Pitt Team Gets $13.9 Million Grant Renewal For Radiation-Exposure Countermeasures

By Courtney McCrimmon

Researchers at the University of Pittsburgh Cancer Institute (UPCI) and the University of Pittsburgh School of Medicine have been awarded $13.9 million over five years by the National Institute of Allergy and Infectious Diseases (NAID) to continue developing small molecule radiation protectors and mitigators that can be easily accessed and administered in the event of a large-scale radiological or nuclear emergency.

In 2005, NAID’s Center for Countermeasures Against Radiation program granted $10 million over five years to Joel Greenberger, chair of the Department of Radiation Oncology at Pitt, and his team of researchers with the University’s Center for Medical Countermeasures Against Radiation.

“With our previous funding, we dedicated our time to exploring the mitochondria—the energy generator of all cells—and developing drugs that could counteract damage caused by radiation exposure,” Greenberger said. “We proved that targeting small molecules to the mitochondria was a successful approach. With our current funding, we hope to accomplish a variety of goals, including gene identification for targeted therapies and finding a new approach to the development of radiation mitigators. We also hope to develop strategies to deliver the drugs quickly and intelligently to block mitochondria ‘wrong-doings’ that could lead to massive cell death after a nuclear event.”

Previous funding supported research examining several potent mitigators of radiation damage, including new classes of chemicals and known natural compounds. Greenberger’s team, in conjunction with a team of chemists led by Peter Wipf, Pitt Distinguished Professor of Chemistry, aided in the development of JP4-039, a drug that assists the mitochondria in combating radiation-induced cell death.

In addition, according to research from Greenberger’s laboratory, resveratrol, the natural antioxidant commonly found in red wine and many plants, proved to protect cells in mouse models from radiation when altered by a process called acetylation.

“Our work is truly a multidisciplinary effort in which the combined expertise and knowledge of biochemists, clinical researchers, chemists, pharmacologists, and pharmacists led to the successful development of novel protectors and mitigators against irradiation damage,” Greenberger said.

Pitt’s Regional Biocontainment Laboratory Gets $1.9 Million to Study Rift Valley Fever

By Clare Collins

The University of Pittsburgh Regional Biocontainment Laboratory (RBL) has received a $1.9 million contract from the U.S. Department of Defense (DOD) to explore long-sought treatments for Rift Valley Fever (RVF), which poses significant risks to U.S. military and civilian populations.

The contract from the DOD’s Defense Threat Reduction Agency will enable Pitt’s Regional Biocontainment Laboratory (RBL) to explore the biological processes that underlie disease caused by the RVF virus, a fever-causing viral disease that affects humans and domestic animals, such as cattle, buffalo, sheep, goats, and camels.

“RVF is a serious threat because it can spread very quickly through both animal and human populations,” said Amy L. Hartman, principal investigator of the project, RBL research manager and research instructor in the Pitt Graduate School of Public Health’s Department of Infectious Disease and Microbiology. “Epidemics have already occurred in Africa and Saudi Arabia, and the virus can potentially spread to the United States.”

Throughout the three-year project, Hartman and her team, including Doug Reed, RBL aerobiology manager and conversa- gator on the contract, will develop animal models of RVF that will mimic the disease seen in humans. “This research should help us understand more about how the virus causes disease in animals after respira- tory infection, with the eventual goal of developing drugs or vaccines that can offer wide-reaching protection to populations at risk,” she said.

The Center for Vaccine Research (CVR) at the University houses both the RBL, which is celebrating its second anniversary this month, and the Vaccine Research Labo- ratory. Researchers at the CVR develop new methods and strategies to prevent and treat infectious diseases, potentially improving and protecting global health.

“Pitt Is 11th Among U.S. Publics in ‘High Impact Universities’ Rankings

By John Baroith

The University of Pittsburgh places 11th among U.S. public institutions and 31st in the world in a new “High Impact Universities 2010” ranking conducted in cooperation with the University of Western Australia that benchmarks “the research output or performance of the world’s top universities.”

The other top U.S. public institutions in the ranking are Harvard, Stanford, MIT, Penn, Johns Hopkins, Columbia, Chicago, Cornell, Yale, Duke, NC, Northwestern, Rochester, and USC. Among the top foreign universities in the ranking are Cambridge, Oxford, Imperial College of London, and the University of Paris. Pitt outranks, among many others, Caltech, Dartmouth, Illinois, Indiana, Maryland, Ohio State, Princeton, Purdue, Rice, Rutgers, Texas, Virginia, and Washington University in St. Louis.

The authors of the ranking, published online at www.highimpactuniversities.com/index.html, say that their project “is all about promoting a move toward simplicity, transparency, and fairness in the process of performance or impact assessment of university research” [italics theirs]. The ranking uses what it terms a research performance index or RPI for each university, employing indices of quantitative measures “of the quality and consistency of publication [by faculty members] as measured by citations or references.” The authors say that these measures are “objective, verifiable, and difficult to manipulate.”

The online publication considers each institution as possessing “five broad facul- ties” that it ranks separately and designates as follows: medicine, dentistry, pharmacol- ogy, and health sciences; pure, natural, and mathematical sciences; engineering, computing, and technology; life, biological, and agricultural sciences; and arts, humanities, business, and social sciences. The highest ranking of the Pitt faculty categories is the first—in medicine, dentistry, pharmacology, and health sciences—which is No. 6 among U.S. public institutions, No. 12 among all U.S. institutions, and No. 16 in the world, followed by the life, biological, and agricultural sciences category, in which Pitt is No. 8 among U.S. publics, No. 20 among all U.S. institutions, and No. 31 in the world; and the arts, humanities, business, and social sciences category, in which Pitt is ranked 16th among U.S. publics and 28th in both the U.S. and the world.

The RPI for each institution “is a percentage, indicating its overall quality and consistency as well as equal contributions from all faculties, as measured relatively to a world ‘dream team’ comprising all the best faculties in the world.”

According to the ranking’s publication policy, the faculty publications used for the ranking were those appearing between 2000 and 2009 inclusive and were “restricted to journal and conference articles and authored and edited books,” while restrictions were placed on the sources of citations.
Three University Center of International Studies (UCIS)-affiliated centers at the University of Pittsburgh recently received funding from the U.S. Department of Education. The centers are the Center for Russian and East European Studies (REES), the Center for Latin American Studies (CLAS), and the International Business Center (IBC).

REES received a first-time designation as a Title VI Comprehensive Resource Center (NRC)—it was formerly designated as a National Resource Center (NRC) by the Department of Education. REES received about $1.45 million in Title VI funding for Foreign Language and Area Studies Fellowships. The funding awards follow the Pitt Global Studies Program’s recent first-time designation as a National Resource Center (NRC) by the Department of Education. REES also received about $1.45 million in Title VI funding for Foreign Language and Area Studies Fellowships.

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The funding awards follow the Pitt Global Studies Program’s recent first-time designation as a National Resource Center (NRC) by the Department of Education.
Building Blocks of Creation: The Age Of NanoScience and Technology

By Jeffery Fraser

Each year, scientists are making discoveries that advance our understanding of nanoscience, lending substance to the speculation that nanotechnology is a revolutionary force that will profoundly change everything, from the electronics we use to the way doctors practice medicine.

For the most part, the scientists doing the heavy lifting are university-based researchers in physics, chemistry, engineering, biology, and other fields who—given the tools and freedom to explore—are laying the foundation for technologies few thought possible. Prominent among them are the more than 50 University of Pittsburgh researchers who are making significant contributions to the development of nanotechnologies, an endeavor that became a national initiative more than a decade ago.

Today, Pitt researchers are:
• developing special coatings with nanoparticles that prevent surfaces from icing
• investigating materials containing nanosize bits of semiconductor material to solve one of the chief problems standing in the way of making paint convert sunlight into electricity; and
• integrating biology and nanotechnologies to develop highly sensitive, easy-to-use biosensors that push the boundaries of diagnostic medicine.

These researchers’ exploration of nanoscience has led to homemade devices with remarkable capabilities, including a microscope capable of capturing on film light trapped within metal particles. They’ve set out to discover never-before-seen nanoparticles with properties that could nudge science closer to realizing true quantum computing with the potential for speeds and computational power that would make today’s computers seem snail-like. And Pitt scientists are among the most proactive in assessing the impact these emerging nanotechnologies may have on human health and the environment, as well as in investigating ways to make these technologies safer.

A Matter of Scale

The prefix nano means 10^-9, or a billionth. A nanosecond is one billionth of a second; a nanometer, one billionth of a meter. At that scale, the head of a pin seems large, measuring about 2 million nanometers. Nanoscience, therefore, is the study of the world around us at the timest of levels. In this field, atoms and molecules are the building blocks for creating new materials and machines. The federal government defines nanoscience as the understanding and control of matter at dimensions between 1 and 100 nanometers; Pitt directs its research towards the smaller, more challenging end of that range, at 1-20 nanometers.

But size is only part of the intrigue, because materials at nanoscale possess remarkably different properties than their larger counterparts. “Very interesting things happen in that range,” says George Klinzing, vice provost for research at Pitt. “If you are looking at friction, it’s different at the level of 1-20 nanometers than it is in large particles of hundreds or thousands of nanometers. The basic laws are different. Understanding that is very important—and challenging. How are you going to manipulate these things? How are you going to make things if you’re not sure how they’ll behave? We put a lot of effort into understanding that.”

The potential impact of nanotechnology on human health, the economy, and national security led President Bill Clinton to establish in 2000 the National Nanotechnology Initiative (NNI) as a multiagency framework to ensure U.S. leadership in the field by investing in basic research to understand nanoscale phenomena and facilitate technology transfer. Since then, NNI funding has risen approximately fourfold, from $462 million to nearly $1.8 billion in fiscal 2010. Pitt’s traditional strength in materials research meant that, even before NNI, University researchers in fields ranging from chemistry to physics were investigating nanoscience with the support of a growing number of federal agencies eager to develop the new technology. In December 2002, under the leadership of then-Provost James V. Maher, Pitt created the Institute for NanoScience and Engineering to support and integrate the work of the increasing number of faculty from diverse disciplines embarking on nanoscience research.

Within four years, the Institute was renamed the Petersen Institute for NanoScience and Engineering (PINSE). The institute’s Benedum Hall home was renovated to accommodate a state-of-the-art nanofabrication and characterization facility, the range of sophisticated instruments available to researchers expanded significantly, and, with a $5 million gift from the Petersens, an endowment was created to support the work of Pitt’s scientists.

An Uncommon Resource

Today PINSE stands as one of the most up-to-date, comprehensive institutes for nanoscale research on a university campus, offering scientists an uncommon asset for doing science at nanoscale and for securing external support for their work.

Few universities provide facilities and instruments to both characterize and fabricate nanomaterials in one place. "From..."
The Age of NanoScience and Technology

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In 2009, PINSE opened its doors to researchers beyond the Pitt campus, including individuals in industry and at other academic institutions. About a half-dozen PINSE-affiliated faculty also are engaged in collaborative research projects with various companies, and the list is expected to grow as the University steps up efforts to form industry partnerships around nanotechnology.

PINSE-affiliated faculty also are developing undergraduate and graduate-level coursework in nanoscience and nanotechnology, including entry-level courses in electrical engineering and a laboratory course that allows undergraduates to experience working with the leading-edge instruments and other amenities in the characterization and fabrication facility. “The philosophy is not only to educate our students in the theory, but also to give them hands-on experience as well, because we see more and more job openings in the emerging nanotechnology industry,” says Kim.

Recognition at the Highest Levels

Nano technology research at Pitt is showing significant potential for helping to develop the kind of longer-term industry partnerships the University seeks. That is the result of several factors, including the expertise of faculty members, the breadth of that expertise and their experience, and the expanding list of their accomplishments and awards.

PINSE-affiliated faculty are involved in more than 100 nanoscience-related research projects during any given year. Their work is supported by an estimated $12 million in grants from federal government agencies, ranging from the National Science Foundation (NSF) and the Department of Energy to the Department of Defense and the National Institute of Standards and Technology. Many faculty have received prestigious awards, including at least 10 PINSE-affiliated scientists who have earned an NSF Career Award.

In fact, Pitt is regularly ranked among the top seven universities in both nanotechnology research and commercialization by Small Times, the leading nanotechnology trade publication. “Its breadth of expertise, resources, and publishing activities,” the magazine recently wrote, “puts Pitt near the top for micro and nanotech research.”

A Quantum Challenge

For decades, quantum computing has been a grand challenge for physicists seeking to realize nanoscience’s potential for surpassing the speeds and computational abilities of today’s best computers. Jeremy Levy’s ambitious experimental research program is directly addressing the many challenges that must be overcome to reach that elusive goal.

Levy, a professor of physics and astronomy in Pitt’s School of Arts and Sciences and director of the Center for Oxide-Semiconductor Materials for Quantum Computation, works to understand and create nanoscale structures, investigate their properties, and discover new physics in the process. His laboratory specializes in a class of materials known as complex oxides, which act somewhat like semiconductors but have a more robust behavior.

Working with a system consisting of two oxides—a layer of lanthanum aluminate about 1 nanometer thick grown onto strontium titanate—Levy found that the
interface between the two materials can be switched between a conducting phase and an insulating phase. His lab also invented a method to control the process, which, he says, is reminiscent of an Etch A Sketch® toy. From these oxide nanostructures, his lab was able to make a transistor roughly 1,000 times smaller than those used in today’s computers.

His work with oxide nanostructures has implications for advancing the basic science that underlies quantum computing. Recently, he was awarded a $7.5 million Multidisciplinary University Research Initiative grant from the U.S. Air Force Office of Scientific Research to support his work on quantum preservation, simulation, and transfer in oxide nanostructures. “What we are trying to do is to develop new types of quantum technology that utilize the properties of superconductors,” says Levy. In one of those projects, researchers in Levy’s lab are trying to discover new particles that have been predicted but never observed before in the universe. These particles possess topological properties that allow them to be “braided” in ways that offer advantages for developing a quantum computer, such as making it more tolerant of errors. “We are dealing with some of the most challenging parts of quantum computing,” Levy says.

**Back to the Future**

When it comes to nanomachines, none have been around longer than a prolific and diverse population of viruses known as bacteriophages. Recent evidence suggests these microorganisms evolved in nature at least 3.5 billion years ago, perhaps near the beginning of life itself—the “original nanomachines,” Roger Hendrix calls them.

One notable attribute of bacteriophages is their ability to infect bacteria. They can penetrate bacterial cells, become one with them, and either kill or alter them. But they are not well understood, despite their advanced age and the fact that some 10 million trillion trillion individual bacteriophages are estimated to be roaming the planet at any one time.

A Distinguished Professor of Biological Sciences in Pitt’s School of Arts and Sciences, Hendrix studies how bacteriophages—which have been refined by natural selection over billions of years of existence—are assembled from their component parts. Each bacteriophage has a protein shell for a head and a tail that is part of the machinery for injecting DNA into the cell that it infects.

Of particular interest to Hendrix is the introduction of DNA during the head assembly process and the elaborate rearrangement the protein shell then undergoes to make it more stable, sturdy, and resistant. The tail assembly also has its mysteries to solve. One is understanding how the tail is assembled to the same length for all bacteriophages in a population.

“It’s a general question about how you assemble biological structures or nanostructures,” says Hendrix. “How are the dimensions determined? If you’re making a structure out of identical bricks, how do you know when to stop piling up the bricks?”

Answering such questions about bacteriophage assembly could have implications for the development of a range of nanotechnologies. “These nanomachines are more sophisticated than anything anyone can build in the lab these days,” says Hendrix. “So understanding how they work is informative for understanding how we can make nanomachines.”

Roger Hendrix, Distinguished Professor of Biological Sciences in Pitt’s School of Arts and Sciences, studies bacteriophages, which are viruses that evolved at least 3.5 billion years ago. In his laboratory, Di Gao is investigating single-molecule machines. Using a scanning tunneling microscope, for example, he can shoot single electrons into a molecule and learn how its internal structure can be manipulated. It’s a step into the next frontier in electronics.

“In there going to be a limit on how far conventional electronic devices can be shrunk,” Petek says. “At some point, rather than using silicon, there may be advantages to using molecular materials. Single-molecule devices represent the smallest miniaturization of a device one can imagine.”

**Ice and Sun**

In his laboratory, Di Gao is investigating ways of modifying surfaces with nanoparticles that some day might lead to ice-proof roads, while also exploring the use of nanowire arrays to solve a stubborn problem confounding the development of a promising new technology for harnessing the power of the sun.

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It could also lead to enhancing efficiencies of photovoltaic devices. “By bending light, this approach, this structure, allows the light to interact with thin-film solar cell material at longer distances,” says Kim. “That means better absorption and better utilization of that solar energy, which produces higher efficiencies in electricity generation.”

Photovoltaic Paint

Among the potential benefits of nanoparticles is the possibility of finally solving one of the major problems standing in the way of realizing a commercially viable photovoltaic paint able to convert sunlight into electricity. Although the world is moving closer to such a solar-power paint, available technologies fall short of reaching the needed conversion efficiencies because too few of the solar photons they absorb are converted into electrons. One scientist working on that problem is David Waldeck, a professor of chemistry and chair in Pitt’s Department of Chemistry in the School of Arts and Sciences, whose research interests include understanding and controlling electron motion on nanometer scales. Waldeck’s laboratory is making composite materials of nanoscale bits of semiconductor that are mixed with a conducting polymer material. These semiconductor nanoparticles have several advantages. “We are able to tune the color of light they absorb and where their energy levels lie by changing their size,” says Waldeck. “By changing the surface coating on the nanoparticles, we can place them at the interface of two different polymers and absorb most of the light at the boundary of the polymers. Because we can make one of the polymers be a cathode and the other polymer an anode—like the poles of a battery—absorbing the light at that boundary allows us to very efficiently drive the electron from one phase to another.”

Such a development would offer a more efficient and less expensive process for converting light into electricity. “If it all works, you will be able to ‘paint’ your roof one day, plug it in, and save on your electricity bill. That’s the basic idea.”

Another research interest of Waldeck’s is understanding how to manipulate light on nanometer-length scales. This work has led to a collaborative project with Joanne Yeh, a professor in the Pitt School of Medicine’s Department of Structural Biology,

In his laboratory, Di Gao is investigating ways of modifying surfaces with nanoparticles that some day might lead to ice-proof roads, while also exploring the use of nanowire arrays to solve a stubborn problem confounding the development of a promising new technology for harnessing the power of the sun.

Gao is applying his study of superhydrophobic surfaces to develop coatings that prevent the conditions necessary for icing to begin. Particle size, in particular, is critical. And if making an anti-icing material is the goal, smaller is better. Gao’s laboratory exploits that scientific fact by developing coatings that are a blend of polymers and nanoparticles small enough to deny supercooled water the nucleation center necessary for ice to form.

“Water basically gets bounced away,” says Gao, an assistant professor of chemical and petroleum engineering and a W.K. Whitford Faculty Fellow, is discovering how nanoparticles can be used to prevent ice buildup on road surfaces as well as on airplane wings and power lines. Above, Gao works with Ashish Het, a fourth-year PhD student. The large machine in the background is an X-ray diffractometer, which is used to examine the crystallinity of materials.

Gao’s laboratory is also focusing its expertise on improving the efficiency of dye-sensitized solar cells, an emerging technology with the potential to harvest energy at a wavelength that silicon-based cells find too few of the solar photons they absorb. One problem with current dye-sensitive solar cells is their disordered nanoparticle network, which requires electrons to hop between particles. Gao is trying to solve that problem by using ordered, or vertically aligned, titanium oxide nanowire arrays, which, he says, “give the electrons a freeway to get out of the cell and improve the electron transport efficiency of the anode.”

Unconventional Optics

A basic premise of conventional optics is that light bends in a certain way when it enters a different medium. PINSE codirector Kim is interested in manipulating light in novel ways that cannot be achieved with conventional optics.

One of his interests in particular is making light bend the opposite way from its natural way of bending—and developing new nanomaterials that will allow that to be exploited as a platform for new applications ranging from extremely high-resolution imaging to advanced photovoltaic devices.

While the potential for so-called negative-index metamaterials has been recognized and pursued for several years, moving the technology from the laboratory to real-world applications has been problematic. In most approaches, for example, light is lost as it travels through the metamaterials. And these materials work only for a narrow spectral range. Both drawbacks limit the materials’ practical usefulness.

Kim, however, is taking a different approach, developing a nano-optic structure that can bend light in a negative direction, in a way that is amenable to a wide range of wavelengths, is relatively easy to fabricate, and is almost lossless, meaning that light passes through it with minimal loss of energy. Such properties open the door to a host of possible advanced uses.

For instance, the new nano-optic structure, when used for imaging, could make it possible to produce smaller transistor patterns. The structure also has promise as an advanced lens capable of observing extremely small objects, achieving higher-resolution imaging than is currently available.
Among the potential benefits of nanoparticles are the possibilities of solving such problems as developing a viable photovoltaic paint able to convert sunlight into electricity ... or highly sensitive biodegradable sensors for early detection of diseases.

Supersensitive Detectors

Turning carbon nanotubes into chemical and biological sensors is one of Alexander Star’s research interests. His research group recently used tubes with diameters 100,000 times smaller than a human hair to develop a sensor that can warn asthma sufferers of an impending attack.

The sensor detects concentrations of nitric oxide in human breath. Nitric oxide is a marker of inflammation. Rising levels of the gas suggest a buildup of inflammation in the airways, which can predict an asthma attack.

A nanotube’s advantage in detection is its extremely small size. When gas molecules like nitric oxide bind to the surface, they significantly impede the flow of electrical current—an event that can be detected.

“Ideally, such sensors could be sold in pharmacies, like glucose sensors that test glucose levels in blood,” says Star, an assistant professor of chemistry at Pitt. “People would be able to detect the nitric oxide levels in their breath and take their asthma medication as a preventive treatment.”

Star’s lab also found that cup-like nanomaterials can be built with nitrogen by stopping their growth at small segments. The lab is investigating how these nanocups can be joined to form hollow capsules, which might someday be used for targeted drug delivery. “We can figure out how to fill them with drugs and hopefully use them as next-generation therapeutic systems,” Star adds.

For that to happen, nanomaterials must be made to safely degrade in the human body. Star’s research includes investigating the impact such materials have on the environment and on human cells. His lab, for example, was the first to discover that enzymes derived from horseradish could be used as a catalyst for degrading nanotubes.

Recently, the first human enzyme capable of biodegrading carbon nanotubes was identified by an international team of researchers led by Valerian Kagan, a professor and vice chair in the Department of Environmental and Occupational Health in Pitt’s Graduate School of Public Health. Tests on mice have suggested that inhaling carbon nanotubes can result in severe inflammation in the lungs and early onset of fibrosis. The researchers found that nanotubes degraded with the human enzyme myeloperoxidase did not cause lung inflammation.

The findings suggest that carbon nanotubes might someday be developed as a safe method of delivering drugs and that a natural treatment for people exposed to carbon nanotubes is possible.

Pitt researchers, in fact, have been among the most proactive in investigating the potential adverse effects of nanotechnology. “Carbon nanotubes are being used in products, and companies want to produce them in large quantities,” says Star, who was among the researchers involved in the Kagan study. “It’s only appropriate to look at how they affect the body and the environment.”

Far-Reaching Contributions

In microelectronics, basic research in solid-state physics and semiconductor materials led to new circuitry, small-scale chips, and other advances from which powerful personal computers, cell phones, and other technologies widely used today have evolved. The NNI, more than a decade ago, envisioned nanotechnology taking a similar trajectory, starting with understanding the underlying science and creating simple materials before evolving to more advanced materials and structures.

“Good research has specific goals,” says Vice Provost Klizing. “Often the goal is to answer an important question, improve an existing technology, or create a transformational technology. The importance of these goals is in proportion to their capacity to help improve the quality of our lives, reduce suffering, and lift the human spirit.”

Pitt nanoscience investigators, accept-ing these challenges, are well positioned to make more than incremental advances. “We anticipate making more fundamental contributions in the future that will be even more far-reaching,” says Kim.
Concerts


"Pittsburgh Coda Camp 2010," event to help promote software development in the community, 8 a.m.-5 p.m. Oct. 16, 5th and 6th floors, S word Square, Pittsburgh.Net Users Group, 412-716-2594.

"Critical Role of Neuroprotection and Recovery," Steven H. Graham, Connolly Family Chair, Stroke Institute, Pitt School of Medicine, 4 p.m. Oct. 12, 2500 Povair Hall, Provost Inaugural Lecture, 412-624-5750.

"Economic Hit Man Details His Experience Exploiting Latin America and the Middle East," John Perkins, New York Times best-selling author, 8 a.m. Oct. 14, Auditorium, Soldiers and Sailors Memorial Hall & Museum, 4141 Fifth Ave., Oakland, Pitt Women’s Studies Program, wstudies@pitt.edu.


"Poetry Reading," Jennifer Kwon Dobbs, assistant professor of English, St. Olaf College, 4 p.m. Oct. 15, 208B Cathedral of Learning, Pittsburgh Consortium for Adoption Studies, mnyov@pitt.edu.

"August Wilson’s Pittsburgh," Pitt history professor Laurence Glasson, 2 p.m., Synod Hall, 125 N. Craig St., Oakland, St. Paul’s Cathedral’s Race & Reconciliation Dialogue Group, 412-681-8528.

Miscellaneous


"First Person plural" (2000), directed by Deann Borshay Liem, 7:30 p.m. Oct. 14, 4130 Povair Hall, Pittsburgh Consortium for Adoption Studies, mnyov@pitt.edu.

"Oral Presentations," workshop, 10 a.m. Oct. 16, Lecture Room 2, Scaife Hall, Pitt Survival Skills and Ethics Program, 412-578-3716, survival@pitt.edu.

"Economic Hit Man Details His Experience Exploiting Latin America and the Middle East," John Perkins, New York Times best-selling author, 8 a.m. Oct. 14, Auditorium, Soldiers and Sailors Memorial Hall & Museum, 4141 Fifth Ave., Oakland, Pitt Women’s Studies Program, wstudies@pitt.edu.


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