Collaboration inspires CST student researchers
Discover the benefits of investing wisely.

The College of Science and Technology takes on today’s toughest challenges. That’s one way to invest in the future.

Another is making a planned gift to support CST’s extraordinary mission. There are many creative ways to support the college, where you, your loved ones and CST all benefit. From gift annuities to bequests to putting your IRA to work for students and faculty, learn how you can invest wisely by investing in the future of the College of Science and Technology.

Go to temple.edu/cst/alumni to learn more. Or contact:

Victoria Blevins  
Director of Development  
vblevins@temple.edu or 215-204-4704
Collaborative Transformation
Throughout the college, faculty and students pursue advanced research together.

Field Camp
Geology students travel west to become “real geologists.”
Part of what makes a College of Science and Technology education extraordinary is the
dedication and talent of our faculty. Since 2007, we have hired nearly 50 new professors,
both promising younger researchers and those at the peak of their careers. You can learn
more about new faculty members on page 10, but I want to briefly highlight the accom-
plishments of several.

John Perdew is one of the world’s most cited physicists, specifically in the field of
density functional theory. A member of the National Academy of Sciences, he is devising
new functionals within Kohn-Sham DFT, one of the most successful methods used in
solid-state physics and quantum chemistry. Also in physics, Adrienn Ruzsinszky, recipi-
ent of CST’s Early Career Development Professorship, is also doing extraordinary work in
DFT. Jody Hey, who studies genetics with a focus on the process that leads to differences
between populations and new species, is director of our new Center for Computational
Genetics and Genomics. With funding from NIH and NSF, Ronald Levy has a vigorous
research program in theoretical biophysical chemistry and is currently working on HIV
macromolecular interactions and their impact on viral evolution of drug resistance.

The efforts of CST professors in the laboratory are impressive, but equally inspiring is
their work with students. In “Collaborative transformation,” (page 14) you can read how
faculty and students are working together on advanced projects, from developing sophisti-
cated security programs for cloud-based data to investigating whether modified forms
of ascorbic acid may act as anti-cancer agents.

Everyone at the college and the entire Temple community is looking forward to the
summer 2014 opening of the Science Education and Research Center (SERC). SERC will
contain leading-edge labs and classrooms to attract talented scholars and provide students
with opportunities for exploration and investigation. To fully support moving scientific
breakthroughs from the lab to the real world, SERC will contain the latest communica-
tions, safety, HVAC and other technologies. With multidisciplinary research the key to
advancing science, SERC’s entire fifth floor is designed to support interdisciplinary efforts
in the fast-growing materials science field.

More and more, alumni and friends are re-engaging with the college. More than 50 alumni
are participating in our new Owl to Owl Mentor Program, helping CST students prepare for
their careers. Many alumni are supporting the college financially. Al Brown (BA ’64, Chem)
made a major gift to name a SERC lab, with the funds being used to support student
scholarships. Thanks to everyone who makes CST’s success possible. With your help we will
continue to set new standards in innovative research and teaching, impacting people the
world over.

Sincerely,

Michael Klein
Dean and Laura H. Carnell Professor of Science
Science Education and Research Center rising

CST’s science education and Research Center continues to make remarkable progress.

Signed by Dean Michael Klein, members of the Temple University Board of Trustees, faculty and alumni, the final structural beam was placed atop SERC on June 26. This “topping off” date was about six weeks ahead of schedule.

Designed by Architectural Resources Cambridge and USA Architects, the seven-story, 246,000-square-foot structure remains on track to open in summer 2014. SERC will fully support tomorrow’s advanced scientific research with leading-edge communications, safety, HVAC and other technologies. SERC’s lower level will house a sophisticated scanning tunneling microscope facility, one of just a few vibration-free labs of its kind in the Northeast. SERC will also provide much-needed space for the departments of Physics, Computer & Information Sciences, and Earth & Environmental Science.

Faculty expertise featured in local and national media

The Associated Press featured EES Assistant Professor Nicholas Davatzes in an article on a breakthrough that solves two problems in geothermal development: creating reservoirs big enough for commercial production and holding down costs. Newberry Crater, an ancient volcano in Oregon’s Cascade Range, has plenty of heat deep below the surface to boil water into steam, but none of the cracks and fissures in the rock to serve as a steam reservoir for a geothermal power plant. “Creating multiple reservoirs from a single well is key to making it economical, because drilling each well is so expensive,” said Davatzes, who helped develop a computer model describing the structure of the rock before it was fractured.

Philadelphia’s KYW News Radio and Fox29 interviewed Laura Toran, Weeks Chair in Environmental Geology, on how Pennsylvania’s geology makes it among the leaders in potentially dangerous sinkholes. Sinkholes occur in areas with an easily dissolved rock called karst and plenty of subterranean water. “Karst features are underground,” said Toran. “Sinkholes clue us in that they’re there, and they’re interesting because they can transfer contaminants much faster than regular aquifers, and that can be scary, so we have to keep track of where they are.”
TEDx brings science with style to Temple

Have you seen a man gargle with liquid nitrogen? Heard a drummer play the evolutionary history of a gene? Or learned about the ultimate Temple Made story: a high school dropout who finished his physics degree in three years and is now on his way to Harvard? These were just three of the compelling talks featured at CST’s TEDxTempleU event, part of Temple Alumni Weekend 2013.

It was Michael Zdilla, assistant professor of chemistry, who demonstrated the Leidenfrost Effect by putting liquid nitrogen in his mouth during his talk on the uncertain path to renewable fuels. He’s OK; the vast difference in temperature between liquid nitrogen and Professor Zdilla’s tongue creates a momentary cushion of protective steam.

Other morning speakers included Tonia Hsieh, assistant professor of biology, and Laura Toran, Weeks Chair in Environmental Geology. Jae Hyeon Lee, the physics student headed to Harvard for a PhD, spoke passionately about his own journey and how to improve science education.

Riseborough and Huennekens named American Physical Society Fellows
Professor Peter Riseborough and Adjunct Research Professor John Huennekens have been elected fellows of the American Physical Society (APS). Fellowship in APS is limited to no more than one half of one percent of the society’s 50,000 members. APS cited Riseborough “for contributions to quantum statistical mechanics on non-linear and non-equilibrium phenomena and correlated electron systems.” Huennekens was singled out for contributions to the development of “fine and hyperfine structure, and quantum interference effects based spectroscopic probes for the study of electronic state interactions and transition dipole moments.” Riseborough and Huennekens become the eighth and ninth APS Fellows in the Department of Physics.

CIS hosts national NSF proposal-writing workshop
The Department of Computer & Information Sciences hosted an NSF CAREER Proposal Writing Workshop at Temple University Center City. More than 100 faculty members from institutions across the United States, including MIT, Duke, Purdue, Princeton, Clemson and the University of Chicago attended the workshop. Invited speakers included Tommaso Melodia from SUNY Buffalo and Sayeef Salahuddin from UC Berkeley. Organized by CIS faculty Jie Wu, Shan Lin and Chiu Tan, the workshop’s goals were to introduce junior faculty to the CAREER program and help them prepare their proposal. The NSF CAREER program serves a critical role in the NSF’s efforts to identify and support the nation’s most promising junior faculty.
The second session kicked off with Erik Cordes, assistant professor of biology, who took the audience into an Alvin submersible to explore the depths of the Gulf of Mexico. Math Professor John Allen Paulos spoke on the complicated relationship between language and mathematics in “Stories vs. Statistics.”

The afternoon ended with Rob Kulathinal, assistant professor of biology, and several musicians playing the evolutionary signal of the BRCA1 gene, the mutation of which has been linked to hereditary breast cancer. It was a surprisingly danceable journey through 300 million years of evolution as interpreted by 35 distinct vertebrate species.

TEDxTempleU was sponsored by the Temple University Alumni Association; CST’s Alumni Board; SPAce Inc.; and Stanley Lefkowitz, CST ’65, and Debbie Lefkowitz.

Chemistry Professor Mike Zdilla named first Smith Professor

Mike Zdilla, assistant professor of chemistry, has received the Robert L. Smith Early Career Professorship in Chemistry. The named professorship, the Chemistry Department’s first, was established with a gift from the estates of Robert L. Smith (MA ’49, Chem) and his wife, Lucretia, and is used to help jump-start the research careers of promising young chemistry faculty.

In addition, the Department of the Navy named Zdilla a 2013 Naval Young Investigator. Zdilla’s research proposal was titled “Exploration of Energetic Manganese Metal-nitrogen-oxygen Complexes and Clusters.” A total of $8.2 million is distributed among this year’s 16 recipients, chosen from a field of 310 candidates from 13 academic institutions. Their work delves into an array of topics that could lead to advancements in naval technologies, including sea-based logistic delivery systems, robotics, photonic devices, undersea optical wireless communication, solar fuel cells and neural computation. Each of the faculty members selected will receive annual monetary awards over three years for their research.
Spring 2013 Graduation

The College of Science and Technology held its fourteenth spring graduation ceremony on May 16, bringing together hundreds of students and their families, faculty, staff, alumni and friends to celebrate this academic milestone. Held in McGonigle Hall, the ceremony honored 329 CST graduates from across the United States and around the world.

The featured speaker was Michael Berman (BA ’66, Bio), medical director of Labor and Delivery at Beth Israel Medical Center in New York City and founder of the Hygeia Foundation and Institute for Perinatal Loss and Bereavement, a nonprofit whose mission is to comfort those who grieve the loss of a pregnancy or newborn and to address disparities in access to healthcare. Also addressing the students were graduating senior Ashley Truxal, who is going on to pursue a doctorate in physical chemistry at the University of California, Berkeley, and CST Alumni Board President Paul Curcillo, (BA ’84, Bio).

Chocolate’s neuroprotective benefits

Chocolate is known to boost energy and mood, and has been shown to improve circulation by relaxing arterial walls. The latest research from the Sbarro Institute for Cancer Research and Molecular Medicine and the University of L’Aquila in Italy suggests chocolate also presents neuroprotective benefit for neurodegenerative diseases like Alzheimer’s and Parkinson’s. The research shows that cocoa polyphenols trigger neuroprotection by activating a BDNF survival pathway that counteracts neurite dystrophy. In other words, BDNF has been likened to “miracle grow” for new brain cells responsible for creating neuroplasticity in older adults. The findings as published in the Journal of Cellular Biochemistry may have important implications for the prevention of cognitive impairment in the elderly, as well as countering a neurodegenerative disease’s progression.

"Understanding the preventive potential and the mechanism of action of functional food may provide a means to limit cognitive impairment progression," says Antonio Giordano, founder and director of the Sbarro Institute.
Drug discovery proof-of-concept grants lead to patents

An innovative funding model designed to promote interdisciplinary collaboration with the School of Pharmacy’s Moulder Center for Drug Discovery Research is already showing results. In 2010 the university established a competitive process for awarding two-year, $100,000 Drug Discovery Initiative (DDI) grants. These proof-of-concept grants allow researchers across the university to generate preliminary data that can be used in applying for government, private or industry funds.

The grants are also having a positive impact on the university’s intellectual property portfolio. From the first three awarded by the Moulder Center in March 2011, three drug-related patent applications have been filed by Temple’s Office of Technology Development and Commercialization.

College of Science and Technology faculty members Rodrigo Andrade and Mark Feitelson, and Salim Merali, associate professor of biochemistry in the Fels Institute for Cancer Research and Molecular Biology, were awarded the initial DDI grants. These grants have resulted in two patent filings from Merali’s project and one from the Andrade’s.

“Originally, what we had was a basic science finding where we had a protein that could play an important role in the treatment of cancer,” said Merali. “But how could we take this protein and develop it into a drug for treating prostate cancer?”

Andrade, an associate professor of organic chemistry, had developed natural product-based molecules that could play a key role in overcoming multi-drug resistance in cancer therapy.

“Through this DDI grant, we were able to use the Moulder Center’s expertise to synthesize these molecules and have them screened to see what targets they hit and what the possible side effects might be,” he said.

Andrade and Merali both said the DDI grants gave them access to pharma-industry resources that they otherwise would not have been able to utilize. “The screening process is usually left for the pharma industry to complete because it is normally cost-prohibitive for academic researchers,” said Andrade.

“This creation of Moulder DDI grants is one of the best decisions that Temple has ever made,” said Merali. “It is a small investment, but if just one of these patent applications develops into a commercial product, Temple will benefit tremendously.”

—Preston Moretz

Mathematics conference honors Marvin Knopp

Some of the world’s foremost number theorists and other leading mathematicians came to Temple for a conference honoring the late mathematics professor Marvin Knopp. During his 35-year career at Temple, Professor Knopp played a key role in elevating the mathematics department’s research-oriented stature. The two-day Marvin Knopp Memorial Conference featured nine talks discussing Knopp’s work in analytic number theory. Participants included several members of the National Academy of Sciences; winners of several of the prestigious awards in mathematics such as the Cole Prize, AMS Steele Prize and Euler Medal; a fellow of the American Academy of Arts and Sciences; and a former president of the American Mathematical Society. “Marvin Knopp has tremendous stature within the number theory community, both for the quality of his work and because he was so very well liked,” said Edward Letzter, chair of the Mathematics Department and conference co-organizer.
CIS student proves he is real-world ready

As the “Temple Made” billboard proudly asserts: Temple students are “Real World Raised.” Geoffrey E. Allen (BS ’13, CIS), was an intern at Vanguard’s headquarters in Malvern, Pa., where he developed a web-based application for the company’s fixed-income systems. When he returned to Temple in the fall, he began a year-long information science and technology capstone course that pairs teams of students with real campus clients to work on software development projects. Allen led a six-student team that developed an online scheduling system for Temple’s Writing Center. The experience replicated a professional software development cycle: they interviewed the client, analyzed the situation, designed a solution and coded the software; then tested, documented and implemented it. “I learned how to manage people and how to deal with personalities. And I learned technical skills,” he said. “We really do have a competitive advantage when we go into the work world.”

The payoff: Before he even graduated, Allen had a position in Vanguard’s two-year Technology Leadership Program.

App aims to create a farming community across abandoned lots

In a city with more than 40,000 abandoned lots, keeping track of each property’s location and attributes is the first step toward returning them to productive use.

That’s the concept behind a project launched by Computer & Information Sciences Associate Professor Justin Shi and four students through Temple’s Urban Apps and Maps Studio. The team has created GrowShare, an online tool that helps users find and develop vacant lots into viable urban farming projects.

The group created the GrowShare website, which is now being developed into a mobile application. Ultimately, the team sees the tool as a means of revitalizing urban neighborhoods, creating jobs and reducing crime through urban farming.

The project already has been recognized as a runner-up for a judge’s choice award in the Google Places API Developer Challenge, a competition among 87 teams of developers and programmers from 27 countries. According to Brett Statman, TYL ’13, who served as lead programmer and designer on the project, the group overcame a steep learning curve to develop the project and take the award. “Learning everything I needed to make the project happen, along with taking classes and attending [gymnastics] practices was very challenging,” he said. “It was great to have all of the hard work noticed—especially by Google.”

In addition to Statman, the project team included CIS students. “The students are very motivated,” said Shi. “They learned as they were going how to do the mobile and web programming for the competition.”

The program builds on Google’s Maps API, overlaying locations of vacant lots throughout the city as well as public information such as crime statistics. It also shows what gardening projects are available, in progress or completed, and allows users to buy or sell resources such as tools, produce and labor using open-auction functionality.

“Everything—even people—can be a resource, as long as there is a seller or buyer,” said Shi. “The open auction creates the fairest platform for these exchanges.” According to Shi, the site enables civic exchange by allowing users to connect with others interested in transforming vacant lots into urban farming projects so that they can share resources, collaborate and literally change the landscape of their communities.

–Sarae Gdovin

The program shows what gardening projects are available, in progress or completed, and allows users to buy or sell resources such as tools, produce and labor using open-auction functionality.
Science Scholars Program supports promising young scientists

CST introduced the Science Scholars Program (SSP), designed for high-achieving students. Science Scholars have access to freshman-year research opportunities; personal and professional development programs; and opportunities to participate in international research experiences.

“The goal of SSP is to identify exceptionally prepared, academically strong, incoming freshman who have a passion in science and provide them with opportunities to begin advanced research experiences in their freshman year,” says Rose McGinnis.

This year’s awardees are: Louis Graup, applied mathematics; Eric Tran, biology; Katey Steinberg, biology; Claire Burns-Lynch, chemistry; and Mark Gleason, biology. All of the students had both math and verbal SAT scores above 700, exceptional high school transcripts with many advanced placement credits, and had completed a rigorous fall course load with a GPA of 3.5 or better.

Each SSP student receives $4,000 in summer funding for three years to complete research projects within the college, at Temple or at another institution. Their first summer research project, however, must be completed with a CST faculty member. Other benefits include special seminars, workshops, conferences and colloquia; access to faculty, graduate student and professional mentors; and preparation for awards, scholarships and external research opportunities.

“We want to help students qualify for prestigious scholarships, including Rhodes, Marshall and Goldwater, and have more accepted into prestigious graduate programs,” says McGinnis.

Biology major Eric Tran is working with Professor Tonia Hsieh. “I’m studying the biomechanics of freshwater turtles and their gait transition from water to land,” says Tran. “SSP is a great program that passionate freshman scientists can take advantage of.”

For the 2014 academic year, CST seeks to select 8 to 10 new SSP students. By the program’s fifth year, there could potentially be 48 total SSP students.

“It’s an excellent program,” says Louis Graup, who is modeling traffic flow with math professor Benjamin Seibold. “To say that we’re the first Science Scholars of Temple University is pretty impressive.”

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CST NOTES

Frontiers in Computational Science symposium attracts leaders in the field

In October, CST hosted the Frontiers in Computational Science symposium as part of the celebration of the investiture of Neil D. Theobald, 10th President of Temple University.

Computational science is described as the third pillar of scientific discovery, along with experiment and theory. Researchers construct mathematical models, apply quantitative analysis and implement high-performance computing to analyze phenomena occurring on the atomic, micrometer and macroscopic scales.

More than 300 researchers, alumni and students from across the country registered for the two-day event. Speakers included Princeton University’s Pablo Debenedetti and George Schatz of Northwestern University. CST’s presenters included faculty members Jody Hey, biology; Zoran Obradovic, computer and information sciences; John Perdew, physics; and Christian Schafmeister, chemistry.

Presentations covered many of the field’s essential areas of inquiry, including data mining; density functional theory; femtosecond excitation; organic materials for nanotechnology; and population genetics and genomics.

Through computational science, researchers can take on one of today’s biggest challenges: understanding the structure, function, folding and dynamics of protein molecules. Computational scientists can design safer, more effective medicines, and search for new treatments for HIV, influenza and other diseases.
New CST Faculty

Part of what makes a CST education so extraordinary is the strength of the college’s faculty. This year’s new faculty members bring impressive research and teaching skills across a variety of disciplines.

Eduard Dragut
Assistant Professor
Department of Computer & Information Sciences
Eduard Dragut’s research interests are databases, information retrieval, management of (un)structured data, information integration, information extraction, opinion mining and retrieval, web-oriented research, and cyber infrastructure for scientific research. Most recently a postdoctoral research fellow at Purdue University, he earned his PhD in computer science at the University of Illinois at Chicago. He has published in the top databases conferences, including three papers in Very Large Data Bases and one paper in the International Conference on Data Engineering.

Jody Hey
Professor
Department of Biology
Jody Hey studies evolution and genetics with a focus on the divergence process that leads to differences between populations and new species. Hey also develops statistical methods for discerning how species and populations have diverged, and has worked on human origins and the spread of human populations around the world. Hey comes to CST from Rutgers University. He also will be director of the new Center for Computational Genetics and Genomics.

Bojeong Kim
Assistant Professor
Department of Earth & Environmental Science
Bojeong Kim is an environmental mineralogist whose research into the consequences of introducing nanoparticles into soil, surface water and groundwater has received international attention. Before coming to CST, she was a research scientist in the Department of Geosciences at Virginia Tech. While there she played a key role in the Center for the Environmental Implications of NanoTechnology, a collaborative effort among researchers from Virginia Tech, Duke, Carnegie Mellon, Howard, Kentucky and Stanford. She earned her PhD in environmental toxicology from Cornell University in 2006.

Ronald Levy
Professor
Department of Chemistry
Ronald Levy has established a vigorous research program in theoretical biophysical chemistry and is currently working on HIV macromolecular interactions and their impact on viral evolution of drug resistance; computer simulations of protein structure and dynamics; and mapping complex biomolecular reactions with large-scale replica exchange reactions. His research is funded through three NIH awards, an NSF award and Department of Education grant. Levy comes to the college from Rutgers University.

John Perdew
Professor
Department of Physics
John Perdew is one of the world’s most-cited physicists, specifically in the field of density functional theory (DFT). He is successfully devising new and useful functionals within Kohn-Sham DFT, one of the most successful methods used in solid-state physics and quantum chemistry. Elected to the National Academy of Sciences in 2011, Perdew comes to CST from Tulane University. Here at Temple, Perdew will be founding director of the Center for Materials Theory, spearheading collaborative research in materials science.

Rachel Spigler
Assistant Professor
Department of Biology
Rachel Spigler earned her PhD in botany from the University of Georgia in 2007. Since 2008 she has been a postdoctoral fellow and then a research assistant professor at the University of Pittsburgh. During this time she attended the Max Planck Institute for Demographic Research, where she studied evolutionary demography. Spigler’s research concerns evolutionary ecology, the interplay between evolutionary processes in organisms and the environment, which has broad implications in the mechanisms of speciation, species extinction and the effect of climate change on populations.

Matthew Stover
Assistant Professor
Department of Mathematics
Matthew Stover earned his PhD from the University of Texas at Austin in 2010. Before joining CST, he was NSF Research Training Group assistant professor at the University of Michigan. He also has held visiting positions at the University of Pennsylvania and the Institut Henri Poincaré. His research is focused on fundamental questions connecting low dimensional topology and number theory. He has been published in leading journals, including the International Journal of Algebra and Computation, Proceedings of the American Mathematical Society and Pacific Journal of Mathematics.
Understanding DNA repair in extreme temperatures

Exposure to ultraviolet (UV) radiation not absorbed by the ozone layer can damage DNA. But an enzyme called DNA photolyase can repair the damage through the absorption of blue light.

Robert Stanley, associate professor of chemistry, has been studying the mechanisms behind this light-driven DNA repair process for 16 years. Now, through a four-year, $1.07 million grant from NASA, Stanley and his colleagues will explore how this process occurs at both extreme high and low temperatures.

Photolyase is a protein that contains a vitamin B2 (riboflavin) molecule as its active agent. It uses the blue light to drive an ultrafast electron-transfer reaction between the protein and the bound DNA lesion, which repairs the damaged DNA in less than three nanoseconds. Stanley and other researchers around the world have discovered the repair mechanism for so-called mesophillic photolyases, which operate at or near human body temperature.

“Nature has to adapt to extremes in temperature, both hot and cold, so we want to know how DNA is damaged and repaired at both high and low temperatures,” Stanley said. “Is DNA more easily damaged at one temperature extreme or the other?”

Stanley said the research focuses on what changes nature makes in the photolyase protein to allow it to function properly in extreme environments because the B2 molecule is thermally unstable.

“We don’t know what evolution does to optimize the DNA repair protein at very low temperatures compared to very high temperatures,” he said. “The photo electron transfer is very sensitive to temperature, so at a very low temperature it may happen very slowly, while at a very high temperature it may take place much more quickly. We just don’t know right now.”

Stanley said NASA officials are intrigued by this research because they are very interested in understanding the extremes under which organisms can exist not only on earth, but other planets as well.

In addition to the work being conducted at Temple, the NASA grant will also fund collaborations between Stanley and researchers at Montclair State University and Duke University on measuring the thermodynamics of the process and on developing detailed computational modeling of the DNA repair process as well as computational predictions on whether DNA gets damaged at higher rates in lower or higher temperatures.

—Preston Moretz

“Nature has to adapt to extremes in temperature, both hot and cold, so we want to know how DNA is damaged and repaired at both high and low temperatures. Is DNA more easily damaged at one temperature extreme or the other?”

—Robert Stanley

Kicker explores degenerative disease in athletes

Brandon McManus (BS ’12, Bio), Temple’s former First Team All-Big East kicker who tried out for the Indianapolis Colts, has a keen interest in chronic traumatic encephalopathy, a progressive degenerative disease of the brain found in athletes and others with a history of repetitive brain trauma, including symptomatic concussions as well as asymptomatic subconcussive hits to the head.

Working with Professor Jacqueline Tanaka in his senior year, he reviewed research about CTE’s causes and who is most likely to be affected. He will have a paper published in a 2014 issue of Scientific American MIND.

McManus holds Temple records for points scored (338), punting average (45.4), field goals made (60) and field goals attempted (83).
CST NOTES

Graduate student shines at ACS

Elizabeth Cerkez, a graduate student working in Professor Daniel Strongin’s group in the Department of Chemistry, was awarded the Certificate of Merit Award for her first presentation at the 244th American Chemical Society National Meeting in the Environmental Chemistry Division. As old industrial sites are abandoned or reclaimed for new uses, the remediation of inorganic materials becomes more and more important. Cerkez’ presentation looked at research on remediation of toxic metals, specifically coupled redox transformation of chromate and arsenite on ferrihydrite. The presentation was judged outstanding for material content and manner of presentation toward the efforts to better understand and protect the environment.

Students earn math distinction

Three Temple undergraduates won a Meritorious Winner Award at the International Mathematical Contest in Modeling. Students Antonio Adiletta, a biology major, Giovanni Adiletta, mathematics and actuarial science, and Kerwing Hy, actuarial science, placed in the top 17 percent of the more than 5,000 teams from around the world participating. “This is a very remarkable result,” said Irina Mitrea, associate professor of mathematics. “A first for Temple University.” The Mathematical Contest in Modeling challenges teams of students to clarify, analyze and propose solutions to open-ended problems. The contest attracts diverse students and faculty advisers from more than 500 institutions around the world.

Funded research

During FY2013, government agencies, corporations and other entities funded approximately 200 projects, totaling more than $15.1 million in sponsored research. Below is a sampling of departmental projects.

**Biology**
- **Erik Cordes**
  - Ecosystem impacts of oil and gas inputs to the gulf
  - Gulf of Mexico Research Initiative (University of Mississippi)
- **Amy Freestone**
  - Causes and consequences of consumer pressure across latitude
  - Directorate for Geosciences/NSF
- **Raymond Habas**
  - Dissecting the molecular mechanisms of canonical wnt signaling
  - National Institute of General Medical Sciences/NIH/DHH5
- **Jacqueline Tanaka**
  - Temple MARC USTAR program
  - NIH/DHH5

**Chemistry**
- **Michael Klein**
  - Building computational models to probe membrane fusion
  - NSF
- **Robert Levis**
  - Nanomaterials by design
  - Army Research Laboratory
- **Spiridoula Matsika**
  - Quantum chemical methods for studying photoinitiated processes in biological systems
  - NSF
- **Christian Schaafmeister**
  - Disrupting protein-protein interactions with Bis-peptides
  - NIH/DHH5

**Computer & Information Sciences**
- **Haibin Ling**
  - Contour-assisted visual inference: systems, algorithms, and applications
  - NSF
- **Zoran Obradovic**
  - Prospective analysis of large and complex partially observed temporal social networks
  - Defense Advanced Research Projects Agency
- **Alexander Yates**
  - Learning a large-scale, open domain semantic parser
  - NSF
- **Jie Wu**
  - Energy-efficient design in wireless networks using cooperative communication
  - NSF

**Earth & Environmental Science**
- **Alexandra Davatzes**
  - Moving FORWARD in Space: workshop for early career planetary science faculty
  - University of Ottawa/Georgetown U./NSF
- **Nicholas Davatzes**
  - Evolution of fault zone permeability and strength, Moab Fault, Utah
  - Shell Oil Company
- **Dennis Terry**
  - Protecting fossil resources through the use of rare earth element analysis
  - National Park Service/Department of the Interior
- **Laura Toran and Jonathan Nyquist**
  - Shale hills critical zone observatory
  - NSF (Pennsylvania State University)

**Mathematics**
- **Shiferaw Berhanu**
  - Semilinear and nonlinear PDEs in CR manifolds and complex variables
  - NSF
- **Yury Grabovsky and Isaac Klapper**
  - Spatiotemporal distribution of oxygen in biofilm infections
  - NIH
- **Sunnie Joshi and Benjamin Seibold**
  - Computational framework for atherosclerotic plaque growth simulations
  - NSF
- **Matthew Stover**
  - Geometry and arithmetic of locally symmetric spaces
  - NSF

**Physics**
- **Svetlana Kotochigova**
  - Reactive collisions and interactions of ultracold dipolar atoms and molecules
  - Air Force Office of Scientific Research
- **A. Marjatta Lyra**
  - Control of molecular quantum state character by coherence effects
  - NSF
- **Zein-Eddine Meziani**
  - Nuclear research using the electromagnetic probe
  - Department of Energy
- **Rongia Tao**
  - Magnetic and electric field application to confectionery materials
  - Mars Chocolate UK
Undergraduates lead Math Circle for middle schoolers

During the past two years the Department of Mathematics has greatly expanded its outreach efforts, including offering the Math Circle—a seven-week, Saturday morning on-campus enrichment program for fifth- through eighth-grade boys and girls.

“The purpose of the Math Circle is to show another side of mathematics that the students might not experience in their schools,” says Irina Mitrea, associate professor of mathematics. “The subjects are a little outside the box and fun. The idea is to keep them engaged and essentially bring them to the next level in terms of their mathematical skills.”

Mitrea and Associate Professor of Mathematics Maria E. Lorenz launched the program in 2012 with funding from the Mathematical Sciences Research Institute in Berkeley, California, and the National Science Foundation.

This year’s innovation: Rather than have undergraduates simply assist with the program, three undergraduate students from both CST and the College of Education designed the curriculum and ran all the sessions under their professors’ supervision.

One participant was Jennifer Hartman, who graduated in May with a double major in secondary math education and mathematics. She kicked off one session by discussing one of the so-called Zeno’s paradoxes, which involves a race between Achilles and a tortoise in which Achilles purportedly gives the tortoise a head start. “It was a hands-on learning opportunity, which we were encouraged to present,” says Hartman. “It was very nice being in a room full of students who are bright and really like math, are engaged and excited to learn.”

Jennifer Hartman (BS ’13, Math) helped design the curriculum for Math Circle, a Saturday morning enrichment program for middle schoolers.

CST NOTES

Professor Paulos receives communications award

Professor John Allen Paulos is the recipient of the 2013 Joint Policy Board for Mathematics (JPBM) Communications Award. Paulos is the author of eight books, including Innumeracy: Mathematical Illiteracy and Its Consequences, and widely read commentaries and reviews. He is also a lively presence on Twitter (@JohnAllenPaulos). JPBM established the award in 1988 to reward and encourage communicators who bring mathematical ideas to nonmathematical audiences. The award citation lauds Paulos for his writings that “combine real-world stories, forthright opinion and wide-ranging mathematics to entertain and inform the public, both about timely issues and about how mathematics often can and should underlie public discussion of policy.”

Biology students awarded GROW grants

Two biology graduate students have won prestigious National Science Foundation Graduate Research Opportunities Worldwide (NSF GROW) program grants. Winners get a travel stipend and living allowance to reside in Denmark, Finland, France, Japan, Korea, Norway, Singapore or Sweden. Kim Reuter, doctoral student in Professor Brent Sewall’s lab, will travel to Finland for several months to work with Dr. Ilkka Hanski, a member of the National Academy of Finland, and a prominent and well-cited researcher in ecology. Samuel Georgian, a PhD candidate studying deep-sea ecology in Professor Erik Cordes’s lab, will conduct research on the effects of ocean acidification on the energetics of cold-water corals at the Kristineberg Sven Lovén Centre for Marine Science in Sweden.
Anthony Cerruti and Eve Lalor prepare an acid solution to dissolve bone in Associate Professor Dennis Terry’s lab, collaborative research that could lead to the prosecution of fossil poachers.
In September a Conwell Dance Theater audience was mesmerized by the kind of performance never seen there—or anywhere else, for that matter. “GALATEA_RESET—A Play on Time and Space” involved three costumed robots equipped with speakers, whirling around the stage dancing and performing computer-generated music as they interacted; five vocal soloists; and a chorus that appears behind a veil. The hour-long, 21st-century update to a Greek mythological love triangle that inspired both Ovid’s poems and a Handel opera was a classic melding of art and science. The Boyer College of Music and Dance’s Maurice Wright, Laura H. Carnell Professor of Music Composition, composed the music, which was performed by Boyer students and alumni. Meanwhile, undergraduates working with Rolf Lakaemper, associate professor of computer & information sciences, programmed the robots to be completely autonomous as they moved about the stage, reacting to the music as the music reacted to them.

Using programming models Lakaemper had developed, but in a more creative way, his students wrote massive amounts of code for multiple computer processors—much more than they had ever produced in class. Noting that robots typically turn at 90-degree angles, senior Ian Bussmann says, “It sounds pretty easy to make a robot go in a curve rather than a straight line, but it turned out to be really challenging.”

Throughout the College of Science and Technology, undergraduates like Bussmann benefit every day from outstanding opportunities to work closely with professors while engaged in the kind of high-level research projects often reserved for graduate students elsewhere.
“It’s not often you find things that combine your computer science background with music, especially with robots.”

—David Ryskalczyk, BS ’13, CIS

The cloud computing research of Associate Professor James Du and Ryan Houlihan (BS ’13, CIS & Physics) helped Houlihan earn a prestigious National Science Foundation fellowship.

A different view of the future

If there is one example of what working directly with a faculty member can do for a student’s future, it’s Ryan Houlihan (BS ’13, CIS & Physics). When he entered CST five years ago, he had no plans to engage in research or attend graduate school. He figured he would get a computer science degree and work as an industry programmer.

Instead, thanks to a prestigious three-year, $32,000-a-year National Science Foundation fellowship, Houlihan this fall began a mechanical engineering doctoral program focusing on computational mechanics at Stanford University.

His transformation began the summer after his sophomore year, when he did an internship at Temple University’s Institute for Computational Molecular Science. It involved using parallel computing and supercomputers that more than doubled computation capabilities—work for which he ultimately was commended by other researchers when he presented his results at the 2010 National Science Foundation Teragrid Conference. “That summer I realized I loved research and wanted to do more of it,” says Houlihan.

Those experiences also led to two lengthy, multi-year undergraduate research stints that cemented his determination to pursue a graduate degree. Supported by the Undergraduate Research Program (URP), Houlihan chose to work with Xiao-Jiang “James” Du, associate professor of computer and information sciences. The two developed sophisticated programming to audit cloud security. “Ryan and I together came up with a novel idea to prevent what are called ‘scrubbing attacks’ on cloud-stored data, and then he implemented it in a real system that involved writing all the program coding and then testing it,” says Du.

During the past three years Du has worked with more than 10 undergraduates on research projects; three, including Houlihan, have published research papers. “We have many excellent undergraduates,” says Du. “Besides teaching and research, part of my job is to involve undergraduate students in research to give them a different view of their futures besides just becoming a programmer. I want to open their minds so they see other opportunities, like going to grad school or coming up with some new technology and starting a new company.”

As a result of their joint research, last year Houlihan’s work won the college’s URP Symposium first place poster award, and was presented at and published in the proceedings of the 2012 Institute of Electrical and Electronics Engineers’ annual GLOBECOM global communications conference.
“Research with a faculty member,” says Houlihan, “is definitely a lot different than classwork, which focuses more on fundamental concepts and problems. When you’re doing research you’re actually applying those concepts, and also finding out that these concepts don’t necessarily hold true in real-life situations.”

Houlihan also believes working closely with faculty is a much more concentrated and effective way to learn: “I feel that one summer internship gains you the equivalent knowledge of taking five or six courses. And doing independent work really cements the information inside your mind. You really look at things in a different light.”

Teams driven by fun and joy

Lakaemper, whose research also involves programming robots to operate in both warehouses and natural disaster areas, loves partnering with undergraduates. “It is not just about scientific facts,” he explains. “It is about learning how to work together, and listening to people who see the world a different way. And these projects aren’t as structured or as organized, it’s more of a team or group of people putting something together, driven by fun and joy.”

Those people with different worldviews, he adds, include Wright and his music students, “who speak a totally different language. For our students it is hard to get the creative aspect of the project and just not the technical aspect, so they can translate and respond to the creativity demands with their engineering abilities.”

Such challenges were one of the appeals of the robot opera, however. “The thing I love about collaborative work is that you end up learning a lot more about another discipline,” says Wright.

Opportunities to succeed

Not every undergraduate student has the mindset or temperament for the trial-and-error nature of scientific research. Ann Valentine, associate professor of chemistry, has worked with lots of smart students who enter her lab and several weeks later tell her, “I don’t know how you get out of bed in the morning. It’s depressing, it doesn’t work and I can’t imagine going through all the disappointments.”

Others, she says, are buoyed enough by occasional terrific success that it more than makes up for 10 previous failures. “My philosophy on undergraduate research is that it’s great if a professor’s lab gets great research out of a student,” she says. “But what’s more important is what the student is getting out of it. There’s no way to know if you really love research unless you get in there every day and try it.”

After her arrival two years ago after teaching at Yale University for a decade, Valentine selected two of the 28 undergraduates interested in working in her lab through the college’s highly successful Undergraduate Research Program.

One student, Jofiel “Jay” Veras, is still working in her lab. He is investigating whether compounds of normally toxic titanium made with modified forms of ascorbic acid can prove to be therapeutic, particularly as an anti-cancer
agent. Initially, the former pre-pharmacy major applied to URP just to enhance his résumé. “But then I started to really enjoy it, and thought it would be a lot more interesting than what I would be doing as a pharmacist,” says Veras, who followed his mother to the United States from the Dominican Republic at the age of two.

Early on, Valentine suggested a way for him to determine if the modified ascorbic acid he had concocted was acting biologically like normal ascorbic acid—an essential key to the research. Due to his youth and inexperience, the method she suggested was easier than a more complex and definitive strategy.

Veras successfully followed the easier method, “But then,” Valentine recalls, “he figured out I hadn’t told him the good way to do it and he said, ‘I’ve figured a way to do it better; I want to do it right’”—which he did, again successfully.

Working closely with Professor Valentine also enhanced his classroom performance. “Just being in the lab and around graduate students puts things in perspective regarding studying and my classes,” he says. “It’s not just about grades, it’s about learning things in class so I can apply them to my work.”

Since the summer of 2012, Veras’ work has been supported by Temple’s Minority Access to Research Careers program, which provides research opportunities and training for students who are interested in academic careers in biomedical or behavioral science.

As part of MARC, Veras spent this past summer at the University of North Carolina’s School of Pharmacy working on synthesizing molecules that were then sent to GlaxoSmithKline for testing because they’ve shown potential to be effective against bacteria strains that cause gonorrhea and acne.

“MARC’s been a huge help in figuring out what research is like,” says the fifth-year senior who intends to pursue a doctorate in medicinal chemistry or molecular pharmacology. “I originally wanted to help people by dispensing drugs, but now I’d rather make new ones.”

Dennis, Anthony and Eve: fossil hunters!

From a table covered with fossils in Associate Professor Dennis Terry’s laboratory, Anthony Cerruti picked up a fossilized bone embedded in gray siltstone. The two-inch long fragment from an
oreodont, an ancient precursor of sheep and pigs, was about 30 million years old. The previous summer Cerruti and Terry, associate professor of geology, had spent a month in temperatures up to 116 degrees F combing four sections of the harshly eroded Badlands National Park in southwestern South Dakota to collect it and 99 other fossils.

The haul also included fossils of two-foot-high deer and camels—a rich fossil record that also has become the target of poachers. Terry and Cerruti repeatedly found beheaded fossilized skeletons; poachers prize skulls because they bring the most money. Some of Terry’s colleagues have had their entire fossil digs stripped bare.

Thanks to a National Park Service law enforcement grant however, Terry, Cerruti and another fifth-year senior, Eve Lalor, have so far successfully verified two techniques that could lead to prosecutions and ultimately halt the poaching. During the up-to-100,000-year fossilization process, porous bones absorb chemicals and minerals from surrounding sediments. Cerruti and Lalor have been analyzing the resulting unique geochemical signatures—both rare-earth elements and other minerals found in Badlands’ fossils. These chemical “fingerprints” could soon enable NPS investigators to identify the exact location and rock layers from which poached fossils have been removed.

Using a rotary grinding tool on the oreodont fragment, Cerruti, a former president of the Geological Society of Temple University, ground away both the siltstone and inner fossilized bone until a small fragment of the cortical—the denser bone exterior—popped loose. The Philadelphia resident would later add to the team’s growing database by using laser ablation-mass spectrometry to analyze the fossil’s chemical properties.

Meanwhile, Lalor placed a four-inch long pinkish camel jawbone studded with seven manganese-blackened teeth within a lead-lined box, and for three minutes zapped it with an X-ray fluorescence (XRF) spectrometer. The resulting readout included traces of strontium, barium and nickel, as well as 61 parts per million of uranium—a level highly indicative of the park location where it was collected, Lalor noted.

“Anthony is the first person to attempt quantifying the South Dakota badlands’ geochemical signatures,” says Terry, “and no one before Eve has attempted to use the hand-held XRF method,” which in the field could safely be used by law enforcement to quickly characterize fossil locales.

“Whether or not their techniques ultimately work, we’re going to know more than we did and that will help us greatly get ready for the next step in this overall endeavor,” says Terry. Both students, who plan to attend graduate school, have relished the opportunity.

“This is an important stepping stone to future research,” says Lalor. “Working closely with Professor Terry I am gaining experience in paleontology, geochemistry and XRF, all of which can be applied to multiple areas of research.”

“It’s really cool to be an active member of a scientific community whose goal is to advance what we know and to protect these invaluable resources,” Cerruti says. “I’ve seen Dr. Terry’s published research cited by other professors. If I continue on with this research, I can feel like I am actually playing a role in advancing science.”

—Bruce E. Beans

“MARC’s been a huge help in figuring out what research is like. I originally wanted to help people by dispensing drugs, but now I’d rather make new ones.”

—Jofiel “Jay” Veras, fifth-year senior
Matthew Enos puts the final touches on a field map during a mapping project outside of Sundance, Wy.
This past May, Catherine Sutton (BS ’13, EES) walked with her classmates during the College of Science and Technology’s graduation ceremonies—but didn’t pick up her actual diploma. That would have to wait until August, after her return from what has become a rite of passage for geology majors: a four- to six-week-long geology field camp.

In Sutton’s case, that meant spending a month in a remote cabin at Oklahoma State University’s Les Houston Geology Field Camp near Cañon City, Colorado, where the High Plains and Rocky Mountains intersect. Building upon everything she had learned as a geology major, the Newtown, Pa., resident spent most of her time identifying, measuring and mapping geological formations whose rocks range in age from 1.7 billion years ago in the Proterozoic Eon to about 66 million years ago at the end of the Cretaceous Period.

“It was a pretty vast range,” says Sutton—particularly when you consider the typical Pennsylvania road cuts she has analyzed represent minute slivers of such geological time. “And everything was so much more exposed out there.”

Spending weeks in the field is a required capstone experience for most U.S. geology majors and, in many states, required for a professional geologist’s license. Besides Sutton, 17 other seniors and rising seniors attended field camps this past spring and summer.

“It’s kind of like a graduation present for geologists,” says Matthew Enos (BS ’13, EES), who explored the Black Hills of South Dakota and Wyoming with the South Dakota School of Mines and Technology. “It’s ironic that it’s required because it’s really what we all want to do.”

Temple doesn’t sponsor a field camp, but more than 80 colleges and universities do. Most camps are based in the western U.S.; a few offer options in Canada, Europe, Asia, Africa and New Zealand. “You really can’t learn most of this stuff from a book,” says Allison Tumarkin-Deratzian, associate professor, who is the undergraduate advisor for the Department of Earth & Environmental Science. “Almost all of our students come back with stories about just how amazing the experience was.”

Although Temple’s geology program offers field trips from the New Jersey coast through the Appalachians, Tumarkin-Deratzian says that examining a road cut with
most of its surrounding rock formations hidden by soil and vegetation is like looking at a tiny, flat 2-D picture. It pales in comparison to the opportunities the West affords to analyze completely exposed rock formations hundreds or thousands of feet high that run for miles in full 3-D view.

For example, in her Grape Creek study area—a dry, cactus-covered region more than a mile above sea level—the oldest, lowest layer of rock Sutton found was granite, an igneous rockindicative of magma intrusion. Above that, she and her teammates found alternating levels of various sedimentary rock—sandstone, shale and limestone—indicative, respectively, of alluvial rivers, deep lake or marine environments and shallow coastal areas, and radically different from what the area is like now. The uppermost sandstone and limestone layers, she knew, were deposited when an inland sea bifurcated the continent during the mid-Cretaceous Period.

Likewise, Alaska’s Limestone Gap area is significantly inland from Anchorage’s Cook Inlet and 4,000 ft. to 6,600 ft. above sea level. Yet Eve Eisemann (BS ’13, EES) found plenty of evidence that the colliding Pacific Plate had thrust ancient marine environments skyward. On the ground, from the bush plane she flew in on and from the higher elevations, Eisemann saw something she never witnessed back East: a clearly demarcated fault line that runs through south-central Alaska.

“It was pretty awesome to see such beautiful examples of structural features I’d never seen before in actual outcroppings,” says Eisemann, now a master’s degree coastal geology candidate at the University of Southern Mississippi.

“Field camp is really all encompassing,” adds Enos. “You get to bring together all you’ve learned in specialized classes and field trips in an effort to make sense of what you’re seeing and map the geology. How was it deposited? How has it been transformed? Was it due to uplift or some kind of collisional tectonics?”

Beyond the intensive geology work, Temple’s field campers also faced other challenges. In Colorado, Sutton endured temperatures as high as 110 degrees F., and a nearby wildfire forced the evacuation of one study area. In Alaska, the wind was so strong that some of the tents of Eisemann’s colleagues nearly blew away. There were fun excursions as well. Sutton visited Pike’s Peak and Great Sand Dunes National Park and Preserve, and scaled one of Colorado’s many 14,000-feet-plus peaks; Enos visited an iconic magma intrusion, Devils Tower National Monument.

This year’s field campers felt Temple had prepared them well. Says Eisemann, “I expected the Alaska students to have a lot more structural experience because the mountains there are so much more modern and active, but I thought I was really prepared—and if I hadn’t been, I would have drowned.”

There’s also real-life applicability. Enos was hired by TPI Environmental, which performs underground geophysical analyses, shortly after his return. “In 2013 mostly everything’s been mapped,” he says, “but whether you are going into academia and doing research or you take one of the jobs here on the East Coast that deals with environmental issues, you need to understand the geological context—whether you are determining a strategy for mitigating environmental problems or working in exploratory geology for a mining or an oil and gas company, mapping is very important.”

After her return Sutton started working as an environmental scientist with URS, an environmental remediation firm in Ft. Washington, Pa. During one interview she was handed a jar of sand collected at one of the firm’s work sites and asked to describe it. “After what I learned at Temple and during my field camp,” says Sutton, “that was really easy to do.”

For some, field camp validates their decision to pursue geology and influences their career and professional paths. That’s true of Alyssa Finlay (BS ’10, MS ’12, EES). Now working for SAIC, an environmental consulting firm in California, she ultimately wants to earn a doctorate and become a geology professor.

“Pursuing geology as a double-major with religion was a last-minute decision for me after I took two geology
“It’s like putting the final pieces together to make a whole person, to make a geologist.”

- Leslee Everett, BS ’13, EES

courses,” says Finlay, who attended James Madison University’s field camp in Ireland following her senior year. “I had already decided to earn my master’s degree, but the field camp—experiencing geology all the time and diving so deeply into it—just reinforced for me the fact that I was on the right path and it was something that I loved.”

The experience Bill Lukens (BS ’09, MS ’13, EES) had during Lehigh University’s traveling field camp greatly influenced how he teaches in the field as both a graduate assistant at Temple and a PhD candidate at Baylor University. “The important thing for undergraduates to learn is how to approach scientific questions in the field,” says Lukens, who has assisted Tumarkin-Deratzian during multiple-day field trips to New York’s Catskill Mountains. “The scale of what you want to learn is different, for example, from just a single outcropping embedded with fossils versus the large-scale processes that caused all of the formations you are analyzing in an entire region.”

Currently a master’s degree candidate, Stephen Peterson (BS ’11, EES), won Lehigh’s field camper of the year award in 2008. That allowed him to successfully apply the following summer for a National Association of Geoscience Teachers-funded internship with the U.S. Geological Survey in Reston, Virginia. Supervisors there recommended pursuing a graduate degree.

“I realized then that to continue doing the things that I loved doing during my internship required a master’s degree,” says Peterson, whose dream job would be working for the USGS.

Likewise, Everett enjoyed her field camp experience so much that she too wants a career with USGS, mapping geological formations. She has another goal too: “I hope to get a PhD and become a professor—a professor who also teaches at a university-sponsored field camp.”

-Bruce E. Beans

-Eve Eisenmann takes notes in Alaska.

-Matthew Enos poses at the base of Devil’s Tower in the northwest Black Hills of Wyoming.

-Leslee Everett (in purple) with other students out in the field, Badlands, S.D.
So much of science—in the classroom, the lab and the field—is about careful planning. It’s the meticulous attention to detail that moves science forward and enables CST researchers to break new ground in cancer treatment, renewable energy and many other areas that affect our lives.

Careful planning is important for your philanthropy, too. Many CST graduates generously support the college each year through an annual gift, but there are other ways to make an impact. From trusts to charitable gift annuities, a variety of financial tools can support the college, protect assets and provide income. Gift planning doesn’t have to be complicated. We created a web site that explains all the options. Go to temple.edu/cst/alumni to learn more. Or, if you want to talk, give me a call or send an email. If you have already designated Temple in your will or made other planned giving arrangements, please let us know.

Now is an important time to consider a planned gift. The Science Education and Research Center will open next year, and gifts that support the college will have an extraordinary impact on the future students and scientists who will work and study there. By supporting SERC, you can both name a lab or classroom in the building and endow a scholarship, support study there. By supporting SERC, you can both name a lab or classroom in the building and endow a scholarship, support study there. By supporting SERC, you can both name a lab or classroom in the building and endow a scholarship, support study there. By supporting SERC, you can both name a lab or classroom in the building and endow a scholarship, support study there. By supporting SERC, you can both name a lab or classroom in the building and endow a scholarship, support study there.

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THE CST GIVING SPIRIT

Impressive support from alumni and friends

More and more, alumni and friends are re-engaging with the life of the college and its students, and supporting the college financially.

• Albert Brown (BA ‘64, Chem) pledged $500,000 to name a chemistry lab within the Science Education and Research Center, with the funds being used to support both the Albert B. Brown Scholarship and faculty endowment. Brown is a leading expert in emulsion polymerization, contributing to a number of new product technologies, and a highly respected figure in the technology community, advising numerous research departments and businesses. In 2001, Brown’s significant work in the field of polymers earned him the designation of Corporate Research Fellow at Rohm and Haas. Established in 2010, the Brown Scholarship provides funds for undergraduate students majoring in chemistry who demonstrate high academic achievement, with strong preference given to students pursuing industrial chemistry as a profession.

• Robert Figlin (BA ’70, Chem), Steven Spielberg Family Chair in Hematology Oncology and professor of medicine and biomedical sciences at Cedars-Sinai Medical Center in Los Angeles, pledged $50,000 to establish two scholarships for undergraduate junior or senior students majoring in chemistry, physics, mathematics, or computer and information sciences.

• A $50,000 pledge from David Tepper (BA ’64, Math), who teaches in CST’s Department of Mathematics, will support the work of math professors.

• A $57,000 gift from the Estate of Helen Sholomskas will be used to augment the Francis James Sholomskas Scholarship for Outstanding Students.

• The Temple University Chemical Society, a student organization, hosted Setting the Spike for Science, a volleyball tournament to raise funds for a recent Tuteach graduate. With 10 teams and more than 150 participants, the event at McGonigle Hall raised nearly $2,000. The funds will be used to purchase much-needed teaching supplies for the recipient’s public-school classroom.
Class Notes

1970s
Dace Viceps Madore (MA ’71, PhD ’74, Bio), who worked on Prevnar, a drug made by Pfizer, was inducted into the Temple University League for Entrepreneurial Women Hall of Fame.

Jeffrey F. Daniels (BA ’74, Sci) recently celebrated his 35th year in chiropractic practice.

1980s
Jerry A. Lindheim (BA ’83, Bio, LAW ’88) participated in a panel called “Causation across Jurisdictions” during the International Asbestos Forum in London in October. He is a partner in Locks Law Firm in Philadelphia.

George M. Brunner (BA ’85, Math), vice president of CBOS Inc., a strategy and technology consultancy in North Wales, Pa., served as a preliminary judge for Temple’s 2011 Be Your Own Boss Bowl, a competition offered through the Innovation and Entrepreneurship Institute in the Fox School of Business.

Marilou Taylor Watson (BA ’87, Bio, PHR ’91) was named to the School of Pharmacy Board of Visitors in December. She is a partner in the intellectual property practice in the law firm of Fox Rothschild LLP in Blue Bell, Pa. Watson also co-chairs the firm’s diversity committee.

David M. Tener (MA ’89, Chem) was named managing partner in the law firm of Caeser, Rivise, Bernstein, Cohen and Pokotilow in Philadelphia.

1990s
Paul C. Pasles (MA ’94, PhD ’97, Math) received the 2011 Excellence in Teaching Award from the College of Arts and Sciences of Villanova University, where he is Associate Professor of Mathematics.

2000s
Thomas Elliott (BS ’10, CIS) recently accepted a position as a software engineer at the Boeing Company working on avionics software for the V-22 Osprey program.

Nikolay Dementev (PhD ’10, Chem) was awarded a prestigious JSPS postdoctoral fellowship at Kyushu University in Japan (2011).

Nicole Haloupek (BS ’12, Bio) is in the doctoral program in molecular biology at the University of California, Berkeley.

Kathryn Knauth (BS ’12, Math) is a software development engineer at Amazon, working with third-party developers who are creating apps for the Kindle Fire tablet.

College of Science and Technology graduates have worked hard to earn their success; now you can share what you have learned with the next generation.

A CST alumni mentor is a guide and a resource, someone who shares his or her professional experience with a current CST student.

In just a few meetings a semester, a mentor can help a student think about what he or she wants to achieve in life, set goals and map out strategies for achieving dreams.

To find out more about mentoring, go to www.temple.edu/cst/alumni or contact Victoria Vicente at victoria@temple.edu or 215-204-8281.
Insurance industry software pioneer: Christopher Gali (MS ’94, CIS)

While still a graduate student, Chris Gali got his first software programming assignment: a part-time gig that paid $5 an hour. A decade and a half later in 2008, Gali and his business partner, Christopher Doggett, sold AdminServer—the insurance industry software firm they had launched 10 years earlier—to Oracle for $125 million.

That transaction confirmed the sense that Gali had about the United States after arriving at Temple from his native city of Chennai, India. “I came from a society where the chances of you getting where you wanted to go were minimal,” says Gali. “It was a great feeling to realize after a few months here that if you work hard you can go far.”

Gali met Doggett while working for a consulting company on site at AIG’s offices in Wilmington, Delaware. In 1998, they launched AdminServer. With Doggett handling business matters and Gali writing revolutionary software applications that would move the insurance industry onto the burgeoning Internet, their firm took off. By the time they sold it, they had 400 employees and 17 major insurance and financial clients, including Nationwide, Mutual of New York, ING, Fidelity Investments and Merrill Lynch.

With more time on their hands, the pair ventured into another exciting industry. They opened up a nationally praised Rittenhouse Square speakeasy-style bar, Franklin Mortgage & Investment Company; Lemon Hill, a Fairmount-area gastropub; and another bar in Kentucky. Gali also joined the board of directors of the Franklin Institute and the Philadelphia Police Foundation, and established an annual $25,000 grant to the CST’s Department of Computer & Information Sciences. “Jie Wu, the department chair, has done wonders with the department and has moved it up so many notches,” says Gali.

After their non-compete agreement had lapsed, the partners launched a new Philadelphia-based insurance software company, Adminovate, in January 2012.

“Everyone wanted to get the band back together again,” Gali says. The chief architect who leads the technical design and management of all of the firm’s software development, Gali has created what he calls the “next generation” insurance software. Compatible with Microsoft, smartphones and cloud-based systems, the firm’s first product is designed for use by insurance business analysts, not just programmers. Among their first clients: Health India TPA, which processes payments for AIG and other insurers.

Says Gali: “I think what we have is not only going to change the insurance industry, but I think every financial sector will change because of our new software.”

~Bruce E. Beans

“I think what we have is not only going to change the insurance industry, but I think every financial sector will change because of our new software.”
Hydrogeologist for North and South American copper mines: Todd Keay (BA ’83, EES)

After he graduated from high school, Todd Keay was driving a truck to deliver clothing throughout South Jersey. His trips through the Pine Barrens began piquing his interest in the natural environment. But after he entered Temple, the Haddonfield, N.J., resident still was not sure about his major—until he took an introductory geology course with Peter Goodwin, former professor and Geology Department chair.

One field trip took Keay’s class to the undeveloped southern tip of New Jersey’s Long Beach Island. They looked at the rippled sand in the surf zone and worked their way back through the dunes and into the muddy sediments of the bay, digging into and analyzing sedimentary layers. “We could see the beginning of the rock record,” he recalls.

The next week they explored a quarry near Exton, Pa. “It was quartzite, lithified beach sand, and we could see all those ripples and worm burrows we had seen the previous week,” says Keay. “It was an example of the same sediments, but hundreds of millions of years old. I just went on from there.”

Where he went was Arizona. For the past 27 years he has been a hydrogeologist with Tucson consulting firm Errol L. Montgomery Associates, where he is now a partner. His main focus is groundwater- and surface water-related mining issues, particularly regarding copper mines. His assignments include assessing possible groundwater contamination, mitigating and/or minimizing and controlling such contamination, and developing the water resources necessary to process the minerals.

A new copper mine typically costs $2 to $6 billion to develop. Regardless of whether it is in Arizona or Argentina, Bolivia or Peru, a proposed mine must pass regulatory muster, meet with local approval and obtain necessary funding. Increasingly, these milestones depend on whether Keay’s team can demonstrate that the mine can be operated in an environmentally responsible manner.

“What I like best about my job is building a team that puts all the pieces together to help understand and guide how the proposed operations will impact the ground- and surface-water systems, and how those systems will impact the mining operations.”

In short, Keay says, “I love seeing different parts of the world, and hydrology helps me do that.”

—Bruce E. Beans
The chemistry was right: George (BS ’50, Chem) and Marion (BS ’50, Chem) Evans

Although they graduated the same year from Frankford High School in Philadelphia, George and Marion Albertson Evans never met until they sat next to each other at Temple in a sophomore physics class. “I was impressed there was a woman in the class,” George says. “There weren’t too many women among our peers who were majoring in chemistry.”

The two quickly became so smitten with each other that Marion jokingly says they nearly flunked physics. They did pass, and a year after they graduated, they married in 1951. Months later, while George served during the Korean War at the Army Chemical Corps in Edgewood, Maryland, Marion began filling in for him as a chemist with the Fels-Naptha Soap Company in Philadelphia.

Two years later George returned to Fels-Naptha in a management position, and Marion soon left to begin raising the first of their three children at their Northeast Philadelphia home.

After Purex bought Fels-Naptha in the early 1960s, it lured George and his family to southern California so he could manage a plant. When he retired about 25 years later, he was the executive vice president in charge of Purex’ Consumer Products Division, its largest, which produced such products as Purex liquid and dry detergents, Purex bleach and Brillo soap pads.

“There was never a day in my career that I did not like going to work,” says George. “I worked for excellent companies and loved my job.” Now both in their mid-80s, the couple is quite active at their retirement community in Carlsbad, California. They still love to travel.

“We’ve been able to travel all over the world,” says Marion. “We’ve been very fortunate.”

The couple gives Temple considerable credit for their comfortable lives. “The skills I developed at Temple were most helpful in my career,” says George, who ultimately had Purex’ research & development department reporting to him. Supporters of both CST and Temple athletics, the couple has given annually to the university for decades. Five years ago they established a substantial annuity to fund a Department of Chemistry scholarship for a graduate of either Frankford High School or another Philadelphia public high school.

“We couldn’t have gone to college if Temple wasn’t in Philadelphia,” George explains, “and we feel that we got an excellent education. Any success we’ve had in life we attribute to our degrees from Temple.”

–Bruce E. Beans

Marion Albertson and George Evans in their 1950 yearbook portraits.
World-class STEM education for everyone:
Jennifer Berman (BS ’13 Math)

The United States has fallen behind in science, technology, engineering and mathematics (STEM). In 2010, based on high-school performance, the nation ranked 25th in math and 17th in science among 30 developed nations. By 2020, it is projected that only 16 percent of college graduates will specialize in STEM, while 80 percent of the workforce will require STEM skills. We simply will not have the scientists and engineers we will need to invent our future.

The success of our nation will depend on closing this gap through vastly improved STEM education. Inspired by my experiences as a classroom teacher, I founded Education United, a nonprofit that prepares K–12 students for STEM careers through tutoring and after-school programs.

My journey began in early 2013 when I saw a flyer for the Be Your Own Boss Bowl (BYOBB), a universitywide business-plan competition hosted by the Fox School. Seeing the flyer made me think of the students I taught who could benefit from improved instructional materials, and the programs that could use more funding. I had never taken a business class, I would be competing against students who had worked on their plans for years, and the deadline was just three months away. But this was my best opportunity to get Education United off the ground.

Herb Green and Doug Baird of TUtach helped guide me. Together with BYOBB mentor Diane Allen, executive director of Coaching Solutions, we determined the need for STEM support services in the Philadelphia area, and how other organizations met this need. We learned that within a 45-minute driving radius of Temple, 78 percent of public-school students are below proficient in math or science, which is more than the national average. I worked with disadvantaged kids, so I had a special interest in making our services accessible to everyone. That goal determined how Education United would grow and operate, all while remaining financially viable.

I submitted my business plan, hoping that I could compete. Of 98 plans, mine was one of nine selected for the final round. I was the only entry from the College of Science and Technology.

The morning of the presentation I was nervous. It’s one thing to throw a plan into a shark tank, quite another to throw yourself in. Later that day, I leaned I earned best woman-written business plan, and won first place in the Social Impact Competition.

Since the competition, we have applied for grants and entered more competitions. We are networking with Temple, the Philadelphia Mayor’s Office, school districts and other nonprofits. Our services launched in September, helped by TUtach students who earn course credit. I’m looking forward to getting more people and organizations involved. I am excited to unite educators, business leaders and citizens who want to make a positive impact on children, families, schools and communities. We all need world-class STEM education to ensure a bright future for our nation.

– Jennifer Berman
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 the yearly interest on your endowed gift so that your contribution 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 giving.temple.edu.
CST’s TEDxTempleU event, which featured faculty and student talks, music and science demonstrations, attracted more than 200 attendees.