THE EVOLUTION OF THE SCIENCE EDUCATION AND RESEARCH CENTER

June 2012
Construction begins on the seven-story, 247,000-square-foot structure.

June 2013
Provost Hai-Lung Dai and others sign SERC’s final beam.

June 2013
The final structural beam is hoisted to the top of SERC.

March 2014
SERC’s advanced glass-curtain wall is applied.

September 2014
SERC opens for students and faculty.

October 2014
Building dedication includes Pennsylvania’s then-Lt. Gov. James F. Cawley IV.

THE EVOLUTION OF THE SCIENCE EDUCATION AND RESEARCH CENTER
OUTLOOK
Winter 2015
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DEAN’S MESSAGE

This is an extraordinary moment for the College of Science and Technology, one that will set the stage for an even brighter future.

After years of dreaming, planning, designing and building, the Science Education and Research Center, which opened for students and faculty in September, was officially dedicated on Oct. 10, 2014. SERC’s research labs and high-tech infrastructure will accelerate scientific discovery within the college and across the Philadelphia region.

Today, every research breakthrough is a multidisciplinary effort. Nothing stimulates interdisciplinary, collaborative research more than having top scientists from across disciplines working right next to each other. SERC is home to the departments of Physics and Computer & Information Sciences, seven research centers, chemical/biological labs, and advanced instrumentation such as clean rooms and a low-vibration scanning tunneling microscope facility. The result will be better research and teaching, more innovation, and a greater impact on people’s lives.

SERC has already helped to attract top researchers to CST, such as John Perdew and Sudhir Kumar—both authors of top-100 cited papers in their fields. 2014 was one of our strongest faculty recruiting years ever, with talented and experienced researchers joining each of our six departments (page 8). SERC is a key component of CST’s long-term effort to attract world-class faculty—particularly in the areas of computational and materials sciences—and to give them the resources to conduct groundbreaking research and to bring their discoveries to the marketplace. The effort is paying off: CST recently won a highly competitive $12 million Department of Energy award to design new materials with potential energy applications (page 7).

This past year, CST also introduced several new research centers and institutes that will help to further focus our research expertise in areas such as energy research, materials and drug design, and genomic medicine (page 16).

As CST continues to grow, our alumni and friends have been with us every step of the way, from supporting scholarships to returning to campus to mentor our undergraduates. Thank you for all that you do for the college. Together we will move science and Temple University forward in so many ways.

Michael L. Klein, FRS

Dean and Laura H. Carnell Professor of Science
BIOLOGY FACULTY AND STUDENTS EXPLORE DEEP-SEA CORAL IN THE GULF

Imagine spending eight hours with two other people in a space that is 6 feet in diameter. Now imagine that the space is about a mile beneath the surface of the Gulf of Mexico.

That scenario describes the spring 2014 research voyage of CST faculty and students aboard Alvin, a U.S. Navy-owned submersible. “We looked for corals that show an ability to grow under very harsh conditions,” explains Erik Cordes, associate professor of biology, whose research is funded by the National Science Foundation (NSF). “These coral reefs are already more acidic—due to their depth and rise in atmospheric carbon dioxide levels—than any on Earth, yet they survive.”

In addition to Cordes, the CST team included Rob Kulathinal, assistant professor of biology and co–principal investigator on the NSF grant, and Professor of Biology Robert Sanders. “I’m a lab-reared genomicist, so these opportunities typically do not present themselves,” says Kulathinal, who is examining gene-expression changes of Lophelia pertusa coral at different levels of acidity.

Sanders—whose research focuses on the microbial food web in oceans and lakes—gathered data on organisms that feed on bacteria in surface waters and in the deep chlorophyll maximum, a depth stratum rich in phytoplankton and other microbes and near oil seeps on the ocean floor. Cordes and his team completed 18 dives, gathering coral specimens to conduct experiments at sea and perform genomic analysis back at Temple University. A small film crew was on hand to chronicle Cordes’ work for Acid Horizon, a documentary about his research.

Four graduate students from the Cordes lab, Alanna Durkin, Carlos Gomez, Sam Georgian and Danielle DeLeo*, were also on the voyage. “For most people in our field, getting an Alvin dive is the pinnacle of their careers,” Georgian said. “For graduate students, it’s a rare experience.”

—Greg Fornia

*More about Danielle DeLeo on page 28, In Their Words.
SPRING 2014 GRADUATION

The College of Science and Technology held its 15th graduation ceremony on May 15. Held in McGonigle Hall, the ceremony honored more than 300 CST graduates from around the world.

The featured speaker was James Edward Maceo West, a pioneer in acoustic research who attended Temple in the 1950s and was recognized with an honorary degree in 2014. West’s many awards and honors include the National Medal of Technology and Innovation, the highest honor bestowed on an inventor in the U.S.; the Acoustical Society of America’s Gold Medal; and the Industrial Research Institute’s Achievement Award.

Kevin Chemidlin, a computer science major, was this year’s student speaker. He earned a Temple Merit Scholarship in 2010, the Adeline and Marvin Wachman Scholarship in 2011, and the Jules J. Sheldon, DDS, Scholarship in 2013. Chemidlin is now systems analyst/project manager for Cigna.
Which are the world’s most cited scientific research papers? The journal Nature asked Thomson Reuters to compile the top 100 from its Web of Science database, which goes back more than a century.

The list includes four papers from three CST Carnell professors. They are John Perdew, Department of Physics, with #16 and #93; Sudhir Kumar, Department of Biology, with #45; and Dean Michael Klein, Department of Chemistry, with #79.

“Academic scholarship is being more and more quantified by the number of citations to a given publication,” said Dean Klein. “This achievement is a testament to the quality of recruiting that has taken place recently at CST.”

### PHYSICS DEPARTMENT HIGHLIGHTED AT APS MEETING

A video showcasing the faculty, research, facilities and growth in Temple’s Department of Physics debuted at the March meeting of the American Physical Society (APS) in Denver.

The video was produced by APSTV and highlights the cutting-edge research of Rongjia Tao, former chair of the Physics Department; John Perdew, Laura H. Carnell Professor of Physics and Chemistry; Xiaoxing Xi, Laura H. Carnell Professor and new department chair; and professors Marjatta Lyyra, Zein-Eddine Meziani and Bernd Surrow.

In addition to the faculty and their research, the video also focuses on the Science Education and Research Center and its impact on the Physics Department. Tao says the video was received positively by his APS colleagues at the meeting, which was attended by approximately 10,000 physicists, scientists and students.

### LARGEST-EVER SCIENCE AND TECH JOB FAIR

The College of Science and Technology’s spring 2014 Science and Technology Job Fair attracted more than 400 Temple students and 50 top employers—both records for the event, which has been held since 2008. Participating companies included Agilent Technologies, Children’s Hospital of Philadelphia, Cigna, GlaxoSmithKline, Independence Blue Cross, JPMorgan Chase, Prudential, the Wistar Institute and Vanguard.

The College of Science and Technology’s spring Science and Technology Job Fair attracted more than 400 Temple students and 50 top employers—both records for the event.
ALUMNI MENTORS POINT THE WAY FOR STUDENTS

The grade-point average of Phimy Pham, a chemistry major who wants to become a pharmacist, increased a full point from one semester to the next after Jim Guare (BA ’77, MA ’83, Chem) began mentoring her through CST’s Owl to Owl Mentor Program.

Spearheaded by Guare, president of CST’s alumni board and chair of its mentoring committee, the program pairs CST students with CST graduates. Its popularity—56 mentors and 63 students in its second year—is one reason other Temple colleges and schools are considering replicating the program.

Among many achievements during his 28-year career at Merck & Co. Inc., Guare helped develop Crixivan, one of the drugs that transformed AIDS from a fatal disease to a chronic condition. “I had a wonderful career, but I didn’t do it by myself,” Guare says. “I had people all along the way, from high school to Temple to Merck, who mentored me.”

He arranged for Pham to do research in the Temple School of Pharmacy’s Moulder Center for Drug Discovery Research. “He motivated me to push myself more,” Pham says. “I’m really grateful that I met him.”

Alumni board member Jennifer Gresh (BS ’98, Geo) manages the Philadelphia office of Duffield Associates, an engineering firm. She has met multiple times with geology major Chelsea Rush—over lunch, at a Society of Women Environmental Professionals networking event and out in the field to assess groundwater for possible petroleum contamination. “The business of geology wasn’t obvious to me as an undergraduate, so I’d like to give Chelsea the full picture,” Gresh says.

Madison Martin, a senior biology major who hopes to go to medical school, was paired with Risa Altman (BA ’81, Bio), a Lehigh Valley pediatrician associated with Children’s Hospital of Philadelphia. “We’ve talked over lunch about the process of becoming a doctor, and I shadowed her seeing patients,” Martin says. “It’s interesting to see in practice what I’d get to do rather than just reading it online.”

—Bruce Beans

A mentor makes a huge impact on a student’s life and career. Find out more about Owl to Owl at cst.temple.edu/owl2owl.
DOE GRANT PUTS CST AT ENERGY RESEARCH FRONTIER

The College of Science and Technology will be the new home of an Energy Frontier Research Center focusing on the design of new layered materials with potential use in energy applications. The Center for the Computational Design of Functional Layered Materials is one of 10 new Energy Frontier Research Centers announced by the U.S. Department of Energy (DOE), which awarded a total of $100 million to 32 such centers nationwide.

Transforming the way energy is generated, transmitted, stored and used will be among the critical challenges facing the United States in the 21st century. To more quickly advance technologies that have potential to meet rapidly growing energy needs, the DOE created the Energy Frontier Research Centers to support research that lays the groundwork to address future needs in energy production, storage and use.

Temple’s center, funded through a four-year, $12 million DOE award, will be led by Laura H. Carnell Professor of Physics and Chemistry John Perdew and includes 19 principal investigators, 10 of whom are from Temple. External collaborators include Princeton University, Brookhaven National Laboratory and the Jawahalal Nehru Center for Advanced Scientific Research in India. Perdew says the center will attempt to design new layered materials that have useful applications in energy production or storage. “The interesting thing about the single layers of materials is you can readily change them and control their properties,” says Perdew. “For instance, you could tune them to absorb a particular frequency or frequencies of light for conversion into electricity.”

Perdew says the center’s computational scientists will use computer simulations to add atoms or molecules to a material’s surface or change the material’s structure and then compute whether those changes affect the material’s properties in a desired way to create a new material. Experimental scientists working at the center would then grow these new materials and test their applications, he adds.

“There were more than 200 Energy Frontier proposals, and Temple is one of only 10 newly funded centers,” says Dean Michael Klein. “This demonstrates the remarkable research expertise in CST and puts Temple on the map as a top player in science and technology.”

—Preston Moretz, SMC ’82

GROOMING TOMORROW’S BIOTECH LEADERS

The Philadelphia region is one of the fastest-growing biotechnology hubs in the nation. To meet the growing demand for professionals skilled in that field, CST launched a two-year professional science master’s (PSM) degree program in 2012. This biotech degree prepares students for research and project-management careers that focus on solving real-world problems in health and environmental sciences.

In summer 2014, Temple University approved a second PSM degree in bioinnovation. A collaboration between Temple’s College of Science and Technology and the Fox School of Business, the PSM in bioinnovation offers cross-disciplinary knowledge and training essential for professionals looking to enter—or advance in—the rapidly expanding areas of biotechnology startups and pharmaceutical companies; public health and environmental agencies; scientific and technical writing or grant administration; or intellectual property law.

“From critical analysis of innovative biomodels and bioconcepts to building and managing biotech startups, the PSM in bioinnovation offers the skills to help recent graduates and current professionals accelerate career advancement or transition into exciting business sectors,” says Eva Surmacz, associate professor in biology (research), who helped develop the program.

The PSM designation was developed by the Council of Graduate Schools, a national organization that advances graduate education and research. The degree is designed to offer advanced scientific training and management skills valued by employers.

In May 2014, three students graduated from the biotechnology program, including Rachel Chiaverelli (BS ’12, Bio; PSM ’14, Biolinn), who hopes to pursue a PhD and eventually run her own research laboratory. “The program exposes students to research,” says Chiaverelli, “but it’s also broad enough that you could easily become a project manager one day.”

—Greg Fornia

NEW LEADERSHIP TO HELP SET DIRECTION FOR CST

The college has hired John Walker to serve as CST’s new associate vice dean. Walker joins the college after more than 15 years of significant management responsibility in academia, including Drexel University, Stevens Institute of Technology and Temple’s Beasley School of Law. He will work in partnership with the dean, senior staff and other stakeholders to develop a comprehensive strategic plan for the college, including enhanced communications, alumni engagement, and marketing to increase graduate enrollment.
Graham Dobereiner  
**ASSISTANT PROFESSOR, CHEMISTRY**  
Graham Dobereiner specializes in the study of chemical reactions across alkyl groups. A 2011 recipient of a PhD in chemistry from Yale University, Dobereiner’s doctoral thesis won the university’s Richard Wolfgang Prize for best doctoral thesis by a chemistry student. He has presented his research across the Northeast and been published more than a dozen times, including in the *Journal of the American Chemistry Society*. He was previously a postdoctoral research associate at the Massachusetts Institute of Technology.

Ananias Escalante  
**PROFESSOR, BIOLOGY**  
Ananias Escalante studies ecology and the evolution of infectious diseases by focusing on the genetic patterns of pathogens across anthropological, epidemiological, ecological and biological perspectives. Of particular interest is the study of the evolution and drug resistance of malaria-causing parasites, for which Escalante has received numerous grants from the National Institutes of Health and various educational institutes across the United States and Latin America. The founder and president of the CoEvolution Society, Escalante comes to Temple from Arizona State University.

Alexander Gray  
**ASSISTANT PROFESSOR, PHYSICS**  
Alexander Gray specializes in the exploration of the possibilities of photoemission spectroscopy. A 2011 recipient of a PhD in physics from Berkeley National Laboratory at the University of California, Gray has been published more than three dozen times and invited to speak at several international conferences. He comes to Temple from the Institute for Materials and Energy Science at Stanford University, where he had been an experimental research associate since 2011.

S. Blair Hedges  
**LAURA H. CARNELL PROFESSOR OF BIODIVERSITY**  
S. Blair Hedges comes to Temple from Penn State, where he had taught since earning a PhD in zoology from the University of Maryland. Hedges’ research explores the evolution of biodiversity by studying evolutionary genetics and genomics, with particular interest in how the planetary environment affects life. He has named 112 species in the Caribbean and received more than a dozen grants from NASA and the National Science Foundation to study early life on Earth and the implications for life on other planets.

Bo Ji  
**ASSISTANT PROFESSOR, COMPUTER AND INFORMATION SCIENCES**  
Bo Ji’s research interests include the modeling, analysis, control and optimization of complex information system networks. A native of China, Ji enrolled at Ohio State in 2007 and earned his PhD in electric and computer engineering in 2012. He has since published three papers in IEEE INFOCOM, a leading conference for computer information systems research, and has taken a particular interest in optimization and queuing theory in wireless networks and cloud computing.

Sudhir Kumar  
**LAURA H. CARNELL PROFESSOR OF GENOMIC MEDICINE**  
Sudhir Kumar’s research focuses on analyzing the evolution of species, genomes and mutations using integrative and comparative approaches, particularly through technology. Kumar has received numerous grants from the National Institutes of Health to develop computational analysis of genetic evolution; his web applications have been cited more than 50,000 times. He comes from Arizona State University to Temple, where he will serve as director of CST’s new Institute for Genomic and Evolutionary Medicine.
David Liberles
ASSOCIATE PROFESSOR, BIOLOGY

David Liberles studies bioinformatics, comparative genomics and molecular evolution. A recipient of numerous grants from the National Institutes of Health, the National Science Foundation and the European Science Foundation, Liberles has also presented his work and taught at locations around the world, including Oslo, Norway; Christchurch, New Zealand; and Bellville, South Africa. A recipient of a PhD in chemistry from the California Institute of Technology, Liberles comes to Temple from the University of Wyoming.

Chelsea Walton
ASSISTANT PROFESSOR, MATHEMATICS

Chelsea Walton’s mathematical areas of interest include noncommutative algebra, noncommutative algebraic geometry, noncommutative invariant theory and representation theory. A 2011 recipient of a PhD in mathematics from the University of Michigan, Walton has presented her research at conferences across North America, including at the Mathematical Sciences Research Institute in Berkeley, California. Prior to coming to Temple, she was a National Science Foundation–funded postdoctoral fellow at the Massachusetts Institute of Technology.

Sujith Ravi
ASSISTANT PROFESSOR, EARTH AND ENVIRONMENTAL SCIENCE

Sujith Ravi’s research interests include ecohydrology, land degradation, sediment transportation, water resources and the food-energy-water nexus. A 2008 recipient of a PhD in environmental sciences/hydrology from the University of Virginia, Ravi was previously a postdoctoral fellow at Stanford University.

Brent Sewall
ASSISTANT PROFESSOR, BIOLOGY

Brent Sewall’s research focuses on understanding critical and emerging threats to biodiversity and developing effective strategies for conservation. He joined the Biology Department as a non-tenure track faculty member in 2009. He has received several awards, including the American Society of Mammalogists William T. Hornaday Award for outstanding contributions to mammal conservation and CST’s William Caldwell Memorial Distinguished Mentoring Award. Prior to arriving at Temple, Sewall was a visiting assistant professor of conservation biology at the College of William and Mary. Sewall received his PhD in ecology from the University of California, Davis.

Sarah Wengryniuk
ASSISTANT PROFESSOR, CHEMISTRY

Sarah Wengryniuk’s research interests include organic synthesis and methodology. She was previously a National Institutes of Health–funded postdoctoral research fellow at the Scripps Research Institute in La Jolla, California, where she worked in collaboration with Bristol Myers-Squibb on late-stage functionalization of macrocyclic drug candidates. She earned her PhD in organic chemistry from Duke University in 2012, where she was a National Science Foundation Graduate Research Fellow.

Katherine Willets
ASSOCIATE PROFESSOR, CHEMISTRY

Katherine Willets’ research focuses on the effectiveness of super-resolution imaging techniques. As co–primary investigator, she received a $7.5 million grant from the Air Force Office of Scientific Research for electrochemical imaging and mechanistic studies on the nanometer scale. She earned the 2013 Early Career award from the Department of Energy. Willets, who earned her PhD at Stanford, comes to Temple from the University of Texas at Austin, where she was an assistant professor.

CARNELL PROFESSORSHIPS AT CST CONTINUE TO GROW

This year, two faculty members—S. Blair Hedges and Sudhir Kumar—joined CST as Laura H. Carnell Professors. Established in 1985, Carnell professorships recognize Temple faculty who have distinguished themselves in research, scholarship, the creative arts and teaching. They honor Temple’s first dean, Laura H. Carnell, who worked alongside founder Russell H. Conwell. CST currently has 10 Carnell professors—more than any other Temple school or college.
CST STUDENTS AWARDED PRESTIGIOUS NSF FELLOWSHIPS

Four CST graduate students were awarded prestigious National Science Foundation (NSF) Graduate Research Fellowship Program grants in 2014. That program recognizes and supports outstanding graduate students in NSF-supported science, technology, engineering and mathematics disciplines who are pursuing research-based master’s and doctoral degrees in the U.S.

Temple chemistry students made a particularly strong showing, with three awardees. The Department of Chemistry was one of only 31 departments nationwide to receive multiple fellowships and one of only 10 to receive multiple fellowships in organic chemistry.

“This is a remarkable accomplishment for both the students and the Chemistry Department,” says Bill Wuest, assistant professor of chemistry, whose lab is working on potent, Lysol-like compounds for use in cleaning oil pipelines, ships’ surfaces and medical devices. “Our students keep getting better and better, and as a result, our research keeps getting stronger and stronger.”

Selected through a national competition, the grantees receive an annual $32,000 stipend and $12,000 cost-of-education allowance for three years. Fellows are also eligible for access to cyber-infrastructure resources and international research collaborations.

CST’s 2014 NSF Graduate Research fellows are Megan Jennings, chemistry; Samuel Markson, chemistry; Steven Schnell, biology; and Christiana Teijaro, chemistry.

Teijaro, a member of Associate Professor of Chemistry Rodrigo Andrade’s lab, is working on the synthesis of certain natural alkaloids that inhibit the protein responsible for preventing cancer drugs from passing through cancer cells. “I’m very excited to focus on my research 100 percent,” Teijaro says. “The Chemistry Department is conducting innovative, quality research that competes with any university.”

—Greg Fornia, SMC ’92

Our students keep getting better and better, and as a result, our research keeps getting stronger and stronger.

—Bill Wuest
**Biology**

Raymond Habas
- Functional Analysis of the Bifunctional Ion Channel and Kinase TRPM7, National Institutes of Health (NIH) (University of Medicine and Dentistry of New Jersey)

Jody Hey
- Maintenance and Development of iMa Program, NIH/ Department of Health and Human Services (DHHS)
- The Population Genetics of Divergence, NIH/DHHS
- Statistical Inference Under Isolation-With-Migration Models, National Science Foundation (NSF)

Rob Kulathinal
- Functional Behavioral Analysis of Positively Selected Genes in the Drosophila Melanogaster Lineage, Directorate for Biological Sciences/NSF

Laszlo Otvos
- Synthetic Peptides Acting as AdipoR Agonists, NIH (Northwestern University)

Brent Sewall
- Fort Indiantown Gap—INRMP Contract, Pennsylvania Department of Military and Veteran Affairs (Penn. DMVA)
- Fort Indiantown Gap—RTLA Seasonal Contract, Penn. DMVA

**Chemistry**

Rodrigo Andrade
- Asymmetric Synthesis of Strychnos and Aspidosperma Alkaloids, NSF

Eric Borquet
- Interface between water and a carbonate mineral oxide model system, ExxonMobil
- Coherent Photoreactivity of Surfaces, Defense Advanced Research Projects Agency (DARPA)
- DARPA LoCo 4-C: Local Control of Materials Syntheses, DARPA
- DARPA LoCo 4-C: Local Control of Materials Syntheses—Fundamental Optimal Dynamic Discrimination for User-defined Reaction-Control, DARPA

Steven Fletcher
- NOBCCHe Fellowship, GlaxoSmithKline
- Interaction of Inhalation Anesthetics, NIH (University of Pennsylvania)

Michael L. Klein
- Local Control of Material Synthesis Development of a High-Energy, Ultra-Broadband, Ultra-Short Infrared Laser Source, Directorate for Biological Sciences/NSF
- Polymer Interface Structure Advancement, Lockheed Martin
- Nanomaterials by Design, Army Research Lab

Ronald M. Levy
- Computer Simulations of Protein Structure and Dynamics, NIH/DHHS
- NSF CDI-Type II: Mapping Complex Biomolecular Reactions with Large-Scale Replica Exchange Simulations on National Production Cyberinfrastructure, NSF
- HIV Interactions and Viral Evolution, Scripps Research Institute, NIH/DHHS

Yi Rao
- Studies of Carrier Generation for High Efficient Photovoltaic Applications, Honda Research Institute USA Inc.

Christian Schafmeister
- Towards Durable, High-Flow Water Filtration Membranes, U.S. Army Corps of Engineers

Vincent Voelz
- Early Stages of Protein Folding Explored by Experimental and Computational Approaches, NSF

Bradford Wayland
- Tuning of Metal-Centered Radicals for Substrate Activations and Catalysis, NSF

William Wuest
- Development of Chemical Probes to Study Nucleoside Signaling in Bacterial Biofilms, Charles E. Kaufman Foundation

Michael Zdilla
- Analogues of the Biological Oxygen Evolving Complex: A Redesigned Approach to Manganese Cluster, NSF
- Materials Carbon Monoxide Activation and Lithium Ion Battery Materials, Henry and Camille Dreyfus Foundation Inc.

**Dean’s Office**

Douglas Baird
- TUTEACH: Serving Philadelphia by Preparing Better Science and Mathematics Teachers, Verizon Foundation

Susan Varnum
- 2013 GPSC Summer Camp at Temple University, McKean Defense Group
- 2014 ExxonMobil Bernard Harris Summer Science Camp, Harris Foundation
- 2014 GPSC Camp-SeaPerch Science, McKean Defense Group

**Computer & Information Sciences**

Xiaojiang Du
- I-Corps: Commercialization Feasibility for Increasing Cognitive Femtocell Network Capacity, NSF

Krishna Kant
- EAGER: Quality of Configuration in Large-Scale Data Centers, NSF

Eugene Kwatny
- CNS—Collaborative Research: EAGER—from Computer Networks to Food Networks, NSF

Haibin Ling
- Correspondence: Theory, Algorithm, and Application, NSF

**Physics**

Ke Chen
- Magnesium Diboride DC and Data Cables for Digital-RF Systems, Hypes Inc.

Maria Iavarone
- Vortex Matter in Confined Superconductors and Mesoscopic Hybrid Heterostructures, Office of Science, U.S. Department of Energy (U.S. DOE)

Svetlana Kotochigova
- Controlling Anisotropy in Interactions of Ultra-Cold Atoms and Molecules for Quantum Information Processing, NSF

Jeffrey Martoff
- Collaborative Research: Direct Search for Dark Matter with Underground Argon at LNGS, NSF

James Napolitano
- Daya Bay Reactor Neutrino Experiment, Office of High Energy Physics, U.S. DOE

John P. Perdew
- Center for Computational Design of Functional Layered Materials, U.S. DOE
- DMR Condensed Matter and Materials Theory, NSF

Adrienn Ruzsinszky
- Exploring the Random Phase Approximation for Materials and Chemical Physics, Office of Science, U.S. DOE

Xiaoxing Xi
- Artificial Oxide Heterostructures with Tunable Band Gap, Office of Scientific Research, U.S. Air Force
- Magnesium Diboride Thin Films, Multilayers, and Coatings for SRF Cavities, Office of Science, U.S. DOE
- MGB2 Thin Film Deposition on Metals, Argonne National Laboratory
- SC Testing, Alameda Applied Sciences Corporation
- Ultra-wideband MGB2 Mixer for High Resolution Terahertz Spectroscopy, NASA

Benjamin Seibold
- Control of Vehicular Traffic Flow via Low-Density Autonomous Vehicles, NSF

Daniel Szyl
- Multiple Preconditioners for Saddle-Point and Other Problems, NSF
NOSEK WINS BE YOUR OWN BOSS BOWL

Guiding Technologies Corp., a startup company founded by CIS Professor John Nosek, won the $125,000 grand prize at the Be Your Own Boss Bowl (BYOBB), Temple’s universitywide business-plan competition. Guiding Technologies focuses on improving outcomes and quality of life for autistic children through its software GAINS (Guidance, Assessment and Information System), which simplifies and systematizes the way complex applied behavioral analysis (ABA) therapy is conducted.

ABA, the gold standard in treatment for autistic children, is costly and inconsistently administered, and there is a scarcity of qualified ABA therapists. But without early ABA therapy, autistic children may lead diminished lives, with a ten-fold increase in lifetime costs.

“What we found was that this new organic matrix seemed to have extremely good low-temperature conductivity,” Wunder says. Though the matrix currently decomposes above room temperature, when the researchers placed it in dry ice (−78 degrees Celsius), it held the same ability for conductivity as it did at room temperature.

“I’m not aware of any material, solid or liquid, that has ever behaved like that for ion conduction at low temperatures,” Zdilla says. “This technology could be valuable for battery performance in extremely cold temperatures like space, the deep sea, the Arctic or Antarctica. Even in some more temperate places, it still gets cold enough that regular batteries do not perform well.”

The researchers are confident the technology—once the material is stabilized above room temperature—has the potential to make lithium ion batteries better and safer.

—Preston Moretz

MAKING LITHIUM BATTERIES SAFER

Lithium ion batteries, central to powering most modern technology, are potentially dangerous—the liquid electrolytes used to manufacture those batteries can be volatile. Now two CST chemists have developed a way of creating a solid electrolyte that might reduce the battery’s volatility without decreasing its conductivity or increasing its costs.

“There have been quite a few thrusts toward making lithium batteries safer, and one of them is to make everything in the battery a solid,” says Professor of Chemistry Stephanie Wunder, who is collaborating with Michael Zdilla, assistant professor of chemistry. “But in general, solids are less conductive.”

Zdilla’s lab has developed a new solid electrolyte matrix by dissolving organic liquids and lithium salts—which are like table salt but with lithium instead of sodium ions. Both materials are similar to those currently used in lithium ion batteries. A nonpolar solvent is then added. “They are the same inexpensive materials that are going into lithium batteries right now,” he notes.

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—Preston Moretz
The Science Education and Research Center opened in September 2014. Its impact on research and teaching, innovation, and discovery will be felt for decades.

SERC

Joseph V. Labolito
SERC’s soaring two-story lobby is just one of many spaces designed to stimulate interdisciplinary collaboration among faculty members and undergraduate and graduate students.
SERC offers ample space for CST's researchers and students, including 52 research labs, 16 teaching labs, two large lecture halls, and offices for faculty and postdocs. Each floor offers break-out rooms, conference rooms, lounges and other spaces that support collaboration.

SERC is home to the departments of Physics and Computer & Information Sciences, seven research centers, including the Institute for Genomics and Evolutionary Medicine and the Center for Networked Computing, and advanced facilities such as (top, center) Class 100 and Class 1,000 clean rooms and a low-vibration scanning tunneling microscope facility, the only one of its kind in the Philadelphia region.
Images clockwise from bottom left:
- Drug molecule, iStock
- Genetic map, Martin Krzywinski/Science Source
- HIV virus, NIH/NIAID/Seth Pincus/Elizabeth Fischer/Austin Athman/Science Source
- Mosquito, Mark Giles/Science Source
- Male Papilio aristodemus, free domain.
One day last May, Ron Levy sat in his temporary office in the Bio-Life Building speaking with Nan-Jie Deng, one of his assistant research professors. They were discussing Deng’s research, which involves using free energy molecular dynamics simulations to design inhibitors against HIV viral proteins.

Levy, Laura H. Carnell Professor of Biophysics and Computational Biology, directs the Center for Biophysics & Computational Biology—one of seven new research centers or institutes that, over the past year, have doubled the number of CST research entities, creating a collaborative critical mass of internationally renowned researchers.

Underscoring that cooperative thrust, later that day Deng reported on his progress at a joint seminar involving Levy’s center and the Institute for Computational Molecular Science headed by Dean Michael Klein. Finally, Levy, who was lured away from Rutgers University and whose lab is on the top floor of the Science Education and Research Center (SERC), spoke with Bill Flynn, a graduate student. The topic: Flynn’s efforts to use deep sequencing data to determine patterns of correlated mutations in HIV proteins.

Explaining why he came, Levy says, “I’ve known Michael Klein for years, and knew that great things were happening here in computational science. It’s really exciting.”

CST has hired more than 60 faculty members since 2007 and, over the past two years, a handful of senior faculty who are leaders in their fields. Why did such a distinguished group uproot well-established research labs to come to CST? SERC was part of the allure. “To attract scientists from around the world, you need to have great facilities to launch an initiative of the magnitude we are contemplating,” says Sudhir Kumar, Laura H. Carnell Professor of Genomic Medicine and founding director of the Institute for Genomics and Evolutionary Medicine (iGEM).

Given these new researchers’ need to mine and analyze huge data sets, another draw was the ultrafast, powerful capabilities of Temple’s High-Performance Computing Cluster and its related virtual server, TUcloud—the kind of computing power that opens new scientific frontiers.

“From basic questions on evolution to critically important questions on human health, much of modern life-science research involves the development and application of advanced computing technologies,” says Jody Hey, who arrived a year ago from Rutgers.
Kumar was also attracted by the chance to work with CST colleagues and researchers from the College of Public Health, School of Medicine and Fox Chase Cancer Center. "Genomics is part of many exciting research endeavors in these disciplines," says Kumar. "It's a tool to measure the kind of differences we have from one another and also the diversity in the blueprint of life. With this unique angle, we can connect various entities at Temple."

This collaborative urge triggered a domino effect of additional high-level hires. After arriving from Rutgers last fall, Hey suggested recruiting Kumar from Arizona State University, where he appeared to be set for life after being named a Regents’ Professor just three years earlier. Both Hey and Kumar have been recent presidents of the Society for Molecular Biology and Evolution.

In turn, Kumar approached S. Blair Hedges, a longtime collaborator from Pennsylvania State University. Along with Kumar and another former Arizona State professor now at Temple, Ananias Escalante, Hedges is Laura H. Carnell Professor of Biodiversity and a founding member of iGEM and director of his own Center for Biodiversity.

"Much of modern life-sciences research involves the development and application of advanced computing technologies."

—Jody Hey

"INTERDISCIPLINARY COLLABORATION"

Another attraction for new faculty is the chance to collaborate with talented researchers within the college and beyond. "People are attracted by the fact that at its highest levels—from president to provost and the dean—Temple has a science- and tech-supportive administration," says Levy. "Great research stems from being around great people."

John Perdew, who came to Temple from Tulane University and is one of the world’s most cited physicists, agrees: "I now have more potential collaborators. Our proximity in SERC brings together computational researchers from many different areas in physics, chemistry and biology, as well as top researchers from the Philadelphia region."

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"BETTER PHARMACEUTICALS"

Funded by the National Institutes of Health and National Science Foundation, Levy’s Center for Biophysics & Computational Biology (CB2) focuses on leading-edge computational research that explores the intersection of biology, chemistry and biophysics.
“We work on problems in biology from a chemistry background to design better pharmaceuticals that improve health,” says Levy. “The targets of most drugs are large protein molecules, but it is not obvious, from either experimental data or looking at the molecules’ structures, how to best design pharmaceuticals.”

Enter structure-based design utilizing model simulations, a field whose long-considered promise has begun to be fulfilled in the past five years with the development of more powerful and accurate simulation methods. These techniques are now capable of creating a framework and making a connection between tremendous amounts of available experimental and structural data. CB2 researchers use such methodologies, Levy says, “to target new drugs that take out of action important proteins that are essential for the functioning of the AIDS virus.”

Levy’s lab also uses molecular simulations to assure that drugs bind as tightly as possible to their targets so that they can be taken in the smallest doses and minimize side effects. Finally, his group uses sequence-based and statistical techniques to investigate how viruses mutate in order to develop resistance to drugs.

“Resistance often doesn’t happen because of one mutation but because of a complex pattern of mutations,” he says. “It’s an ingenious process that you have to outwit because the mutations change the protein you have targeted just enough so that the drug isn’t effective anymore, but not so much that the protein isn’t still effective.”

**GENETIC COMPONENTS OF DISEASE**

Genome analysis, which requires sophisticated computational methodologies, is at the heart of Kumar’s iGEM. He notes that many diseases, including brain and breast cancers, have genetic components. Given the millions of genetic differences that exist between human beings, researchers want to know which of these differences are potentially harmful, and when and how they will affect us. “That,” he says, “is the grand challenge of genomic medicine. Which persons have problematic mutations, and what could those mutations ultimately cause?”

To address that challenge, Kumar practices “phylomedicine,” which involves sifting through tremendous amounts of genetic data from human beings; our closest relatives, the apes; and many other species to assess the impact of mutations we each harbor. “We are essentially mining the outcome of nature’s experiments from a large number of species to inform human medicine,” he says.

Kumar’s institute will also engage in related activities, such as phylogenetics, to develop species trees and analytics to better process genomic data. Software tools Kumar has developed have been cited more than 70,000 times. That includes TimeTree, a public database he and Hedges created that allows users to quickly calculate divergence times among various species—92.3 million years ago, for example, for humans and dogs.
Says Kumar: "We want to build tools for biologists throughout the world to do analyses easily and to discover scientific knowledge efficiently."

**SMARTER, BETTER MATERIALS**

The Center for Materials Theory, led by Laura H. Carnell Professor of Physics and Chemistry John Perdew, focuses on materials theory and density functional theory. Members include Dean Klein and professors Peter Riseborough, Adrienn Ruzsinszky and Jianwei Sun. The group develops the fundamentals and approximations of density functional theory for atoms, molecules and solids. For practical electronic structure calculations, both materials physics and quantum chemistry now usually rely on this theory—which can predict a molecule's shape or the energy of a bond.

Perdew’s innovations include the development of a “Jacob’s ladder” of approximations. As the ladder’s rungs (three so far, with more under development) go higher, they describe with increasing accuracy a material’s exchange-correlation energy, which is “nature’s glue” for interatomic binding.

Perdew’s group is also probing what is termed the van der Waals interaction. “It’s an interaction that produces an attraction between atoms, but one that is much weaker than a chemical bond,” he says. “It’s the interaction that binds carbon atoms in graphite in flat, two-dimensional layers that are easy to break apart.

That’s why you can write on a piece of paper with a pencil.” The same force, adds Perdew, holds together molybdenum disulfide, which has potential applications in solar cells and for hydrogen fuel production.

Perdew also leads Temple’s Center for the Computational Design of Functional Layered Materials, one of 10 new Energy Frontier Research Centers announced by the U.S. Department of Energy. The $12 million award will support the design of materials that could potentially have applications in energy production or storage. (See page 7.)

**BIOLOGICAL AND GENOMIC ARCHAEOLOGY**

Hedges’ Center for Biodiversity explores such questions as how many species there are on Earth and what they need to continue to exist in the face of environmental degradation. Much of his work focuses on the Caribbean islands, including helicoptering into remote sections of Haiti that harbor the last remaining 1 percent of that country’s original forests in order to determine how best to keep frogs, butterflies and other species that depend upon those forests from going extinct.

Collecting frogs and snakes has its own charms, but the big data sets he and Kumar have gathered in their TimeTree program provide him with an essential tool to help pinpoint when two species diverged.
"If once there was one population of lizards,” Hedges explains, “but 1 or 2 million years ago two populations said goodbye to one another because some lizards rafted on litter during a storm over to another island, the tree-of-life data tell us when they became different species.”

Over in CCGG, Assistant Professor Alexander Platt is currently engaged in what he calls genomic archaeology—using genomic data sequenced from the teeth of three 50,000-year-old Neanderthal fossils to learn much more about that species and how it differed from Homo sapiens. Last year, Hey co-authored a separate study that concluded a small amount of gene sharing that took place between Neanderthal-like hominids and Homo sapiens occurred not, as some had speculated, in Africa more than 100,000 years ago, but later, possibly in the Middle East between 47,000 and 65,000 years ago, after humans began migrating out of Africa.

“Everyone wants to know where they come from, and human evolution is one of the greatest stories,” Hey says. “But much of the story remains untold. What were archaic Homo sapiens like, and where and when did the transition to modern humans occur, and what happened to cause that? It’s the most fundamental and exciting story to tell about our history.”

—Bruce E. Beans
Message from the Alumni Board president

In 2008, I was asked to join the newly formed CST Alumni Board. My first question: “What will the board do?”

One of the board’s first tasks was to establish a successful mentoring program, something that other Temple University schools and colleges were struggling to do. The idea of helping students appealed to me very much—I am in debt to the people throughout my life who have taught me, encouraged me and allowed me to gain from their experience. Two years ago, the board implemented the Owl to Owl Mentor Program, an initiative I chaired. The program tripled in participation last year and has caught the attention of the entire university.

With Paul Curcillo as president and myself as vice president—at first, the board’s only two members—the Alumni Board has grown to 12 accomplished professionals dedicated to helping students and CST. We recently established a scholarship for deserving and talented CST students and hope to make the first award in the fall of 2015.

Paul is now president-elect of the Temple University Alumni Association, and I have the daunting task of filling his very big shoes at CST. But I am looking forward to that role because I know the work we do is so important to so many students. After all, one of life’s most rewarding experiences is giving back and guiding students toward their dreams.

I ask you to join in these efforts, either as a mentor or through supporting the Alumni Scholarship Fund. We are witnessing incredible changes here at Temple and CST. Helping students take advantage of this great university is a wonderful thing to do and doesn’t require a whole lot of time or money—just a desire to help.

Thank you.

Jim Guare (BA ’77, MA ’83, Chem)
DEAN’S ENDOWED PROFESSORSHIPS

The College of Science and Technology’s extraordinary professors conduct advanced research and invent new technology. They attract research dollars and talented graduate students and inspire undergraduates to excel in the lab.

To support faculty, CST has launched a $1 million campaign to fund two endowed term professorships within the college. These endowed positions will help attract researchers from top institutions, and the income the endowments generate offers a guaranteed source of funding for salaries and other expenses, freeing up money for equipment and other direct research support.

So far, CST has raised nearly $500,000 toward its $1 million goal. Once the challenge is met, CST will name a lecture hall in the new Science Education and Research Center for Hazel Tomlinson, a chemistry professor who set the standard for dedication to science and to students. In her more than four decades of teaching at Temple University, Tomlinson inspired generations of students to succeed in the lab and in life.

To learn more about the Dean’s Endowed Professorship or to make a gift, go to giving.temple.edu/cstprofchallenge.

ALUMNI SCHOLARSHIP FUND

The College of Science and Technology Alumni Board has established the Alumni Scholarship Fund to support deserving and talented science and technology students. Board members, alumni and friends of the college have so far raised more than $54,000. The first award will be presented to a CST student in 2015.

Many alumni are using their gifts to name a lecture-hall seat in the new Science Education and Research Center, which features both a 200-seat and 400-seat lecture hall on its first floor. Alumni can name a seat in honor of a faculty member or a loved one for a gift of $500. Young alumni, those who have graduated within the past 10 years, can name a seat for $250. To make a gift to the scholarship fund, go to giving.temple.edu/cstfund.

Special thanks to the Board of Visitors and Alumni Board members for their support of the Alumni Scholarship Fund and the endowed professorships. Both boards achieved close to 100 percent participation in these fundraising efforts.
Seda Tarzian (BS ’48, Bio): A pioneer in pharmaceutical research

As a retired pharmaceutical research medical program director, Tarzian knows personally how hard it can be for students to finance their education. She enrolled at Temple after her stepfather agreed to pay for her education, but after a semester that source of funding dried up. Tarzian struggled mightily.

“At times, I had no place to live and no money,” recalls Tarzian, who is now a member of CST’s Board of Visitors. She arranged a payment plan that required her to pay $60 every six weeks and got a job as a supermarket cashier. She also spent a summer as a General Electric draftsman, where one of her assignments included work for the Manhattan Project.

Following graduation, Tarzian discovered it was not easy being a woman in what at the time was a department dominated by male science professors. “I experienced a lot of prejudice,” she acknowledges. Over the course of the next four decades, Tarzian worked her way up from being a Jeanes Hospital medical technologist to Merck’s first female medical program coordinator. She also was a histologist in the Anatomy Department of the Temple University School of Medicine, as well as a lecturer and instructor in the medical technical training program.

Her pharmaceutical career included doing preclinical in vivo testing of new pharmacological compounds and serving as a literature reviewer and clinical research associate responsible for new drug applications at the National Drug Company, a division of Richardson-Merrell Inc. At Merck she coordinated the clinical trials of several anti-inflammatory, ophthalmological and gastrointestinal drugs that received FDA approval, including Prilosec, the widely prescribed acid reflux drug.

Tarzian is also an accomplished artist—her watercolors have illustrated the college’s holiday greeting cards—and a soloist with the St. Gregory the Illuminator Armenian Apostolic Church choir in Philadelphia’s Roxborough neighborhood.

Eight years ago she established the Seda Tarzian Scholarship, presented to talented CST students with preference given to those who have experienced socioeconomic or education disadvantages. Her motivation: Make sure CST students don’t have to struggle financially. “I want to make sure no one goes through what I did,” she says.

—Bruce Beans

Jody-Ann Forrester-Small (BS ’13, CIS): Sky’s the limit

When she arrived on campus in 2011, Forrester-Small felt out of place. Coming from the Community College of Philadelphia, where she earned an associate degree with honors, she says, “I felt overwhelmed. The students were so much more directed here, and I was an older student.”

Just 14 months later—more than a semester before she graduated with a 3.51 GPA—she was offered and accepted a consulting position with Protiviti, a California-based risk, audit and business consulting firm with an office in Philadelphia.

After starting as an information technology audit consultant, this year she has been tackling IT security projects. “I feel like the sky’s the limit because I get to work with a bunch of great people and with clients in healthcare, retail, banking and education,” she says. “I get to learn about different industries, and each project represents a new challenge.”

Forrester-Small, who moved from Jamaica to Philadelphia in 2005, gives a lot of credit for her success to three CIS faculty: Wendy Urban, her faculty advisor; Claudia Pine-Simon, the Association for Computer Machinery (ACM) faculty advisor; and Rose McGinnis, director of Student Professional Development at CST.

“I take my hat off to those ladies,” says Forrester-Small, whose husband, Ainsworth Small, graduated from Temple in 2008 with a degree in architecture. “They were like mother figures to me. They encouraged me to get involved in the [Computer and Information Sciences] Department and introduced me to areas beyond Temple.”

In 2012, she earned a scholarship, funded by Vanguard, to attend the Grace Hopper Celebration of Women in Computing Conference in Baltimore. “I met with 3,600 women from all over the world who are heavily involved in technology,” says Forrester-Small, who also earned a scholarship from the Philadelphia chapter of the Society for Information Management.

Forrester-Small made the most of her time at CST. She interned as a business systems analyst at PNC Bank—thanks to a resume session with Urban and McGinnis and to a CST job fair she attended just two months after coming to Temple. She served as public relations officer for Temple’s ACM student chapter and, during her last semester and through the ensuing summer, as a CIS grader and course assistant.

“I loved my experience at Temple, and I’d still like to be there now,” she says, “but my job is even more fun.”

—Bruce Beans
Stephen P. Peterson (BS ’11; MS ’14, Geo): Keeping Philadelphia’s soil safe

Older industrial cities such as Philadelphia tend to have high lead and heavy-metals concentrations in their soil. With the growth of urban agriculture—where people use vacant lots, parks and even recreation centers to grow fruits and vegetables—concerns have arisen about whether people are slowly poisoning themselves by eating what they grow in urban gardens.

Stephen P. Peterson decided to explore whether or not such dangers lurk in Philadelphia’s Fairmount Park, the largest inner-city park system in the U.S. and the site of some urban agriculture. For a year and a half, he examined the presence of lead and other potentially harmful heavy metals in the soil there.

“Everywhere I went—no matter how old the area or how dense the woods—the levels of lead and other metals were well above Philadelphia’s normal level, which is already above the national average,” he says. All but one of the urban gardens he tested were in raised planting beds where the soil is brought in from elsewhere, so heavy-metals levels were low. “Fairmount Park people are doing it right bringing in fresh topsoil,” he explains.

Peterson shared his research with city officials. “This research provides the city with the necessary information and tools to better assess the locations of these materials concentrations, test the park’s soils more efficiently and do what is necessary to make the park healthier for Philadelphia’s inhabitants,” he says.

His research has won numerous awards at national and international conferences and helped earn him a prestigious yearlong fellowship from the U.S. Forest Service’s Northern Research Station in Philadelphia. “They’re interested in the urban forestry landscape and getting the urban tree canopy back to what it once was, and they believed this research could impact that,” says Peterson.

Improving the environment fulfills a dream that began when Peterson enrolled in and loved an environmental science class in high school. “I wanted to be a tree hugger and change the world,” he says. “I came to Temple because it was one of the few schools at that time that offered environmental science.”

Peterson is now with GEI Consultants, an engineering and scientific consulting firm in Mount Laurel, New Jersey.

—Preston Moretz, SMC ’82
CHEMISTRY: REUNION AND WINE

The Department of Chemistry hosted both an all-alumni reunion and a chemistry of wine event during Temple University’s Homecoming Weekend, Oct. 10–12, 2014.

The reunion attracted a cross-section of graduates to the new Science Education and Research Center. The chemistry of wine event featured tastings and a presentation by Robert Levis, department chair, on what makes a good and a bad wine and how to tell the difference.

Attendees at the chemistry reunion and wine event included (top, left to right) Ronald (BA ’68, Chem) and Brenda (CLA ’73) Kabler and William (BA ’58, Chem) and Sandra (BA ’56, Chem; EDU ’63) Flank; (left) Raymond Dagger (BA ’74, Bio; MA ’80, Chem) and David Hill, (CLA ’70, ’72, ’74); and (above) David Dalton, professor in CST’s Department of Chemistry.
Melvin H. Stein, BA ’66, Bio; PHR ’69 published Odyssey of a Philly Boy: Serendipity, Tsouris and a Little Mazel with Outskirts Press.

Michael Gealt, BA ’70, Bio is executive vice president and provost at Central Michigan University, Mount Pleasant, Michigan, which has more than 20,000 students at its multiple campuses.

David Spaulding, BA ’72, Math earned a doctorate in finance and international economics from Pace University in New York.

Jerry Lindheim, BA ’83, Bio; LAW ’88 presented a lecture in Copenhagen to members of the Danish bar who practice personal injury law. Previously, he has lectured on topics of evidence deposition and trial and courtroom practice. He is a partner in Locks Law Firm in Philadelphia.

George M. Brunner, BA ’85, Math is vice president of CBOS Inc., a strategy and technology consultancy in North Wales, Pennsylvania.

Nancy Soares, BA ’87, Bio has been named vice president of the American Animal Hospital Association’s Board of Directors.

Marilou Watson, BA ’87, Bio; PHR ’91 received Philadelphia Business Journal’s Minority Business Leader Award, which recognizes influential business leaders who are making a difference in their communities. She is a partner in the law firm of Fox Rothschild LLP.

Gina M. Caputo, BA ’07, Bio earned a doctor of osteopathic medicine degree from the Philadelphia College of Osteopathic Medicine in 2013.

Emily A. Morton, BS ’10, Geo earned a master of science in geophysics from the New Mexico Institute of Mining and Technology and started a yearlong research position at Los Alamos National Laboratory.

Brandon Presley, BS ’10, Chem is a forensic chemist at NMS Labs in Willow Grove, Pennsylvania, and is enrolled in the analytical chemistry PhD program at Temple.

Teresa Rothea, BS ’11, Math/CS earned her MBA from Delaware’s Wilmington University.

REMEMBERING LEWIS KATZ

Lewis Katz, (BA ’63, Bio), a tireless Temple advocate and longtime university trustee, died in a plane crash on May 31, 2014. Katz was incredibly generous in giving his time, support and leadership to the university. In 2014, he announced a $25 million commitment—the largest single pledge in Temple’s history—to support the education and research mission of Temple’s School of Medicine. In recognition of his commitment and a lifetime of work on behalf of the university, Temple’s Board of Trustees named the School of Medicine for Katz. Temple also awarded him an honorary degree during Commencement 2014, and Katz addressed the audience—with humor and grace—saying, “Work matters, but family matters more. Make time for those who need you and for the causes you believe in.”

Work matters, but family matters more.
Make time for those who need you and for the causes you believe in.
—Lewis Katz

Keep Temple posted! Email CSTalum@temple.edu to share your recent news and accomplishments.
Descending through the water column, the sub’s pilot makes his final checks and adjustments. I watch as the last natural light from the ocean’s surface fades. There, in complete darkness, bioluminescent organisms glow all around us as we dive to the seafloor, approximately 1,000 meters below the surface. Once there, a long list of tasks awaits, including genetic sampling and taking live collections of several cold-water corals using the manipulator arms and collection devices mounted to Alvin, the submersible.

It’s my first dive in a deep submergence vehicle, making a once distant aspiration a reality, and a unique situation for a deep-sea biologist. I’m seeing the animals firsthand in their natural environment. Being there — so far beneath the surface — I fully appreciate the complexity and beauty of deep-sea ecosystems and the organisms that inhabit them. It’s the first of two life-changing descents in Alvin during a three-week research expedition in the Gulf of Mexico in May 2014.

In 2010, the Deepwater Horizon disaster released nearly 5 million barrels of oil at depth, with 7 million liters of oil dispersants directly applied during the ensuing cleanup efforts. Approximately 2 million liters of dispersants were applied — for the first time — directly into the deep sea. No one knew what the impact would be.

The Gulf spill, which took place when I was an undergraduate, was the first environmental catastrophe I witnessed from a scientific perspective. Its impact on marine ecosystems, wildlife and communities around the Gulf transformed my naive curiosity into a passionate and focused plan to attend graduate school. Working with Associate Professor of Biology Erik Cordes, I decided to dedicate my dissertation research to investigating the impacts of this disaster and the toxicity of these pollutants on cold-water coral communities. Through shipboard field experiments and gene expression analyses, I could determine how these organisms respond to stressful environmental conditions and anthropogenic disturbances to better understand their ability to persist and recover in the event of future disturbances.

The Gulf voyage, during my second year of doctoral studies, was my third oceanic expedition. That’s rare for graduate students. Each day on the ship was hard — typically 12 hours or more of work. We broke only for meals, and there were no days off. Regardless, each day was inspiring, taking me — literally and figuratively — to new depths. When you are down there, you feel a connection to ocean life that you just don’t get on the surface. That voyage, that experience, continues to fuel my curiosity for science, making me more passionate about my research. I can’t wait to go again.

—Danielle DeLeo
TAKE UP THE CHALLENGE.

SUPPORT OUR FACULTY.

An endowed professorship profoundly benefits the College of Science and Technology: It brings top researchers to CST who, once here, attract talented junior faculty, postdoctoral scholars and graduate students. That chain reaction sparks more research and better education for undergraduates.

CST has launched a $1 million campaign to fund two endowed term professorships within the college. The income generated guarantees funding for salaries and expenses, freeing up resources for equipment and direct research support.

CST has raised nearly $500,000, but the college needs alumni support to reach its $1 million goal.

Your gift will support professors tackling today’s toughest challenges in energy, health, the environment and many other areas. It means CST can do even more in research, teaching and impacting the world.

TAKE UP THE CHALLENGE TODAY.

Make your gift at giving.temple.edu/cstprofchallenge.
TAKE A SEAT WITH US!

SUPPORT THE ALUMNI SCHOLARSHIP FUND.

To support deserving and talented College of Science and Technology students, the CST Alumni Board has established the Alumni Scholarship Fund.

A gift of $500 ($250 for alumni who have graduated in the past 10 years) will allow you to name a lecture hall seat in the new Science Education and Research Center.

Make your gift today at giving.temple.edu/CSTfund to leave a lasting legacy for CST students.