

Outlook

The magazine for
the College of Science
and Technology
FALL 2011

Carbon Nanotubes

- thin film solar cells
- portable water filtration
- more efficient flat screens!

$$dT/dt > 0$$

leads to higher

purity than

$$dT/dt = 0$$

Taking the Lead

Expanding multidisciplinary research
and tech commercialization

*Talented students
matched with exceptional researchers.*

*Advanced theory
matched to hands-on experience.*

*Your contribution
matched by our commitment.*

The Undergraduate Research Program offers CST students the opportunity to work alongside Temple's most experienced researchers. But many URP students have to work at jobs off campus, and that means less time in the lab working on today's most difficult challenges.

Your gift to URP will provide students with hourly stipends for lab work. CST will then match your financial contribution—on a one-to-one basis—so that your gift will go twice as far.

Together, we can help URP students spend more time in the lab, earn money for living expenses and learn what it takes to excel in advanced research before they graduate.

To make a gift to the Undergraduate Research Program, use the enclosed envelope or go to myowlspace.com/giving.

Outlook

Outlook is a magazine for all Temple alumni who earned a degree in the sciences and friends of the College of Science and Technology (CST).

College of Science and Technology

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Expanding Research Across Campus

CST is taking the lead in multidisciplinary research and tech commercialization.

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Future in Motion

The Department of Computer & Information Sciences is reshaping the way we connect to data, doctors and more.

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The College of Science and Technology welcomed 1,106 freshmen and transfer students this year. At the beginning of the fall semester we invited these newest students to a Meet the Dean event. The lecture hall where the event was held can accommodate 300 people, but it felt as if the entire Class of 2015 had squeezed themselves in among the seats and aisles. (See the photo on page 4.)

Seeing such a gathering, I was struck by their enthusiasm for learning. I also thought about the many challenges this newest class faces: difficult economic times, global competition and increasing technological sophistication. CST has always prepared its students for what lies ahead through a demanding curriculum and engaged faculty. We are expanding our efforts to provide CST students with every advantage.

For example, we have introduced new advising initiatives that help students achieve success in the classroom and graduate on time. Our TUteach program offers students the option to enter the teaching profession. We are growing the Undergraduate Research Program, which pairs students with experienced faculty members for advanced research projects, so that every undergraduate will have a real-world research experience before they graduate.

To ensure students have more research opportunities, we must continue to support the outstanding efforts of CST professors. In this issue of *Outlook*, you will read how CST's faculty is taking a leadership role in interdisciplinary research and bringing new ideas to the marketplace faster. (See page 14.) Another article focuses on the accomplishments of the Department of Computer & Information Sciences under the direction of its chair, Jie Wu. (See page 20.)

Today's faculty and students also need exceptional facilities. We continue to work with the university and USA Architects to design the new Science Education and Research Building. Set at the heart of Main Campus, the new building will provide more space for CST students and faculty and support advanced science. (See page 4.)

Alumni, who speak with students about careers, serve as mentors and hire our graduates, play a critical role in our success. Many CST graduates as well as friends and corporate and foundation partners are featured in this issue's Honor Roll of Donors. Thank you for your financial support. You help ensure that today's students and faculty have the opportunity to succeed and to make a positive impact on campus, in our communities and around the world.

Sincerely,

A handwritten signature in black ink, appearing to read 'Hai-Lung Dai'. The signature is stylized with a large, looped 'D' and a horizontal line extending to the left.

Hai-Lung Dai

Dean and Laura H. Carnell Professor of Chemistry

New peptide could be effective treatment for triple negative breast cancer

A NEW PEPTIDE DEVELOPED by researchers in the College of Science and Technology has demonstrated efficacy against triple negative breast cancer.

The leptin receptor antagonist peptide, developed by researchers Laszlo Otvos and Eva Surmacz, could become an attractive option for triple negative breast cancer treatment, especially in the obese patient population. The researchers published their findings online in the *European Journal of Cancer*.



Eva Surmacz

According to the researchers, triple negative breast cancers—which represent 10 to 20 percent of all mammary tumors—are characterized by the aggressive traits often found in younger women and have been associated with poor prognosis.

“Obesity increases the risk for triple negative breast cancer development,” said Surmacz, an associate research professor in biology. “Because triple negative breast cancer patients are unresponsive to current targeted therapies and other treatment options are only partially effective, new pharmacological modalities are urgently needed.”

Leptin, a protein that is always elevated in obese individuals and is higher in women than in men, can act locally within the body and promote cancer development by inducing the survival and growth of tumor cells, counteracting the effects of cancer therapies and promoting metastasis. Previous studies by Surmacz suggested that leptin levels are significantly higher in aggressive breast tumors than in normal breast tissue.

In their study, the researchers examined if the leptin receptor was a viable target for the treatment of this type of cancer. It has been shown that in human triple negative breast cancer tissues, the leptin receptor was expressed in 92 percent and leptin in 86 percent of cases.

Using a mouse model of triple negative breast cancer, they tested the new leptin receptor antagonist peptide and compared it to conventional chemotherapy. The leptin receptor antagonist peptide extended the average survival time by 80 percent, compared to 21 percent for chemotherapy. The peptide was found to be non-toxic even up to the highest dose administered, said Surmacz.

“If this peptide, with its advantageous administration route and safety profile, can be developed as a drug it could be a useful addition to the existing oncology drug repertoire against various forms of cancer, including breast, brain, prostate and colon cancers,” said Surmacz.

The study was partially funded by the Pennsylvania Department of Health.

Otvos and Surmacz are inventors on an international patent application covering this peptide and analogues for the treatment of various cancers, arthritis and autoimmune disease forms. The patent is owned by Temple University. Start-up Peptherx, Inc., has an exclusive option to negotiate a license to these compounds from the university. Peptherx, Inc., is a therapeutic peptide company focused on designing, screening and developing synthetic peptide modulators of adipokine signaling for the treatment of cancer, inflammatory/autoimmune and metabolic diseases.

—Preston Moretz, SCT '82

NEWS FEED

Faculty expertise featured in local, national and international media



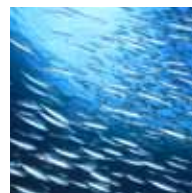
Mathematician **John Allen Paulos** explored several vexing questions for *Scientific American*, including “Are your friends more popular than you are?” and “Do the abilities of animals to calculate really exceed those of humans?”



Assistant math professor **Benjamin Seibold** was featured in several media outlets for his research on traffic modeling, including *The New York Times*, *The Wall Street Journal*, *The Financial Times* (London), KYW Newsradio, NBC Philadelphia and *The Philadelphia Inquirer*.



Geophysicist **Jonathan Nyquist** measured and discussed the impact of the epic 8.9 magnitude earthquake in Japan on the Philadelphia region, and the likelihood of the quake causing a worldwide chain of seismic catastrophes on Fox29 television and in *The Philadelphia Inquirer*.



Marine biologist **Erik Cordes**, who has been studying coral reefs in the Gulf of Mexico in the aftermath of the BP oil spill, was featured in articles exploring the spill's effects on ocean life in *National Geographic*, *Nature* and *The New York Times*.

CST NOTES

Professor Klein honored by RSC

Michael Klein

Michael Klein, Carnell Professor of Science and director of the Institute for Computational Molecular Science, received the S F Boys-A Rahman Award presented

by the Royal Society of Chemistry (RSC). Klein was honored for devising ingenious and innovative algorithms and methods that have enabled the simulation and understanding of properties of macromolecular systems and molecular assemblies. The RSC is the largest organization in Europe for advancing the chemical sciences, whose activities span publishing, education, conferences, science policy and the promotion of chemistry to the public.

Professor Martoff awarded Fulbright

C. J. Martoff, professor of physics, has been awarded a Fulbright U.S. Scholar Award for the 2011–2012 academic year. Professor Martoff will work on dark matter detection with faculty from the University of Milan at the Gran Sasso National Laboratory, located in the Abruzzo region of central Italy. Dark matter detection represents about half of Professor Martoff's research funding, which includes two active multiyear NSF grants and one active multiyear subcontract. The Gran Sasso National Laboratory is one of four National Institute of Nuclear Physics laboratories in Italy. It is the largest underground laboratory in the world for experiments in particle physics, particle astrophysics and nuclear astrophysics. Gran Sasso is used by scientists from more than 20 different countries, working at about 15 separate experiments in varying phases.

Science Education and Research Building taking shape

THE ADVANCED SCIENCE Education and Research Building (SERB)—now in the final planning stages—will provide more space and state-of-the-art technology for CST's experienced faculty and talented students.

SERB will rise on Polett Walk adjacent to Gladfelter Hall. It will connect to the Engineering Building and, if plans are approved, a bridge will also span 12th Street connecting SERB and the Bio-Life Building. The facility will contain laboratories and classrooms that will help attract talented scholars and provide CST students with more opportunities for research. The building is financed by a Commonwealth of Pennsylvania capital grant and is one component of *Temple 20/20*, the university's ambitious framework for transforming Main Campus into a 21st-century living and learning environment.

While details are still being finalized, the structure is slated to be seven stories tall and contain more than 200,000 square feet of space. The building will contain the latest communications, safety, HVAC and other technologies needed for advanced scientific research, including biosafety level 3 and level 4 laboratories.

The building's first floor, with dramatic 20-foot ceilings, will feature two large lecture halls as well as exhibition spaces and lounge areas. The second floor will house teaching labs, storage and support areas and seminar and conference rooms. The building's interior configuration will include space for the departments of Physics, Computer & Information Sciences and others offices.

Class of 2015 meets Dean Hai-Lung Dai



With more than 1,100 new students for fall 2011, the CST Meet the Dean event filled a Beury Hall auditorium...and then some. Students heard from Dean Dai and other CST staff members on the many resources and opportunities offered by the college. Several recent CST graduates also shared advice and encouragement.

CST researchers awarded funding for drug discovery research

TWO CST RESEARCHERS, Mark Feitelson and Rodrigo Andrade, have each received grant awards through the Temple University Drug Discovery initiative. The funding encourages and supports collaborative research with the Moulder Center for Drug Discovery Research in the School of Pharmacy. The projects were selected through an internal competition to identify research relating to the identification and development of new therapeutics that can be used to treat human diseases or dysfunctions.

Proposals were evaluated on the extent to which they support the following criteria:

scientific merit/rationale; likelihood of the target translating to or impacting a human disease state; likelihood of success (project transitioning to a viable drug discovery project); likelihood of the completed project qualifying for additional, external funding; and likelihood of producing intellectual property leading to commercialization. CST's awarded projects are:

DEVELOPMENT OF NEW THERAPEUTICS AGAINST THE HEPATITIS B VIRUS (HBV) ENCODED ONCOPROTEIN, HBX, TARGETING VIRUS REPLICATION AND ASSOCIATED DISEASES

PI: Mark Feitelson, Professor of Biology

Hepatitis B (HBV) is a significant health issue, especially in developing countries. Only one mechanistic target has been exploited in the design of HBV treatments, namely the inhibition of virus polymerases. These drugs only target replicating virus and cannot affect the latent virus, which can lie dormant in the host for many years. Given the likelihood that HBV will eventually develop resistance to these drugs, it is essential that new therapies be developed. The purpose of the proposed project is to identify molecules that inhibit the activities of the latent and replicating hepatitis B virus.

DISCOVERY OF NATURAL PRODUCT-BASED DRUGS TO OVERCOME MDR

PI: Rodrigo Andrade, Assistant Professor of Chemistry

Multiple drug resistance (MDR) is a common and increasing problem in cancer therapy. The purpose of this project is to synthesize and evaluate natural product-based small molecules that reverse MDR in cancer cells and tumors. The long-term goal of this project is to develop safe and effective drugs to overcome MDR.



The funding encourages and supports collaborative research with the Moulder Center for Drug Discovery Research in the School of Pharmacy.

CST NOTES

Vanguard helps CIS students attend conference

Four CIS students presented their research at the Grace Hopper Celebration of Women in Computing Conference in Portland, Ore. Inspired by computer pioneer Admiral Grace Murray Hopper, the conference highlights research and career interests of women in computing.

"It's a great opportunity for students to see what women innovators and leaders have done in our field," said Instructor Wendy Urban who, along with Instructor Claudia Pine-Simon, mentored the Temple students.

Two CIS student projects were chosen.

Moriah Baxevane-Connell's "Women and Computer-Related Fields of Study" investigates how high school and college students view computer classes. **Annika Lutz, Emily Le Blanc** and **Kathryn Knauth** presented "Mind-Body Kinecton, Utilizing the Kinect Platform for Therapeutic Recreation," which explores how users can control 3D graphics through body movements.

Vanguard, the investment firm that also serves on CIS' advisory council, provided \$2,900 to offset the students' conference costs. "Vanguard is an outstanding corporate partner," said Urban, noting the firm consistently hires interns and full-time employees from CIS. "For students to see such a highly regarded company so committed to Temple, that is a huge plus."

CST NOTES



Better technology to harness geothermal energy

Nicholas Davatzes, of the Department of Earth & Environmental Science, conducted fault-zone mapping along the Moab Fault in Utah for his research on the evolution of Moab fault-zone permeability and strength, funded by the Shell Petroleum Company. Davatzes also conducted image logging as part of enhanced geothermal systems (EGS) demonstration projects at Newberry Volcano, Ore., and the Desert Peak and Brandy's Geothermal Fields in Nevada. The EGS projects, with funding from the U.S. Department of Energy and Ormat Technologies, are part of developing better technologies to harness the natural heat of the earth to generate electricity.

Mathematics professor awarded BMS lectureship

Mathematics Professor **Igor Rivin** was awarded a prestigious BMS lectureship at the Berlin Mathematical School for fall 2011. Offered to guest lecturers with high international visibility, BMS lecturers teach a course in their research area. The Berlin Mathematical School is a joint graduate school of the mathematics departments of the three major Berlin universities. Rivin will lecture on variational approaches to the geometry of surfaces and three-dimensional spaces, and applications in physics and chemistry.

CST researchers receive Temple's concept grant awards for interdisciplinary projects

THREE CST RESEARCHERS, Jie Wu, chair and professor in computer & information sciences (CIS), Chiu Tan, CIS assistant professor, and Frank Chang, a professor in biology, are among a select group of Temple University faculty members to receive concept grant awards from the Office of Research and Graduate Education.

Wu, leading a team that includes Tan and faculty members from medicine and engineering, will oversee developing a body sensor network for use in monitoring fetal health. Body sensor networks consist of on-body sensing units, monitoring blood pressure and

other metrics, coupled with a local processing unit. Data are transmitted to the local unit, such as a smartphone, for temporary storage and long-range transmission. Body sensor networks continuously monitor people remotely, which can improve healthcare outcomes and potentially reduce costs.

Chang is a co-investigator on a project focused on determining the diagnostic and therapeutic potential for one of more than 50 novel cancer biomarkers discovered by a patented Temple technology. This technology, capable of detecting biomarkers in early stage cancers, dramatically shifts the way biomarkers are discovered and validated for use in both therapeutics and diagnostics.

The goal of the concept awards is to expand Temple research by supporting large-scale projects in life sciences and health-related areas, especially those with interdisciplinary collaborations. Four projects, featuring 20 Temple faculty members from eight schools and colleges, were selected.

The goal of the concept awards is to expand Temple research by supporting large-scale projects in life sciences and health-related areas, especially those with interdisciplinary collaborations.

Biology professor testifies before Congress on value of undergraduate research

IN LATE 2010, CST Biology Professor Tonia Hsieh spoke at a congressional briefing hosted by The Council on Undergraduate Research, in conjunction with the House Science, Technology, Engineering and Mathematics (STEM) Education Caucus on "Undergraduate Research and American Innovation." Her briefing focused on "the transformative educational role of undergraduate research with a corresponding discussion of the federal programs that support this work.



Tonia Hsieh

Regardless of type of institution, undergraduate research has the potential to radically change the understanding of any number of important existing scientific or engineering concepts and add new knowledge to the field."

CST helps launch science festival in Philadelphia



Al Tielebein, a math with teaching major, helps kids learn about electrical conductivity during Science Day at the Ballpark.

THE INAUGURAL PHILADELPHIA Science Festival, sponsored in part by Temple University, brought science to life for thousands of people in the Philadelphia region with the help of world-class faculty members from the College of Science and Technology.

The centerpiece of the mid-April festival, held at locations across the city, was Science Carnival on the Parkway featuring the Nano Dome, which combines interactive computer simulations of nanoscale objects with 3D visualizations and force feedback. Developed in collaboration with CST's Institute for Computational Molecular Science, the Nano Dome offers insight into the unusual behavior of nanoparticles. CST faculty and staff at the event included Associate Professor Axel Kohlmeyer, postdoctoral fellow Robert Johnson and Doug Baird, assistant dean for science education and special projects.

During Science Day at the Ballpark, Professor Susan Jansen-Varnum and Doug Baird helped kids and families explore the electrical conductivity of ionic compounds, build a conductivity tester and measure the chemical ions in a variety of household solutions. The Raft Rally at the Independence Seaport Museum offered opportunities to learn about the physics behind buoyancy, design and build a raft, and test the raft against the competition.

Professor Michael Zdilla, an audience favorite during an evening of eye-popping experiments, joined Sam Kean's Science Cabaret at the Chemical Heritage Foundation. In addition, striking visualizations exploring the beauty of bacteria and molecules and the realm of quantum physics and created by faculty members from the Institute for Computational Molecular Science, were featured at a month-long exhibition at TRUST Gallery in Old City, Philadelphia.

CST NOTES



Industry leaders at CST's women in computing event.

Women working in technology

The Temple student chapter of ACM-W, the Association for Computing Machinery's women in computing initiative, held a panel of and about women in technology. More than 50 attendees were part of the standing-room only crowd. The panelists were Valerie Gall, senior director, Systems Services, IT, Burlington Coat Factory; Shannon Morrison, technology security associate, PricewaterhouseCoopers; Becky Rinaldi, legal and compliance IT director, Cigna; Pauline Romas (BA '09, CIS), Almac; Julie Turnbull, DBA for Banner (ERP) System, Temple Computer Services; and Eloise Young, vice president and CIO, Philadelphia Gas Works.

Math well represented at 2011 meetings

CST's Department of Mathematics was well represented at the Joint Mathematics Meetings of the American Mathematical Society and Mathematical Association of America, held in New Orleans. Professors **Yury Grabovsky**, **Igor Rivin** and **Daniel Szyld** gave invited presentations on "Why does nature go multiscale? Mathematics of Modeling Multiscale Heterogeneous Media"; "Asymptotic phenomena in geometric group theory: Expander Graphs in Pure and Applied Mathematics"; and "Superlinear convergence of MINRES: Mathematics of Computation: Differential Equations, Linear Algebra, and Applications," respectively. Also, Associate Professor **David Zitarelli** was invited to participate in the panel "Writing the History of the MAA's First 100 Years."

Mirza Ahmed (BS '11, Bio): A journey of discovery just beginning



Mirza Ahmed with Professor Jacqueline Tanaka

IN THE SUMMER of 2010, Pakistan experienced its most severe flooding in nearly a century. Whole villages were washed away and thousands were killed and displaced. At one point, 20 percent of the country's land area was under water. As a biological sciences student, Pakistani American and someone with a passion for international development and public health, I wanted to find a way to repair the landscape and help the people of Pakistan move forward.

My journey began when my brother, who was working in Dubai, told me about the 2011 Education Without Borders. It's a conference sponsored by the royal family of the United Arab Emirates that brings together world leaders. It's a grand stage to present innovative solutions to global challenges. Not the kind of place you would expect to find someone who hadn't earned his bachelor's degree yet. But if I wanted to make an impact on Pakistan's future, this was the place I had to be.

I asked Professor Jacqueline Tanaka to help guide me in my pursuit. Together, we set out to understand water quality issues in Pakistan, investigating the environmental, economic and social effects of poor water quality. Professor Tanaka helped me to realize that this is a field where I can excel professionally and have a profound impact on communities around the world.

We identified Khyber Pakhtunkhwa as the region with the most severe environmental degradation and substantial economic, political and social challenges. Less than 13 percent of the population has access to safe drinking water due, in part, to heavy metals that enter the soil, ground water and rivers from untreated industrial effluents. We identified

biological solutions needed to address both industrial waste as well as the use of untreated sewage for agricultural irrigation. In brief, we proposed using native trees such as birch, willow and poplar to bioaccumulate heavy metals and toxins and increase water quality. Each of these trees grows in high levels of zinc and cadmium and translocates the metals from the roots and shoots to the leaves. Furthermore, the planting of more trees in the region helps control annual flooding.

I submitted my paper to the conference and, out of a pool of 5,000 students, I was selected to be one of 26 presenters in Dubai. In fact, I was the sole presenter of a biological solution to a global challenge. It was an amazing experience to be recognized by the organizers, attendees and by so many other individuals of South Asian heritage.

My Earth Without Borders presentation led directly to another opportunity at the University of Chicago, where I developed an implementation plan for my research in a competition sponsored by the Human Development Foundation (HDF). I earned a second-place finish, and I'm currently in talks with the HDF to begin implementing my biological solution to Pakistan's clean water needs. I am also looking for new mentors to help me on my research path.

In the past year and a half I have learned so much about international affairs and the social and economic benefits of environmental sustainability. I have traveled so far, yet I feel my journey is just beginning.

—*Mirza Ahmed*

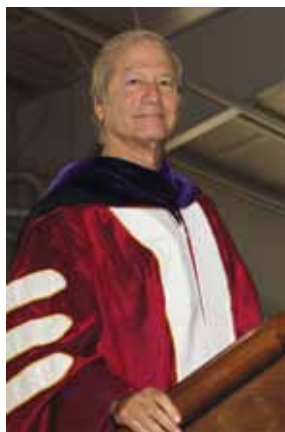
Accomplished graduates and speakers at CST graduation ceremony

THE COLLEGE OF Science and Technology held its graduation ceremony Thursday, May 12, in the Student Pavilion on Main Campus. CST's Class of 2011—one of its largest and most accomplished—included 26 advanced-degree candidates and more than 300 bachelor's degree candidates in biology, biochemistry, chemistry, computer and information sciences, earth and environmental sciences, mathematics and physics.

The Class of 2011 also featured the first graduates of TUteach, a collaboration of CST and Temple's College of Education. TUteach is designed to help correct the nation's increasingly serious science and math education deficiency. TUteach students graduate with a bachelor of science in their chosen math or science field, as well as with the academic and experiential qualifications necessary to earn a middle or high school teaching certificate.

The ceremony featured remarks by Temple Board member and CST graduate, Lewis Katz. After earning his bachelor's degree in biology at Temple, he went on to The Dickinson School of Law and to open Katz, Ettin & Levine in New Jersey. In 1998, Katz and a partner became the principal owners of the NBA's New Jersey Nets. The next year, that partnership purchased 50 percent of the New York Yankees. In addition, Katz led the campaign to build a new Boys & Girls Club in Camden, N.J. He also established the Whittaker Student Leadership Award at Temple, given to a student who demonstrates innovative leadership in furthering student activities. In 2004, Temple honored Katz with its Alumni Distinguished Service Award.

The ceremony's student speaker was Jenna Leigh Fox, who earned a bachelor's degree in biology as well as a certificate in Spanish for the Health and Human Services Professions. She participated in the university's honors program, earning recognition on the Honors Director's List as well as on the CST Dean's List. She is a member of the Phi Beta Kappa Honor Society. She also was selected to present her research at Temple's recent Undergraduate Research Day in Harrisburg, Pa. She has been accepted at six medical schools and also plans to pursue a master's degree in public health.



Temple University Board member and CST graduate Lewis Katz spoke to graduates during the college's commencement ceremony.

CST NOTES

Seed grants reward interdisciplinary research at Temple



Professor Bradford Wayland

For the third year, the Office of the Provost has awarded seed grants to faculty teams in the sciences for multidisciplinary and clinical translational research, and in the arts and humanities for multidisciplinary research and creative collaborations. This year, 21 grants were awarded, each totaling as much as \$50,000, representing 59 scholars from 12 schools and colleges at Temple, and three campuses, including Temple University Japan. Professor of Chemistry **Bradford Wayland** and **Svetlana Neretina** from the College of Engineering received funding for "An Innovative Strategy for the Fabrication of Nano-Based Multijunction Solar Cells."

"The seed grants continue to encourage new university collaborations and expand the depth and breadth of our interdisciplinary research and creative works, helping us advance Temple's goal of 'research excellence' that benefits society," said Senior Vice Provost for Research and Graduate Education Ken Blank. "These grants are important vehicles for helping faculty bring additional grant funding and recognition to Temple."

CST NOTES

Research/Creative project grants go to three CST students



Haley Gilles

Three CST students earned research and creative project grants in the spring 2011 round of awards under the Creative Arts, Research and Scholarship (CARAS) program. CARAS

provides funding for research, scholarly and creative projects proposed by undergraduates and professional students. The grants, between \$1,500 and \$3,500, are administered by the Office of the Senior Vice Provost of Undergraduate Studies. The three CST awardees are **Ryan DeLand**, chemistry major, for *The Quality of Ventilation in the Philadelphia Subway System*; **Haley Gilles**, biology major, for *Reducing Migratory and Local Bird Collisions on Large Glass Expanses: Pilot Study on Beury Hall*; and **Sachin Parikh**, neuroscience major, for *Neurochemical Adaptations while Running on a Slippery Surface in Basilisk Lizards*.

CST student delivers best elevator pitch

Ryan Lelache, a CIS undergraduate, was a finalist in PricewaterhouseCooper's Best Elevator Pitch Contest. The competition asked undergraduates of all majors to submit 30-second videos pitching what makes them stand out to potential employers. Over a six-week period, friends, family and supporters cast thousands of votes for their favorite videos. The 10 most popular clips advanced to the finals, where they were judged in four categories: body language and professional appearance; the ability to articulate unique skills; future aspirations; and a strong close.

CIS host Future of Computing Competition

EACH YEAR, THE Department of Computer & Information Sciences sponsors its Future of Computing Competition for high school students as well as for undergraduates and graduates students at Temple. This year, 20 projects were submitted for review by 14 CIS faculty and other experts. Additional sponsors of the April competition and awards included AWeber Communications, Protiviti, PricewaterhouseCoopers, InternU and others. Winners include:

UNDERGRADUATE AWARDS

GOLD AWARD

- *FINDME: Lost and Found System on the Internet* by Alexander Lubneuski and Dan Reuven

SILVER AWARDS

- *DEAR: Dance and Engineering in Augmented Reality* by Michael Korostelev, Michael Hwang, Kathryn Knauth and David Bui
- *Remote control of a service robot using gesture recognition* by Stefan Lekic

BRONZE AWARD

- *Women in a Man's Virtual World* by Lisa Kirk

GRADUATE AWARDS

GOLD AWARD

- *Extracting Strips Representation of Actions from Web Text for Machine Reading between the Lines* by Avirup Sil

SILVER AWARD

- *Travel Speed Forecasting using Continuous Conditional Random Fields* by Nemanja Djuric, Vladan Radosavljevic and Vladimir Coric

BRONZE AWARD

- *Sustainable GPU at Scale* by Moussa Taifi



The Future of Computing Competition also presented four awards for projects designed by students from Springfield Township High School and Upper Dublin High School, both in Pennsylvania.

TUteach celebrates first graduates and more



CST's TUteach prepares students to be great math and science teachers. Manali Saraiya (top right) was one of four students in TUteach's inaugural graduating class.

WITH THE UNITED States facing an increasingly serious science and math educational deficiency, skilled teachers—with a deep knowledge of biology, chemistry, physics, math and other subjects—are needed more than ever. Yet, in urban school districts, only about half of high school science teachers are certified in their content area.

TUteach, a collaboration of the College of Science and Technology and the College of Education and funded by a grant of up to \$2.4 million by the National Math and Science Initiative, continues its impressive growth in training the next generation of great math and science teachers. Program enrollment has increased from 21 students in fall 2006 to more than 160 in spring 2011. In addition, there are more than 70 mentor teachers from 24 public schools, and these numbers continue to grow.

Four students—Dianne Choi, Jisu Jeong, Manali Saraiya and James Richards—were part of TUteach's inaugural class of graduates in May.

TUteach—modeled on the UTeach program at the University of Texas at Austin—is one of the most effective ways to prepare skilled science teachers for long-term success in the classroom. Ninety percent of UTeach graduates go into teaching, and 80 percent are still in the classroom after five years.

Staff from the UTeach Institute, including Mary Walker, program replication manager, and Ashley Welch, site coordinator, visited Temple in April to learn more about TUteach's progress. The site visit team conducted student focus groups, observed several TUteach courses, and led a discussion on data from TUteach and other UTeach replication sites nationwide. Temple's TUteach program earned the UTeach Institute's highest rating in approximately 80 percent of 50+ metrics, including creating an organization devoted to preparing teachers, attracting and retaining students, and continuous program improvement.

CST NOTES

Chemistry graduate student receives prestigious award

Chemistry graduate student **Ali Eftekhari-Bafrooei** was selected to receive the inaugural William G. Fateley Student Award, the top Coblentz Student Award given by the Coblentz Society. The Coblentz Society is a nonprofit organization founded in 1954 that fosters the understanding and application of vibrational spectroscopy. One of the Coblentz Society's primary missions is to bestow recognition upon professionals for excellence in the advancement of vibrational spectroscopy. Eftekhari-Bafrooei was selected for his work performed in Professor of Chemistry **Eric Borguet's** laboratory in vibrational spectroscopy and dynamics of interfacial water, both hydrophilic and hydrophobic, with surface-specific technique of vibrational sum-frequency generation.



Aboard the icebreaker **Nathaniel B. Palmer**

In early 2011, Biology Professor **Bob Sanders** and postdoctoral fellow **Scott Fay** were aboard the icebreaking ship, *Nathaniel B. Palmer*, to study the Ross Sea, a shallow bay in the Antarctic coastline due south from New Zealand. The seven-week research expedition, supported by a National Science Foundation Grant, focused on the phytoplankton at the base of the Ross Sea's food web and the special combination of currents, nutrients and trace metals that allow it to thrive.

New CST faculty bring expertise and impressive research to campus

New CST faculty members bring the four-year tenure-track hiring total to 36, surpassing the college's 2012 goal of 30 new research-active professors. Faculty hired over the past two years bring expertise, impressive research and a commitment to working with Temple students in the lab, in the field and in the classroom.

2011

Irina Mitrea
Associate Professor,
Department of Mathematics

Irina Mitrea is the former associate director of the Institute for Mathematics and its Applications at the University of Minnesota, one of the premier, NSF-funded institutes for interdisciplinary and applied mathematics research. Her work encompasses a number of interacting areas, including numerical methods for the resolution of PDEs. Mitrea earned her PhD at the University of Minnesota and held postdoctoral appointments at Cornell University, the Institute for Advanced Study and Clay Mathematics Institute.



Ann Valentine
Associate Professor,
Department of Chemistry

As an assistant and associate professor, Ann Valentine taught at Yale University for 10 years in the general chemistry program. She earned her PhD from the Massachusetts Institute of Technology and while there worked on bioinorganic hydrocarbon oxidation using an enzyme extracted from a thermophile bacteria. As a postdoctoral research associate at Penn State, Valentine worked on the structure and mechanism of the bacteriophage T4 primosome.

Vincent Voelz
Assistant Professor,
Department of Chemistry

Vincent Voelz earned his PhD from the University of California–San Francisco, where he studied the zipping and assembly search strategy that was used to simulate and monitor proteins in their physical folding process. He showed that the zipping and assembly method was fast enough to predict protein structure with an atomically detailed force field. As a postdoctoral research associate at Stanford University, Voelz continued his work on the understanding of protein folding using theory and simulation.



William Wuest
Assistant Professor,
Department of Chemistry

William Wuest, an expert in organic and bioorganic chemistry, earned his PhD from the University of Pennsylvania. At Penn, Wuest developed a synthetic effort for the total synthesis of (+)-Peloruside A. As a postdoctoral research associate at the Harvard Medical School he investigated the cloning, overproduction, purification and characterization of enzymes for use in the development of new natural product biosynthesis strategies.

2010

Ke Chen
Assistant Professor,
Department of Physics

Ke Chen joins the college from Penn State University where he served as a postdoctoral fellow. He received his PhD in condensed matter physics from the Chinese Academy of Sciences, Beijing. His research interests are in high-temperature superconductor thin films. Chen is the author or co-author of 27 publications, and has given two invited talks and nine conference presentations.



Vasilij Dolgushev
Associate Professor,
Department of Mathematics

Vasilij Dolgushev joins the college from University of California–Irvine where he was an assistant professor in the department of mathematics. His research interests are in noncommutative geometry, homological algebra, category theory and mathematical physics. Dolgushev received his PhD in mathematics from the Massachusetts Institute of Technology.

Tonia Hsieh
Assistant Professor,
Department of Biology

Tonia Hsieh joins the college from the University of Florida where she was an assistant professor. She received her PhD in biology from Harvard University and has held positions as postdoctoral research associate at Brown University and at Harvard University. Her research interests include integrating the disciplines of ecology, evolution, morphology and animal behavior, how unstable or unpredictable environmental surfaces affect locomotor behavior and control, and how ecology and habitat structure influence morphological evolution.

Maria Iavarone
Associate Professor,
Department of Physics

Maria Iavarone joins the college from the Argonne National Laboratory in Illinois where she was a research fellow, visiting scholar, researcher, distinguished scholar, assistant physicist and physicist. She received her PhD in physics from the University of Naples Federico II, Italy. Her research interests include strongly correlated electron systems, mesoscopic complex systems and nanoscale superconductivity.



Rob Kulathinal
Assistant Professor,
Department of Biology

Rob Kulathinal joins the college from the Genetics Institute at the University of Florida. He received his PhD in biology from McMaster University and was a postdoctoral research and teaching fellow at Harvard University. His research interests span the domains of evolutionary biology, genomics and bioinformatics.

Shan Lin
Assistant Professor,
Department of Computer
& Information Sciences

Shan Lin joins the college from the University of Virginia where he received his PhD in computer science. His research interests include feedback-control-based design in cyber physical systems, wireless networks, wireless sensor networks, cognitive networking systems and networked information systems.



Xifan Wu
Assistant Professor,
Department of Physics

Xifan Wu joins the college from Princeton University where he was a research scholar and postdoctoral research associate. He received his PhD in computational physics from Rutgers University. His research interests include the applications and algorithms of first-principles computational methods.

In memoriam: Joel Bryan



IN 2010, THE College of Science and Technology community lost a skilled writer, a dedicated colleague and dear friend. Joel Bryan died of congestive heart failure at the Hospital of the University of Pennsylvania after a short illness. Bryan served as CST's assistant director of communications developing all print and web materials, including

the alumni magazine and speeches, for the college. Prior to Temple, Bryan held the position of communications manager at Drexel University's College of Information Science and Technology.

Bryan was born Oct. 26, 1977, in Scranton, Pa. He attended Wayne Highlands School District and Bethany United Methodist Church. He graduated from Haverford College and was pursuing his master's degree at Temple University. Joel enjoyed reading, mountain biking, photography, hiking, camping, chess, sports, and time with friends and family. He believed in helping others, particularly through Kiva.org, which provides business microloans to poor people around the world.

At a memorial service held at the college attended by CST faculty and staff and Joel's parents and wife Emily, Dean Dai spoke of the "talented, gentle and warm person" who had touched the lives of so many at Temple and beyond.

Undergraduate Research Program students earn scholarships

FIVE CST STUDENTS participating in the Undergraduate Research Program (URP) were awarded a Dean's Scholarship in recognition of their outstanding work in the classroom and lab. The \$2,000 scholarships went to Ashia Bibi, Petra Brayo, Mateusz Dobrowolski, Cheryl Doughty and Feisi Liang.

Another URP student, Nicole Haloupek, received the \$2,000 Hazel M. Tomlinson, Ph.D., Memorial Scholarship. Established in 1995 by the estate of Tomlinson (BA '26, MA '28, Chem), a longtime member of the chemistry faculty, the scholarship is awarded

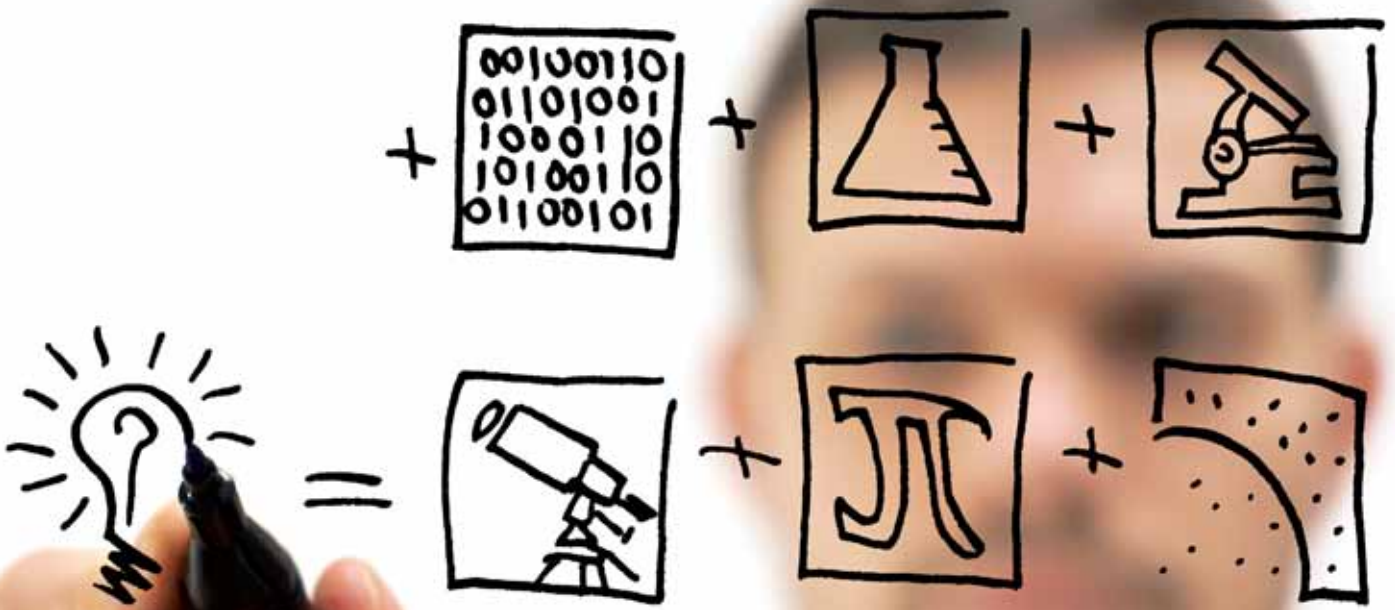
to undergraduate chemistry students who have demonstrated academic achievement and financial need.

Begun in the summer of 2009, URP aims to get more CST student into the laboratory with world-class Temple researchers. Students receive academic credit for lab work and can earn an hourly stipend. More than 220 students have participated in the program, working with faculty from CST and across the university. In addition to this year's awardees, there have been seven other URP students who have earned CST scholarships.

Expanding research across campus

CST is taking the lead in multidisciplinary research and tech commercialization

By Greg Fornia, SCT '92



OVER THE PAST five years, the College of Science and Technology has moved forward in many ways, including hiring outstanding researchers, more than doubling the amount of sponsored research, launching the innovative Undergraduate Research Program and bringing science to the community through TUteach and participation in events like the Philadelphia Science Festival.

The college's recent successes mean it can take a leadership role in two exciting new areas that have the potential to greatly expand the research enterprise at Temple University and impact lives around the world: catalyze multidisciplinary research among Temple's schools and colleges, and bring new ideas and inventions to the marketplace through technology transfer and commercialization.

According to Ken Blank, senior vice provost for research and graduate education, the days of the single investigator in a lab by himself trying to solve complex problems have long since gone. "Researchers need a multidisciplinary approach to examine a problem from several disciplinary directions in order to find a solution," says Blank, who also holds an appointment as professor in CST's Department of Biology.

Exchange ideas

FOR BLANK, THE strength of a multidisciplinary approach is that it generally leads to ideas and inventions that are much more practical. Take the development of ethanol as a substitute for high-priced and imported oil. "The technology to turn grain into fuel was developed, but no one really understood that this breakthrough would inevitably drive up the price of commodities and people in the Third World would not be able to afford food," explains Blank. "Rather than just researchers looking at the scientific challenges, a policymaker and a food economist would have brought valuable perspectives to the development of ethanol."

To foster more interdisciplinary and collaborative research Blank's office has developed a searchable database that covers all the research currently taking place at Temple. He also has begun a series of research "exchanges" that bring together faculty from across the university. Attended by more than 40 faculty members from 14 departments, the first exchange examined substance abuse. "We wanted people who may not



Ken Blank, vice provost for research and graduate education, holds Physics Chair Rongjia Tao's fuel-saving technology.

be directly related to the subject matter but have an interest and can make a contribution," says Blank, "For the substance abuse exchange we had someone doing research related to tobacco and someone examining public policy, and they offered invaluable insights into how to move this area of research forward."

At CST, Shohreh Amini, associate dean for research and graduate programs, is working with department chairs to emphasize the importance of interdisciplinary and collaborative research. "Just because you are a chemist or physicist doesn't mean you can't be part of a team that may be working on a question related to biomedicine," says Amini. "Engineering and biology used to be so far apart, now they are together because of bioengineering and nanotechnology. Biologists can design molecules that are therapeutic, but we need engineers and other specialists to get that molecule inside the cell. Good things happen with teamwork."

"Just because you are a chemist or physicist doesn't mean you can't be part of a team that may be working on a question related to biomedicine. Engineering and biology used to be so far apart, now they are together because of bioengineering and nanotechnology."

—Associate Dean Shohreh Amini

Enhance collaboration

ACCORDING TO AMINI, CST is well positioned to be at the center of Temple's interdisciplinary research efforts.

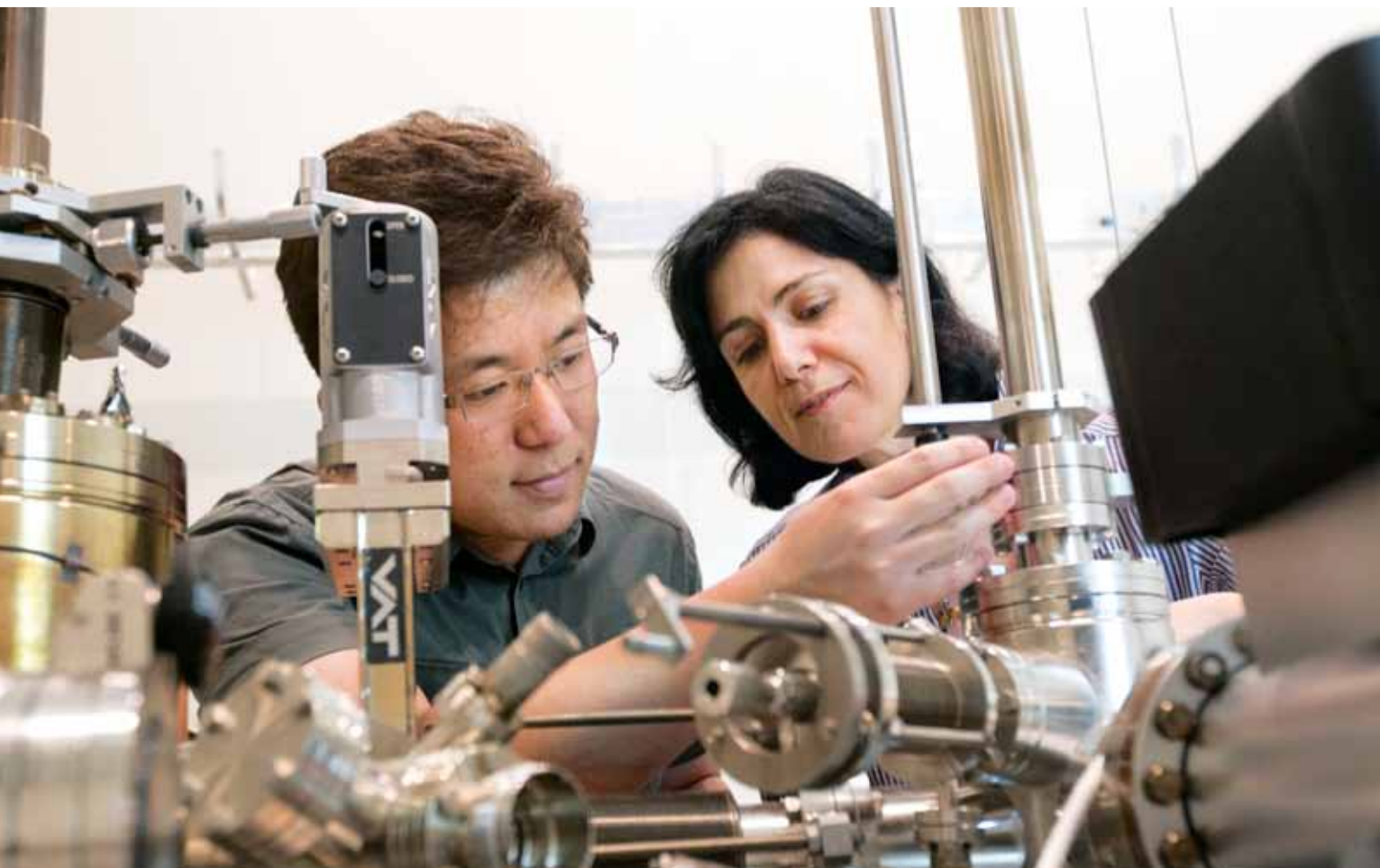
For example, two CST researchers, Professor of Biology Mark Feitelson, working on new therapeutics against Hepatitis B, and Assistant Professor of Chemistry Rodrigo Andrade, investigating natural product-based drugs to overcome multiple-drug resistant cancers, each received 2011 grant awards through the Temple University Drug Discovery initiative, which encourages and supports collaborative research with the Moulder Center for Drug Discovery Research in the School of Pharmacy.

"We have so many strong research cores—in both facilities and expertise—that are ideal for collaboration," says Amini.

"For example, our zebrafish facility in the Bio-Life Building is something that people in the School of Medicine would love to get their hands on for the ability to manipulate genes."

Other examples of CST research cores that will increase collaborative investigation include the Institute for Computational Molecular Science; the high-performance computer cluster that will significantly enhance the high-speed computing capabilities of Temple researchers; the Materials Research Facility, under the direction of Hongwen Zhou, which provides a centralized location for analytical instrumentation to support faculty across the university; and the newly installed scanning tunneling microscope in the lab of Associate Professor of Physics Maria Iavarone. That instrument, one of only a few around the world that can operate at extremely low temperatures, will enable researchers

Associate Professor of Physics Maria Iavarone and postdoctoral student Xin Zhang check CST's new scanning tunneling microscope, one of just a few worldwide that operate at extremely low temperatures.



In 2011, revenues from licensing agreements for Temple-developed technologies surpassed the \$1 million mark for the first time in the university's history, roughly three times the amount the university received in fiscal year 2010.

in chemistry, physics and engineering to examine impurities of different materials at the atomic scale and to, for example, engineer materials with new physical properties for use in superconducting cables, solar panels and other electronics.

According to Blank, one of the prime goals of collaborative research at Temple is to move patentable discoveries from the research bench to the marketplace. "Today, we are treating commercialization in a much more proactive way," says Blank. "Many other universities have a very passive process in engaging the faculty, they may offer education and then sit and wait for faculty to come to them and make disclosures."

Commercialize ideas

STEPHEN NAPPI, DIRECTOR of the Office of Technology Development and Commercialization, leads the charge to take more Temple ideas and inventions to the marketplace and bring more revenue back to the university. "As a direct result of meeting with every department on campus, we have seen increased invention disclosures—from students, staff and faculty from Main Campus to Ambler and everywhere in between—coming through our office," says Nappi, who notes that Blank has been a leading proponent of using social media, like LinkedIn, to connect researchers with investors and entrepreneurs. "Our goal is to protect new research, move patentable discoveries to the marketplace and collaborate, through licensing, with an established corporation or start-up company to bring products to market."

In 2011, revenues from licensing agreements for Temple-developed technologies surpassed the \$1 million mark for the first time in the university's history, roughly three times the amount the university received in fiscal year 2010. Commercialization revenues generated from those agreements

Funded Research at CST

External funding for advanced research at CST has more than doubled since 2007. Below is a list of recently funded projects in CST departments.

BIOLOGY

Shohreh Amini, Teachers as Scientists, Scientists as Teachers, *National Science Foundation*

Darius Balciunas, Transposon-based Platform for Insertional Mutagenesis and Genome Engineering, *National Institutes of Health/DHHS*

Erik Cordes, Gulf of Mexico Oil Spill Response, *National Science Foundation*

Erik Cordes, Lophelia II, U.S. Bureau of Ocean Energy Management

Erik Cordes, Mississippi Canyon 252 Incident, NOAA Natural Resources Damage Assessment

Raymond Habas, Dissecting the Molecular Mechanisms of Canonical Wnt Signaling, *National Institute of General Medical Sciences/NIH/DHHS*

Raymond Habas, Non-Canonical Wnt Signaling and Cell Motility, *National Institutes of Health/DHHS*

Karen Palter, Integrated Computational and Experimental Model for Biochemical and Electrical Interactions in Ion Channels and the Impact of Sialic Acid on Neuronal Function, *National Science Foundation (Johns Hopkins University)*

Gregory Smutzer, Validation of PROP Taste Strips for the NIH Toolbox Study, *NorthShore University Health System Research Institute*

CHEMISTRY

Erik Borguet, A Molecular Resolution Investigation of Electron Transfer at Electrochemical Interfaces, *National Science Foundation*

Erik Borguet, Guidelines for the Preparation of Project Plans, *North Atlantic Treaty Organization*

Erik Borguet, Hypergol Sensor Using Passive Wireless Saw Devices, *Applied Sensor Research & Development Corp.*

Erik Borguet, Passive Wireless SAW Humidity Sensors and System, *Applied Sensor Research & Development Corp.*

Hai-Lung Dai, Molecular Interaction with Colloidal Surfaces Probed by Nonlinear Light Scattering, *National Science Foundation*

Hai-Lung Dai, Structure and Spectroscopy of Buried Interfaces in Organic Thin Film and Colloids, *Air Force Office of Scientific Research*

Franklin Davis, Asymmetric Synthesis of Substituted Tropanes, *BioStrategy Partners*

Michael Klein, Development of Drugs that Target the m2 Proton Channel from Influenza A Virus, *NIH (University of Pennsylvania)*

Michael Klein, Interaction of Inhaled Anesthetics with Membranes & Membrane Proteins: Insights from Simulation Studies, *NIH (University of Pennsylvania)*

Robert Levis, Mathematical Modeling and Experimental Validation of Ultrafast Nonlinear Light-Matter Coupling Associated with Filamentation in Transparent Media, *Air Force Office of Scientific Research (University of Arizona)*

Robert Levis, Multidimensional Detection of Explosive Devices, *Office of Naval Research*

Robert Levis, Strong Field Control of Molecular Processes, *National Science Foundation*

Spiridoula Matsika, Theoretical Studies of Nonadiabatic Photoinitiated Processes in Complex Systems, *National Science Foundation*

Spiridoula Matsika, Understanding Laser Control of Molecular Dynamics, *Department of Energy*

Allen Nicholson, Reactivity Epitopes of Ribonuclease III Substrates, *National Institutes of Health/DHHS*

Christian Schafmeister, Development of Protein Surface Binding, Low Entropy Oligomers, *National Institute of General Medical Sciences/NIH/DHHS*

Christian Schafmeister, Disrupting Protein-Protein Interactions with Bis-peptides, *NIH-EUREKA Award/National Institute of General Medical Sciences/NIH/DHHS*

Christian Schafmeister, Investigating Cell Membrane Permeation as a General Mechanism to Promote Bacterial Cell Death, *Cephalon, Inc.*

Christian Schafmeister, Molecular Lego Based Catalysis, *Department of Defense/Defense Threat Reduction Agency*

Robert Stanley, Photoinduced Electron Transfer in DNA Photolyase, *National Science Foundation*

Daniel Strongin, Astrobiology Biogeocatalysis Research Center at Montana State University, *National Aeronautics and Space Administration*

Daniel Strongin, Inhibiting Oxidation of Metal Sulfide-containing Material Using Nano Layers of Phospholipids, *The NanoTechnology Institute*

Daniel Strongin, Reactivity of Iron-Bearing Minerals and CO₂ Sequestration, *Department of Energy*

Daniel Strongin, Structure-Sorption Relationship in Disordered Iron-oxhydroxides, *National Science Foundation*

Bradford Wayland, Alkaline Fuel Cell Membrane Design and Synthesis, *DuPont/Army*

Bradford Wayland, Catalytic Hydrogenation of Carbon Monoxide and Hydrocarbon Oxidation, *Department of Energy*

Bradford Wayland, Metal-Centered Radicals and Organometallic Complexes in Controlled Radical Polymerizations of Olefins, *National Science Foundation*

Susan Varnum, Temple/ExxonMobil Bernard Harris Summer Science Camp, *Harris Foundation*

Stephanie Wunder, Anion Exchange Polymer Membranes Based on Polyoctahedral Silsesquioxanes for Alkaline and Low-temper, *Hybrid Plastics*

Stephanie Wunder, Layered Nanolaminated MAX Phases as Anodes for Lithium Ion Batteries, *Ben Franklin Technology Partners (Drexel University)*

COMPUTER & INFORMATION SCIENCES

Xiaojiang Du, MRI: Development of a Hybrid Wireless Network Infrastructure for Integrated Research and Education, *National Science Foundation*

Xiaojiang Du, NeTS Medium: Collaborative Research: Mobile Content Sharing Networks: Theory to Implementation, *National Science Foundation*

Xiaojiang Du, NeTS NOSS: Towards Robust and Self-Healing Heterogeneous Wireless Sensor Net, *National Science Foundation*

Abdallah Khreishah, Architecture for Joint Integration of Inter- and Intra-network Coding in Lossy Wireless Multihop Networks, *National Science Foundation*

Eugene Kwatny, Test Campus and Urban Wireless Networks as part of Global Environment for Network Innovations (GENI), *National Science Foundation*

Longin Jan Latecki, Automatic Human-Like Perception and Navigation in the Natural Environment, *Air Force Office of Scientific Research (Purdue University)*

Longin Jan Latecki, Collaborative: Perception of Scene Layout by Machines and Visually Impaired User, *National Science Foundation*

Longin Jan Latecki, Collaborative Research: Recovery of 3D Shapes from Single Views, *National Science Foundation*

Longin Jan Latecki, Machine Learning Methods for Discovery of Relevant Features, *Johnson & Johnson*

Longin Jan Latecki, RADIUS: Rapid Automated Decomposition of Images for Ubiquitous Sensing, *Los Alamos National Laboratory, Department of Energy*

continued on page 18

FUNDED RESEARCH, continued from page 17

Longin Jan Latecki, Recovery of 3D Shapes from X-ray Images, Sandia Lab, Department of Energy

Longin Jan Latecki, Simultaneous Contour Grouping and Medial Axis Estimation, National Science Foundation

Shan Lin, Test Campus and Urban Wireless Networks as part of Global Environment for Network Innovations (GENI), National Science Foundation

Haibin Ling, EAGER: A New Framework for Balancing Deformability and Discriminability in Computer Vision, National Science Foundation

Vasileios Megalooikonomou, Modeling, Detection, and Analysis of Branching Structures in Med, National Science Foundation

Justin Yuan Shi, Human Service Integrated Data Warehouse, City of Philadelphia

Chiu Chiang Tan, Test Campus and Urban Wireless Networks as part of Global Environment for Network Innovations (GENI), National Science Foundation

Slobodan Vucetic, Discriminative Modeling Framework for Mining of Spatio-temporal Data in Remote Sensing, National Science Foundation

Slobodan Vucetic, Machine Learning Algorithms for Fault Detection and Diagnostic, ExxonMobil Research & Engineering Company

Slobodan Vucetic, Memory-constrained Predictive Data Mining SPAF 110506, National Science Foundation

Jie Wu, Body Sensor Networks and Their Applications in Maternal Fetal Monitoring, Commonwealth of Pennsylvania

Jie Wu, CCSS: Architecture for Joint Integration of Inter- and Intrasession Network Coding in Lossy Wireless Multihop Networks, National Science Foundation

Jie Wu, Collaborative Research: Mobile Content Sharing Networks: Theory to Implementation, National Science Foundation

Jie Wu, EAGER: A Meso-Scale GENI WiMax Project, National Science Foundation

Jie Wu, EAGER: A New Algorithmic and Graph Model for Networking in Challenged Environments, National Science Foundation

Jie Wu, EAGER: Mobile Multicore Computing, National Science Foundation

Jie Wu, Energy-Efficient Design in Wireless Networks Using Cooperative Communication, National Science Foundation

Jie Wu, Mobility-Assisted Routing in Mobile Networks, National Science Foundation

Jie Wu, MRI-R2: A Hybrid High-Performance GPU/CPU System, National Science Foundation

Jie Wu, Test Campus and Urban Wireless Networks as part of Global Environment for Network Innovations (GENI), National Science Foundation

Jie Wu, Urban Apps & Maps Studio, U.S. Department of Commerce

Alexander Yates, Learning Representations of Language for Domain Adaptation, National Science Foundation

Wei Zhao, A Study of Security Countermeasures for Cyber-Physical Systems, National Science Foundation

EARTH & ENVIRONMENTAL SCIENCE

Nicholas Davatzes, Brady's Geothermal Field EGS Project Geomechanical Analysis, Ormat Technologies, Inc.

Nicholas Davatzes, Fault Geometry and the Mechanics in the Coso Geothermal Field, U.S. Geological Survey/Department of the Interior

Nicholas Davatzes, Integrated Geological and Geomechanical Characterization for the Analysis of MEQ in EGS Experiments (Geysers), DOE Geothermal Technologies Program (Texas A&M University)

Nicholas Davatzes, Integrated Temple University/USGS Component of Desert Peak, Nevada EGS, Ormat Technologies, Inc.

Nicholas Davatzes, Newberry Volcano EGS Demonstration; Geomechanics Component, AltaRock Energy

Laura Toran, Shale Hills Critical Zone Observatory, NSF (Pennsylvania State University)

MATH

Shiferaw Berhanu, Workshop on Partial Differential Equations and Several Complex Variables, National Science Foundation

Vasily Dolgushev, Higher Algebraic Structures, Deligne's Conjectures and Formality Theorems, NSF (University of California, Riverside)

David Futer, Collaborative Research: Hyperbolic Geometry of Knots and 3-Manifolds, National Science Foundation

Christian Gutierrez, Nonlinear Partial Differential Equations of Monge-Ampere Type, National Science Foundation

Edward Letzter, Complete Noncommutative Algebras, National Security Agency

Martin Lorenz, Special Meeting: Braids in Algebra, Geometry and Topology, National Science Foundation

Martin Lorenz, Topics in Noncommutative Algebra and Invariant Theory, National Security Agency

Isaak Pesenson, Framework for Regularizing Hyperspectral Images: Image Processing, Spectral Domain Dimension Reduction, Visualization and Quality Assessment, National Geospatial-Intelligence Agency (California Institute of Technology)

Benjamin Seibold, Capturing Subgrid Structures with Level Set Methods, NSF (Massachusetts Institute of Technology)

Benjamin Seibold, Collaborative Research: Phantom Traffic Jams, Continuing Modeling and Connections with Detonation Theory, National Science Foundation

PHYSICS

Maria Iavarone, Vortex Matter in Confined Superconductors and Mesoscopic Hybrid Heterostructures, Department of Energy

Svetlana Kotochigova, Reactive Collisions and Interactions of Ultracold Dipolar Atoms and Molecules, Air Force Office for Scientific Research

Svetlana Kotochigova, Ultracold Neutral and Ionic Polar Molecules for Quantum Computing, National Science Foundation

A. Marjatta Lyyra, Molecular Quantum Control within the Frequency Domain, National Science Foundation

Jeffrey Martoff, Collaborative Proposal: MAX-Multi-ton Argon and Xenon TPCS, NSF (Princeton University)

Jeffrey Martoff, Darkside: Direct Dark Matter Search, National Science Foundation

Jeffrey Martoff, "Green" Liquid Scintillator Development, Department of Energy (Brookhaven National Laboratory)

Zein-Eddine Meziani, Nuclear Research Using the Electromagnetic Probe, Department of Energy

Nikolaos Sparveris, Thomas Jefferson National Accelerator Facility Contract, Jefferson Science Associates

Rongjia Tao, Radioactive Materials and the Surrounding Atmosphere, Defense Threat Reduction Agency

Xiaoxing Xi, Magnesium Diboride Thin Films for Superconducting RF Cavities, Department of Energy

Xiaoxing Xi, Raman Spectroscopic Study of Coupling between Magnetic and Ferroelectric Orders in Nanoscaled Thin Films and Superlattices, Department of Energy

Xiaoxing Xi, Superconducting Circuits Using Magnesium Diboride Josephson Junctions, Office of Naval Research

are then split 60/40 between Temple and the faculty researcher. Of the 60 percent received by the university, 20 percent goes to the general fund, 20 percent goes to the Office of Technology Development and Commercialization, 14 percent to the researcher's department or research unit, and 6 percent to the researcher's college or school.

CST received approximately \$199,568 in revenues from licensing agreements, followed by the School of Pharmacy (\$15,105), the School of Medicine (\$13,861) and the Kornberg School of Dentistry (\$5,324). For his fuel injection and crude oil viscosity technologies, Physics Professor and Chair Rongjia Tao earned the largest royalties check ever received by a Temple researcher. Another CST researcher who received significant royalties was Frank Chang, professor of biology. Chang has the university's longest-running licensing agreement, dating back to January 1993.

"We want to develop the most effective and efficient mechanism for moving technology from campus to society," says Nappi. "Every step of the way must be geared to transfer research discoveries to the right commercial vehicle and then onto the marketplace. When we do that, we improve society, showcase the strength of research at CST and increase revenue back to the university."

Associate Director Axel Kohlmeyer (left) and Director Michael Klein of the Institute for Computational Molecular Science, an invaluable resource for researchers from across Temple and beyond.



The next generation of pure nanotechnology

Founded by Professor of Chemistry Eric Borguet and Lev Davidson, an MBA candidate at Temple's Fox School of Business, pureNANO Technologies is helping to usher in a new era of nanotechnology that could bring about thin film solar cells that roll up like wrapping paper and slimmer, vastly more efficient flat panel displays.

"Today's tablets and e-readers are not flexible," says Borguet, who serves as the company's chief technology officer. "Nanotechnology can be used to develop a wireless, electronic newspaper about as thick and bendable as a sheet of paper."

Carbon nanotubes, with very high electrical connectivity, tensile strength and elasticity, are ideal for creating flexible electronic devices. Currently, the process used to create single-walled nanotubes leaves behind relatively high levels of a metal catalyst and non-nanotube carbon, which detract from the nanotubes' extraordinary properties. Borguet's purification technique, co-developed with Nikolay Dementev (MA '10, PhD '11, Chem), uses fewer chemical steps to produce purer nanotubes.

One of the first things Davidson focused on was how important nanotube purity is to manufacturers. "We spoke with many companies and researchers who are working in this space," he says. "What we found is that purity is a goal and a necessity. pureNANO can provide that purity to a greater extent than other processes in less time and with less cost. That's a compelling, easy-to-understand value proposition."

Davidson connected with Borguet through Fox's Innovation & Entrepreneurship Institute. In 2010, the team was awarded the grand prize in Fox's Innovative Idea Competition. This year pureNANO won the school's Be Your Own Boss Bowl, receiving \$70,000 in cash, \$30,000 in professional services and \$10,000 in Microsoft products. While Borguet continues to investigate how to scale up the purity process to meet the demands of manufacturers, Davidson has been meeting with potential investors and partners, such as nanotube manufacturers and consumer electronics companies.

"Not having a science background, this was new to me, but nanotechnology is really exciting and I believe represents the next frontier of tech innovation," says Davidson. "From



Chemistry Professor Eric Borguet and Fox School MBA candidate Lev Davidson, founders of the nanotechnology start-up pureNANO.

a material that looks like black powder you can create flat panel displays that can be up to 92 percent more energy efficient and scores of other products."

Borguet and Davidson have been working closely with Temple's Office of Technology Development and Commercialization to bring their nanotechnology process to market. "The invention-disclosure procedures here at Temple pushed us to do very deep background research on the existing state of the art," says Borguet. "We explored patent literature, which scientists may not normally look at, in addition to the published scientific literature."

Both Borguet and Davidson see many opportunities for CST and the university to take advanced research from the lab to people and products around the world. "There are so many amazing resources here to help commercialize leading-edge technology," says Davidson. "pureNANO is just one example of how great technology, great science and great businesses can start at Temple."



The Department of Computer & Information Sciences is reshaping the way we connect to data, doctors and more.

by Brian M. Schleiter

IMAGINE A WORLD where you hop in your car, tell it where you want to go and the car drives itself there. And because your car—and every other automobile—is guided by computers communicating wirelessly, there is never an accident or traffic congestion and you always arrive on time, using the least amount of energy possible in the process. Sound like a science fiction movie? It's not. It's part of the innovative research conducted in the Department of Computer & Information Sciences (CIS), where professors, researchers and students are not just debating such possibilities, they are working to develop the solutions to lead us there sooner than you might think.

Last year, CIS faculty received several significant research grants for innovative research projects, primarily from the National Science Foundation (NSF), Air Force Office of Scientific Research, National Institute of Standards and

Technology and other federal agencies. These projects have the potential to reshape the way wireless technology is used to share content, such as purchasing airfare on the internet, helping robots learn to navigate and giving doctors new ways to diagnose patients using wireless imaging and data.

CIS, established in 1965 and one of the oldest computer science departments in the nation, was launched by forward thinking academics who envisioned computer technology changing not just academic research, but the world. Today, the department is positioned to compete with the nations' leading computer science programs.

CIS boasts 40 full-time faculty members, more than 300 undergraduate students and 50 PhD students. During the past academic year, nearly 100 CIS students earned bachelor or advanced degrees. The department offers BA and BS degrees in computer science (CS) and information science and technology (IS&T), as well as minors in both fields. CS programs offer students a broad education in traditional computer science concepts. IS&T programs provide both detailed knowledge and a broad background in the technology of information systems.

"Right now, computer technology affects every area of our lives," says Professor Jie Wu, CIS chair since 2009. One of Wu's first actions as head of the department was to create a new area of academic emphasis, the Center for Networked Computing, which focuses on advances in internet and



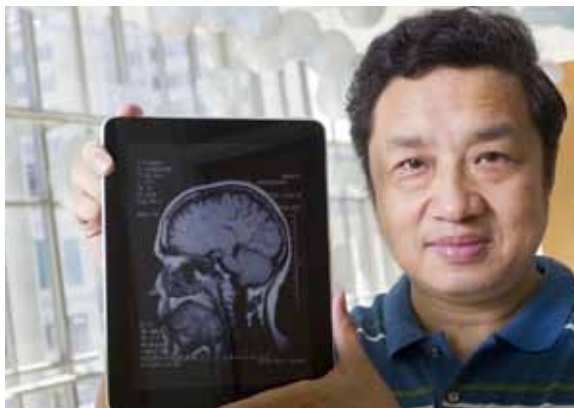
wireless technology. The goal was to create a place where faculty and students with shared research interests in computer networks could collaborate.

Wu is the principle investigator on multiple NSF research grants, one of which is a \$935,000 collaborative grant with Ohio State University on mobile computing applications. In May 2011, Wu participated in a summit on the development of next generation internet applications sponsored by NSF and the White House Office of Science and Technology Policy. In addition, Wu, an IEEE Fellow and ACM Distinguished Speaker, served as technical program co-chair for IEEE INFOCOM 2011, the premier conference in computer and data communication networks held in Shanghai.

Under Wu's stewardship, the department has embarked on a five-year plan for enhancing the quality of education and research programs. In the past two years, the department has recruited four new faculty members and increased the number of students in CIS. In addition, a thousand square feet of new research space in Carnell Hall has been allocated. In 2009, *U.S. News & World Report* included CIS for the first time among the ranked computer science departments. Sponsored research grants have increased eightfold since 2009 and CIS now has the highest level of NSF funding of any program on campus.

"New sponsored research grants will attract higher-quality students as well as opportunities for collaboration with

local government and the private sector," says Wu. It is all part of a concerted effort to further enhance the department's academic and research reputation, both nationally and internationally. Each semester, eminent scholars in the field are invited to visit Temple and speak to faculty and students in the CIS Distinguished Lecture Series. The first lecture for fall 2011 was given by Professor Richard Karp from the University of California at Berkeley, who is considered the father of theoretical computer science and is a recipient of the Turing Award, recognized as the "Nobel Prize" of computing. "The lecture series brings leaders in the field to Temple, which provides faculty and students with unique research and educational experiences," Wu says.



Jie Wu, chair of the Department of Computer & Information Sciences, has helped increase the scope of research in the department, including mobile medicine.

Outreach activities also are an integral part of the five-year plan. "In the past two years, I have visited more than 30 universities in Asia, Europe, and North and South America to meet colleagues in the field and to explore possible research collaborations and faculty/student exchanges."

Department outreach activities also include serving Philadelphia's local community. CIS sponsors the Future of Computing Competition, which invites area high school students, undergraduate and graduate students to compete for the best innovative research ideas in emerging computing fields. To draw more students from the Philadelphia region, the department is launching an advertising campaign that invites prospective applicants to "help build the future" of the field.

Assistant Professor Alexander Yates' research focuses on language processing systems, which could lead to new web search tools.

DATA·MINING·AND·MEDICINE·

CIS HAS A strong research program in data mining, particularly through the work of the Center for Data Analytics and Biomedical Informatics directed by Professor Zoran

Obradovic. Data mining searches for hidden or unknown patterns when analyzing large data sets. This year, Assistant Professor Alexander Yates was awarded a \$897,000 NSF grant, in conjunction with Northwestern University, to develop an experimental language processing system that could serve as a foundation for building a new web search tool based not on key word entry, but by definitively answering a query. For example, a user would speak into a mobile phone. "Find me the cheapest flight from Seattle to Los Angeles" and instead of generating a list of web pages, the tool would find the lowest fare. A second application is improving existing voice recognition software by improving the way devices, such as a mobile phone and a home digital video recorder, talk to each other.

"What we're doing at Temple is pretty different from standard practice," Yates says. "The big take home message is we have lots of new young researchers who are very productive. CIS is an exciting place to work right now."

Where CIS really excels is in merging the data mining process with the promise of network science, an emerging discipline that examines the interconnections among diverse information networks. For example, by combing through data-rich volumes of genetic research, medical journal abstracts and images, information contained in a patient's electronic health record and other sources, computers have the potential to advise physicians on treatment or therapy options. Professor Obradovic and Associate Professor Vasilis Megalookonomou both have multiple years of collaborations with physicians on several National Institute of Health grants focusing on data mining and biomedical imaging technology in medical applications.

HIGH-IMPACT·RESEARCH·

CIS IS ALSO moving forward in other areas of medicine. Imagine the possibility of a doctor remotely monitoring a patient's vital signs from his or her mobile phone in real time as the patient rests at home. The patient's information is gathered either by sensors worn on the body or a mobile phone application. "Doctors can make a diagnosis based on their knowledge and experience. A computer can assist them in making these choices, just as computers have been programmed to help an experienced chess player make the best move," says Wu, who is a principal investigator on a \$300,000 Pennsylvania formula grant in collaboration with faculty from Temple's School of Medicine and College of Engineering.

Telemedicine is one example of the type of long-term, high-impact project Wu envisions the department pursuing.

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“We want to be a leader in computer education and research, regionally and nationally.”

—Professor Jie Wu,
Chair,
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Yet, the success of this research depends on a high-bandwidth wireless network that is capable of securely transmitting a vast amount of data representing expert knowledge. There also needs to be a supercomputer capable of running millions of calculations simultaneously to recommend the best diagnostic to a health problem. There are several ongoing projects at CIS that are helping to address these issues for both the future of telemedicine and many other applications.

The university’s new supercomputer—a hybrid GPU/CPU cluster computer—was installed earlier this year under Wu’s \$840,000 NSF research equipment grant. Nicknamed “The Owl’s Nest,” it features more than 100 nodes containing more than 1,200 processor cores, 48 Nvidia Tesla GPUs

(hardware made specifically for high-performance computing) and 120 terabytes of storage. The supercomputer is available to researchers across Temple and beyond.

CIS also is partnering with the City of Philadelphia and Drexel University to create the next generation of an ultra-high-speed WiMAX wireless network to serve the downtown area. The WiMAX network will provide wireless coverage of up to 6 miles with delivery rates of up to 30 Mbps. This project has generated national interest as a prototype for deploying WiMAX technology in urban areas, as part of the Global Environment for Network Innovations project at NSF.

Wu believes CIS is capable of even more success in the years ahead. By 2014, his goals include hiring an additional three to four faculty members, moving the department into the new Science Education and Research Building and achieving a 70–80 ranking in *U.S. News*. It is an ambitious plan put into play by an ambitious leader who understands the direction of the rapidly changing discipline of computer and information sciences. “We want to be a leader in computer education and research, regionally and nationally,” Wu says. “We are moving in that direction.”

NEW INITIATIVES PUT CIS AT FOREFRONT OF MOBILE INNOVATION

APPS & MAPS

The College of Science and Technology, in partnership with the College of Liberal Arts, College of Engineering and the Fox School of Business, received \$500,000 from the U.S. Department of Commerce’s Economic Development Administration to build an Urban Apps & Maps Studio. Jie Wu, CIS chair, is co-principal investigator.

Envisioned as a hub for creating software applications, maps and data sets, the studio aims to connect high school and college students with entrepreneurs, organizations and faculty to develop and commercialize the apps and maps designed by the studio. The studio seeks to move software and database projects into real-world use to stimulate economic develop-

ment and job creation.

Temple also received nearly \$200,000 from the National Science Foundation to establish a test bed of campus and urban wireless networks. The funding—awarded to Wu and CIS faculty members Eugene Kwatny, Shan Lin and Chiu Chiang Tan—complements the apps & maps project through collaborative application design, mapping and economic development using computer network technology.

INTO THE CLOUD

Cloud computing is the new frontier for computer science innovation. People are remotely storing and accessing personal files such as music, pictures and videos on remote servers. Because they reside “in the cloud,” they

can be accessed anywhere from many devices.

“Cloud computing is changing the way people do everything, from ordering pizza to job interviews,” says CIS Assistant Professor Shan Lin.

Lin is teaching a course on cloud-enabled application development as part of Project Hawaii, a Microsoft initiative at select universities aiming to develop the next generation of mobile applications and support services. Lin is particularly intrigued by the idea of physicians using the cloud to monitor a patient’s vital signs no matter where they go. Data would be collected by inexpensive sensors installed in closets, offices and cars and transmitted by a cell phone. Says Lin, “The potential for cloud-computing is limitless.”



The College of Science and Technology is an extraordinary place, full of students and faculty who are helping to shape the future of all our lives. It's the same with CST alumni, always pushing the boundaries in science, business, tech, medicine and dozens of other fields.

The excitement of discovery is why I wanted to be a part of CST and Temple University. In my relatively brief time at the college, I've met professors, students and graduates who are leaders and innovators. I am looking forward to meeting many more and to working with our alumni and friends to help shape CST's exciting future.

I want to hear your ideas for how we can advance the mission of CST and continue to pursue our goal of being one of the top-ranked colleges of its kind in the world. I also invite you to call or email to set up a time to talk about how you can support today's talented faculty and students or establish a lasting legacy to sustain CST for future generations. You also can contribute your time and expertise by being part of a group of committed volunteers helping to move CST forward.

On behalf of the college, I want to thank all those alumni, friends, corporations and foundations who supported CST in FY 2011. I also want to thank the many alumni who have mentored our students, offered internships and jobs to recent graduates, or returned to campus to talk about their work and careers. Our future is brighter because of your commitment to CST.

Sincerely,

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Director of Development

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The College of Science and Technology would like to extend its deep appreciation to the alumni, friends, parents, corporations and foundations who made donations between July 1, 2010, and June 30, 2011. Their generosity means CST can continue to set new standards in research, teaching and engagement with the world.

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Barry and Deborah Lurie,
CLA '69, '71, MED '76, '81
Jennifer Lyons
Timothy L. Lyons, CST '11
Hong Ma, CLA '83
Tayshawn R. Mabry, CHPSW '10
Christine M. Macolino, CST '09
Sophia J. Maier, CST '11
Sidney Paul Maletzky, CST '57
Abhishek Mandal, CST '11
Benita and Jerome Mandel, CST '53
Michael Anthony Marella, CST '86,
PHR '11
Celeste and John Marinelli
Alisa and Michael J. Marino, CST '89
Leonard Markowitz, CST '59, CLA '51
Lenox Dick Martin, CST '64
Melissa Martinez
Susan Grose Mattei, CST '77
Chukwuma Charles Mbata, CST '07
Jamie L. McDowell, CST '11
Rose Marie, SBM '82, '91,
and William McGinnis
Regius J. McKenzie, CST '85
Sandra C. McLean, CST '70, EDU '75
Roberta B. Metzman, CST '61, '63
Louis Milakofsky, CST '62
Eric, CST '80, '81, and Lori Miller
Erich P. Montgomery, SBM '87
Jeanne C. Moody, CLA '67
Charles D. Moore, CST '78
David John Moore, CST '75
Rachel and Robert Moreno
Dan and Mary Anne Morris
Carol and George Morton,
ENG '67, '83
Ahmed Mulla, CST '11
Joanne S. Murphy, CST '70, '74
Pearl Myrie
Kinnari and Rutesh Narielwala,
ENG '01
Andrew Nelson, CST '11
Jesse and Van Nguyen
Lananh Nguyen
Nicholas E. Nowotarski, CST '11
Ana Nunez
Iheanacho C. Nwabara
David I. Nwasike, CST '11
Winnie and Anthony Nwasike
Brenda O'Callaghan
William O'Callaghan, CST '11
John D. Odell, CST '57
Dewey Odhner, CST '81
Barbara O'Neill, CST '92
Susan P. Osborn, CST '83
C. Scott Overdorf, EDU '84
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John Papadimitriou, CST '90
Carol Ekizian Papazian, SCT '84
Kathy M. Paruthanparayil, CST '09

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 Dharam N. Patel
 Krina H. Patel, CST '02
 Robert Patrick, CST '67
 Sojan K. Paul, CST '97
 Paul S. Pzdalski, CST '92
 David J. R. Peckarsky
 Anita and Austin J. Penecale
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 Janet B. Perper, PHR '80
 Thao T. Pham, CST '06
 Catherine Pierre-Rosia, CST '90
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 Cyril G. Pyle, CST '81, '85, ENG '97
 Attiq Rahman, CST '93
 Salma N. Rajayki, CST '11
 Boopathy and
 Niraimathi Ramakrishnan
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 and Florence Riesner
 Per Arne Rikvold, CST '84
 Kristin L. Roantree, CST '07
 Paul A. Robinson, CST '66
 Madelene Rodriguez
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 Chunyu Zhao, CST '98
 Leah, CST '58, MED '62,
 and Marvin Ziskin

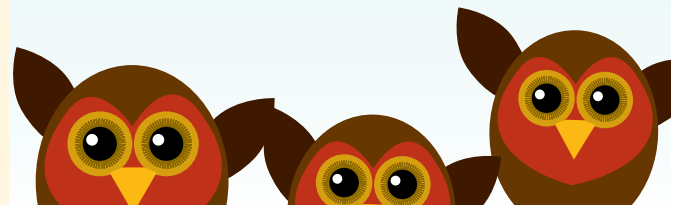
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Marcda Hilaire: A long-term Temple relationship

AT THE AGE of five, Marcda Hilaire (BA '11, Bio) battled and overcame typhoid fever, malaria and anemia—all at the same time—in her native Haiti. At the age of nine, she lost her grandmother to breast cancer. The events pushed Hilaire to pursue a medical career.

Earning her bachelor's degree in biology from Temple is just the latest stop on a journey that began when Hilaire was in the seventh grade in West Palm Beach, Fla.

"My teacher there knew about this program at Temple, which was created by an alumnus, Moses Williams, to help minorities get into the medical fields," she said.

Hilaire applied and was accepted into Temple's Physician Scientist Training Program, which for 10 summers—seventh grade through undergraduate—introduces minority students to biomedical research. She first came to Temple in 2002, during the summer between seventh and eighth grades.

"Before I ever came to Temple for college, I had the whole college experience: living in the dorms, lectures in Tuttleman Hall, classes in Bio-Life Building, studying at Paley Library," she said. "We called it 'science boot camp' because 13-year-olds are not usually doing science experiments, research and stuff like that."

From 2004 to 2007 Hilaire spent her summers working under biochemist Scott Shore at Temple's Fels Institute for Cancer Research and Molecular Biology, conducting research on breast cancer—the same disease that had afflicted her grandmother; doing rounds with doctors at Temple University Hospital; completing a research internship at the National Institutes of Health working on HIV/AIDS; and working as a research intern at Rosetta Inpharmatics, a subsidiary of Merck and Co.



"It was right along the lines of wanting to become a doctor," she said. "I was doing hard-core research in a lab with a real scientist. I was really humbled by that whole experience."

In 12th grade, Hilaire was selected to be a Gates Millennium Scholar. Funded by the Bill and Melinda Gates Foundation, the scholarship provides 10 years of financial, academic and personal support to minorities studying in the fields of computer science, education, engineering, library science, mathematics, public health and the sciences.

She enrolled as an undergraduate biology major at Temple in fall of 2007.

"I don't think I would have had the same experience somewhere else," she said. "Being somewhere where you're already connected and you have a relationship—I say Temple and I have had a long-term relationship—is really important.

"I also love the people here," Hilaire added. "I think that's one of the special things about

Temple; it's the people you meet here from all over the world, all sorts of religions and cultures. The people here at Temple made my experience very enriching."

But she is also quick to point out how important her faith has been in her success.

"I owe everything I am and everything I've gotten to God," said Hilaire. "There have been some really hard times, and without God, I just wouldn't be who I am today."

She will next pursue her master's degree in public health, possibly at Tulane University, then go on to medical school with the thought of one day starting her own medical practice.

"An education is the greatest gift I have gained in America and as an aspiring doctor, I intend on sharing it with the disadvantaged communities, people just like me," Hilaire said. "My lifelong dream is to open a hospital in Haiti, especially for children. It may start off as a clinic, but a hospital is my dream."

—Preston Moretz, SCT '82

Class Notes

1960s

Neil Phillips (BA '65, Bio) one of the founding physicians of Delaware Valley Urology LLC, has retired from the practice.

Arthur Neil Lebowitz (BA '68, Bio; MED '72) co-wrote *The Healthcare Survival Guide*, which won an Apex Award for Publishing Excellence and an Independent Book Publishers Association Benjamin Franklin Award for Best First Book (Nonfiction).

William J. Kuprevich Jr. (BA '69, Bio) was presented with the Pennsylvania Osteopathic Medical Association Distinguished Service Award in 2009 and served as chief medical officer for Team USA at the Games of the XXIX Olympiad in Beijing.

1970s

Charles H. Fitzpatrick (BA '77, Bio) was named president of the New Jersey Society of Optometric Physicians (NJSOP) for 2010–2011. He was installed as president during NJSOP's annual conference in Atlantic City, N.J.

1980s

Joel Hoffman (BA '84, Math), senior vice president of Ingenix Consulting in Denver, was named a "Top 25 Consultant" by *Consulting* magazine.

David M. Tener (MA '89, Chem), a shareholder in the law firm of Caesar, Rivise, Bernstein, Cohen and Pokotilow, was included in the 2011 edition of *The Best Lawyers in America* in the area of intellectual property law.

1990s

John Anton (MA '91, EES) works as a consultant and adjunct professor and published his first book, *Dinosaurs Incognito*, in 2009.

2000s

Lynn Wen Acquaviva (BS '04, Bio) graduated from the Philadelphia College of Osteopathic Medicine with a doctor of osteopathic medicine degree.

Shaismy Kudakachira (BS '08, Bio) joined the Class of 2014 at West Virginia School of Osteopathic Medicine in Lewisburg, W.Va. She is working toward a doctor of osteopathic medicine degree.

THE CST GIVING SPIRIT

Gift honors Nina Hillman and supports tomorrow's students

Nina Hillman, a CST professor and administrator until she retired in 2006 and an inspiration to young people and colleagues, died in February 2011. Now a \$10,000 gift from her husband, **Ralph Hillman**, professor emeritus in the Department of Biology, will help support tomorrow's talented students.

The Dr. Nina Hillman Memorial Award will be presented each year to a graduating senior in genetics or development biology for outstanding academic and research work. "During her career Nina had an international reputation in genetics and scores of students who worked in her lab," says Ralph Hillman. "This award will reward Temple students who are filled with ambition and drive."

Hillman's research was in developmental genetics and reproductive biology, with a focus on determining the causes of specific phenotypic effects of a series of mutant genes in mice. She published more than 80 research articles. She came to Temple as a postdoctoral fellow in 1962 and became a research associate in 1964. She was named an associate professor in 1976, served as biology chair from 1984 to 1987 and was named Laura Carnell Professor of Biology in 1988. She was a recipient of the Lindback Award for Distinguished Teaching and Great Teacher Award.

Hillman also was director for the NSF-funded Philadelphia Collaborative for Excellence in Teacher Preparation. The Howard Hughes Medical Institute awarded the program \$1.2 million in 1998 to encourage minority high

school students and Temple students to focus on scientific research.

Daniel Swern legacy continues

Daniel Swern, an esteemed scientist and faculty member in the Department of Chemistry who died in 1982, is most well-known for his discovery of the Swern oxidation process. After his death, the Swern Memorial Fund was established to provide fellowships for doctoral students in the Department of Chemistry to enable students to pursue their research. In addition, CST's Swern Memorial Lecture brings some of the brightest minds in chemistry to campus.

In early 2011, Professor Swern's wife, **Ann R. Swern**, EDU '58, '72, passed away. A \$25,000 gift from her estate will be added to the memorial fund's endowment, helping to provide more support for CST's graduate students.

THE CST GIVING SPIRIT

\$100,000 gift strengthens scholarships

Abraham (BA '48, MA '51, Chem) and **Ruth Clearfield** have added \$100,000 to the Abraham and Ruth Clearfield Scholarship Fund. Established in 2005, the endowed fund provides scholarships for undergraduate students majoring in chemistry, or another physical science, who have financial need and excellent academic performance.

After earning his Temple degrees, Professor Clearfield received a PhD at Rutgers University and then joined the faculty of Ohio University. While there, Clearfield synthesized and determined the structures of a number of zirconium phosphates that became the focus of continuing worldwide research efforts. In 1976, he joined the faculty at Texas A&M University and was promoted to the rank of distinguished professor in 2007. In that same year he was honored as an outstanding alumnus in Temple's Gallery of Success.

New endowed funds support students

Two new endowed funds will support CST's talented students. **Jayne Nathanson**, in memory of her late husband and CST faculty member **Mark Nathanson**, established the Dr. Mark A. Nathanson Memorial Research Award Fund in Developmental Biology, which provides an award to talented graduate biology students, with a preference for students majoring in developmental biology.

Rosemary Poole, in memory of her late husband and CST faculty member **John Poole**, established the John A. Poole Memorial Scholarship Fund. This fund provides scholarships for juniors or seniors enrolled in the departments of Biology, Chemistry, Mathematics or Physics who have demonstrated academic excellence, financial need and appreciation for the arts.

Joseph Allegra (BA '70, Chem) honored at Gallery of Success



JOSEPH ALLEGRA, CO-FOUNDER of the Network for Medical Communication and Research (NMCR), was inducted into the Gallery of Success during Temple University's Homecoming Weekend.

The Gallery of Success, a collaborative effort between the Office of Alumni Relations and the Career Center, honors a graduate from one of Temple's 17 schools and colleges each fall. The gallery's mission is twofold: to inspire current students by highlighting the success of Temple graduates who have gone before them and achieved success in their chosen fields, and to recognize those

alumni who have brought honor to the university by distinguishing themselves in their careers

After earning his bachelor's degree from Temple University, Dr. Allegra was granted a medical degree from the Pennsylvania State University. He was chief of the division of medical oncology in the department of medicine at the University of Louisville School of Medicine before serving as acting chair and later as chair of the department until 1989.

Originally established as the Network for Oncology Communication and Research in 1993, NMCR has developed different formats to provide education and communication opportunities for the medical and pharmaceutical communities. NMCR's products and services have become increasingly popular with pharmaceutical manufacturing and biotechnology companies. NMCR was sold in 2006.

Since then, Allegra founded Oncology Molecular Imaging, a diagnostic radiology company oriented to PET scanning technology used in cancer medicine; Kid's Time Pediatrics, which provides urgent care for children in the state of Georgia; and Lincoln Lee Investments, which provides investment management services. Allegra also serves on the boards of Vystar, a publicly traded company specializing in the production of a non-allergic form of latex; Metabolic Testing Systems, a private corporation specializing in innovative testing of cardiac and pulmonary function; and ESS, an automotive parts logistics company. His most recent venture is Novo Oncology Associates, a consulting company working with Capgemini, a worldwide consulting organization, to provide innovative solutions to companies involved in cancer pharmaceuticals.

A founding member of the College of Science and Technology's Board of Visitors, Allegra is deeply committed to his alma mater, recognizing the importance of a high quality education and its ability to jump-start one's career.

"It was at Temple that I came into contact with high quality professors like Guy Allen," he says. "Dr. Allen taught me to be a critical scientist and a good listener. Those skills were key to my career achievements as an academic physician and still serve me today."

Honorees are highlighted for one year in the Gallery of Success, located in Mitten Hall's lower level, on Main Campus. Additionally, the names of all gallery recipients are permanently displayed in the same corridor and on special Temple awards web pages at myowlspace.com.

Celina and Marina Suarez: Fossil hunters

IN 2004, TWO sisters decided to explore a gully not far from the Crystal Geyser Dinosaur Quarry, near Green River, Utah. Marina Suarez (MA '05, EES) was studying different layers of rock and her twin, Celina Suarez (MA '05, EES), was studying the conditions of the bones they found. They had no idea that what they would discover in that gully would be a new species of dinosaur.

As they investigated, Marina and Celina reported to their crew that they found bones protruding from the side of a hill. The next day—and with more help—they uncovered an extraordinary amount of bones that have been identified as 125-million-year-old remains from the dinosaur family *Troodontidae*, a raptor-like group of two-legged, meat-eating dinosaurs.

The dinosaur the sisters discovered has been named *Geminiraptor suarezorum*. According to the Bureau of Land Management in Utah, the name means “twin predatory thief of the Suarezes.” The site is now known as the Suarez Sisters’ Site, and Marina is confident that there are more dinosaurs buried there, possibly even another new species.

Celina and Marina worked as interns for the Bureau of Land Management in Utah in 2001 and 2002, respectively. When Utah State Paleontologist Jim Kirkland asked the sisters if they would like to continue working there in approximately 2003, they quickly seized the opportunity. Marina and Celina’s advisors at Temple—Associate Professor of Geology

Dennis Terry and Professor David Grandstaff, respectively—supported their decision fully. “Completing my master’s degree at Temple really helped me as a researcher and prepared me for my work as a PhD student,” Celina says. “Prior to attending Temple, chemistry was not my favorite subject, but my advisor was really patient with me and helped me understand it so I could apply it to my work.”

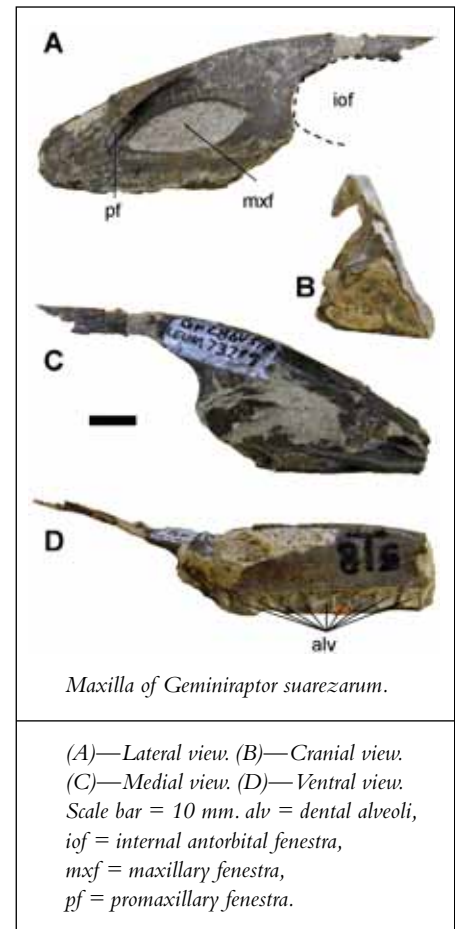
After earning their degrees in earth and environmental science from Temple, the San Antonio natives continued their education at the University of Kansas in Lawrence. They both graduated with doctorates in geology. Marina and Celina never planned to have such similar careers, but they have long shared a passion for dinosaurs and rocks.

“In kindergarten or first grade, we started collecting rocks. I still have many of them in my room at my parents’ house,” Marina says. Today, she is a postdoctoral researcher at Johns Hopkins University in Baltimore, and Celina is a postdoctoral researcher at Boise State University in Idaho. Though their studies have continued at other universities, they both view their time at Temple as invaluable.

“I learned how research is conducted and how to be an independent researcher,” Marina says. “I grew up a lot while living in Philadelphia and attending Temple.”

—Samantha Krotzer, SCT '11

Marina Suarez was studying different layers of rock and her twin, Celina Suarez, was studying the conditions of the bones they found. They had no idea that what they would discover in that gully would be a new species of dinosaur.





At the controls of CST's Nano Dome during the Philadelphia Science Festival.

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—George Washington, address to Congress, Jan. 8, 1790

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