Six Pitt Faculty Receive NSF Awards

Awards fund junior faculty members’ emerging research

Communities powered by clean, local-source energy. Faster, more reliable technologies and computers with a better grasp of human language. Medical care tailored to your DNA, or neural stem cells readily available for treating neurological diseases and injuries.

Six University of Pittsburgh faculty members will advance the futures of energy, health, and technology as part of Faculty Early Career Development (CAREER) awards they received this year from the National Science Foundation. The awards fund junior faculty members’ emerging careers and include an education component that encourages outreach to women and underrepresented populations.

Four recipients teach in Pitt’s Swanson School of Engineering: Tracy Cui, an assistant professor in the Department of Bioengineering; Di Gao, an assistant professor in the Department of Chemical and Petroleum Engineering; Lisa Weiland, an assistant professor in the Department of Mechanical Engineering and Materials Science; and Jun Yang, an assistant professor in the Department of Electrical and Computer Engineering.

Assistant professors Rebecca Hwa and Alexandros Labrinidis, both in the Department of Computer Science in Pitt’s School of Arts and Sciences, also received awards.

As of July 7, Pitt was among only 19 universities to receive six or more of the 420 CAREER awards granted since October 2007. Matching Pitt with six awards are Penn State, Texas A&M University System, the University of Massachusetts, the University of Missouri, the University of Washington, the University of Delaware, and Virginia Tech.

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Tracy Cui is developing a platform for better understanding how to harvest neural stem cells for therapeutic use for neurological diseases and injuries. Her research involves creating a surface of electroactive polymers on which neural stem cells can be directed to become functional neurons. This technology would allow scientists to answer the predominant questions regarding neural stem cell growth and neural tissue regeneration, namely, whether stem cells can become functional cells on an engineered surface and, if so, under what circumstances.

Di Gao’s research could help usher in the much-heralded future of personalized medical care based on an individual’s DNA, with his effort to revamp the technique for screening and separating DNA molecules. Gao’s approach would stretch DNA strands tethered to a solid surface via an electric field, allowing them to be pulled from the surface and analyzed based on their viscoelasticity. This method would overcome the limitations of the predominant method of electrophoreses—submerging the strands in a matrix and applying an electric field. By stretching the DNA, chromosome-size DNA molecules can be separated and studied, large fragments can be screened for mutations, and longer sequence fragments can be extracted. The technique might also be applied to RNA. The education component of Gao’s project includes outreach to underrepresented high school students through a related course and workshop at Baldwin and Westinghouse high schools in Pittsburgh, both of which have large African American student populations, and collaboration with Tsinghua University in China on an international field study module for Pitt undergraduates that focuses on international views of the ethical and social issues of genetic research.

Rebecca Hwa aims to improve the ability of computers to process and translate human language. She will address the difficulty many systems have in processing texts from such specialized domains as business e-mails or scientific literature as well as texts that are automatically translated from foreign languages. Specifically, Hwa will create machine-learning algorithms that find correspondences between “standard English” and texts from specialized domains.

The project focuses on three types of correspondences: direct translations, such as bilingual documents; loose translations, e.g., paraphrased articles; and indirectly related texts without an explicit translation. From these correspondences, a standard system will be adapted to translate or extract texts in specialized domains. Better language processing for a wide range of texts could allow for such computer applications as intelligent tutoring programs and data mining for medical documents.

The need for personalization is expected to increase dramatically as the Internet becomes more widespread and its users—content—more diverse. Accordingly, Alexandros Labrinidis aims to create a user-centric Web portal wherein people can tailor their search results. Labrinidis will first identify quality information from Web data sources, then—through a framework called Quality Agreements (QA)—a person would specify preferences in three categories of quality: Quality of Service, Quality of Data, and Quality of Information.

The user-centric Web portal would then display the Web pages most in keeping with the person’s preferences. Labrinidis’ project re-examines traditional query processing techniques and introduces a new tier of interaction wherein the processor adapts to the user’s changing preferences over time. Labrinidis will conduct user studies to validate the QA framework, evaluate the proposed algorithms analytically and experimentally, and develop prototypes. Results of this research—including software, data, and publications—will be made publicly available via the project Web site db.cs.pitt.edu/user-centric. Labrinidis is codirector of Pitt’s Advanced Data Management Technologies Laboratory (ADMT Lab), which encompasses a range of projects from data management for sensor networks to data-stream management systems and from scientific data management to Web databases.

The ADMT Lab was established in 1995 through an NSF CAREER award presented to ADMT codirector Panos Chrysanthis, a Pitt professor of computer science.

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Lisa Weiland will undertake a twofold effort to help sustainable energy gain a foothold in Western Pennsylvania by implementing self-powered materials into an ongoing project to power the town of Vandergrift in Westmoreland County with hydroelectric power. The Vandergrift project, based in the Swanson School’s Mascaro Center for Sustainable Innovation, will harness the Kiskiminetas River and help power the town’s main business district with free, clean-source electricity using microhydro generators. Because the river—and thus the generator—is small, Weiland will investigate a potential power-generating method based on electromechanical materials that would generate power as the river’s current moves over them. Weiland will focus on, among other things, materials known as ionomers, which have been tested for such uses as self-powered sensors in bridges and for monitoring blood flow in patients at risk for arterial blockage; as the sensors move from vibrations or fluid flow, they would simultaneously send out an electric data signal and recharge themselves. But ionomers have not yet been applied to such high-power devices as generators because of a concern that electrical output and fragility increase in tandem. As part of her CAREER project, Weiland plans to work on constructing more robust ionomers that can produce more power without becoming too delicate. The education component of her project includes working with civic and business leaders in Vandergrift—and eventually other cities—to develop tailored plans for becoming more efficient producers and consumers of energy and goods.

As technologies become more compact and powerful, the microprocessors within them become more prone to overheating, leading to poor performance, reduced reliability, and shorter lifetimes. Jun Yang will investigate ways of controlling temperature by proactively scheduling workloads among different processing cores—which perform specific tasks within a processor—of today’s multicore processors. Current processors adopt a reactive temperature control by decreasing power flow within the entire processor—even if only one core overheats. Yang’s technique instead prevents overheating by swapping a high-stress task in an overheating core with a low-stress task from a cooler core. This approach would diminish the occurrence of hotspots and maintain a temperature at which the processor can function with maximum performance and reliability. Yang focuses her research on computer architecture particularly power and thermal-aware design, energy efficiency, and chip multiprocessor design.

Pitt Sets Emergency Preparedness Drills for 11 Buildings in August

The University of Pittsburgh’s Department of Environmental Health and Safety has scheduled emergency preparedness exercises during August for 10 University-operated high-rise buildings and the Petersen Events Center.

The exercises will be initiated by the sounding of an emergency alarm throughout each building; occupants should evacuate the building via the nearest stairwell or exit door. Each exercise should last no more than 20 minutes. (Occupants of the Cathedral of Learning will be given special instructions for their scheduled exercise.) Each residence hall will have an emergency preparedness exercise during the fall term.

Individuals with medical conditions or disabilities that may require accommodations for participation in an evacuation exercise or in a real emergency are requested to call Environmental Health and Safety at 412-624-9505 for the development of an individual emergency response plan.

The schedule is:

- Salk Hall, Aug. 8, 8:30 a.m.; Petersen Events Center, Aug. 8, 9:15 a.m.; Biomedical Sciences Tower 3, Aug. 11, 8:30 a.m.; Learning Research and Development Center, Aug. 11, 9:15 a.m.; Benedum Hall, Aug. 12, 8:30 a.m.; Graduate School of Public Health, Aug. 12, 9:15 a.m.; Alumni Hall, Aug. 13, 8:30 a.m.; School of Information Sciences, Aug. 13, 9:15 a.m.; Chevron Science Center, Aug. 14, 8:30 a.m.; William Pitt Union, Aug. 14, 9:15 a.m.; and Cathedral of Learning, Aug. 15, 8:30 a.m.

BIG BEN SUPPORTS PITT POLICE K-9

Training and equipment were made available for the Pitt Police canine, Officer Rays. Through the Ben Roethlisberger Foundation, which donated nearly $100,000 to Pittsburg area police and fire department K-9 units. Dog lover Ben Roethlisberger, who also plays quarterback for the Pittsburgh Steelers, donated the money because, he said, he wanted “to recognize and support the men and women in the police and fire departments who risk their lives to protect our communities and their families. Since it was my idea, this program is a unique way to contribute to K-9 units in different cities that play a vital role in assisting police and fire efforts.”

Pictured (left to right) Roethlisberger, Police Chief Tim Delaney; Pitt Police Officer David Nanu; Allegheny County Deputy District Attorney Tom Swanger, and Rob Cochran, president and CEO of #1 Cochran, one of the foundation’s major supporters.

Academic Benefits of Full-Day Kindergarten Are Short-Term, Pitt Study Finds

By Sharon S. Blake

As full-day kindergarten becomes more popular throughout the United States, parents may wonder whether the full-day programs pay off academically for children in the long run.

According to a new study by researchers at the University of Pittsburgh and Loyola University Chicago, the academic benefits are more short-term.

The study, published in the July/August 2008 issue of the journal Child Development, suggests that full-day kindergarten promotes academic achievement, and those children in full-day kindergarten have slightly better reading and math skills than children in part-day kindergarten. However, those initial academic benefits diminish early in elementary school.

Pitt assistant professor of psychology Elizabeth Votruba-Drzal, the study’s lead author, worked with data on 13,776 children from the Early Childhood Longitudinal Study: Kindergarten Class of 1998-99, a study of a nationally representative group of kindergartners. Votruba-Drzal and her colleagues measured children’s academic achievement in math and reading in the fall and spring of their kindergarten and first-grade years, and in the spring of their third- and fifth-grade years. The researchers looked at the type and extent of child care the children received outside of the kindergarten classroom, the quality of cognitive stimulation they received at home, and their families’ poverty level.

“These study results suggest that the shift from part-day to full-day kindergarten programs occurring across the United States may have some positive implications for the child’s learning trajectories in the short run,” says Votruba-Drzal. “They also highlight characteristics of children and their families that are noteworthy in explaining why the full-day advantages fade relatively quickly.”

Overall, the study found that reading and math skills of children in full-day kindergarten grew faster from the fall to the spring of their kindergarten year compared to the academic skills of children in part-day kindergarten. However, the full-day kindergartners’ gains in reading and math did not last far beyond their kindergarten year. In fact, from the spring of their kindergarten year through fifth grade, the academic skills of children in part-day kindergarten grew faster than those of children in full-day kindergarten. The advantage of full-day versus part-day programs was no longer evident by the spring of third grade.

According to the researchers, this is owing, in part, to the fact that the children in part-day kindergarten were from more socio-economically advantaged situations and had more stimulating home environments than those in full-day programs.

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Academic Benefits of Full-Day Kindergarten


Film

Pitt PhD Dissertation Defenses
Jill Brady, School of Health and Rehabilitation Sciences, “Examining Inter-segmental Influences on Predicted Vert Subcalculation,” 9 a.m. July 21, Room 5047 Forbes Tower.


Thinking Outside the Box, this is about a reality game show and a potential contestant who has a rather unorthodox method of auditioning, to be directed by Jean- nie Foster-McKie, is slated for 7 p.m. Aug. 24 at Open Stage Theatre. Admission is free.

The Pittsburgh New Works Festival will present staged readings on Aug. 24 and Aug. 31. Main stage productions run Thursdays through Sundays.

The festival is dedicated to fostering the development of original one-act plays written by local and national playwrights that are being produced for the first time by local theater companies.

By Sharon L. Blake

Concerts
Steve Earl, country-rock, 8 p.m. July 24, Byham Theater, 101 Sixth St., Downtown, Pittsburgh Cultural Trust, 412-441-1907, www.pgharts.org.

The Black Crowes, country-rock, 8 p.m. Aug. 9, Byham Theater, 101 Sixth St., Downtown, Pittsburgh Cultural Trust, 412-441-1907, www.pgharts.org.


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**Awards & More**

Andrew F. Stewart, professor and chief of the Division of Endocrinology and Metabolism, Department of Medicine, University of Pittsburgh School of Medicine, was honored by The Endocrine Society during the organization’s 90th annual meeting on June 20 in San Francisco. Stewart delivered the society’s 2008 Gerald D. Aurbach Award Lecture, in recognition of his outstanding contributions to endocrinology research.

Considered an international authority in disorders of bone and mineral metabolism, Stewart leads investigations involving translation and basic science research of pancreatic beta islet cell function in individuals with diabetes. He was the first to characterize humoral hypercalcemia of malignancy, a syndrome that is a common cause of death in patients with breast, lung, and other cancers, in complete biochemical detail.

The Aurbach Award is given by The Endocrine Society in honor of the late Gerald D. Aurbach, who served as society president from 1989 to 1990. The award was first presented in 1993.

Anthony Grace, a professor of neuroscience, psychiatry, and psychology in Pitt’s Department of Neuroscience, received the 2008 CINP-Lilly Neuroscience Basic Research Award for his research into the biological bases of psychiatric disorders.

The award is presented by the Collegium Internationale Neuro-Psycho-Psychopharmacologicum and pharmaceutical company Eli Lilly to a researcher younger than 55 who has made significant contributions to the understanding of the nervous system. Grace accepted the award July 13 in Munich at CINP’s 26th congress. CINP is the world’s sole global organization dedicated to neurop-phytopharmacology.

Freddie H. Fu was installed as the 37th president of the American Orthopaedic Society for Sports Medicine (A OSSM) during the society’s annual meeting in Orlando, Fla. Fu is a professor and chair of the Department of Orthopaedic Surgery in the University of Pittsburgh School of Medicine and founding medical director in the UPMC Center for Sports Medicine.

Fu is known worldwide for his pioneering surgical techniques to treat sports-related injuries to the knee and shoulder and his extensive scientific and clinical research in biomechanics. Under Fu’s leadership, the UPMC Center for Sports Medicine has grown into one of the world’s largest and most comprehensive sports medicine clinical and research centers. Fu is the head team physician for the University’s Department of Athletics.

Fu joined the medical school faculty in 1982 as an assistant professor of orthopaedic surgery and director of sports medicine. He became clinical vice chair of the Department of Orthopaedic Surgery in 1990 and executive vice chair in 1994. He is the editor of 28 major orthopaedic textbooks and also serves on the editorial boards of, and as a reviewer for, many orthopaedic journals, including the American Journal of Sports Medicine, Arthroscopy, and the Journal of Bone and Joint Surgery.

The CINP-Lilly award acknowledges Grace’s work to determine the modes of action of psychiatric drugs by creating models of neuron activity that expose the biological and chemical roots of mental disorders. The award pertains in particular to his research into the neurobiology of schizophrenia and the resulting interplay between medication and the brain’s neurotransmitters.

The Pittsburgh Supercomputing Center (PSC) won the Best Demonstration at TG08 award during the annual conference of the TeraGrid, a National Science Foundation program of cyberinfrastructure for U.S. science and education. A PSC team of two scientists, Shawn Brown and Philip Blood, and University of Pittsburgh student intern Jordan Soyke received the award for WII MD, an innovative project that merges the video-game technology of the Nintendo Wii with interactive supercomputing. Based upon participation from U.S. to visiting students at a National Science Foundation open house in Arlington, Va. The PSC is a joint effort of the University of Pittsburgh and Carnegie Mellon University together with the Westinghouse Electric Company.

**Michael Madison**, professor of law and associate dean for research in the University of Pittsburgh School of Law, is one of four law professors and other experts who served on a committee to develop a Code of Best Practices in Fair Use for Online Video to guide creators of online entertainment.

Sponsored by the American University’s Center for Social Media, the committee was cochaired by Peter Jaszi, professor of law and faculty director of the Glushko-Samuelson Intellectual Property Clinic at American’s Washington College of Law, and Patricia Aufderheide, professor and director of the social media center in American’s School of Communication.

Madison had a similar role on the board of an earlier project—a statement of best practices for fair use in documentary filmmaking—on which the current project is based.

**Publication Notice** The next edition of *Pitt Chronicle* will be published Aug. 19. Items for publication in the newspaper’s Happenings calendar (see page 3) should be received six working days prior to the desired publication 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, faxed to 412-624-4895, or sent by campus mail to 422 Craig Hall. For more information, call 412-624-4238 or e-mail alee@pitt.edu.