP provides space, infrastructure such as racks and networking, and power and cooling for the cooperative supercomputers. Purdue's central information technology organization also handles storage, maintenance including software updates, end-user support, and security. The idea: let researchers concentrate on research, not on operating a high-performance computing system.

"You don't need a machine room," Neumeister says. "You don't have to hire somebody to run your equipment."

The clusters' faculty owners also save money. Because of group purchase agreements, Purdue saved $1.3 million on the Top 500-class clusters built in 2008 and 2009. Many faculty members have used the savings to buy more computing power than they could have otherwise. ITaP is readying another new cluster for the fall of 2010.

"One major advantage of participating in a community cluster is having access to large-scale high-performance computing at very low cost," says Ghadir Haikal, civil engineering professor.

Faculty members always have access to nodes they buy and potentially to many more. When parts of a community cluster are idle, they're shared with other users. Purdue's clusters keep busy 95 percent of the time, maximizing return on the investment.

"It gives you access to more computing power than you would be able to get on your own," says Scott Jackson, agronomy professor.

Campus Technology Magazine, which recognized the Community Cluster Program with a 2010 Campus Technology Innovators Award, called the program a model for other universities. Purdue was one of 11 winners from 500 nominations worldwide.

Purdue's success has prompted the University of Iowa to pilot a community cluster model in a new program on its campus, says Jerry Protheroe, Iowa's manager for research computing services.

"It gave us the confidence that, yes, this is the right thing to do. We've had researchers coming out of the woodwork asking to buy in," explains Protheroe, who has consulted with John Campbell, the ITaP associate vice president who oversees research computing, and Bill Whitson, director of research support at ITaP's Rosen Center for Advanced Computing.

Before building a cluster, staff members from ITaP and its research and discovery arm, the Rosen Center, consult with faculty

CMS Experiment at the LHC, CERN

Data recorded: 2010-Mar-30 11:04:37.067645 GMT(13:04:37 CEST)
Run: 132440
Event: 3111007
Lumi section: 139
Orbit: 36243167
Crossing: 1

members on desired features. Faculty members buy into the cluster using external grants and internal funds. ITaP then pools the money and negotiates reduced prices.

ITaP can put a cluster into service rapidly. In both 2008 and 2009, the organization held high-tech barn-raisings, with several hundred staff and volunteers assembling the units before noon.

Community clusters have increased Purdue's research computing capacity by more than 10 times since 2006 and attracted nearly 100 faculty members from more than 50 campus units. The clusters are used in diverse ways, from modeling climate change and developing new medications to studying Wikipedia's social structure and designing next-generation nanoscale electronics. Community cluster users range from those with one or a few nodes to researchers who have dozens or even hundreds, like Neumeister and Gerhard Klimeck.

Klimeck, an electrical and computer engineering professor who develops nanoscale models that work on tens of thousands of processors, can access some of the nation's most powerful research supercomputers. But the community clusters are vital to him. "You need something local to have preliminary scaling and development capabilities," he says.

Klimeck's nodes also support nanoHUB, an international resource for nanotechnology research and education. A major nanoHUB feature is the ability to use research simulation tools online.

"We use the community clusters transparently as a backbone for those computational services," he says. □

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

Joseph Francisco
William E. Moore
Distinguished Professor
of Physical Chemistry

"If I ranked the advantages, the ready access to computational resources for my students is number one."

Jayathi Murthy
Robert V. Adams Professor
of Mechanical Engineering

"We don't have to do this ourselves. They take care of these clusters. They install software. They test them out. I can't tell you how useful that is."

Other Computing Services Offered

» **DiaGrid**, www.dia-grid.org, is a distributed computing pool of nearly 30,000 processors, allowing jobs to be run on thousands of computers simultaneously. Access to the pool is readily available to any Purdue researcher. Popular applications have been or are being adapted to work on DiaGrid, including MATLAB, BLAST, and Microsoft Excel.

» **TeraGrid**, www.rcac.purdue.edu/teragrid, is the National Science Foundation's cyber-infrastructure for open scientific research. ITaP serves as Purdue's TeraGrid conduit, providing access to some of the nation's largest supercomputers. Through the TeraGrid, researchers also have access to real-time high-resolution satellite, radar, and other remote sensing data from ITaP's Purdue Terrestrial Observatory.

» **HUBzero**, www.hubzero.org, is a multifaceted Web-based tool for deploying and accessing computational research codes and visualizing and analyzing results. Through built-in social networking features, users can create online communities for collaboration, distribution of research results, and education. ITaP can host a hub for you, or you can host it yourself through an open-source version of HUBzero. □

→‖ SPONSORED PROGRAM SERVICES

Contact a Pre-Award Center for Proposal Development Support

Principal Investigators (PIs), remember to contact your pre-award center early in the process for assistance in developing proposals. Send your e-mail to:

College of Agriculture: **agpreaward@purdue.edu**

College of Education: **centralpreaward@purdue.edu**

College of Engineering: **coepreaward@preaward.edu**

College of Health and Human Sciences: **chhspreaward@purdue.edu**

College of Liberal Arts: **centralpreaward@purdue.ed**u

College of Pharmacy: **copreaward@purdue.edu**

College of Science: **cospreaward@purdue.edu**

College of Technology: **centralpreaward@purdue.edu**

Discovery Park: **spsdpark@purdue.edu**

Krannert School of Management: **centralpreaward@purdue.edu**

School of Veterinary Medicine: **vetpreaward@purdue.edu**

In your e-mail, please include the PI name, department, sponsor, deadline, and reference to sponsor guidelines when available. After the pre-award team receives this information, a pre-award specialist will contact you to begin work on your proposal.

For more information, contact Mike Ludwig, director of sponsored programs, 494-1063, **mrludwig@purdue.edu** or Lucia Anderson, director of business managers, 494-9452 or **lucia@purdue.edu**. □
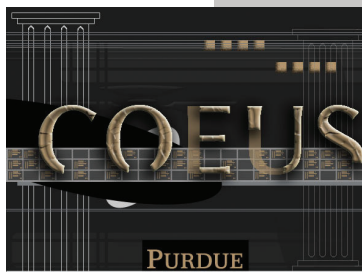
Complete a Request Form to use CoeusLite

Sponsored Program Services would like to remind faculty of the newly available CoeusLite application. CoeusLite is an investigator portal that provides faculty the ability to create and manage their own proposal records and budget estimates without administrative assistance. The Web-based application is accessible from any location in the world with an internet connection.

To begin using CoeusLite, simply complete the online Access Request form at **www.purdue.edu/coeus/Requests/access.html**. System access will be established immediately and a New Investigator User pack including login and navigation instructions will be returned by e-mail upon receipt of the request form.

For more information regarding the CoeusLite interface or Coeus functionality, contact Chris Tompkins at **tompkinc@purdue.edu** or the help list serve at **coeuslitehelp@purdue.edu**. □

Data provided by Sponsored Program Services

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» Agency for International Development
Total Federal
» Industrials and Foundations
» State/Local Governments
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» Foreign Governments
Total Non-Federal
Total Purdue System-wide

Comprehensive monthly awards list includes search and sort capabilities

A search and sort Excel file of sponsored program awards received is available online at **www.purdue.edu/research/vpr/.** *Included in the awards are non-competitive awards, such as Purdue Research Foundation research grants, Purdue assistantships, gift and voluntary support activities, fellowships, ARP/USDA awards, and industrial awards.*

Awards by Sponsor

Fiscal Year 2010
July 1, 2009 to June 30, 2010

	FY2009		FY2010		% Change	
	NO.	$ AMOUNT	NO.	$ AMOUNT	NO.	$ AMOUNT
	315	66,131,020	418	108,370,287	33%	64%
	275	52,161,902	288	81,356,290	5%	56%
	204	30,889,044	222	34,385,438	9%	11%
	121	26,781,702	133	54,002,269	10%	102%
	159	14,063,141	182	21,706,467	14%	54%
	73	6,303,114	65	5,191,685	-11%	-18%
	85	10,758,701	103	22,913,903	21%	113%
	31	6,347,220	29	6,414,531	-6%	1%
	16	1,883,962	14	1,294,263	-13%	-31%
	23	5,668,650	25	4,950,972	9%	-13%
	19	2,789,116	19	4,306,600	0%	54%
	1,321	$223,777,572	1,498	$344,892,706	13%	54%
	1,790	83,286,601	1,488	56,624,078	-17%	-32%
	200	24,678,983	205	27,870,167	2%	13%
	566	9,043,201	511	7,195,292	-10%	-20%
	27	1,384,153	31	1,457,505	15%	5%
	2,583	$118,392,939	2,235	$93,147,043	-13%	-21%
	3,904	$342,170,511	3,733	$438,039,750	-4%	28%

www.purdue.edu/research/vpr

Lectures, Symposia, Forums, Workshops

William E. Boeing Distinguished Lecture

» **When** September 7, 7:00 p.m.

» **Where** Fowler Hall, Stewart Center

» **Re** Maj. Gen. Charles F. Bolden Jr., NASA administrator and former astronaut, will be the featured speaker at this year's lecture. Read more and register online at **https://engineering. purdue.edu/AAE**. □

Global Warming Forum

» **When** September 27, 8:00 p.m.

» **Where** Loeb Playhouse, Stewart Center

» **Panelists** S. Fred Singer, Chairman, Science & Environmental Policy Project; Kenneth Haapala, Economist, Past President, Philosophical Society of Washington; Robert H. Socolow, Co-Director, The Carbon Mitigation Initiative, Princeton University; and Susan Avery, President and Director, Woods Hole Oceanographic Institution

» **Moderator** Moira Gunn, host of NPR's Tech Nation and BioTech Nation

» **Sponsors** Colleges of Engineering and Science, Global Policy Research Institute □

Purdue University Green Week 2010

In October, Purdue University will celebrate its third Green Week, a series of activities around campus to bring attention to sustainability issues.

» **When** October 4 – October 9

Watch for details from the Global Sustainability Initiative — led by the Centers for the Environment, Energy, and Purdue Climate Change Research Center. □

Introduction to XPS: What Should You Know About X-ray Photo Electron Spectroscopy?

» **When** September 22-23, 8:00 a.m.–5:00 p.m (2-day course) with an optional 3rd Day (9-24)

» **Where** Burton D. Morgan Center for Entrepreneurship, Room 129

» **Contact** Dmitry Zemlyanov at: dzemlian@purdue.edu or Melissa Schwartz at: lanem@purdue.edu

» **Registration & Additional Information** nano.purdue.edu/XPS/

Proposal Writing for Graduate Students

» **When** Wednesday, September 29, 7–9 p.m.

» **Where** Stewart Center, 214 ABCD

» **Contact** Peter Dunn, 494-3996 or pedunn@purdue.edu

» **Re** Register on the Graduate School's Professional Development Web site at www.gradschool.purdue.edu/development/

Company Fund Raising Boot Camp

» **When** October 11, 9:00 a.m.–4:30 p.m.

» **Where** Burton D. Morgan Center for Entrepreneurship, Room 121

» **Contact** Julie Goonewardene, jgoonewa@purdue.edu

International Symposium On Breast Cancer Prevention: Nutrition Communication And Public Policy

» **When** October 18 & 19

» **Where** Stewart Center

» **Contact** Kris Swank, 494-4674 or Sophie Lelievre (lelievre@purdue.edu)

» **Re** www.purdue.edu/breastcancer/

RCHE Fall Conference —
Bench to Bedside: The develop-
ment and application of
evidence-based guidelines

Regenstrief Center for Healthcare Engineering (RCHE) Lunch Speaker Series

The RCHE luncheon series highlights researchers whose work was initially funded through RCHE seed grants and is now funded through external sources.

> » **When**   Noon. See dates below.
> » **Where**   Mann Hall
> » **Contact** To register for these luncheons, please RSVP to rche@purdue. edu, no later than one week before the lunch. Please include the date you will be attending so the appropriate number of lunches can be ordered.

September 8, Jake Jensen, communication — "Using Narrative Persuasion to Increase Colon Cancer Detection in High-Risk Individuals: A Worksite Intervention"

September 22, Bart Collins and Melanie Morgan, communication — "Understanding Physician Support for Patient-Centered e-Health Systems"

October 13, Scott Schaffer, education — "Workplace Learning and Performance Improvement Initiative"

October 27, Lee Schwarz, management — "Modeling the Supply Chains for Healthcare Products" □

Pilot Funding for Research Use of Core Facilities

The Indiana Clinical and Translational Sciences Institute (Indiana CTSI) — a partnership between Purdue University, Indiana University, and the University of Notre Dame to accelerate clinical and translational research in Indiana — is accepting applications for Pilot Funding for Research Use of Core Facilities program through October 18. Guidelines and application forms are available on the Indiana CTSI HUB at **www.indianactsi.org/grants**; log in using your university career account username and password.

The proposals should come from investigators interested in up to $10,000 in services from one of the eligible CTSI-designated cores listed on the Indiana CTSI HUB Web site: **www.indianactsi.org/research/cores**.

Contact Thomas G. Sors, center project manager, at 494-1678 or **tsors@purdue.edu**. □

RCHE Fall Conference — Bench to Bedside: The development and application of evidence-based guidelines

> » **When**   September 20
>   8:00 a.m. – 12:30 p.m.
> » **Where**   Burton D. Morgan Center
> » **Re**   This half-day conference is ideal for those interested in research or employment in the healthcare industry. Featured speakers are Rick Norling, former president and CEO of Premier Inc., and Mark Chassin, president of the Joint Commission.
>
>   More information, including registration, is available at **www.purdue.edu/rche/ benchtobedside**. □

How Electronic Health Records are Transforming Nursing with Dr. Patricia Hinton Walker

> » **When**   October 22
>   8:00 a.m. – 3:00 p.m.
> » **Where**   Lawson 1142
> » **Re**   Join the Purdue School of Nursing and the Regenstrief Center for Healthcare Engineering for a presentation on advances, issues, and implications of electronic health records and informatics. Dr. Patricia Hinton Walker from the Uniformed Services University of the Health Services will be keynote speaker.
>
>   Read more and register online at **www.purdue. edu/rche**. □

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>> Research Services Directory

» General Information & Questions; 494-9806

» Vice President for Research; 494-6209; Richard O. Buckius, rbuckius@purdue.edu

» Discovery Park; 496-6625; Alan Rebar, rebar@purdue.edu

» Research Core Facilities; Cost Sharing; 496-1938; Jeff Bolin, jtb@purdue.edu

» Internal Competitions, 494-4231; Marietta Harrison, harrisom@purdue.edu

» Industry Research and Technology Programs; 494-0743; John Schneider, jas@purdue.edu

» Research Development; 494-6706; Christine King, hcking@purdue.edu

» Research Integrity and Regulatory Affairs; 494-3996; Peter Dunn, pedunn@purdue.edu

» Conflict of Interest; 496-1763; Voichita Dadarlat, voichi@purdue.edu

» Export Controls; 494-1852; Michael Reckowsky, mreckowsky@purdue.edu

» Human Subjects; 494-5942; Kristine Hershberger, kh@purdue.edu

» Animals; 494-7206; Lisa Snider, ldsnider@purdue.edu

» Biohazards; 494-1496; Bob Golden, rwgolden@purdue.edu

Award Information
» Sponsored Program Services; 494-1055; www.purdue.edu/sps

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

Technology Commercialization
» Patent & Copyright Information; 588-3475; Elizabeth Hart-Wells, otcip@prf.org

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Read *Dimensions of Discovery* online at » www.purdue.edu/research/vpr/publications/

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If you would like to be on the mailing list, please e-mail Linda Howell at lahowell@purdue.edu or Pam Burroff-Murr at burroff@purdue.edu.

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» expertise profiles for potential collaborators

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