

University Update

Budget-Building in the Face of Historic Cuts

To: Members of the
University Community

From: Mark A. Nordenberg

Date: July 8, 2011

A Year of Progress and of Challenge

The year just closed was another in an unbroken succession of years characterized by high performance and remarkable progress at Pitt. It was a year that saw inspiring examples of individual accomplishment emerge from within each of the University's constituent groups. It also was a year in which key measures of institutional progress continued their dramatic climb.

Two telling examples convey a clear sense of our still-building momentum in education and research. We set yet another record in applications to the undergraduate programs on the Oakland campus and know that next fall's freshman class will be the strongest in Pitt history. And though a precise calculation of research expenditures cannot be made until the books are formally closed, we already know that we will have smashed our previous record for research expenditures and will be at or near \$800 million—an incredible sum that is important not only for our work but because of the nearly 3,000 jobs those funds support in the regional economy.

Despite these significant successes, though, both the past year and the year ahead almost certainly will be known mainly for the serious challenges they have and will present, particularly in terms of state funding. In opening his first budget address—delivered on March 8, exactly four months ago today—Governor Corbett noted that he had inherited a deficit of more than \$4 billion and pointedly remarked, “A nation that once produced wealth beyond calculation has now produced debt beyond reckoning.” He went on to describe the process of dealing with that large deficit in everyday terms:

“In many ways what we need to do is the same as reviving an abandoned apple tree. If the tree isn't tended and the branches pruned that tree will grow into a tangle of limbs and leaves. But it will bear no fruit. We need to take this tree, so long overgrown, and cut back what isn't fruitful. And we need to do that essential pruning on all branches of government. We need to do the hard cutting so the tree can once again bear fruit. And that fruit is jobs.”

A Key to Individual Dreams and Collective Prosperity

From the individual perspective, public higher education has long been viewed as a critical avenue of access to the American dream—a dream that is built on the successful pursuit of meaningful and rewarding employment. Just this week, the Brookings Institute issued a paper provocatively titled “Where is the Best Place to Invest \$102,000—In Stocks, Bonds, or a College Degree?” According to the authors:

“The answer is clear: Higher education is a much better investment than almost any other alternative, even for the ‘Class of the Great Recession’ (young adults ages 23-24). In today's tough job market, a college degree dramatically boosts the odds of finding a job and making more money.

“On average, the benefits of a four-year college degree are equivalent to an investment that returns 15.2 percent per year. This is more than double the average return to stock market investments since 1950, and more than five times the returns to corporate bonds, gold, long-term government bonds, or home ownership. From any investment perspective, college is a great deal.”

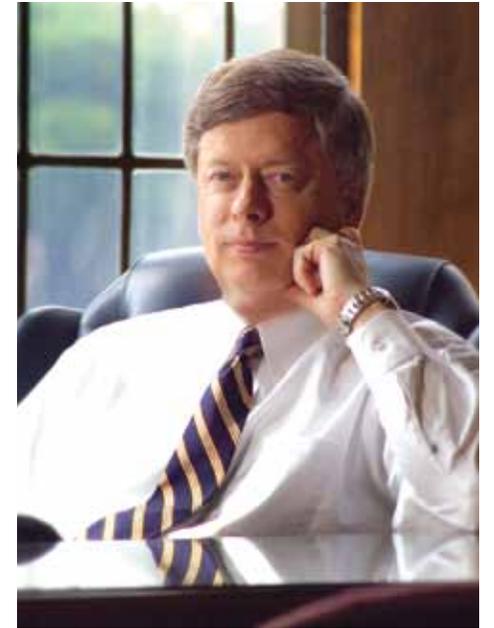
The authors also note that the returns on a college degree extend beyond the significant benefit of lifetime earnings that are, on average, \$570,000 higher than the earnings of a

high school graduate, citing as examples that “college graduates are healthier and live longer than high school graduates” and “have higher job satisfaction than people with lower levels of education.”

“On average, the benefits of a four-year college degree are equivalent to an investment that returns 15.2 percent per year. This is more than double the average return to stock market investments since 1950, and more than five times the returns to corporate bonds, gold, long-term government bonds, or home ownership. From any investment perspective, college is a great deal.”

—Brookings Institute

The broader benefits to the collective good of a well-educated citizenry have been formally recognized since the time of Pitt's founding nearly 225 years ago and were underscored when Pitt became a state-related university 45 years ago. Particularly in the innovation economy of the 21st century, it also has come to be recognized that university research sits at the heart of most commercial innovation and economic progress. Certainly, Pitt research has played a key role in the “rebirth” of this region's economy. In fact, when it comes to jobs, Pitt



Mark A. Nordenberg

can be viewed as a “triple threat”—a major educator of the current and future workforce, a major employer in its own right, and a major generator of the ideas that will spawn new industries, new companies, and new jobs.

Continued on page 8

Pitt to Host Third Annual Summit of the Hesselbein Global Academy



Pitt alumnus Frances Hesselbein (right) and retired Brigadier General Belinda H. Pinckney, who will deliver the July 25 Hesselbein Lecture in the O'Hara Student Center.

By Patricia Lomando White

The University of Pittsburgh is once again opening its campus to students from around the globe who want to learn to be engaged, informed, innovative leaders from world-renowned professional mentors at the third annual Student Leadership Summit of the Pitt Hesselbein Global Academy for Student Leadership and Civic Engagement, to be held July 23-26 on the University's

Pittsburgh campus.

The by-invitation-only summit—comprising a series of daily workshops—will open at 3:30 p.m. July 23 and conclude at noon July 26 in the William Pitt Union. A highlight of the summit is the Hesselbein Lecture at 5 p.m. July 25 in the O'Hara Student Center (formerly the Concordia Club), featuring retired Brigadier General Belinda

H. Pinckney, who served in the U.S. Army for 34 years and is a leading authority on diversity, leadership, and family relations in the military. Pinckney's lecture, which is free and open to the public, will examine the state of global engagement, leadership, and military service. A reception will follow the lecture at 6:15 p.m. RSVP to program manager Angela Miller McGraw at angelamm@pitt.edu or 412-624-5203.

The Hesselbein Global Academy was created in 2009 to honor the ongoing legacy of Pitt alumnus Frances Hesselbein, recipient of the 1998 Presidential Medal of Freedom and chair of the board of governors of the Leader to Leader Institute (formerly the Peter F. Drucker Foundation for Nonprofit Management). The academy's mission is to inspire, develop, and reward accomplished student leaders as they meet the challenges of tomorrow.

“Once again we are bringing in an amazing group of student leaders from around the world, as well as some of the finest leaders from the public and private sectors,” said Pitt Vice Provost and Dean of Students Kathy Humphrey. “Many students who participated in the previous two summits have said it was one of the highlights of their collegiate careers because of the people who are involved and the format of the programs.”

The summit provides a forum for student leaders to engage in an elevated level

Continued on page 7

Six Pitt Students Receive 2011 David L. Boren Awards for International Study



By Patricia Lomando White

Four University of Pittsburgh Honors College students—Stacey Stachera, Russell Ottalini, Lorraine Keeler, and Cody Dickerson—have received 2011 David L. Boren Scholarships, and Pitt School of Law student Sarah Paulsworth and Graduate School of Public and International Affairs (GSPIA) student Ashley Fitzgerald have been awarded 2011 David L. Boren Fellowships, all for international study. Stachera and Fitzgerald will study in Tanzania, Ottalini in Japan, Keeler in Brazil, Dickerson in China, and Paulsworth in Kazakhstan.

For the third consecutive year, the Institute of International Education, which administers the awards on behalf of the National Security Education Program (NSEP), received a record number of applications for the undergraduate Boren Scholarship. This year, 944 undergraduate students applied for the Boren Scholarship, and 152 were awarded, and 625 graduate students applied for the Boren Fellowship, and 117 were awarded.

This is the ninth consecutive year that at least one Pitt student has been awarded the honor. Since 1997, 26 Pitt students have received Boren Scholarships and 17 graduate students have received Boren Fellowships.

Stachera, from Erie, Pa., will be a senior at Pitt this fall, majoring in political

science with a concentration in international relations. She also is working to earn certificates in African studies and global studies. Stachera is studying Swahili this fall at the State University of Zanzibar. Her future plans include graduating from Pitt with a BA degree, fulfilling her Boren service requirement with the Department of State or USAID, and earning a master's degree in international development or peace and conflict resolution.

Ottalini, a Pitt junior from Silver Spring, Md., is majoring in Japanese and sociology. He is studying Japanese at Sophia University in Tokyo for the coming academic year. He intends to study the language along with Japanese lifestyles in urban and traditional contexts while abroad. Upon completion of his Pitt degree, Ottalini plans to attend graduate school to earn a master's degree in either urban studies or international studies.

Keeler, from Seattle, Wash., will be a junior at Pitt this fall, majoring in environmental studies with minors in Latin and Portuguese. She will be participating in two programs in Brazil next year, the first semester in Belém and the greater Amazon region, and the second in Salvador da Bahia. Keeler hopes to graduate from Pitt with a BPhil degree incorporating her majors and the research conducted this

summer and in Brazil. After completing the required government service in the EPA, she will pursue a master's degree in public policy and a PhD degree in sustainability/environmental policy.

Dickerson, from Plattsburg, Mo., will be a Pitt junior this fall, majoring in religious studies and preparing to begin work toward a Bachelor of Philosophy degree in international and area studies. Dickerson will spend the fall semester at Beijing Foreign Studies University focusing on language acquisition and the second semester at Yunnan Nationalities University in Kunming where he will study both the Chinese language and Chinese minority policies. After earning his Pitt degree, Dickerson plans to fulfill his service requirement in the U.S. Department of State. He hopes to use that experience to shape his plans for graduate school with the ultimate goal of becoming a foreign service officer.

Paulsworth, a second-year Pitt law student from Fairless Hills, Pa., is a JD candidate working on certificates in comparative and international law and Russian and Eastern European studies. Her Boren award includes both domestic study and study-abroad components. During the summer, she will be studying at the Indiana University-Bloomington in the Summer Workshop for Slavic, Eastern European, and Central Asian Languages and in intensive Kazakh classes. She will then travel to Kazakhstan to take part in the Eurasian Regional Language Program and work on her Boren Fellowship project, "The Legal Framework for Ethnic Stability in Kazakhstan." The project includes language study, research, and the composition of a scholarly paper. Paulsworth plans to pursue a career with the U.S. government working on legal issues related to human rights and humanitarian law.

Fitzgerald, a second year GSPIA graduate student from Seattle, Wash., is majoring in human security with a minor in security and intelligence studies. She is working on a master's degree in public and international affairs with a graduate

certificate in African studies. Her research interests are in African development, conflict resolution, and U.S. intelligence and security policy. As a Boren Fellow, Fitzgerald will be living in Tanzania for one year, taking a Pitt sponsored Swahili language and cultural immersion program in Karagwe, Tanzania, in the summer. She also will spend a semester on the island of Zanzibar, Tanzania, involving a home-stay with a Swahili-speaking family and taking language courses at the State University of Zanzibar, as well as independent graduate research on conflict mitigation in East Africa. Upon completion of her Boren Fellowship, Fitzgerald plans to work in the field of conflict resolution on behalf of the United States government.

Boren Scholarships and Fellowships are sponsored by NSEP, a major federal initiative designed to build a broader and more qualified pool of U.S. citizens with foreign language and international skills. Boren Awards provide U.S. undergraduate and graduate students with

the resources and encouragement to acquire language skills and experience in countries critical to the future security and stability of the nation. In exchange for funding, Boren award recipients agree to work in the federal government for a period of at least one year following graduation.

The mission of NSEP, established by the National Security Education Act of 1991, is to development the national capacity for educating U.S. citizens, understanding foreign cultures, strengthening U.S. economic competitiveness, and enhancing international cooperation and security.

The Boren Scholarship is named for David L. Boren, principal author of the legislation that created NSEP in 1991. Boren served as the governor of Oklahoma from 1974 to 1978 and as a U.S. senator from Oklahoma from 1979 to 1994. He currently serves as the president of the University of Oklahoma. Boren is widely respected for his academic credentials, his longtime support for education, and his distinguished political career as a reformer in the American political system.

This is the ninth consecutive year that at least one Pitt student has been awarded the honor. Since 1997, 26 Pitt students have received Boren Scholarships and 17 graduate students have received Boren Fellowships.

Three Pitt Law Students Selected as 2011 Nordenberg Fellows for European Summer Internships

By Patricia Lomando White

For the fifth year, students from the University of Pittsburgh School of Law are spending their summer in Europe as Nordenberg Fellows. The fellowships are funded by the Chancellor Mark A. Nordenberg University Professorship, held by Pitt law professor Ronald A. Brand. Each Fellow receives \$6,000 in funding from the Nordenberg Chair.

A brief biography of each honoree follows.

Lauren Mullen, from Linesville, Pa., is interning at the European Court of Auditors in Luxembourg. Mullen graduated from New York University with a degree in international relations and a minor in Spanish. She received numerous scholarships at NYU and is the recipient of a Pitt Law Merit Scholarship. Mullen was a member of the 2011 Pitt Law team at the Mardi Gras Sports Law Competition, held at the University of Tulane School of Law. As an undergraduate, Mullen spent a semester in Italy.

Thomas Rollins, from Salt Lake City, is spending the summer at the Max Planck Institute for Comparative and International Private Law in Hamburg, Germany, conducting research on comparative law and policy regulation of trans-Atlantic trade in the ports of Hamburg and New York. The Max

Planck Institute is the premier comparative and international private law research institute in Europe. Rollins graduated from the University of Utah Honors College program with degrees in history and international studies and a minor in German. He received numerous scholarships at Utah and coauthored an article published in the *Hinckley Journal of Politics* in 2009. Rollins spent two summers in Germany in a language immersion program.

Kimberly Stains, from Altoona, Pa., is interning at the Moravcevic Vojnovic Zdravkovic law firm in Belgrade, Serbia. Stains graduated from Grove City College with a dual degree in political science and Spanish and was named most outstanding prelaw student. As an undergraduate, Stains spent a summer abroad in Beijing and a summer and semester abroad in Buenos Aires. She also was a research assistant at the Universidad Anáhuac Law School in Mexico City during summer 2010 and worked as an intern in 2009 for Terrance F. McVerry, judge of the U.S. District Court of the Western District of Pennsylvania. She also served as a K&L Gates Public Interest Fellow at the Education Law Center in June 2011.

PittChronicle

Newspaper of the University of Pittsburgh

PUBLISHER	Robert Hill
ASSOCIATE PUBLISHER	John Harvith
EXECUTIVE EDITOR	Linda K. Schmittmeyer
EDITOR	Jane-Ellen Robinet
ART DIRECTOR	Gary A. Cravener
STAFF WRITERS	Sharon S. Blake John Fedele Audrey M. Marks Patricia Lomando White
CONTRIBUTING WRITERS	Shannon Barnes Morgan Kelly Mark A. Nordenberg

The *Pitt Chronicle* is published throughout the year by University News and Magazines, University of Pittsburgh, 400 Craig Hall, Pittsburgh, PA 15260. Phone: 412-624-1033, Fax: 412-624-4895. E-mail: chron@pitt.edu Web: www.chronicle.pitt.edu

The University of Pittsburgh is an affirmative action, equal opportunity institution that does not discriminate upon any basis prohibited by law.

Top-Notch Researchers Propel Pitt's Drug Discovery Institute

Spotlight on **Research**



By Shannon Barnes

Sitting atop the University of Pittsburgh's Biomedical Science Tower 3 (BST3), researchers in Pitt's Drug Discovery Institute (DDI) are searching for new methods to alleviate suffering caused by a variety of diseases. Their research includes studying the delicate protein interactions involved with cancer, designing new drug compounds, and developing automated technologies to enhance existing research methods. Their interests are diverse, yet their mission is the same—to advance global health.

Drug discovery is a classic example of translational science, or “bench to bedside” research (or in this case, “bench to bottle”). Advances made in the laboratory lead to new and more effective pharmaceutical products for patients. The road to drug discovery, however, is never a straight path. In the early stages, medicinal chemists and structural biologists dissect the intricate interactions between proteins so they can hypothesize potential drug targets and determine which compounds are likely to disrupt or enhance a biological function. Once they've identified an area of interest, that target is screened against thousands of compounds to find one (or several) that might disrupt the protein-protein interaction. When a “hit” is identified, organic chemists find the best and most efficient methods to synthesize and scale up those compounds in the laboratory. Biologists then validate the compounds in the lab and in living things to determine effectiveness, safety, and stability. If any of these qualities is less than optimal, the molecule gets sent back to the chemists for improvement.

A Novel Concept

Pitt's Drug Discovery Institute opened its doors in 2006, one of the first tenants of the \$205 million BST3, a research tower with modern, open laboratories and a sophisticated floor plan. When Arthur S. Levine, senior vice chancellor for the health sciences and dean of Pitt's School of Medicine, designed the concept for BST3, he envisioned collaboration at the most basic levels of science, believing that sharing physical space and technologies would encourage more collaboration. Barry Gold, DDI associate director and professor and chair of pharmaceutical sciences in the School of Pharmacy, thinks Levine's concept works: “We really focus on teamwork here at Pitt. In fact, other universities are copying how we're keeping our experts and their equipment in close proximity. I just wish the cancer center wasn't so far away,” he laughs. (The University of Pittsburgh Cancer Institute is a five-minute bus ride from Pitt's main campus.)

Over the years, DDI has expanded to a high-production facility, capable of holding as many as five million chemical compounds and equipped with more than 10 robots for auto-

Over the years, DDI has expanded to a high-production facility, capable of holding as many as five million chemical compounds and equipped with more than 10 robots for automated assay plating, giving researchers virtually infinite drug-screening opportunities. Its faculty members hail primarily from three Pitt schools—the School of Arts and Sciences, the School of Medicine, and the School of Pharmacy—and create a unique mosaic of scientists, from organic chemists to clinical scientists, who work along the continuum of drug discovery.



Pitt's Drug Discovery Institute has entered an exciting transition period under the new leadership of D. Lansing Taylor (right), Allegheny Foundation Professor of computational and systems biology in Pitt's School of Medicine. The institute has four associate directors, including Barry Gold (left), a professor and chair of pharmaceutical sciences; Edward Chu, professor of medicine and of pharmacology and chemical biology as well as chief of the Pitt School of Medicine's Division of Hematology-Oncology and deputy director of the University of Pittsburgh Cancer Institute; Peter Wipf, Distinguished University Professor of Chemistry and director of Pitt's Combinatorial Chemistry Center; and Ivet Bahar, John K. Vries Professor and chair of computational and systems biology.

ated assay plating, giving researchers virtually infinite drug-screening opportunities. Its faculty members hail primarily from three Pitt schools—the School of Arts and Sciences, the School of Medicine, and the School of Pharmacy—and create a unique mosaic of scientists, from organic chemists to clinical scientists, who work along the continuum of drug discovery.

Dennis Curran, a Pitt Distinguished Service and Bayer Professor of Chemistry in the School of Arts and Sciences, notes that chemists and clinicians often don't speak the same language, but he believes the key to continuity is having leaders who can span the scientific spectrum. “Everyone has [his/her] own niche in academia, but we have great leaders who can relate to people up and down the pipeline,” says Curran, who specializes in organic compound synthesis.

The Research Team

Curran was a key collaborator in the development of AR67, an anticancer drug that is currently in phase II clinical trials with Arno Therapeutics Inc. AR67 is being tested in patients with glioblastoma multiforme, a highly aggressive brain cancer. He developed the drug with the late Thomas G. Burke, a professor of medicine at the Univer-

sity of Kentucky College of Medicine. Currently, Curran is working on the synthesis of several compounds: “Being academicians, we aren't satisfied with just making more of the same compound. If we have a difficult synthesis, we want to make it better. We're interested in pushing the edge of the possible in moving a compound to a drug candidate. We want new chemistry, new compounds, cutting-edge science.”

Alexander Dömling, professor of pharmaceutical sciences in the School of Pharmacy and of chemistry, came to Pitt in 2006 after founding two pharmaceutical companies and helping advance Almorexant, a sleep-aid drug, to phase III clinical

trials. Despite his extensive industry experience, Dömling sees himself first as a teacher and researcher. “High throughput screening (HTS) is very important in drug discovery, but in academia, our priority is to teach. Before they use HTS, students need to understand the science behind drug interactions,” he says. Dömling's main interest lies in designing antagonists of protein-protein interactions (PPI) that could be used as drug targets. He mines structural models to find small pockets of deeply buried amino acids, which he calls “anchors.” Together with collaborator Carlos Camacho, a professor

Continued on page 4



Dennis Curran, a Pitt Distinguished Service Professor and Bayer Professor of Chemistry in the School of Arts and Sciences, was a key collaborator in the development of AR67, an anticancer drug that is currently in phase II clinical trials with Arno Therapeutics Inc. AR67 is being tested in patients with glioblastoma multiforme, a highly aggressive brain cancer.

Top-Notch Researchers Propel Pitt's Drug Discovery Institute

Continued from page 3



JIM JUDKIS

Peter Wipf, Distinguished University Professor of Chemistry, was instrumental in founding Pitt's Combinatorial Chemistry Center in 1998. The center was expanded in 2002 as part of a larger National Institutes of Health center initiative and became the University of Pittsburgh Center for Chemical Methodologies and Library Development. Wipf believes this type of diverse, multi-investigator center of excellence allows scholars to pool their expertise to discover novel therapies for major as well as neglected diseases.

of computational and systems biology in the School of Medicine, Dömling created an online tool, called anchor.query (<http://anchorquery.cbb.pitt.edu/>), which allows researchers to search easily for these anchors and define promising areas for drug discovery. Dömling's current PPI of interest is the interaction between the cancer-related proteins p53 and MDM2/MDMX. When the proteins interact, they form a small, deep cavity—the type that is ideal for drugs to bind to and effect a change in function. “This PPI is a hot topic in drug discovery right now, and no drugs have been approved that disrupt this type of interaction in cancer cells,” Dömling says. Dömling will be leaving Pitt in September to become chair of chemistry at the University of Groningen in The Netherlands, but will maintain research collaborations at Pitt via an adjunct appointment.

Peter Wipf is Distinguished University Professor of Chemistry, an associate director of DDI, and director of Pitt's Combinatorial Chemistry Center, which was established in 1998. He is best known for his groundbreaking work in the total synthesis of complex organic molecules and was instrumental in advancing the use of combinatorial chemistry techniques at Pitt. Combinatorial chemistry is a synthesis method that became popular in the 1990s as

a way for chemists to create large numbers of compounds in a very short period of time. As these new technologies and methods of organic synthesis were further developed at the Combinatorial Chemistry Center, the center was expanded in 2002 as part of a larger National Institutes of Health center initiative and became the University of Pittsburgh Center for Chemical Methodologies and Library Development (UPCMLD). UPCMLD is one of five centers in NIH's Centers of Excellence in Chemical Methods and Library Development Program, which fosters innovation in chemical synthesis and drug discovery by developing chemical methodologies and creating diverse compound libraries with a range of physiological properties. As UPCMLD director, Wipf encourages interdisciplinary, multi-investigator research projects that allow the sharing of compounds, resources, and ideas. While Wipf is particularly interested in developing anticancer agents and neurodegenerative disease therapies, he feels that this type of diverse, multi-investigator

center of excellence allows scholars to pool their expertise to discover novel therapies for major as well as neglected diseases.

Ivet Bahar is the John K. Vries Professor and chair of computational and systems biology and the newest associate director of DDI. Her research, like Dömling's,

focuses on protein-protein interactions, but she offers a unique biological perspective. She explains that her lab has traditionally looked at rational drug design as a dynamic process at the molecular level. By studying the atomic motions of proteins, researchers can glean how these proteins interact and rationalize which are likely to be inhibited by small molecules. “In the newest wave of drug discovery, however, we realize that you can design an inhibitor that binds well and has high activity, but we want to know what happens when you put it in the body,” Bahar says, adding that her group focuses on protein dynamics, or how the proteins move and interact. “Structure is important, but it

“In the newest wave of drug discovery, however, we realize that you can design an inhibitor that binds well and has high activity, but we want to know what happens when you put it in the body. Our group focuses on protein dynamics, or how the proteins move and interact. Structure is important, but it is a snapshot. We want to observe how the protein achieves its function—then we can design the drug.”

—Ivet Bahar

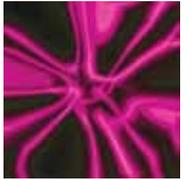
is a snapshot. We want to observe how the protein achieves its function—then we can design the drug,” she adds.

Joining this systems biology approach is Andreas Vogt, a research assistant professor of computational and systems biology in the School of Medicine. Vogt has done substantial work in high-content imaging technology, which allows researchers to obtain data from individual cells and analyze the effects of drugs on their target of interest in a cellular context. Vogt also performs image-based analysis of whole organisms, such as zebrafish, which are an ideal system for *in vivo* high-content screens. These tropical freshwater fish are vertebrates and share biological similarities to higher organisms; they are optically transparent, and their tiny embryos can easily be stored in 96-well microplates, a standard format for high throughput screening. Using his imaging technology and an artificial intelligence-based image analysis method called Cognition Network Therapy, Vogt has detected and quantified structures of interest in zebrafish embryos,

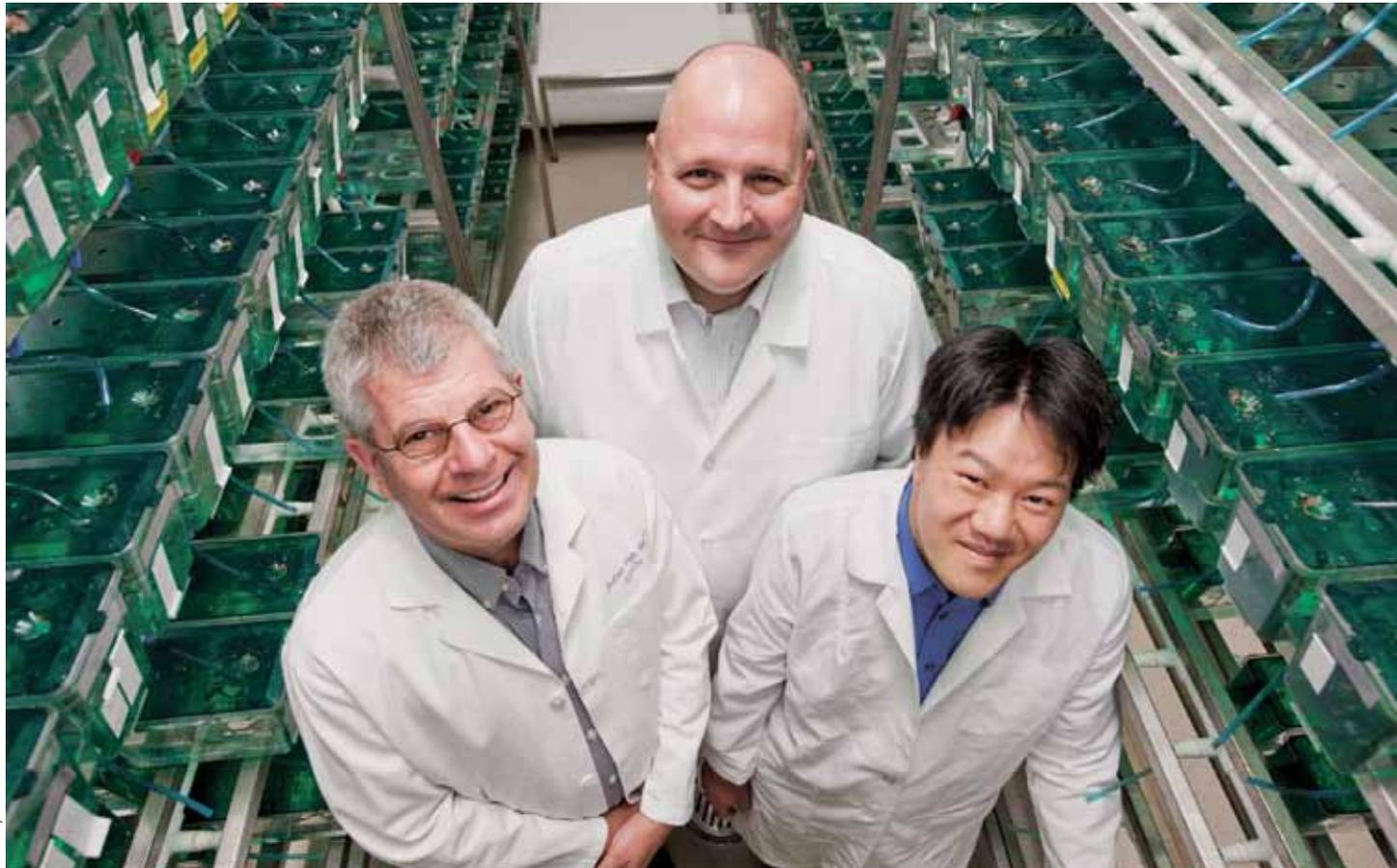
Continued on page 5



Ivet Bahar is the John K. Vries Professor and chair of computational and systems biology and an associate director of DDI. Her research team focuses on protein dynamics, or how proteins move and interact, in its efforts to design effective drugs.



Continued from page 4



JIM BURKE/CODE

Andreas Vogt (left), a research assistant professor of computational and systems biology in Pitt's School of Medicine, has done substantial work in high-content imaging technology, which allows researchers to obtain data from individual cells and analyze the effects of drugs on their target of interest in a cellular context. Vogt also performs image-based analysis of whole organisms, such as zebrafish. Because of their small size, optical transparency, and physiological similarities to human biology, zebrafish embryos are an ideal system for *in vivo* high-content screens. Vogt collaborates with Pitt Professors of Developmental Biology Neil Hukriede and Michael Tsang (center and right, respectively) in developing novel automated imaging assays to analyze biological function in transgenic fluorescent zebrafish embryos.

including the presence of intersegmental blood vessels, which are used as a measure of angiogenesis. Vogt collaborates with Pitt's zebrafish superstars, professors of developmental biology Michael Tsang and Neil Hukriede, in developing novel automated imaging assays to measure fluorescence and analyze biological function in transgenic zebrafish embryos.

Pitt researchers employ both HTS, the dominant tool in the drug discovery process, and high-content screening (HCS)—a combination of fluorescence labeling technologies and electronic imaging technologies that enable the study of individual cells on a light microscope. Together, those tools allow collaborators to access Pitt's massive compound library, where researchers can screen thousands of interesting chemotypes [a chemically distinct entity in a plant or microorganism] against their target of interest and visualize protein interactions via live cell microscopy.

Pitt researchers employ both HTS, the dominant tool in the drug discovery process, and high-content screening (HCS)—a combination of fluorescence labeling technologies and electronic imaging technologies that enable the study of individual cells on a light microscope. Together, those tools allow collaborators to access Pitt's massive compound library, where researchers can screen thousands of interesting chemotypes [a chemically distinct entity in a plant or microorganism] against their target of interest and visualize protein interactions via live cell microscopy.

Paul Johnston is a research professor of pharmaceutical sciences and manager of the Pittsburgh Molecular Library Screening Center (PMLSC), a federally funded joint venture between Pitt and Carnegie Mellon University that was part of the NIH Roadmap Initiative Molecular Library Screening Center Network pilot phase. Johnston is also coprincipal investigator and manager of the Pittsburgh Specialized Application Center (PSAC), a component of the National Cancer Institute's Chemical Biology Consortium (CBC). CBC is part of the Experimental Therapeutics (NExT) Program, a partnership between the National Cancer Institute's Division of Cancer Treatment and Diagnosis and Center for Cancer Research, and is tasked with streamlining the development and testing of promising new anticancer drugs to expedite their delivery to the bedside.

Johnston is a pioneer in developing and performing high throughput cell-based screening assays. He worked in the pharmaceutical industry for 14 years and has close ties with Pittsburgh biotechnology experts. This experience, along with his creativity and

innovation with HTS and HCS assays, has allowed him to build one of the nation's top academic screening facilities. The PMLSC and PSAC offer advanced services to investigators who are interested in screening large libraries of small molecules against targets of interest, using such advanced technologies as liquid-handling robots; multimode plate readers with luminescence, fluorescence, fluorescence polarization, time-resolved fluorescence, and absorbance detection capability; HCS fluorescent microscopy platforms with live cell and kinetic screening options with image storage and analysis databases; sophisticated screening microscopes; and biosafety level 2 tissue culture hoods and incubators.

Combining Business and Basic Science

DDI is in an exciting transition period, as it shifts focus with its new director D. Lansing Taylor, Allegheny Foundation professor in the School of Medicine's Department of Computational and Systems Biology. Taylor pioneered high content screening methods to automate cell and experimental animal drug discovery and marketed these technologies through his company, Cellomics, Inc., now part of ThermoFisher. He also founded sev-

Lansing Taylor plans to use his business acumen to reach out to potential partners in industry. He notes that both Harvard University and Washington University in St. Louis, two national leaders in drug discovery, have recently developed partnerships with large pharmaceutical companies. He is confident that Pitt's academic prowess will attract the pharmaceutical industry, as well: "We have tremendous talent, world-class facilities, and the drive to push discovery into the future."

eral Pittsburgh-based biotechnology companies, most recently Cellumen and Cernostics, which applied cellular and tissue systems biology to drug safety and diagnostics.

As both an entrepreneur and an academician, Taylor provides a unique industrial perspective with a deep appreciation for basic science. "There is no single isolated target that we can perturb with drugs, so it is essential to understand the biological systems and address this complexity up front, using functional model systems such as sophisticated cell models and small experimental animal models, like *C. elegans* [roundworm] and zebrafish. We can use these live models to gain biological insight very early on in the drug discovery process." Taylor is energetic about his new role and the future of drug discovery. Even before he began his first day in his new position, Taylor coined this tagline that demonstrates his enthusiasm and vision for DDI: "Novel chemistries and systems biologies to accelerate drug discovery."

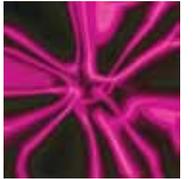
Taylor plans to use his business acumen to reach out to potential partners in industry. He notes that both Harvard University and Washington University in St. Louis, two national leaders in drug discovery, have recently developed partnerships with large pharmaceutical companies. He is confident that Pitt's academic prowess will attract the pharmaceutical industry, as well: "We have tremendous talent, world-class facilities, and the drive to push discovery into the future," Taylor says. "By combining our intellectual power with their business knowledge, we will gain mutual value that will help our institution and the world. It's all here."

Associate Director Gold explains, "Drug

Continued on page 6

Top-Notch Researchers Propel Pitt's Drug Discovery Institute

Spotlight on **Research**



Continued from page 5

discovery is a lengthy, difficult, expensive process. An entire drug portfolio from conception to delivery can cost upwards of \$800 million, money that universities typically do not have. At the same time, the big pharma pipeline is not always full, so when that occurs (for example, when they have several drugs go off patent at the same time), they look to universities for real leads on new compounds." Gold thinks the strength of the University is in studying a diverse set of tar-

gets and creating novel candidates for drug screening. He says, "The more work we do here, the less risk is involved for pharma, and they are more likely to purchase a license. Since we don't have the capacity for large scale-ups or human trials, this is an ideal situation for the inventor, the University, and thereby the region as a whole."

DDI looks to industry partnerships to help advance the basic research that might lead to new therapies and help society.

"The money that comes with an industry partnership is reinvested into the University and supports additional research and infrastructure," Gold says. This investment has clearly paid off, as Pitt has recruited some of the nation's top scientists and has remained in the top 10 schools in the nation for NIH funding for more than 10 years.

Curran believes that this upward swing will continue into the next decade: "Our chemistry department is in the process of

leapfrogging to the top with our new organic chemistry wing and \$2 million NMR [nuclear magnetic resonance] facility that we use to characterize drug candidates. Faculty recruits are looking for three things in a university—a good name, high-quality faculty, and high-tech facilities—and we have all three. Good faculty attract good students, and funding typically follows." Pitt's remarkable success in the past 10 years should prove, without a doubt, that Curran's belief is true.

Pitt's Center for Vaccine Research Targets Emerging Infections, Biodefense Capabilities

By Shannon Barnes

Ted Ross, a professor of microbiology and molecular genetics in Pitt's School of Medicine, was attending the 2009 Third International Conference on Influenza Vaccines for the World in Cannes, France, when U.S. government officials announced that they had isolated a new strain of flu, H1N1. The new strain comprised both influenza and swine flu, the officials said, and the implication was clear: Influenza had jumped species, moving from pigs to humans.

The tone of the Cannes meeting changed drastically, with some participants catching early flights home, and a few prominent international flu researchers scrapping their planned talks in favor of impromptu lectures on zoonoses, or animal viruses that can be transmitted to humans. The Centers for Disease Control and Prevention (CDC) called Ross, an expert in pathogen-host interactions, and asked for help in characterizing the virus in animal models. Ross instructed his team to learn everything they could about H1N1, and they received human samples to test in early June. "There was a lot of anxiety. The World Health Organization (WHO) had raised the alert to pandemic level 6 (widespread human infection), and we were in a race to find answers," Ross recalled.

Ross' lab is part of the Pitt's Center for Vaccine Research (CVR), which comprises 17 full-time faculty and 10 affiliate scientists. The CVR was established the same year as Pitt's Drug Discovery Institute (2006) and is also housed in Biomedical Science Tower 3. The two entities share the same mission—to improve global health—yet they focus on two different aspects of disease, treatment and prevention. CVR scientists study a wide range of bacterial and viral pathogens, but their main focus is on emerging infections and biodefense. "We don't mandate what microbes our faculty work on, but they must be epidemic diseases of global importance," says Donald S. Burke, associate vice chancellor for global health, dean of Pitt's Graduate School of Public Health, and CVR director. Burke is a former U.S. Army colonel who led infectious disease research at the Walter Reed Army Institute of Research as well as the Armed Forces Research Institute of Medical Sciences in Bangkok, Thailand.

CVR researchers study pathogens with high levels of antigenic variability. Highly variable viruses (like flu) constantly evolve, creating a challenge for vaccine designers. Ronald Montelaro, a professor of microbiology and molecular genetics and CVR codirector, is a pioneer



Ted Ross' (center) lab is part of Pitt's Center for Vaccine Research (CVR), where scientists study a wide range of bacterial and viral pathogens, focusing primarily on emerging infections and biodefense. Ross, a professor of microbiology and molecular genetics in Pitt's School of Medicine, is an expert in pathogen-host interactions. His research focuses on the development of effective vaccine design for infectious agents such as influenza and HIV. His research team includes research specialists Corey Crevar (left) and Donald Carter (right).

in the study of lentiviruses, the family of retroviruses that includes human immunodeficiency virus (HIV). "We describe lentiviral infection as a virus that enters waving a red flag that is attacked by the immune system. But then the virus throws up a yellow flag or a blue flag, tricking the immune system. A critical question in vaccine development is: How many different colored flags can the immune system effectively recognize and attack?"

Advancing Global Health

While dengue fever is not widely recognized in the United States, it is endemic in more than 100 countries. Caused by a mosquito-borne flavivirus, severe infections can lead to a serious illness called dengue hemorrhagic fever, which is often fatal—particularly in children—and can cause severe complications, such as brain or liver damage, seizure, or shock. CVR researcher Ernesto T.A. Marques Jr., a Pitt professor of infectious diseases and microbiology in the Graduate School of Public Health, travels to Brazil about three times a year to collect data from patients in the South American nation, which is the epicenter of dengue infection. By comparing clinical data with genetic data, he discovered genetic markers that indicate individual susceptibility to dengue infection. Such biomarkers are particularly useful in helping doctors determine which dengue-fever patients may develop serious illness and which may recover quickly.

Tuberculosis (TB) is another devastating disease worldwide, having killed

her to watch the granulomas (what she calls "hot spots") in real time and to see how they respond to different drugs over the course of a treatment regimen. Previously, researchers were limited to examining tissues postmortem. Flynn's serial imaging technology represents a major breakthrough in TB imaging and will likely lead to quicker advances in vaccine and drug development.

Flynn's imaging center is housed in the CVR's Regional Biocontainment Laboratory (RBL), one of 13 federally funded labs that study potential bioterrorism threats and develop vaccines and therapies for such diseases. RBL Associate Director Kelly Stefano Cole, a professor of immunology in the School of Medicine, notes that in the field of biodefense, vaccine development and drug discovery complement each other. "Of course, we need new vac-

1.7 million people in 2009. CVR researcher JoAnne Flynn, a professor of microbiology and molecular genetics, and her colleagues have developed imaging technology to better understand how the bacteria respond to drugs. The hallmark of TB is the presence of large, inflammatory clumps of bacterial and immune cells, called granulomas. Flynn, using a \$12 million grant from the Bill and Melinda Gates Foundation, installed one of the world's first hybrid positron emission tomography/computed tomography (PET/CT) scanners in a Biosafety Level 3 laboratory, enabling

cines, but if there was a bioterrorist attack and a pathogen was intentionally released, we would need quick access to large stockpiles of therapeutics to treat or blunt the effects of the illness," Cole says. "Likewise, if a researcher is accidentally exposed to anthrax in the laboratory, we also need drugs to quickly treat that person."

Burke affirms the commonality between vaccine development and drug discovery. "Both the CVR and DDI are product-oriented centers—the ultimate in translational science. The ideas bubble up from the ground floor of the BST3 and float through the hallways of the various departments, maturing and evolving, until they get to us. Our job is to translate the science into interventions that will improve public and global health."

Ross believes that the events that transpired during the H1N1 pandemic demonstrated how unprepared our nation is for a major biological emergency. A vaccine was not made widely available to the public until months after the peak of the outbreak. He says, "If this virus had hit the general population as hard as it did young people, the pandemic would have been much more devastating." He hopes that new-generation vaccines will greatly speed up the flu vaccine production process, lowering manufacturing costs and making vaccines more widely available much more quickly.

So when or where will the next biological emergency occur? No one knows for sure, but these CVR researchers will be on the front lines, ready to fight.



CVR researcher JoAnne Flynn, a professor of microbiology and molecular genetics, and her colleagues have developed imaging technology to better understand how tuberculosis (TB) responds to drugs. The hallmark of TB is the presence of large, inflammatory clumps of bacterial and immune cells, called granulomas. Flynn, using a \$12 million grant from the Bill and Melinda Gates Foundation, installed one of the world's first hybrid positron emission tomography/computed tomography (PET/CT) scanners in a Biosafety Level 3 laboratory, enabling her to watch the granulomas in real time and to see how they respond to different drugs. Flynn's serial imaging technology represents a major breakthrough in TB imaging and will likely lead to quicker advances in vaccine and drug development.

News of Note



Pitt Physicists Part of Global Project Reporting That Particle Beam Could Reveal Clues About Universe

Pitt researchers were part of an international team of physicists that recorded activity in a particle beam fired from one side of Japan to the other that could help explain the composition of the Universe.

The Japan-based T2K collaboration, which includes approximately 500 scientists from 59 institutions worldwide, recently reported that a beam of neutrally charged particles known as neutrinos transformed from one type of neutrino into another as the particles were fired 185 miles through the Earth. The morphing of muon neutrinos into electron neutrinos was the first observed conversion, or oscillation, involving these "flavors" of neutrino, as the particle's three varieties are known.

Vittorio Paolone, Steven Dytman, and Donna Naples, professors of physics and astronomy in Pitt's School of Arts and Sciences, oversaw the electronics that detected the type and concentration of neutrinos in the particle beam as it left the Japan Proton Accelerator Research Complex (J-PARC) in Tokai. Those readings were compared against the content of the particle beam when it

reached the Super-Kamiokande detector in Kamioka to determine the level of neutrino oscillation, Paolone said.

The crossover of the muon neutrinos to electron neutrinos presents a new avenue for exploring the Universe's structure, Paolone explained. This new type of oscillation will allow scientists to study charge-polarity violation in neutrinos. Charge-polarity violation is a phenomenon thought to be the reason why the Universe contains far more matter than antimatter, Paolone said.

Matter and antimatter existed in equal amounts when the Universe was created. But unknown disruptions gave one state an advantage over the other as the Universe was developing, Paolone said. The T2K experiment suggests that neutrinos might have had some part in causing the unbalance, he said.

"Charge-polarity violation may have occurred early on in the development of the Universe, changing matter so that it became the dominant state," Paolone explained. "The question is, what tipped the balance toward matter?"

The T2K results unexpectedly reopened the possibility of explaining how matter trumped antimatter, Paolone said. Previous research had determined that particles known as quarks also undergo charge-polarity violation, but further study found it occurred on too small of a scale to change the balance of the Universe.

The T2K experiment is primarily funded by Japan's Ministry of Education, Culture, Sports, Science, and Technology. Pitt is one of 70 U.S. institutions working on the project with support for the American collaborators also coming from the U.S. Department of Energy, Office of Science. The J-PARC facility was damaged during the March 2011 earthquake in Japan (Paolone was one of the researchers at the facility during the quake). The complex is expected to begin operating again by late 2011.

—Morgan Kelly

Zadorozhny to Help Secure Next-Generation Wireless Networks Under International Award From Research Council of Norway

An international project to make the next generation of wireless Internet networks more secure and efficient has called upon Pitt professor Vladimir Zadorozhny, whose work in Pitt's School of Information Sciences (iSchool) focuses on information networks and wireless systems, among other areas.

Zadorozhny was recently awarded a Leiv Eiriksson Fellowship and research grant from the Research Council of Norway to explore efficient data processing, privacy, and security in large-scale information networks. Zadorozhny's work also will benefit a larger effort supported by the European Commission to improve wireless networks and mobile systems of the future. Pitt is one of only three American universities working on the project along with 10 institutions in Norway, Denmark, Spain, Italy, China, Mexico and Tunisia.

The fellowship stems from the Research Council's Leiv Eiriksson mobility program, which is intended to encourage collaboration between researchers in Norway and the United States and Canada. As part of his award, Zadorozhny will spend a portion of 2011 conducting research in Norway at the University of Agder, which is coordinating the European Commission endeavor. Zadorozhny has frequently collaborated with Agder researchers in the past and plans to use his fellowship as an opportunity to establish long-term projects between Pitt's iSchool and the University of Agder.

—Morgan Kelly



Pitt to Host Third Annual Summit of the Hesselbein Global Academy

Continued from page 1

of leadership training by working closely with accomplished professionals during the four-day event.

Nine well-respected professionals will serve as mentors during the Hesselbein Summit, including J. Roger Glunt, president of Glunt Development Co., Inc. and Jayar Construction Co., Inc. Glunt is a former member of the University's Board of Trustees, a graduate of the Joseph M. Katz Graduate School of Business, and former president of the Pitt Alumni Association.

Forty-six students from Australia, Canada, Denmark, Ethiopia, Germany, Ghana, Israel, Kazakhstan, Malaysia, Mexico, Pakistan, Singapore, Uganda, and the United Kingdom are scheduled to attend. They will join domestic students from large and small American colleges and universities from 16 different states.

Five Pitt students will participate, including Olivia Enders, a junior from Millersburg, Pa., who is majoring in English literature, religious studies, and philosophy; Katherine Malekoff, a senior from Greensboro, N.C., who is majoring in urban studies and sociology; Tara Matthews, a senior from Elkridge, Md., who is majoring in economics and political science with an emphasis in global studies; Matt Riehle, a senior from Mars, Pa., who is majoring in political science, legal studies, and chemistry; and Andrew Taglianetti, a senior from Bridgeville, Pa., who is majoring in business management with a concentration in marketing and finance.

From 9:30 a.m. to 2:30 p.m. July 25, students, under the direction of their mentors, will apply what they learn to solve a specific organizational problem at such participating organizations as Collegiate YMCA, Community Human Services, Conservation Consultants Inc., Ladies Hospital Aid Society, Leadership Pittsburgh, Pitt's Office of Veterans Services, United Cerebral Palsy, and Sustainable Pittsburgh.

"Having been a part of the first two summits, I am excited to return to campus and work with another outstanding group of students and mentors," said Hesselbein, who will be in attendance at this year's summit. "One of the incredible things that happened at both summits is the strong bond that has formed between the students, as well as between the students and their mentors."

Of Pinckney, Hesselbein said, "She is one of the finest leaders I have ever known, and it will be such a privilege for the students attending the summit, as well as the Pitt community, to hear her unique perspectives about what it takes to be an effective leader in our global society."

Pinckney is founder, president, and chief executive officer at BHP Consulting, LLC, providing strategic direction on military transition planning, financial management, and public-private sector partnerships. The first African American female inducted into the Officer Candidate School Hall of Fame, Pinckney has been accorded numerous honors, including the Department of Defense Outstanding Diversity Military Service Award, the Defense Superior Service Medal, four Army Commendation medals, and the Alpha Kappa Alpha President's Award for exemplary service to humankind.

In addition to her work with the military, Pinckney also advocates for at-risk youth through the Charles Houston Community Center in Alexandria, Va. Pinckney holds a Bachelor of Science degree in business administration from the University of Maryland, a Master of Public Administration degree in financial management from Golden Gate University, and a Master of Science degree in national resource strategy from the National Defense University.

Budget-Building in the Face of Historic Cuts

Continued from page 1

To return to the Governor's tree-pruning analogy, no one has suggested that the University of Pittsburgh is a branch that is not bearing fruit. Instead, as I indicated in my public presentation at last month's meeting of our Board of Trustees, key dimensions of Pitt's productivity can be seen in the 287,000 graduates it has educated and the \$10.5 billion in research funds that it has expended since becoming a state-related university in 1966, as well as in its widely acknowledged impact as an engine of economic growth and job creation.

A Pattern of Funding Decline

It also is important to note that, as productive as Pitt has been, we also have been subjected to many years of budgetary pruning. Though a retreat from earlier levels of state support can be traced over an even more extended period of time, those budgetary pressures were particularly pronounced during the past decade. Our appropriation was cut in six of those 10 years, with the Commonwealth's investment in Pitt's appropriation, excluding federal dollars, standing at \$9.3 million less in the fiscal year just closed than it was 10 years earlier.

General trend lines for the past eight years also are revealing. During that period, inflation rose by more than 20 percent; overall state spending increased by nearly 40 percent; state support for basic education climbed by more than 60 percent; but support for higher education remained flat. In 2008, the most current year for which comparative data is available, Pennsylvania ranked 46th among the 50 states in terms of per capita spending for higher education. Pennsylvania's per capita investment of \$185.12 stands in stark contrast to the higher levels of funding provided by such neighboring states as Michigan (\$258.28), New Jersey (\$259.73), Delaware (\$278.47), Connecticut (\$295.46), West Virginia (\$309.87), Maryland (\$331.45) and New York (\$331.54). To express that range in a somewhat different way, neighboring New York spent nearly 80 percent more per capita on higher education than Pennsylvania did.

One inescapable impact of this bottom-five funding pattern was prominently displayed in the "College Affordability and Transparency" lists released by the U.S. Department of Education just last week. Penn State and Pitt were ranked first and second on the list of highest-tuition four-year public institutions of higher education. In fact, because so many of Penn State's branch campuses also made the list, 22 of the 30 highest-tuition institutions were from Pennsylvania. When public funding for public universities is reduced, cost burdens fall on students.

The impact of comparative underfunding also can be seen in institution-to-institution comparisons. For example, our state appropriation during the last fiscal year, before the deep recent cuts were imposed, represented less than 10 percent of our total operating budget. Most of the institutions that have been grouped with Pitt in the top cluster of public research universities in the annual assessment of *The Top American Research Universities* receive a state appropriation representing a markedly higher percentage of their total budgets: Berkeley, 26 percent; Florida, 32 percent; North Carolina, 22 percent; and Wisconsin, 18 percent. Within that top group, in fact, only the University of Michigan, at 7 percent, lagged behind Pitt, and with these recent cuts, Pitt has fallen to 7.7 percent.

Facing Historic Cuts

Even acknowledging the state's budget challenges, given Pitt's proven productivity and this record of pre-existing pruning, the Governor's initial budget proposal was a shock to virtually everyone. That proposal recommended that our Education and General (E&G) appropriation be cut by 50 percent and that our four academic medical center lines—supporting important programs in the School of Medicine, Western Psychiatric Institute and Clinic, the School of Dental Medicine, and Graduate School of Public Health—be completely eliminated. Legislators from both parties appeared to be among the most surprised and quickly rallied to the cause of funding restoration. Everyone who cares about Pitt—or, more broadly, about public higher education—always will be grateful for their support.

Over the course of the following months, a campaign to secure substantial restoration of funding for public higher education was waged. The state budget enacted last week provides for a 19 percent reduction to our E&G appropriation and a 50 percent reduction to our academic medical lines. Our total reduction is 22 percent—or more than \$40 million—a higher-percentage reduction than the other state-related universities because a larger portion of our appropriation traditionally had been allocated to the academic medical lines. Our 22 percent reduction compares to an overall reduction in state spending of 4 percent. Though our position did improve since early March, the cuts imposed on Pitt, then, remain deep and disproportionate.

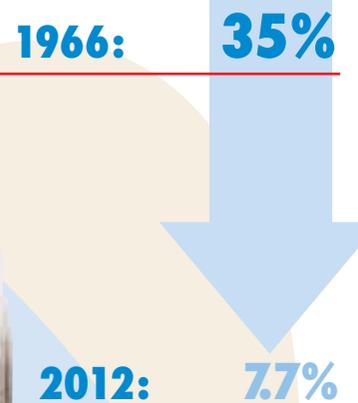
To place these funding levels in context, current cuts take Pitt's appropriation all the way back its Fiscal Year 1995 level.

Most of the institutions that have been grouped with Pitt in the top cluster of public research universities in the annual assessment of *The Top American Research Universities* receive a state appropriation representing a markedly higher percentage of their total budgets: Berkeley, 26 percent; Florida, 32 percent; North Carolina, 22 percent; and Wisconsin, 18 percent. Within that top group, in fact, only the University of Michigan, at 7 percent, lagged behind Pitt, and with these recent cuts, Pitt has fallen to 7.7 percent.

In fact, if federal matching dollars built into this appropriation are not considered, since no such matches were built into state appropriations in the mid-1990's, the level of the state investment, takes us back to FY 1994, when many of our incoming freshmen were being born. Obviously, our operating costs have risen dramatically since then. In fact, from 1995 to the present, the Consumer Price Index rose by nearly 53 percent and the Higher Education Price Index, a more accurate measure of university costs, rose by more than 72 percent.

Continued on page 9

PA Appropriations as Percentage Of Pitt's Total Budget



Continued from page 8

A High-Value Provider

These stark budgetary trends underscore basic lessons that already have been central to our institutional planning. One is that continuing to function as cost-effectively as possible—a priority publicly established by our Trustees in 1996—will be essential to our ongoing progress. Another, now grounded in years of experience, is that, with already low levels of state support being further reduced, Pitt can only compete as a high-value provider of high-quality higher education, lacking the support to compete as a true low-cost alternative.

That distinction is consistent with state master planning, which traditionally has assigned special, and more expensive, roles to Pennsylvania's public research universities. Fortunately, Pitt has earned ever-growing levels of success as a high-value provider. That is seen most clearly in the strong demand from top students for admission to our programs. It also is reflected in such recent honors as Pitt's recognition as a "best value"—a designation linked heavily to quality—both by *The Princeton Review/USA Today* and by *Kiplinger's Personal Finance*.

In crafting annual operating budgets, then, we will continue to emphasize both this long-standing need to "do more with less" and a companion commitment to maintain tuition levels that are as competitive as possible. But we must also place a high priority on well-targeted investments in institutional quality and on support for the high-performing members of our faculty and staff whose work makes Pitt an attractive choice for talented and motivated students and for knowledgeable funders seeking the best possible research teams in an increasingly competitive marketplace. Striking the right balance never is easy, and it is especially difficult when cuts go far beyond anything that any of us, or others in higher education, have experienced.

A Commitment to Cost-Effectiveness

Key cost-cutting and cost-avoidance efforts to date have included reductions in central and unit-level spending, salary freezes, modifications to employee benefits plans, cost reductions through consolidated purchasing and channeled spending programs, and savings achieved through such varied initiatives as outsourcing, energy conservation, shifts to paperless systems, greater efficiency through technology, administrative streamlining, program closures, and targeted staff reductions. These initiatives have produced savings that, over time, will amount to hundreds of millions of dollars and have made Pitt, by almost any standard of measure, an operationally efficient organization. However, as we face this year's deep cuts in state support, paired with expense increases and essential investments, further efforts of this type will be required.

As has been noted, the distinguishing budgetary challenge of this fiscal year is the \$40-plus million cut to our state support. We also face unavoidable expense increases in such areas as health insurance, facilities costs, technology investments and licensing fees, and the need to make additional academic investments, some driven by growing enrollments and others by the levels of quality that must be maintained to be competitive as a high-value provider. Putting to the side expenses that can be met through such alternative revenue sources as research grants, we expect these

As has been noted, the distinguishing budgetary challenge of this fiscal year is the \$40-plus million cut to our state support. We also face unavoidable expense increases in such areas as health insurance, facilities costs, technology investments and licensing fees, and the need to make additional academic investments, some driven by growing enrollments and others by the levels of quality that must be maintained to be competitive as a high-value provider. Putting to the side expenses that can be met through such alternative revenue sources as research grants, we expect these additional cost increases and investments to total about \$30 million. When added to the \$40-plus million cut to our state appropriation, the budget gap to be closed, then, is \$70-plus million.

additional cost increases and investments to total about \$30 million. When added to the \$40-plus million cut to our state appropriation, the budget gap to be closed, then, is \$70-plus million. Consistent with our expressed commitment not to place the entire burden of this year's funding crisis on the shoulders of our students, we expect to cover 60 percent of that gap through a combination of central and unit-level budget reductions and adjustments.

A Tempered Tuition-Increase Plan in the Face of Historic Cuts

Given the magnitude of the challenges we face, however, our cost-cutting efforts must also be paired with tuition increases. These have been limited to the extent possible and compare favorably with increases at other institutions, particularly given the size of our state cuts, but are larger than we would have liked. The budget approved by the Executive Committee of the Board of Trustees today provides for a general tuition increase of 8.5 percent for in-state students enrolled in the programs of the Oakland campus, 4 percent for out-of-state students enrolled in the programs of the Oakland campus, and 4 percent for both in-state and out-of-state students enrolled in the programs of the Bradford, Greensburg, Johnstown, and Titusville campuses. Tuition in the School of Medicine, which suffered the highest percentage cuts to its state support, will be

increased by 12 percent for in-state students and 6 percent for out-of-state students.

To focus on the example that typically receives the most attention, tuition for in-state undergraduates enrolled in the School of Arts and Sciences in Oakland will rise to \$15,272, and tuition for out-of-state undergraduates enrolled in that same program will rise to \$24,680. As is clear, then, a sizeable differential between in-state and out-of-state tuition remains, and there continues to be an enormous gap between either Pitt's in-state tuition or out-of-state tuition and the \$40,000-plus tuition charges commonly assessed by peer private universities.

Four important matters related directly to these tuition increases also should be noted. First, our financial aid budgets will be increased by \$13 million, and more than \$163 million in financial aid will be awarded by the University during the next fiscal year. Second, no increases to student fees were recommended or approved. Third, Pitt's tuition structure, unlike some other universities', does not include an automatic increase to the tuition charged to students moving from lower-division (freshmen and sophomore) to upper-division (junior and senior) status. And fourth, to underscore a point made above, lower tuition increases will be assessed on our regional campuses, as has been our pattern for a number of years.

A Provision for Modest Compensation Increase

In the midst of what came to be called the "Great Recession," the University froze the salaries of its employees. Repeating that pattern this year would make the creation of a balanced budget easier and almost certainly would be politically popular in some quarters. However, we continue to live with lingering, negative consequences of that earlier action. Pitt salaries, which always have been at or somewhat below the mid-range of our peers, are less competitive than they were before that freeze. In the main, they also are lower than salaries paid by Pennsylvania's other public research universities.

Also of real importance is the fact that we have no clear sense of when our budgetary circumstances will improve. It is one thing to ask employees to sacrifice for a year or two as an institution moves through difficult times. However, when the success of an enterprise depends so heavily on human talent, when employees are known for their hard work and dedication, and when demand for the services that they support continues to be high, it is more problematic to indefinitely defer all action with respect to compensation.

We have attempted to balance the budgetary challenges that we face and the needs of the members of our faculty and staff by creating a modest salary increase pool of 2 percent in this year's budget. That pool will be allocated on the following basis—a 1.5 percent salary maintenance award for all employees who have received at least a satisfactory performance review for the past year, leaving 0.5 percent to be allocated on the basis of merit, market, and equity. All salary increase decisions will be made, as is customary, during the next several weeks. However, as a further reflection of our challenging circumstances, those increases will be retroactively effective to July 1 only for employees whose base earnings are \$40,000 or less. Salary increases for all other employees will take effect on January 1, 2012.

The fact that we have been able to weather this year's budgetary crisis is a tribute to all of the people of Pitt and to our many friends. When this institution and its important work were threatened, concerned alumni, faculty, staff, and students stepped forward as advocates. As noted, our case was well received within the legislature and also drew the support of many other friends, including leaders of the business community who know firsthand what an indispensable difference a strong Pitt has meant to the progress of this region.

Looking to the Future

The fact that we have been able to weather this year's budgetary crisis is a tribute to all of the people of Pitt and to our many friends. When this institution and its important work were threatened, concerned alumni, faculty, staff, and students stepped forward as advocates. As noted, our case was well received within the legislature and also drew the support of many other friends, including leaders of the business community who know firsthand what an indispensable difference a strong Pitt has meant to the progress of this region.

But our ability to deal with the prospect of almost unimaginable cuts extends far beyond advocacy. We have achieved distinctive levels of academic quality and have become a more significant force for wide-ranging forms of good in the broader community, even as we have built internal financial strength. Absent that foundation, to which so many of you contributed, our ability to respond to the cuts ultimately imposed would have been far more limited.

As our home state confronted a daunting budget shortfall, we were asked to do far more than our fair share to help re-position it for an even brighter future. In looking toward that future, our shared quest, as described by the Governor at the close of his inaugural address, is to find "a true common wealth that allows this generation and future generations to dream with credible hope."

For nearly 225 years, Pitt has helped position generations of Pennsylvanians to define and effectively pursue their dreams, in the process contributing to the Commonwealth's collective strength. Our own, unchanged dream is to continue playing what has been a role of increasing impact as we build a better future together and to do so with support appropriate for our important mission.

Pitt Researchers Tackle Flood of Space Data With \$1.6 Million Project

By Morgan Kelly

In the past 15 years, the wealth of data available to astronomers through new and larger digital-optimized telescopes has revolutionized our understanding of the Universe's inner workings. However, these vast stores of images have also generated a cosmic headache as thousands of researchers have produced an unorganized torrent of different measurements.

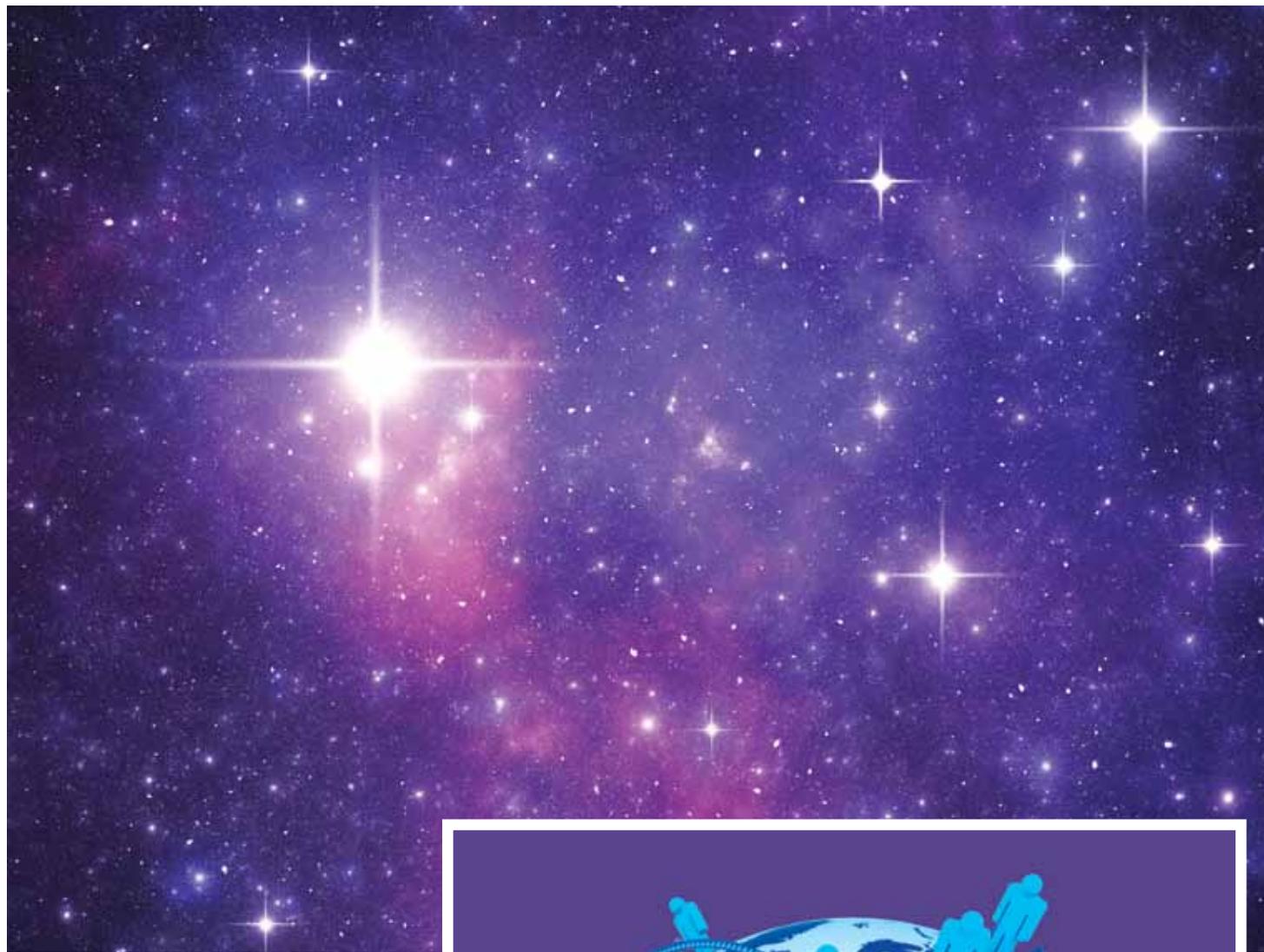
In response, University of Pittsburgh researchers have undertaken a four-year, \$1.6 million project supported by the National Science Foundation to create a single online source that astronomers worldwide can use to organize and quickly share their latest celestial observations. A publicly available tool called AstroShelf would allow researchers to add new measurements about astronomical objects, report their findings in real time, and work with one another's data, explained principal investigator Alexandros Labrinidis, a professor of computer science in Pitt's School of Arts and Sciences. Labrinidis leads the project with Pitt computer science professors Panos Chrysanthis and Liz Marai, as well as with Pitt professors of physics and astronomy Jeffrey Newman, Michael Wood-Vasey, and Arthur Kosowsky.

Large "survey" projects have been a key development in astronomy during the past decade, allowing astronomers the world over to pore over uniformly high-quality images of deep space. Studies of distant galaxies were previously limited to a few astronomers with access to the most powerful ground-based telescopes, explained Newman, a nationally recognized expert in astronomical surveys. New satellites and enormous digital cameras on specially designed telescopes have now obtained detailed images of vast swaths of the night sky, capturing cosmic evolution and activity spanning more than 10 billion years.

The popularity of large surveys mushroomed after 2002 with the public release of photos from the Sloan Digital Sky Survey, the most influential survey project and one in which Pitt had a part, Newman said. Now there are dozens of projects that document the active lives of celestial bodies; Pitt cosmologists alone help lead or participate in approximately 12 different undertakings. And the resulting data can be enormous. For instance, Newman and Wood-Vasey lead Pitt's participation in the Large Synoptic Survey Telescope (LSST), a telescope with a 27-foot diameter and fitted with a 3-billion-pixel camera under construction in Chile. Scheduled to be operational by the end of the decade, the LSST will scan the sky every three days and generate roughly 30 terabytes (more than 5,000 DVDs) of information every night for 10 years. In just a few nights of operation, it will match the amount of data collected by the Sloan survey.

This dizzying flood of information also comes in a variety of forms, Newman said. In the absence of an agreed-upon format, researchers create data sets with a wide variety of parameters and names for celestial bodies. In addition, smaller, potentially important projects lack the communications heft of well-funded efforts and become lost in the din. Newman compared conducting research within the current jungle of information to planning a large dinner party that requires purchasing each ingredient at a different store—with the staff at each store speaking a different language.

The Pitt team's first step is to create a computational framework that will let astronomers link their observations to specific experiments, models, or other



observations. Labrinidis and Chrysanthis will lead the design of an annotation framework to create these links along with an automated work-flow system that will streamline many of the tasks astronomers currently perform manually, such as coordinating follow-up observations. Marai will develop a visual interface allowing astronomers to work directly with images of the sky as they construct and test computational models of the Universe. Together, the three of them will create software to interactively analyze experimental results, as well as to construct and test hypotheses.

AstroShelf also will allow images obtained using different types of light—such as infrared or X-rays—to be correlated with ease to reveal obscured details of distant galaxies and black holes. This feature will be designed using data from

two projects for which Newman is a key member: DEEP3 (the Deep Extragalactic Evolutionary Probe 3) and AEGIS (the All-Wavelength Extended Groth Strip International Survey). DEEP3 examines the light of more than 50,000 faraway galaxies to determine the bodies' composition and distance from Earth. The AEGIS project combines images of the Groth Strip—an area the width of four full moons near the "handle" of the Big Dipper—from the largest ground- and space-based telescopes to document how galaxies have grown and changed over the past 10 billion years.

AstroShelf also will enable researchers to record and share preliminary results of their analyses, Labrinidis said. This capability would be particularly valuable for studying such transient events as supernovae, which are visible from Earth for only a short time and often require multi-institutional coordination to fully observe.



Alexandros Labrinidis



Large "survey" projects have been a key development in astronomy during the past decade, allowing astronomers the world over to pore over uniformly high-quality images of deep space. Studies of distant galaxies were previously limited to a few astronomers with access to the most powerful ground-based telescopes, explained Newman, a nationally recognized expert in astronomical surveys. New satellites and enormous digital cameras on specially designed telescopes have now obtained detailed images of vast swaths of the night sky, capturing cosmic evolution and activity spanning more than 10 billion years.

Pitt's Wood-Vasey is centrally involved in discovering transient events for one such project, Pan-STARRS (Panoramic Survey Telescope and Rapid Response System), a

large survey that uses the world's most powerful digital camera to search the sky for explosive and violent deep-space events.

Happenings



PAUL LYDÉN

**Jesus Christ Superstar,
Benedum Center,
August 2-14**

Lectures/Seminars/ Readings

"Art Nouveau and the Ubiquity of Style," Sarah Hall, Frick Art Museum director of curatorial affairs, 10 a.m. **Aug. 12**, Lexington Education Center, The Frick Art & Historical Center, 7227 Reynolds St., Point Breeze, 412-371-0600, www.thefrickpittsburgh.org.

Opera/Theater/ Dance

The Sound of Music, Rodgers and Hammerstein's classic, **July 19-31**, Benedum Center, 719 Liberty Ave., Downtown, Pittsburgh CLO, 412-456-6666, www.pgharts.org, Pitt Arts Cheap Seats Program, 412-624-4498, www.pittarts.pitt.edu.

Twelfth Night, one of Shakespeare's most-loved comedies, directed by Karla Boos, **July 28-Aug. 21**, Quantum Theatre, West Penn Hospital Foundation Research Facility, 720 Gross St., Bloomfield, 888-718-4253, www.quantumtheatre.com, Pitt Arts Cheap Seats Program, 412-624-4498, www.pittarts.pitt.edu.

Jesus Christ Superstar, an Andrew Lloyd Webber favorite, **Aug. 2-14**, Benedum Center, 719 Liberty Ave., Downtown, Pittsburgh CLO, 412-456-6666, www.pgharts.org, Pitt Arts Cheap Seats Program, 412-624-4498, www.pittarts.pitt.edu.

The Importance of Being Earnest by Oscar Wilde, **Aug. 4-27**, Charity Randall Theatre within the Stephen Foster Memorial, Pittsburgh Irish & Classical Theatre, 412-394-3353, www.pittheatre.org, Pitt Arts Cheap Seats Program, 412-624-4498, www.pittarts.pitt.edu.

August in August, scenes and monologues from Hill District native and Pulitzer Prize winner August Wilson's depiction of the African American experience in the 20th century, **Aug. 18-20**, August Wilson Center for African American Culture, 980 Liberty Ave., Downtown, 412-456-6666, www.pgharts.org.

THE IMPORTANCE OF BEING EARNEST



**The Importance of Being Earnest,
Charity Randall Theatre,
August 4-27**

The Marvelous Wonderettes by Roger Bean, a return to the 1950s and '60s, **through Oct. 2**, CLO Cabaret, 655 Penn Ave., Downtown, 412-281-3973, www.pittsburghclo.org, PITT ARTS Cheap Seats, 412-624-4498, www.pittarts.pitt.edu.

Pitt PhD Dissertation Defenses

Andrew Samuelsson, School of Medicine's Center for Neuroscience/Neurobiology Graduate Program, 10 a.m. **July 21**, "Dissecting the Registration and Processing of Olfactory Events During General Anesthesia," 1495 Starzl Biomedical Science Tower.

Addie Weaver, School of Social Work, 1 p.m. **July 21**, "Is Family Therapy Effective, Acceptable, and Sustainable for Mothers and Children?: An Examination of Structural Family Therapy Implemented Within a Semi-Rural Community Mental Setting," 2117 Cathedral of Learning.

Tina-Marie Assi, Graduate School of Public Health's Department of Epidemiology, 3 p.m. **July 22**, "Impacts of Vaccine Logistics on Vaccine Epidemiology," First-Floor Parkvale Annex Conference Room.

Sarah Choi, School of Medicine's Molecular Pharmacology Graduate Program, 10 a.m. **July 25**, "Preclinical Studies on ATM Kinase Inhibitors as Anti-Cancer Agents," 1395 Starzl Biomedical Science Tower.

Salvatore Cherra, School of Medicine's Cellular and Molecular Pathology Graduate Program, 2 p.m. **July 25**, "Understanding the Interaction Between LRRK2 and PINK1: Implications for Parkinson's Disease," 1104 Scaife Conference Room.

Hans Lottenbach, School of Arts and Sciences' Department of Philosophy, 2 p.m. **July 25**, "Happiness, Approbation, and Rational Choice Studies in Empiricist Moral Philosophy," 1001B Cathedral of Learning.

Lidio Meireles, Joint CMU-Pitt PhD Program in Computational Biology, 9 a.m. **July 26**, "Rational Design of Small-Molecule Inhibitors of Protein-Protein Interactions: Application to the Oncogenic cMyc-Max Interaction," 3073 Biomedical Science Tower 3.

Jacqueline E. Townsend, School of Arts and Sciences' Department of Biological Sciences, 2 p.m. **July 28**, "A New Spin on Specificity: EcoRI Endonuclease-DNA Complexes Studied by Thermodynamics and Electron Spin Resonance Spectroscopy," A219B Langley Hall.

Eva M. Goellner, School of Medicine's Molecular Pharmacology Graduate Program, 1 p.m. **July 29**, "Demonstrating Functional Crosstalk Between DNA Base Excision Repair and Cellular Bioenergetics: A Strategy for the Treatment of Chemotherapy Resistant Glioblastoma," 1395 Biomedical Science Tower.

Wendy M. Martelle, School of Arts and Sciences' Department of Linguistics, 10 a.m. **Aug. 2**, "Testing the Aspect Hypothesis in L2 Russian," 2809 Cathedral of Learning.

Ping Zhang, School of Arts and Sciences' Department of Biological Sciences, 1 p.m. **Aug. 2**, "Signaling From Depolarization to Alternative Splicing: Identification of Molecular Links Mediating Inducible Exon Skipping," A219B Langley Hall.

Zhen Jiang, Graduate School of Public Health Department of Biostatistics, 11 a.m. **Aug. 9**, "Joint Modeling of Multivariate Ordinal Longitudinal Outcome," A622 Parran Hall.

Laura Macía-Vergara, School of Arts and Sciences' Department of Anthropology, 10 a.m. **Aug. 19**, "Dealing with Grievances: The Latino Experience in Pittsburgh, Pennsylvania," 3106 Posvar Hall.

Brett Caloia, School of Arts and Sciences' Department of Philosophy, 3 p.m. **Aug. 22**, "Self-Knowledge, Rationality, and Interpretation," 1001B Cathedral of Learning.

**Handmade Contemporary Craft in
Ceramic, Glass, and Wood,
Carnegie Museum of Art,
Ongoing**



Concerts

Bach, Beethoven, and Brunch, longtime favorite series for classical music lovers and brunch fans, 10:30 a.m.-noon, Sundays **through Aug. 15**, lawn of Mellon Park, Fifth and Shady avenues, Point Breeze/Squirrel Hill, Squirrel Hill Urban Coalition, Bagel Factory, WQED-FM, 412-255-2493.

Stars at Riverview Jazz Series, features Pittsburgh's premier jazz musicians, 7 to 8:30 p.m. Saturdays **through Aug. 27**, Riverview Park, Riverview Avenue, North Side, BNY Mellon and WDUQ, 412-255-2493.

Exhibitions

The Warhol, Mixed Signals: Artists Consider Masculinity in Sports, exhibition of contemporary art dealing with subject of the male athlete, **through Aug. 7**; **Contemporary Magic: A Tarot Deck Art Project**, **through Aug. 7**; **The Word of God(ess): Chitra Ganesh's Tales of Amnesia**, **through Sept. 4**, 117 Sandusky St., North Side, 412-237-8300, www.warhol.org.

Carnegie Museum of Art, Architecture Explorations, **through Aug. 12**; **Pittsburgh Biennial**, **through Sept. 18**; **Ragnar Kjartansson: Song**, **through Oct. 9**; **Hand Made: Contemporary Craft in Ceramic, Glass, and Wood**, **ongoing**, 4400 Forbes Ave., Oakland, 412-622-3131, www.cmoa.org.

Heinz History Center, Ben Franklin: In Search of a Better World, exploring the personal side of one of our founding fathers, **through July 31**; **America's Best Weekly: A Century of The Pittsburgh Courier**, **through Oct. 2**; 1212 Smallman St., Strip District, 412-454-6000, www.heinzhistorycenter.org.

The Frick Art & Historical Center, Fin de Siècle Prints: Art Nouveau on Paper, **through Sept. 11**, docent tours of exhibition available at 2 p.m. Wednesdays, Saturdays, and Sundays, free and open to the public, 7227 Reynolds St., Point Breeze, 412-371-0600, www.thefrickpittsburgh.org.

**Art Nouveau and the
Ubiquity of Style,
Frick Art Museum,
August 12**

**Stars at Riverview Jazz Series,
Riverview Park,
Saturdays through August 27**





Pitt-Johnstown Campus to Host Aug. 8-12 Retreat For Pennsylvania Teenagers in Foster Care

By Sharon S. Blake

An annual retreat for Pennsylvania's young people who are in foster care will be held Aug. 8-12 at the University of Pittsburgh Johnstown (UPJ) campus, 450 Schoolhouse Rd., Johnstown, Pa.

Sponsored by the Pitt School of Social Work's Pennsylvania Child Welfare Training Program and the Pennsylvania Department of Public Welfare Office of Children, Youth, and Families, the event will offer more than 130 participants—ages 16 to 21—a week of educational sessions, group talks, arts and sports activities, and opportunities to bond with others in similar situations. Group members will utilize campus facilities and residence halls while setting goals, making connections, and examining options as they age out of foster care. A banquet with an address by foster care advocate LaTasha C. Watts closes the weeklong retreat.

The title of this year's retreat is "Imagine . . . No Limits!" The young people will be challenged to identify potential barriers in their lives and discuss ways to overcome them.

"I've had the unique opportunity to talk with many young adults and to witness their excitement, connections, resiliency, and renewed commitment to achieving their goals," said Helen Cahalane, principal investigator of child welfare education in Pitt's School of Social Work and retreat facilitator for the past several years. "It is an amazing week continuing Pennsylvania's efforts to improve our child welfare system through youth voice and leadership."



Keynote speaker Latasha C. Watts is an author and motivational speaker who lived in a variety of foster homes throughout Ohio until she aged out of the system two days before her 19th birthday. Watts faced numerous challenges, including abusive relationships, pregnancy, single parenthood, and diagnoses of both cancer and obsessive-compulsive disorder—all before she was 23. Having cleared many of those hurdles, Watts now has 10 years of experience working with young people in a variety of settings. She is founder and executive director of The Purple Project, a support and resource network for those involved with the foster care community. Her first book, *I'm Not Broken, Just A Little Twisted*, is due out later in 2011.

This past year was a significant one for youth in foster care in Pennsylvania, which is now the 24th state to use a Voluntary Post-Adoption Contact Agreement, preserving an adoptive child's connection to siblings and other relatives. Pennsylvania also has a "bill of rights" for foster children. And older youth who have been involved with the child welfare system have

"I've had the unique opportunity to talk with many young adults and to witness their excitement, connections, resiliency, and renewed commitment to achieving their goals."—Helen Cahalane

presented their recommendations to policy makers for changes in that system. These suggestions are drafted every year during focus groups at the annual UPJ retreat.

The event's banquet will take place from 6 to 8:30 p.m. Aug. 11 in the Living Learning Center Heritage Hall on the UPJ campus.

PUBLICATION NOTICE The next edition of *Pitt Chronicle* will be published Aug. 23. Items for publication in the newspaper's *Happenings* calendar (See page 7) should be received at least two weeks prior to the event date. *Happenings* items should include the following information: title of the event, name and title of speaker(s), date, time, location, sponsor(s), and a phone number and Web site for additional information. Items may be e-mailed to chron@pitt.edu, or sent by campus mail to 422 Craig Hall. For more information, call 412-624-1033 or e-mail robinet@pitt.edu.