Undergraduate research propels students to top graduate programs and coveted jobs
"URP OFFERS REAL-WORLD RESEARCH WITH WORLD-CLASS RESEARCHERS."

- TAYLOR LENTZ, CST '17, CHEM

The Undergraduate Research Program (URP) offers top students the opportunity to work alongside experienced researchers, from both CST and across Temple University. In a wet lab, at a powerful computer or out in the field, students in URP learn what it takes to do advanced research: theoretical knowledge, technical skill, critical thinking and how to persevere through failure and build on success.

The experience is essential to being accepted into a top graduate and professional school or to landing a high-paying job in biotechnology, information science and other growing sectors.

Most universities simply don’t offer such an extraordinary opportunity for their undergraduates. CST does. But we need your support to offer URP to more students.

Make your gift at giving.temple.edu/URP.

To discuss giving options, contact John R. Walker, Associate Vice Dean, at 215-204-8176 or john.walker@temple.edu.
OUTLOOK

Fall 2015
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Cover: Computer science major Mark Dolan and Laura Toran, Albert W. and Alice M. Weeks Chair in Environmental Science, investigate storm water runoff
DEAN’S MESSAGE

The College of Science and Technology (CST) recently welcomed more than 1,100 new students. One of the largest cohorts in the college’s history, these talented young people from around the world come to CST for the opportunity to work with extraordinary faculty researchers.

CST professors delve into the evolution of species, improve crude-oil pipeline flow, enhance public safety with 3-D cameras and explore a potential breakthrough in fighting the flu. In FY 2015, CST researchers earned nearly $28 million in outside funding, $10 million more than the previous year. In a challenging funding environment—when government support for scientific research is shrinking precipitously—CST researchers clearly demonstrate the value and potential impact of the work they do here at Temple University. Our newest tenured and tenure-track faculty, listed on page 8, further expand the scope of the college’s scientific expertise. Laura H. Carnell Professor Masatoshi Nei, a highly cited biologist who joins us from Penn State, is a member of the National Academy of Sciences, our third member here at the college, and an author of a top-100 cited paper of all time, our fourth faculty member to join this illustrious group.

Current CST faculty continue to receive new awards and honors. Zoran Obradovic, Laura H. Carnell Professor of Data Analytics, was elected to the prestigious Academia Europaea and John Perdew, Laura H. Carnell Professor of Physics and Chemistry, earned The John Scott Award for his work in density-functional theory.

Through CST’s Undergraduate Research Program (URP), the college’s top students work directly with CST researchers on advanced projects in chemistry, biology, computer science and more. You can learn more about several students and their projects in the URP summer research feature (page 16).

Offering students the tools to excel in the lab or succeed in the job market is at the core of the college’s mission. Over the past several years, we have introduced four Professional Science Master’s (PSM) degrees: biotechnology, bioinnovation, bioinformatics and forensic chemistry (page 13). PSMs blend advanced training in science and business skills employers demand, and the college will introduce new programs in the coming years.

CST’s graduates and friends are an important part of our students’ success. Our Owl to Owl Mentor Program, which pairs alumni and students in similar fields, continues its strong growth. Graduates participate in our job fairs and in research symposia. Others have generously established scholarships, returning to campus for our first-ever Scholarships and Awards Luncheon (page 3). You can learn more about alumni activities, meet talented graduates and review the honor roll of donors—one of the largest in recent memory—beginning on page 20.

In research, alumni engagement and the success of our students, the College of Science and Technology continues to move forward and plays a critical role in Temple’s continuing rise in national rankings. I invite you to follow the college’s achievements in Outlook, at cst.temple.edu and on Facebook, Twitter and Instagram.

Sincerely,

Michael L. Klein, FRS
Dean and Laura H. Carnell Professor of Science
CELEBRATING STUDENT SUCCESS

More than 200 people—students, their families, Temple University alumni and college faculty and staff—attended the first-ever Student Scholarships and Awards Luncheon held in April. In the soaring lobby of the Science Education and Research Center, Dean Michael L. Klein and department chairs presented more than 50 scholarships and awards to CST undergraduate and graduate students. CST scholarships and awards in each of the college’s six departments and the TUteach program award student dedication and excellence in research, teaching and service. Several CST graduates and friends of the college who have established scholarships were in attendance, including Albert Brown (BA ’64, Chem), W. Henry Harrison, Ralph Hillman, Rosemary Poole and Hope Punnett.

Two of the college’s newest awards are the Donald and Annette Baird Family Award in Science and Math Education, awarded to students in the TUteach program who have a commitment to teaching and dedication to community service, and the Scott Hibbs Memorial Award, established by Christopher Gali (MS ’94, CIS), awarded to an undergraduate in computer and information sciences who has demonstrated academic achievement. The 2015 awardees were, respectively, Catherine Bergeron, a physics with teaching major, and Matthew Berardi, a mathematics and computer science major.
College of Science and Technology researchers have assembled the largest and most accurate tree of life calibrated to time. Surprisingly, it reveals that life has been expanding at a constant rate, not slowing down.

The Temple team’s tree of life is depicted in a new way—a cosmologically inspired galaxy-of-life view—and contains more than 50,000 species spiraling out from the origin of life. The paper “Tree of Life Reveals Clock-Like Speciation and Diversification” is published in the online edition of Molecular Biology and Evolution.

“The constant rate of diversification we found indicates that ecological niches of life are not being filled up and saturated,” said Laura H. Carnell Professor of Biodiversity S. Blair Hedges, a member of the research team and director of Temple’s Center for Biodiversity.

An ecological niche refers to a species’ interplay with its environment, such as how it eats, reproduces and interacts with the world around it. As niches fill with species and competition for resources intensifies, the rise of new species might be predicted to diminish. “Our results are contrary to this popular alternative model that predicts a slowing down of diversification as niches fill up with species,” Hedges said.

For the massive effort, researchers painstakingly assembled data from 2,274 molecular studies and built new computer algorithms and tools to synthesize this collection of evolutionary peer-reviewed species diversity timelines, the largest published to date.

The study also challenges the conventional view of adaptation being the principal force driving species diversification. Instead, the findings underscore the importance of random genetic events and geographic isolation in speciation—the biological process by which new species arise. The researchers found that it takes about two million years on average for a new species to emerge onto the scene.

“This finding shows that speciation is more clocklike than people have thought—that speciation and diversification are separate processes from adaptation, responding more to isolation and time,” said Hedges. “Adaptation is definitely occurring, so this does not disagree with Darwinism. But it goes against the popular idea that adaptation drives speciation.”

Besides the new evolutionary insights gained in this study, the time tree of life will provide opportunities for researchers to make other discoveries across disciplines, wherever an evolutionary perspective is needed. Examples include studies of disease and medicine and the effect of climate change on future species diversity.

—Joseph Caspermeyer
MARC ENHANCES DIVERSITY OF BIOMEDICAL RESEARCHERS

CST has been awarded a second five-year grant from the National Institutes of Health to continue Temple's Maximizing Access to Research Careers/Undergraduate Student Training in Academic Research (MARC/U-STAR). Its purpose: to diversify biomedical research by including more students from underrepresented groups including ethnic and racial minorities, low-income and first generation college students.

The latest grant, $3.3 million, supports a 24-month program that provides tuition support and a research stipend for eight juniors and eight seniors. During the academic year students spend about 15 hours a week in a research laboratory and during summers work full-time in a lab. To expose students to potential graduate programs, NIH requires students to spend one of their summers in a high-caliber research laboratory outside of Temple.

During the program’s first five years, 25 of the 30 graduating students entered competitive graduate programs. TU MARC alumni attend Harvard, Columbia, Yale, Cornell, Penn, University of Chicago, Johns Hopkins and other highly ranked programs.

Jacqueline Tanaka, associate professor of biology who directs the program, credits the students’ faculty mentors throughout the university. “Our faculty know or have heard how motivated and hardworking our MARC students are,” says Tanaka. “Faculty members really want to work with them.”

During the program’s first five years, 25 of the 30 graduating students entered competitive graduate programs.

ENHANCING CRUDE OIL PIPELINE FLOW

An electrical device designed by Professor of Physics Rongjia Tao, which enhances the flow of crude oil through pipelines, has been successfully field tested on portions of a major U.S. pipeline.

Tao's oil technology device reduces the viscosity and turbulence of crude oil. Patented by Temple University, the device was created with the financial support of QS Energy, Inc., a Santa Barbara, California-based developer and vendor of commercial flow assurance solutions.

Utilizing electrorheology principles, Tao’s devices have been installed just downstream from pipeline pumps. The electrical field polarizes suspended nanoparticles found in crude oil, causing them to aggregate in short chains along the flow direction—which both decreases viscosity in that direction and effectively suppresses turbulence. This green technology may eliminate the need to heat the crude oil, a current costly industry standard, while significantly reducing required pumping pressures.

Field tests have indicated viscosity decreases. “It also reduces the power needed to pump crude oil while the flow rate is unchanged,” added Tao. “And by reducing pumping pressures, it’s much safer for both land-based pipelines and pipelines that connect with off-shore drilling sites.”

—Bruce E. Beans
SPRING 2015 GRADUATION HONORS STUDENTS AND FAMILIES

Honoring more than 325 students and their families from around the world, the College of Science and Technology held its spring graduation ceremony on May 7 in McGonigle Hall.

The event included remarks from Michael L. Klein, CST dean and Laura H. Carnell Professor of Science, and James Guare (BA ’77, MA ’83, Chem), chair of the college’s Alumni Board.

The ceremony’s featured speakers were Arthur Dawson (BA ’68, PhD ’76, Chem), a noted patent attorney who urged students to use their intellectual “Temple tools” to “keep growing, keep learning and keep taking on new challenges.” The day’s student speaker was Benjamin Franklin Oliver, a U.S. Air Force veteran who graduated with a degree in information science and technology.
DISCOVERY MAY HELP FIGHT FLU

A team of Temple scientists has discovered a possible way of inhibiting influenza.

The research of Eleonora Gianti and Giacomo Fiorin of Temple’s Institute for Computational Molecular Science (ICMS) and Michael L. Klein, ICMS director and CST dean, shows promise for developing more effective antiviral drugs that can be used in the treatment of emerging mutant strains of the virus. Their findings were published in the *Journal of the American Chemical Society*.

Each year, the influenza virus—the pathogen responsible for the flu—affects millions of people around the world. During an annual flu season, an estimated 35,000 people die due to influenza-related illnesses. The Centers for Disease Control and Prevention estimates that during flu season, the flu vaccine—which can prevent people from getting the flu—is only about 23 percent effective, which means antiviral treatment, for people who already have the flu, is especially important.

But with the two main antiviral drugs used to treat the flu, Tamiflu and Relenza, becoming increasingly ineffective against the emerging mutant strains of the virus, the search for new drugs that are effective against all versions of the virus is taking on new urgency.

Gianti and Fiorin discovered a peculiar quirk in how an older, now obsolete drug called amantadine binds to the original form of the virus—the wild type—and the emerging mutant strains.

“This research produced a new derivative of the amantadine molecule that can serve as a dual inhibitor of the flu, by binding to a protein of the mutant virus in one particular orientation—facing away from it—while the same molecule binds to the protein of the wild-type virus facing toward it,” explained Gianti, a postdoctoral fellow in chemistry.

Knowing how this new molecule binds to both types of the virus gives researchers a significant head start in designing more effective drugs. According to Fiorin, optimizing amantadine derivatives and developing an entirely new class of antivirals is vital; Tamiflu still works, but emergent strains may take over the entire flu population and render Tamiflu ineffective within a decade.

“Now it’s down to fine-tuning the chemical structure of this new inhibitor to preserve its ability to bind to and inhibit wild type and mutant simultaneously and make it more effective,” he said. “We’ve found a good template; now we have to optimize it.”

— Greg Fornia, SMC’92

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USING 3-D CAMERAS AND HIGH-SPEED BROADBAND TO ENHANCE PUBLIC SAFETY

Most camera-based surveillance systems are static, providing law enforcement with limited flexibility. They also do not operate effectively when visibility is poor, such as at night or in inclement weather. But now, thanks to a National Science Foundation-funded grant, researchers in the Department of Computer & Information Sciences (CIS) are developing a mobile surveillance camera system that will provide police officers with enhanced viewing capabilities.

Led by Jie Wu, Laura H. Carnell Professor and chair of CIS, the researchers will develop algorithms that allow for the integration of mobile 3-D cameras with cloud-based computing via wireless, high-speed broadband networks. Law enforcement will have more flexibility in deploying the cameras, as well as access to enhanced video and vital information such as facial recognition.

During the two-year pilot program, the researchers plan to field-test their new system on Temple Police vehicles. The system will allow officers to take the cameras where they are most needed, said Wu. In addition to Wu, the team includes Professor Eugene Kwatny and assistant professors Chiu Tan and Haibin Ling.

“Temple Campus Safety Services operates 500 cameras across its Main Campus, but those cameras are mounted on buildings and poles and at other stationary positions,” said Wu. “We want to make the 3-D cameras more mobile.”

The video from the police cameras will be streamed back to the police dispatch using a combination of WiMAX, a next-generation wireless network, and WiFi. Wu is currently developing an experimental WiMAX wireless network in downtown Philadelphia, in collaboration with Drexel University, through another NSF grant.

Temple’s high-performance computing cluster known as Owl’s Nest will use the researchers’ algorithms to immediately analyze the enhanced video from the 3-D cameras to provide the police with information. Wu said the researchers also hope to provide officers with some computational abilities in the police car via laptop computers that will allow for quick analysis of a potential emergency situation.

— Preston Moretz
New Faculty Bring Research Experience

Steven Chemtob
ASSISTANT PROFESSOR, EARTH & ENVIRONMENTAL SCIENCE
Steven Chemtob uses a variety of analytical techniques to study mineral coatings on recent volcanic formations, geochemical controls in oceans and river waters, and environments of rock alteration on Mars. He received his PhD from the California Institute of Technology in 2012 and went on to a NSF postdoctoral fellowship at Washington University in St. Louis. His work has been published in American Mineralogist, Journal of Geophysical Research and Journal of Volcanology and Geothermal Research.

Atsuhiro Muto
ASSISTANT PROFESSOR, EARTH & ENVIRONMENTAL SCIENCE
Atsuhiro Muto has spent six seasons in the challenging environment of Antarctica, including a 65-day long traverse to the South Pole. In 2011, he received the Antarctica Service Medal of the Unites States of America. He has more than a dozen journal articles published and several more accepted for publication. Muto received his PhD from the University of Colorado. Prior to coming to Temple, he taught at the Pennsylvania State University.

Masatoshi Nei
LAURA H. CARNELL PROFESSOR OF BIOLOGY
Masatoshi Nei has been a major contributor to population and evolutionary genetics theory throughout his distinguished career. He is one of a select few to have a statistic named for him, and “Nei’s genetic distance” is a cornerstone of population genetic analyses. His many awards include the Kyoto Prize in Basic Sciences, in 2013, and the Thomas Hunt Morgan Medal, Genetics Society of America. Before coming to Temple, he was Evan Pugh Professor of Biology at Pennsylvania State University and director of the Institute of Molecular Evolutionary Genetics.

Sergei Kosakovsky Pond
PROFESSOR, BIOLOGY
Sergei Kosakovsky Pond is internationally recognized for research in computational biology, next-generation sequencing analysis and as creator of scientific and biomedical software. Before he was associate professor in residence in the Department of Medicine at the University of California San Diego, Pond received his doctorate in applied mathematics from the University of Arizona. He is currently participating in three active NIH grants.

Sean Gillian Queisser
ASSOCIATE PROFESSOR, MATHEMATICS
Sean Queisser has helped to pioneer detailed computational modeling and simulation for investigating the structure-function interplay in biological systems. His research has shown that cells and organelles alter their morphology in order to adapt their computational properties for long-term information storage. Before coming to Temple, Queisser was an assistant professor at the Geothe University Frankfurt and an independent research group leader at the University of Heidelberg.

Yugang Sun
ASSOCIATE PROFESSOR, CHEMISTRY
Yugang Sun comes to Temple from the Center for Nanoscale Materials at the Argonne National Laboratory. In Thomson Reuters’ Highly Cited Researchers 2014 he is listed as both a materials scientist and a chemist. His research focuses on developing novel approaches for synthesis of a range of nanostructures including metal nanoparticles with well-controlled morphologies and metal/semiconductor nanocomposites with multiple functionalities. Sun has more than 100 publications in respected journals such as the Journal of the American Chemical Society.
Darius Torchinsky  
**ASSISTANT PROFESSOR, PHYSICS**

As a postdoctoral fellow at the Massachusetts Institute of Technology, Darius Torchinsky’s research focused on optical pump probe and transient grating studies of high-T superconductors and surface-sensitive measurements of topological insulators. More recently, Torchinsky has turned his attention to the problem of hidden order in the heavy fermion system URu2Si2. Prior to Temple, Torchinsky was a postdoctoral scholar in physics at the California Institute of Technology. He has been published in the *Review of Scientific Instruments.*

Anduo Wang  
**ASSISTANT PROFESSOR, COMPUTER AND INFORMATION SCIENCES**

Anduo Wang’s research is in the area of formal verification with applications in a wide range of computer systems, especially in the sub-area of software-defined networking. Wang received her PhD degree from University of Pennsylvania in 2013 and has since worked as postdoctoral fellow in the Department of Computer Science, University of Illinois Urbana-Champaign. Wang has more than a dozen publications in respected journals.

Qiang Zeng  
**ASSISTANT PROFESSOR, COMPUTER AND INFORMATION SCIENCES**

Qiang Zeng’s main research interest is software security, with a focus on intrusion detection, diagnosis and automated response. During a research internship at NEC Labs in fall 2012 and spring 2013, Qiang worked on a software engineering project called DeltaPath. DeltaPath was accepted by 2014 International Symposium on Code Generation and Optimization, which is a premier conference in code generation and optimization. Zeng received his PhD in 2014 from the Pennsylvania State University.

**USING AUTONOMOUS VEHICLES TO IMPROVE TRAFFIC FLOW**

Assistant Professor of Mathematics Benjamin Seibold has been awarded a three-year, $1 million grant from the National Science Foundation’s Division of Computer and Network Systems to investigate how autonomous vehicles—likely to officially debut on America’s roadways within the decade—might assist with traffic flow and fuel consumption.

“These vehicles collect a lot of data about the environment around them in order to operate safely, and in principle, data can be communicated from one vehicle to another,” says Seibold, whose research involves traffic-flow modeling.

By synchronizing autonomous vehicles so that they can communicate and share certain types of information—such as traffic density and flow velocity—with each other, the vehicles could react in a way that alters the flow of traffic on the highway.

“Traffic that’s about to run into a jam could be slowed down by these autonomous vehicles in a subtle way, perhaps maybe just two miles an hour under the speed limit, so that it’s not a big nuisance to the rest of the drivers,” Seibold says. “This could, for example, help dissipate stop-and-go waves in the traffic flow and prevent prolonging the traffic jam ahead.”

With autonomous vehicles keeping traffic flow at a controlled velocity or reducing the speed of traffic to avoid prolonged jams, all cars on the road will use less gasoline. “If you consider the amount of fuel that is wasted every day because of people being stuck in traffic or having to drive at an unsteady velocity due to unpredictable driving behaviors, being able to reduce that consumption by as much as .1 percent would have a tremendous economic and environmental impact,” says Seibold.

—Preston Moretz
CHECK OUT TECH INTRODUCES MORE WOMEN TO COMPUTER FIELDS

Check Out Tech, co-organized by the Department of Computer & Information Sciences (CIS), introduced more than 200 Temple female students to technology careers. Students were able to network with more than 30 women who are successful technology professionals, getting a firsthand look at what it takes to enter and succeed in a tech field.

Today, about 18 percent of computer science graduates in the nation are female, down from about 37 percent in 1985, according to statistics compiled by the U.S. Department of Education.

“Less women are going into technology fields, perhaps because female students may not feel at home in a male-dominated environment,” explains Urban, who also noted that the technology sector has the lowest number of females of all STEM fields. “Women can bring a very different set of skills to developing computing systems and can equal or surpass male counterparts.”

The event, which was also open to community college and high school students, included representatives from JPMorgan Chase, Protiviti, Siemens, Microsoft, the Vanguard Group and other leading employers in the Philadelphia region. Check Out Tech offered information on Temple’s majors, minors and certificates in the computer and information sciences fields.

“It’s not an event with speakers and presentations,” says Rose McGinnis, director of CST’s Student Professional Development office. “We want the students to develop a personal connection with successful women working in technology.”

Check Out Tech was co-organized by the Philadelphia-based Network of Women with Careers in Technology, an organization dedicated to supporting women in tech fields through education, networking and mentoring.

— Greg Fornia, SMC ’92
Sudhir Kumar
- Comparative Molecular Sequence Analysis, Arizona State University (ASU)
- Computational Analysis of Gene Expression Pattern Images, ASU

David A. Liberles
- Innovation: Beyond Dn/Ds: Population Genetics, Genome Structure, and Protein Structure, NSF

Brent Sewall
- Forestry Contract, Pennsylvania Department of Military and Veteran Affairs (Penn. DMVA)
- GIS Contract, Penn. DMVA
- INRMP Contract and ITAM Contract, Penn. DMVA
- RTLA, Penn. DMVA

Spiridoula Matsika
- Quantum Chemical Methods for Studying Photoinitiated and Electron-Driven Processes, NSF

David A. Liberles
- Interaction of Biomolecules and Bacteria with Titanium at the Mineral Microbe Frontier, NSF

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

Katherine A. Willets
- Understanding Plasmon-Enhanced Electromagnetic Hot Spots for Surface-Enhanced Spectroscopies, NSF
- Probing the Location, Number, and Function of Surface-Bound Antibodies of Plasmonic Nanoparticle Biosensors Using Super-Resolution Fluorescence Imaging, NSF
- Plasmon-Mediated Electrochemical Reactions: The Influence of Nanoparticle Structure, DOE
- MURI: Electrochemical Imaging and Mechanistic Studies of the Nanometer Scale, AFOSR

Michael Zdilla
- Geophysical Characterization of Biogenic Structures in the Massif de la Hotte Key Biodiversity Area, Haiti, Conservation International Foundation
- Integrating Genetic, Taxonomic, and Functional Diversity of Tetrapods Across the Americas and Through Extinction Risk, NSF

S. Blair Hedges
- Ecosystem Threat Assessment and Protected Area Strategy
- Identifying and Characterizing New Components for WNT Signaling, NIH

S. Blair Hedges and Sudhir Kumar
- ABI Development: Enabling Discoveries Across Disciplines Through a Synthesis of Time-Calibrated Evolutionary Histories, NSF

Combating Super Bugs

The University City Science Center, a research park located in Philadelphia, awarded a $200,000 grant to assistant professor of chemistry William Wuest and his research team to further develop a disinfectant that Wuest says is 100 times more potent than Lysol when used against drug resistant bacteria like MRSA. Wuest says he hopes the one-year grant will help his team narrow down compounds, meet EPA standards and, eventually, get a product to market.
NEW LEADERSHIP AT CST

Robert J. Levis, former chair of the Department of Chemistry, has taken on a new role as the college’s senior associate dean with primary responsibility for strategic planning, integrating this aspect of operations with CST’s research portfolio. Levis was central to the Chemistry Department’s success, with sponsored research rising dramatically particularly in the areas of energy, materials science, medicinal chemistry, nanoscience, photonics and chemical biology. Professor Daniel Strongin is the new chemistry chair.

NEW GEOSCIENCES PHD PROGRAM

The Department of Earth & Environmental Science has expanded its graduate program to include a new PhD in geosciences. The program focuses on basic understanding of the geological processes and cycles that affect human well-being and how increasing human population and technology alter those processes and their effects. The degree builds on the department’s research in new and emerging areas and its name, geosciences, reflects the increasing interdisciplinary interactions in the field.

Details at ees.cst.temple.edu/graduate
RIGHT SKILLS RIGHT NOW

FOR TODAY’S JOB MARKET

Professional Science Master’s (PSM) offer advanced curricula and hands-on training
The Human Genome Project ushered in a new era of academic and industry research for better understanding mutations linked to different forms of cancer, finding the genetic roots of disease and using that knowledge to develop more effective and less toxic therapies for patients.

Since the Human Genome Project was completed in 2003, advances in computer technology have greatly aided the discovery process, and researchers around the globe have discovered more than 1,800 disease genes. But as the volume of data gleaned from these studies grows exponentially, so too has the demand for a new generation of research professionals who can capably wield powerful computers to sort through billions of DNA sequences (or reads) and the training for analyzing that data and making sense of it.

They’re called bioinformaticians. This fall, nine students eager to enter the field will embark on CST’s new bioinformatics program, a two-year Professional Science Master’s (PSM) degree. The bioinformatics program is CST’s fourth PSM to launch in the past several years, part of a growing trend at universities globally to offer new career pathways for those who have a bachelor’s degree in a STEM field and are interested in advanced scientific training. As of fall 2015, there are 48 students enrolled in the college’s four PSM programs and nine graduates to date. Graduates have gone on to find new jobs, or better paying positions with a current employer, at GlaxoSmithKline (GSK), Children’s Hospital of Philadelphia, Merck, Johnson & Johnson, U.S. Army, U.S. Navy and other leading companies and government agencies.

“There’s a lot of enthusiasm for a technical level of expertise that’s above the bachelor’s degree and below the PhD,” says Ron Levy, co-director of the bioinformatics program, Laura H. Carnell Professor of Biophysics and Computational Biology and director of the Center for Biophysics & Computational Biology. “There’s a sweet spot there that’s not currently being filled, and we aim to fill it.”

The PSM, developed by the Sloan Foundation and Council of Graduate Schools, offers advanced training in science, while simultaneously developing valued business skills. A survey report from the council found more than 5,800 students enrolled in PSM programs in fall 2013, a 23 percent increase since 2010. More than 91 percent of recent PSM graduates were employed in a job related to their field of study, the survey showed.

In addition to bioinformatics, CST offers PSM degrees in biotechnology, bioinnovation and forensic chemistry, which launched in fall 2015 (see sidebar). PSM programs take students between 18 months and two years to complete and include a capstone project and internship. Internship placements are facilitated by PSM directors and coordinators working in concert with members of each program’s external advisory board, which is made up of private industry executives and researchers from leading pharmaceutical and other scientific companies in the Philadelphia region.

Associate Professor Seema Freer, coordinator for PSM programs in biology, says advisory boards are an indispensable element of PSMs. Board members are actively involved in developing curricula with Temple faculty so students gain the skills most needed for in-demand jobs. Employers also benefit through the saved expense of not having to train new employees when they hire PSM grads.

“Our external board members love meeting with students,” says Freer. “They offer insights from their own career trajectory and advise on current trends in the field.”

The partnerships were of great value to Shirley Shpungin (BS ’13, Bio; PSM ’15, Biotech), who completed her PSM biotechnology degree while working full time as an intern at GSK. While there, she worked closely with a team of scientists to understand the science of oxidative stress in hopes of finding a new drug that targets patients with various respiratory diseases. The experience gave her new insights about ethical concerns related to environmental sustainability.

“The PSM expanded my views and enabled me to think beyond the day-to-day bench work,” says Shpungin, who is now with Johnson & Johnson.

To design the bioinformatics PSM, co-directors Levy and Professor Jody Hey teamed up with Justin Shi, faculty member from the Department of Computer & Information Sciences. Bioinformatics students will gain extensive skills in computer programming as well as a deeper knowledge of genomics and structural biology.

“There’s a tremendous need for people with the know-how to write computer code,” Hey says. “But they also need the knowledge of what the data actually means, the biology and chemistry of it, and to make the connections between the two.”

One of the new bioinformatics students is Akshay Chitturi. While earning a BS in biomedical engineering from Johns Hopkins University this past spring, he spent most of his summer and winter breaks working on computation and structural biology
projects in a laboratory at Temple’s Fox Chase Cancer Center.

“The great thing about the bioinformatics program is that they have connections with many companies and organizations in a variety of fields,” says Chitturi. “It gives you a lot of options in terms of finding a company where you can fit in.”

Taking scientific discoveries made in health care, biotech, public health and other emerging fields and translating them “from the bench to the bedside” presents a host of challenges for researchers and startup companies. Bioinnovation PSM graduates receive cross-disciplinary knowledge and training needed to land jobs in corporations and with lead scientists looking to build strategies for developing, testing and marketing new technologies.

CST developed the bioinnovation curriculum in collaboration with the Fox School of Business. When Robert McNamee, Fox assistant professor and managing director of the Innovation and Entrepreneurship Institute, first learned that CST had plans to add a bioinnovation PSM, he saw a great marriage in the making. The Fox School already had a master’s program for innovation and entrepreneurship, and several of the courses are required or electives for PSM bioinnovation students. A Fox School faculty member with extensive relationships with local biotech companies helps pair students with internships.

“It’s been a very open, collaborative relationship,” says McNamee. “It’s the perfect opportunity to bring a diversity of perspectives together around the table because that’s where the really good ideas come from.”

The bioinnovation program, which started in January 2015, has been developed as the first interdisciplinary science/business program in the region, and is one of only a handful of similar master’s programs nationally, says Eva Surmacz, the program’s academic director and professor of biology (adjunct). The program, she says, is particularly attractive to Millennial-generation students who tend to be more business-oriented and seek employment in new bioscience-related sectors.

Although she earned a BS in criminal justice from Temple University in May 2014, Shahd Azab is now part of bioinnovation’s first cohort. She has already interned with Gentox, a genetic testing company, and Dream It, a partner of the program that Forbes has ranked as one of the world’s top-10 business accelerators for early-stage entrepreneurs.

“Science people don’t talk business and business people don’t talk science,” says Azab, who notes that several family members have been affected by cancer. “So the opportunity to bridge that gap and bring great ideas to help patients control and overcome their illnesses is very appealing.”

With scarce research funding leading to fewer academic career opportunities, Surmacz predicts student interest in PSMs will continue to grow. She sees several similarities with prospective students she meets. “Most are highly motivated and willing to take risks enrolling in a nontraditional program in order to have a chance for a rewarding career at the forefront of scientific discovery,” she says. “From interviews with candidates, these are people who appreciate biomedical innovation and really want to excel in this field.”

—Bruce E. Beans, with additional reporting by Brian Schleter

CST’s newest PSM is forensic chemistry, which offers chemistry and biochemistry majors advanced training in chemical analysis of evidence as well as studies in civil litigation and criminal prosecution for a range of careers in the public and private sectors. Courses include Investigative Chemistry, Mass Spectrometry, Data Analysis and Evidence, and Law and Ethics.

For more information on PSM forensic chemistry, contact Charles Ross, program director, at CWRossIII@temple.edu or Eileen Weinberg, assistant director of graduate services, at eileen.weinberg@temple.edu.

CST is developing additional PSM programs across physics, math, biology and computer science fields, including Medical Dosimetry and Cyber Defense and Information Assurance.

For more information on PSMs in bioinformatics, bioinnovation and biotechnology, contact Associate Professor and PSM Bio Coordinator Seema Freer at sfreer@temple.edu.
SUMMER MEANS RESEARCH

URP student Chris Witzigman in the Tookany Creek investigating storm water runoff.
One morning this past July, Chris Witzigman was clad in chest-high waders, stringing a tape measure across the thigh-high Tookany Creek just south of Jenkintown, Pa., in order to accurately position a small mirror mounted atop a pole. Standing nearby on a low gravel bank, graduate student Emily Arnold was aiming a “total station,” a laser-powered surveying tool, at that mirror to measure how much erosion had altered the streambed during the past month.

As summer jobs go, Witzigman—an avid fisherman and environmental sciences major—was in his element. Credit the College of Science and Technology’s innovative Undergraduate Research Program (URP), which gives undergraduates the opportunity to conduct real-world research under the guidance of CST and other Temple faculty members.

Meanwhile, about 30 yards downstream, computer science major Mark Dolan was wading through the creek with Laura Toran, the Albert W. and Alice M. Weeks Chair in Environmental Geology. She was explaining the urban stream research her group is conducting as part of a five-year, $1.2 million grant the William Penn Foundation awarded to Temple’s Center for Sustainable Communities. Toran and several other Temple professors are working with various watershed organizations to determine how to best manage storm water runoff, silt and contaminants in the Upstream Suburban Philadelphia Cluster—five degraded Delaware Valley creeks that need restoration.

The previous summer Dolan, an ex-Marine from Denver, had been troubleshooting balky computers for university faculty and staff members. Now he was spending most of his time working with both Toran and Justin Shi, associate professor of computer science. He was developing and refining ScienceTap, a hybrid program/mobile app that both researchers and watershed association volunteers can use streamside to upload data and photographs and access information.

Dolan had been meeting weekly with Toran’s research team, but this was the first time he visited them in the field.

“Do you measure the vegetation?” Dolan asked Toran.

“Yes,” she said. “If you are ready for that, we can create a form for you to add to the app.”

“The hardest part of programming is figuring out whether what you’re doing is easy and intuitive for people to use,” he told her. “That’s why it’s so great to be out here. I can see that if it’s too complicated, people aren’t going to be using it in the middle of the stream.”

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Dolan and Witzigman are just two of 55 CST undergraduates who spent this past summer conducting research with faculty members as part of URP. CST launched the program in 2009 to enable undergraduates to obtain valuable hands-on research experience. Since then, 750 CST students have spent two sessions—typically one summer and one fall or spring semester—participating in the highly selective program. They get an up-close view of the research process by working with world-class researchers at either the Main Campus or the Health Sciences Center. They develop an independent research project and then present their findings within their department and at the URP Research Symposium. They may also attend and present their work at scientific conferences and sometimes even author peer-reviewed papers.

“I really like poster presentations,” says Toran, one of 145 Temple faculty members who have mentored undergraduates during the past six years. “It’s their own work and, because they have actually collected the data, they feel a lot more involved with it. Whether they go on to grad school or get a job, URP makes them better scientists and life-long learners.”

Unlike a lot of internships, they also get paid. During the summer, URP students can earn a stipend of up to $4,000. Funded by CST, URP covers half of those costs and the sponsoring faculty members cover the other half out of their own research budgets. That allowed Zack Hauseman (BS ’14, Biochem) who is now in a chemical biology doctoral program at Harvard, to quit a fast-food job and concentrate on research the summer between his sophomore and junior years.

“It allows students who need to earn money over the summer to develop skills in their field rather than just working in retail,” says Rose McGinnis, CST’s director of student professional development and URP.

Conducting independent research is critical for students interested in pursuing graduate education. Participants have parlayed URP experience into graduate programs at Harvard, Stanford and Yale universities and Johns Hopkins Medical School.

“TO GET INTO TOP-TIER RESEARCH INSTITUTIONS, IT’S MORE AND MORE IMPORTANT TO CONDUCT UNDERGRADUATE RESEARCH.” – SEAN MCWILLIAMS, TEMPLE ALUMNUS AND YALE GRADUATE STUDENT

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2015 Fall OUTLOOK
In URP, McWilliams researched catalysts for converting water into hydrogen, a potential fuel, with Michael Zdilla, Robert L. Smith Early Career Professor in Chemistry. Then, like many URP students, he continued working with his URP mentor even after his two-semester URP term ended. “Working with Dr. Zdilla was a major factor in my going to Yale,” says McWilliams.

“I wouldn’t have started doing research without URP and I don’t think I would have gotten into graduate school if I hadn’t done research on bacterial biofilms,” agrees Hauseman, the Harvard doctoral student who leveraged his URP experience into a subsequent internship with Teva, the generic drug giant. “Most graduate school programs expect a significant amount of research from undergrads before they apply, so it is important to start early.”

Such URP experiences, says McGinnis, are analogous to corporate internships that are essential for business majors to be competitive in their job markets. They learn valuable soft skills, such as interpersonal communications and working as a team, that are necessary for success.

“They have the opportunity to take what they learn in the classroom,” she says, “and wrap it around a real project that could have impact.”

URP also broadens students’ awareness of multiple career pathways. “Sometimes students are told, ‘You’re good at science, you should be a doctor,’” says McGinnis. “No one has told them ‘You’re curious and have a scientific thought process. Have you thought about being a researcher?’ ”

For example, Mateusz Dobrowolski (BS ’12, Biochem) was a part-time pharmacy technician on a pre-pharmacy track until his URP experience led to three years in the lab of Karen Palter, associate professor of biology, a biochemistry degree; and a current position as a neuroscience doctoral candidate at Johns Hopkins University.

“If it hadn’t been for URP, I’d probably be finishing my pharmacy degree right now. It changed my life,” says Dobrowolski, whose research involved studying the metabolism of fruit flies that exhibited early indications of diabetes. “Dr. Palter spent a lot of time talking with students about science and career goals.”

Carrie Carson (BS ’14, Biochem) worked with Professor of Chemistry William Wuest on compounds that inhibit oral plaque formation that Wuest’s lab was synthesizing together with Yale researchers. Then she delved into related biological studies Wuest’s lab was conducting in collaboration with Temple’s School of Medicine.

“You experience a lot of failure in research,” says Carson, who leveraged her URP research into a medicinal chemistry internship at GlaxoSmithKline and then into her current job as a research scientist with C3 Jian, a clinical-stage biotech company in Marina Del Ray, California that develops oral plaque solutions. “Research involves being persistent and working with other people because a lot of collaboration is involved.”

WORKING INDEPENDENTLY AND IN TEAMS

URP student Garett Miller, a senior physics major and computer science minor from Lititz, Pennsylvania, was uncertain whether he wanted to go to graduate school and, if he did, was not sure if he wanted to go into astrophysics or biophysics—until he began working with Vincent Voelz, assistant professor of chemistry.

He focused on protein folding, a process integral to such mental illnesses as Alzheimer’s and mad-cow disease. In nature, such proteins fold in a microsecond, but to simulate that process it was taking Miller 240 hours’ worth of time on the university’s high-performance supercomputer network.

“There was always a question about continuing my education, but this summer was pretty successful so I feel secure about going to grad school for biophysics,” he says. “When you’re doing a lab assignment for class, you don’t really have any attachment to it.
But in this lab what I am doing has direct implications for people who have those diseases, at least that’s the goal.”

Sam Nguyen, a junior biology major who recently declared a computer science minor, envisions a career for himself in bioinformatics, which involves crunching large amounts of biological data. For his URP project, Nguyen worked with Associate Professor Erik Cordes who was analyzing tracts of repeating DNA in deep-sea corals, and Assistant Professor Rob Kulathinal, gauging the usefulness of online tools to enhance the teaching of genomics.

“In my courses you have books, handouts and lectures with the professors presenting the information,” says Nguyen. “But in URP I need to go out, find it, and figure out things independently.”

Senior Hansen Pei, a native of Changsha, China, first came to Temple as an exchange student, but a year ago the math major transferred to Temple. He hopes to enter a doctoral program in the United States following his graduation next May. This past spring he worked with Yury Grabovsky, professor of mathematics. He is using mathematics to investigate the elastic properties of composite materials.

“What I am learning in my classes is all theoretical, like the structure of algebra and how to do computations,” says Pei. “But what I am doing in the lab is applying those concepts to a particular problem.” In the process, he says, his mathematical skills and speed have improved, as have his English and team skills.

After she graduates in December, chemistry/pre-pharmacy track major Taylor Lentz suspects her URP experience, although not drug related, will enhance her chances of being accepted into pharmacy school. Lentz, who next year will continue to work in Professor Zdilla’s lab, is researching the inorganic synthesis of alternative fuels by introducing carbon dioxide to ligand-bound cobalt metal complexes.

“It’s been great,” she says. “After a week of training I felt like I was able to revamp the research procedure on my own.”

PREPARING FOR SUCCESSFUL CAREERS

In addition to prestigious graduate schools, URP experience has led to good jobs as well. Kay Yi Li (BS ’14, Bio) began working in the clinical blood transfusion research laboratory of Yanhua Li, assistant professor of pathology and laboratory medicine at Temple’s School of Medicine.

Li went on to work at the Chinese Institute of Blood Transfusion in China. She was the English editor of the institute’s journal, collaborated with Chinese and international blood bank professionals on the translation of transfusion guidelines and wrote a paper on blood screening programs in China. Says Li, who recently entered the Cooper Medical School of Rowan University: “The knowledge and experience I gained from URP were essential for understanding blood transfusion practices in China.”

Andrea Watters (BS ’13, Neuro) tells a similar tale. Her URP experience and subsequent research with Servio Ramirez, a Temple associate professor of pathology and laboratory medicine, led first to a research internship with the U.S. Department of Agriculture and to her current position investigating targeted therapies for melanoma metastasis in the brain at Philadelphia’s renowned Wistar Institute.

It also led to the publication, this past June, of a cover article in the journal Stem Cells and Development regarding the role that tight-junction proteins play in the self-renewal of stem cells in the brain. The article’s authors included Ramirez, a dozen other Temple researchers and Watters—the lead author of her first published paper, which was based on research she started in URP.

Says the Glenside, Pennsylvania native who is contemplating pursuing either a PhD or MD degree, “URP was a complete career changer for me.”

—Bruce E. Beans
At the College of Science and Technology (CST), engagement—the way alumni connect to each other and to today’s students—matters. When alumni attend an event, follow us on social media or read Outlook, doors open to all kinds of possibilities. Here’s one example:

Jean Montgomerie (BA ’87, Bio) was reading last year’s issue of this magazine and was inspired to make a gift to the college. She reached out to me and mentioned, in passing, that she thinks she can convince her employer, the New Jersey Pinelands Commission, to hire a few Temple interns. Through my work with the Owl to Owl Mentor Program, I knew several geology and environmental science students and encouraged them to apply. Several did and, ultimately, Ryan Coughlan landed the gig. According to Jean, Ryan’s work, adding threatened/endangered species records to the commission’s GIS database and ArcMap, was exemplary.

So just by reading Outlook, an alumna made a gift to the college, connected with a fellow graduate, inspired students to apply for an internship, hired a CST intern and gave a future graduate a leg up in the job market and an appreciation for what it means to be connected to the college.

That’s a win-win many times over. Please, learn more about CST, reach out to me and other alumni, come back to campus and meet our extraordinary students. I promise, amazing things will happen.

Sincerely,

Jim Guare (BA ’77, MA ’83, Chem)

Want to learn more about the Alumni Board or have an alumni engagement idea to share? Email jpguare@temple.edu or cstalum@temple.edu

Message from the Alumni Board president

Priyanka Patel (BS ’11, Bio; PSM ’14, Biotech): Finding direction through a mentor

When Priyanka Patel earned her bachelor’s degree four years ago, it was a bittersweet moment for the young woman who now, working for a New Jersey consultancy, guides global biopharmaceutical and life-science clients on product development decisions and future business strategies.

“I was happy I was graduating,” recalls Patel, “but in terms of the goals I had set for myself, such as my GPA and finding a career, I wasn’t happy. I felt lost and had no idea what I should—or could—do afterwards.”

Fortunately, she quickly got a job as a clinical research assistant with Penn Medicine’s Renal-Electrolyte and Hypertension Division and the Penn Transplant Institute. Then, after discovering she liked being involved in clinical drug and medical device trials, she learned of CST’s Professional Science Master’s in Biotechnology, a two-year program that prepares students to become leaders in biotechnology related fields.

She heard about the PSM from its program coordinator, Associate Professor Seema Freer. “She has mentored me academically and personally through every part of my life. I give her credit for where I am today,” says Patel.

“The PSM definitely changed me,” says Patel, who was promoted to a clinical research coordinator at Penn during the program. “I excelled much more than when I was an undergraduate student and I finally felt like I knew what I wanted to pursue.”

In July 2014, shortly after earning her degree, Patel became an associate with Prescient Healthcare Group in Summit, New Jersey, where she provides regulatory and competitive intelligence for the company’s clients.

Patel also participates in the National Professional Science Master’s Association as the ambassador program specialist and she mentors PSM students. She also recently joined the CST Alumni Board, where she will help expand how Temple alumni can positively impact the lives of CST students.

“I want to get involved and give back because, like me, not everyone is going to be a straight-A student, but that shouldn’t stop them because there are so many opportunities out there,” says Patel. “If I can be half the mentor to CST students that Seema Freer has been to me, I would be very grateful and happy.”

— Bruce E. Beans
Steven Szczepanski (BS ’80, Chem; PhD ’85, Chem): Watchdog for consistent pharmaceuticals

Whether it’s a prescription or an over-the-counter medication, when you take a drug you expect consistency. In terms of ingredients, dosage and safety, you presume the first pill you take will be the same as the 100th.

The FDA expects the same.

Enter Steven Szczepanski, the associate director in charge of quality control and the c-GMP (Current Good Manufacturing Practice) Laboratories of PPD Inc. in Wayne, Pennsylvania. For a wide range of large and small start-up pharmaceutical and biotech clients, Szczepanski’s 47-scientist lab conducts quality control and stability tests on both commercially available drugs and drugs undergoing clinical trials.

“Good chemistry is absolutely critical to what we do,” says Szczepanski, who holds 20 patents. “It’s a piece of cake to make 10 or 100 grams of a drug. The trick is to scale up so that time after time you produce pure drugs. It’s really satisfying work.”

After first attending Penn State and then community college, Szczepanski transferred to Temple as a junior. He immediately began working as an undergraduate researcher in the laboratory of Professor Grant Krow, who ultimately would become Szczepanski’s doctoral dissertation advisor. (Krow retired in the early 2000s and died in 2015.) Before his senior year, a paper they co-authored on organic chemistry heterocycles in rearranged camphor had been accepted for publication.

“I didn’t necessarily push the boundaries of science, but to be productive and do something that even graduate students take several years to accomplish was pretty satisfying,” he recalls. “I was proud of it.”

After spending the previous 13 years working in quality control and contract manufacturing positions for pharmaceutical companies in New England and northern California, in 2012 the West Philadelphia native returned to the region to join PPD.

Since then, he has reconnected with CST—including participating in the college’s job fair and being involved, over the past three years, in the hiring of five Temple biology and chemistry graduates for PPD’s Wayne laboratory. He also participates in the alumni mentoring program. “CST graduates have a solid foundation in the sciences,” he explains, “and they and current students are enthusiastic, intelligent and hardworking. They’re very refreshing.”

—Bruce E. Beans

Eric Manas (BS ’91 Phys, PhD ’98 Chem): Crunching data to find new drugs

Four years of college and the beginning of graduate school wasn’t quite enough time for Eric Manas to figure out what he wanted to do.

Today, Manas is director of GlaxoSmithKline’s U.S. Computational Chemistry group, a 20-person unit that utilizes chemical informatics and data, as well as molecular and predictive modeling, to identify molecules that have the greatest potential to target health conditions including cardiovascular, respiratory, immuno-inflammation and infectious diseases.

“It’s about making quicker, more informed decisions based on the data to pick the next molecules to make,” says Manas. “We’re using computation to make fewer and bigger jumps in the drug discovery process.”

Despite an excellent GPA, by the time Manas earned his BS in physics he was unclear in which direction to head. He debated leaving graduate school until his relationships with professors Robert Salomon and Frank Spano rekindled his love of physics and chemistry.

“Dr. Salomon had such a pragmatic view of the world,” Manas says. “He helped me get back to what I’ve always loved about science. He kind of saved my life.”

Spano helped Manas focus on computational and theoretical science. Says Manas, “He’s an amazing theoretician, teaching me to challenge others’ thinking and my own.”

After earning his PhD, Manas conducted postdoctoral research at the University of Pennsylvania School of Medicine. He then worked for Wyeth Pharmaceuticals and TransForm Pharmaceuticals, where he started the computational chemistry group to support drug development.

“We do cool science,” says Manas, who joined GSK nine years ago. “Being able to facilitate patients’ access to medicines that treat and potentially cure human diseases by streamlining the drug discovery and development process is compelling and noble.”

Sharing his experience, Manas mentors CST students and he came back to campus to lecture on drug discovery. “Even as a graduate student you don’t know what’s out there and which direction to take,” he says. “Having people, generous with their time, who provide a guiding light makes a big difference in where you end up and the difference you make in the world.”

—Bruce E. Beans
Albert Brown (BA ’64, Chem) earns TUAA Alumni Impact Award

A worldwide expert in emulsion polymerization who has contributed to a number of new product technologies and a strong supporter of the College of Science and Technology, Albert Brown (BA ’64, Chem) received the 2015 Temple University Alumni Association’s (TUAA) Alumni Impact Award.

TUAA Impact Awards are presented annually to alumni for outstanding service, advocacy and contribution to their school or college, the alumni association and/or the university—individuals who, through such commitments, have proven an inspiration to others in their interest and support of Temple.

After graduating, Brown began work as a chemist in the newly formed Emulsion Synthesis Department at Rohm and Haas (now Dow Chemical). In 1971, he moved to the Coatings area to work on new metal protection paints and coatings, and was named a senior chemist two years later.

He was named a director of synthesis for coatings in 1992 and director of synthesis for the corporation in 1997. In 2001, Brown’s significant work in the field of polymers earned him the designation of corporate research fellow in honor of his years of extraordinary service as one of the few scientists who have consistently delivered strategic innovations, technical leadership and sustained success to the company.

In 2008, Brown was inducted into the TUAA Gallery of Success for his significant professional achievements. In 2010, Brown established the Albert B. Brown Chemistry Scholarship at CST to provide scholarships for undergraduate chemistry majors who demonstrate high academic achievement and financial need; currently gifts and pledges to the fund total more than $500,000.

—Greg Fornia, SMC ’92

SUPPORT STUDENT CHEMICAL SOCIETY THROUGH OWLCROWD

OwlCrowd is Temple’s crowdfunding tool, and the college has successfully used it to raise funds to support geology students going on their field camp experience and computer science students attending a professional conference.

The newest campaign supports the Temple University Chemical Society (TUCS). TUCS offers chemistry students opportunities to network with professionals and work with local schoolchildren. TUCS has earned an award for three straight years from the American Chemical Society (ACS) for being among the most active ACS student chapters in the country.

Each year, TUCS members use their own funds to travel to and attend the ACS National Meeting. That gets expensive. With $4,000 raised through OwlCrowd, four TUCS members can attend the 2016 ACS meeting in San Diego.

At ACS, students meet top researchers, get interviewing tips, learn about graduate schools and network with other chemistry student groups. When TUCS attendees return, they’ll share their experiences with the hundreds of chemistry majors at Temple.

Every gift—no matter the size—makes an impact.

To make your OwlCrowd gift to support chemistry students, go to giving.temple.edu/owlcrowd

OWL TO OWL MENTOR PROGRAM

The college’s Owl to Owl Mentor Program is one of its most popular—and important—alumni activities.

In just a few meetings spread out over two semesters, CST alumni can have a big impact on a student’s education and career. Mentors help students think about what they want to achieve in life, set goals and map out strategies for achieving their dreams.

More than 60 alumni signed up to be mentors this year, but we need more to ensure that each student who wants a mentor has one.

To learn more and to register for next year, go to cst.temple.edu/owl2owl

Owl to Owl Mentor Marc Fleischner (BS ’92, CIS) and one of his mentees, information science and technology student Amanda Chavis
Ira D. Lawrence, Jr. (BA ’76, Bio) named to Temple’s Gallery of Success

Ira D. Lawrence, Jr., a member of CST’s Board of Visitors, has been named to Temple University’s Gallery of Success. A collaboration of the Temple’s Office of Alumni Relations and Career Center, the award honors alumni for their inspiring success stories.

Lawrence has more than 25 years of leadership experience in the global pharmaceutical and medical device industries. He currently serves as a senior-level consultant, with numerous clients worldwide. Previous positions include chief medical officer of Alphaeon Corporation; senior vice president and chief medical officer at Medicis; and president, chief executive officer and board member at SciClone Pharmaceuticals, Inc.

Lawrence graduated summa cum laude from Temple with a degree in biology, where he was also a recipient of a President’s Scholar award and Rosenfeld Award as the outstanding pre-med student in his class. He attended medical school at Hahnemann Medical College, now Drexel University College of Medicine, where he graduated with honors. He completed his internship and residency in internal medicine at Northwestern University where he also served as chief medical resident.

Prior to entering the pharmaceutical industry, Lawrence practiced internal medicine and allergy/clinical immunology at the Veterans Administration Lakeside Medical Center in Chicago and was on the faculty of Northwestern University Medical School. A fellow of the American College of Physicians, he is the author of numerous scientific articles and textbook chapters and recipient of a number of research and teaching awards.

NEW STUDENT SCHOLARSHIPS

With a generous contribution, Steven Petchon, FOX ’80, established the Petchon Family Computer & Information Sciences Endowed Scholarship Fund, for deserving students in the CIS department and the Steven B. Petchon Endowment Supporting Student ACM Involvement, to support students who wish to attend Association for Computing Machinery events. Several years ago Petchon established an excellence in teaching fund to support outstanding faculty at the college.

The family of Muriel Brownstein established the Dr. Muriel Apfelberg Brownstein Endowed Scholarship Fund, to support students enrolled in TUteach, the college’s science teacher training program. The fund honors the memory and legacy of Dr. Brownstein, a Temple University College of Education graduate and a life-long advocate for science education.

NAMED SPACES IN SCIENCE EDUCATION AND RESEARCH CENTER

The Science Education and Research Center (SERC) opened in fall 2014, offering advanced research and teaching facilities for the departments of Physics and Computer & Information Sciences, as well as spaces for chemistry and geology. Several CST alumni generously made contributions to name spaces—from labs to classrooms to server rooms—throughout SERC’s eight levels.

On October 23, 2015, the college celebrated these gifts and officially dedicated several named spaces during ceremonies for alumni and their families as well as students and faculty of the college. One of the largest spaces dedicated that day was the chemistry research lab of Associate Professor Christian Shafmeister, which honors Albert Brown (BA ’64, Chem). Brown’s support of the college and of Temple University has been extraordinary. You can read more about his accomplishments and philanthropy on the opposite page.

Also dedicated that day were the physics lab of Associate Professor Bernd Surrow, named through the generosity of Seda Tarzian (BS ’48, Bio), a member of the college’s Board of Visitors. A collaboratory—an informal space where students and faculty can gather and work together—was named by Jay Novik (BA ’67, Math), also a Board of Visitors member, in memory of his parents.

In addition to spaces dedicated in SERC, the Allegra Family Math and Science Teacher Education Center in Gladfelter Hall, which serves TUteach students and staff, was named through the generosity of Dr. and Mrs. Joseph C. Allegra. Dr. Allegra is chair of CST’s Board of Visitors.
Message from the Associate Vice Dean

This is an exciting time at the College of Science and Technology.

This fall we welcomed one of the college’s largest classes ever, more than 1,100 talented students from around the world. Ten new tenured and tenure-track faculty members also joined the college, distinguished researchers and teachers whose work will attract new research funding and graduate students.

The Science Education and Research Center (SERC), completed last year and now a hub of activity on Main Campus, is supporting advanced research and learning in computer science, chemistry and physics and through several interdisciplinary research centers that are harnessing the power of big data, computer simulations and the human genome to solve today’s most important problems.

This success is fueled by the continuing financial commitment of our alumni, friends, faculty, staff and others. Our supporters understand the immense value of the College of Science and Technology in the research we do, the students we graduate and the impact we have on the world.

This year’s Honor Roll of Donors is one of the longest in recent memory, in part because so many of you were able to find a college initiative that reflected your passions. The Dean’s Endowed Professorship made significant progress and moved passed the halfway mark on its way to a $1 million goal to fund two new term professorships. The CST Alumni Board Scholarship reached its initial goal, and three students received the first scholarships this year. The Board is now looking to increase the fund to help more students, and is reaching out to alumni for help. Others supported our facilities and equipment needs by naming a space in SERC.

CST donors helped fund students who attended the Grace Hopper Women in Computing Conference and Geology Field Camp by making a gift through OwlCrowd, Temple University’s online fundraising tool. Supporters joined us for Temple Toast, a one-day giving opportunity that honored Temple founder Russell H. Conwell.

Both OwlCrowd campaigns exceeded their financial goals and our Temple Toast totals were some of the highest among the university’s schools and colleges.

Thank you to those alumni and friends, faculty and staff, foundations and corporations who support our talented students, exceptional faculty and innovative programs. Together we will continue to transform lives here at the College of Science and Technology, in the Philadelphia region and around the world.

I invite you to contact me to talk about ways we can work together to strengthen the College of Science and Technology.

Warmest regards,

John R. Walker, CLA ’87, LAW ’03, ’06
Associate Vice Dean
jrwalker@temple.edu
HONOR ROLL OF DONORS

The College of Science and Technology extends its deep appreciation to the alumni, friends, faculty, staff, parents, students, corporations, and foundations that made generous contributions between July 1, 2014 and June 30, 2015. Their generosity means CST can continue to set new standards in research, teaching and engagement with the world.

CONWELL SOCIETY DONORS

Named for Temple University’s founder and first president, the Conwell Society celebrates those who sustain Temple’s educational enterprise through annual leadership gifts of $1,000 or more. The following donors gave at the Conwell Society level for fiscal year 2015.

TRUSTEE’S CIRCLE ( GIFTS OF $100,000 OR MORE )

Barry Arkles, CST ’70, ’76, and Janine Black, FOX ’13
Steven, FOX ’80, and Nancy Petchon
Sbarro Health Research Organization

FOUNDER’S CLUB ( GIFTS OF $50,000 TO $99,999 )

Joseph C., CST ’70, and Marilyn D. Allegra
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Stanley A., CST ’65, and Debbie Lefkowitz
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PRESIDENT’S COUNCIL ( GIFTS OF $25,000 TO $49,999 )

Albert B. Brown, CST ’64, and Marie B. Koals, EDU ’63, ’68
George, CST ’50, and Marion, CST ’50, Evans
Christopher J. Galli, CST ’94
James, CST ’77, ’83, and Debbie Guare
Michael L. and Brenda M. Klein
A. Marjatta Lyra and Benedict Stavis

HONOR ROLL OF DONORS

Simons Foundation
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SUPPORTING CST THROUGH THE TEMPLE TOAST

On Tuesday, February 17, 2015, Temple University celebrated university founder and first president, Russell H. Conwell, with the Temple Toast. The all-day birthday party was designed to encourage donations online and on campus. CST had one of the largest numbers of donors among the university’s schools and college. The following individuals made a gift during Temple Toast, supporting CST’s Annual Fund.

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FACEBOOK / Fall 2015

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OWLCROWD CONTRIBUTIONS SUPPORT CST STUDENTS

OwlCrowd is the official crowd-funding platform for Temple University, enabling online fundraising for projects that benefit the university. In fiscal year 2015, CST supporters funded scholarships for students to attend the Grace Hopper Celebration of Women in Computing and Summer Geology Field Camp. Thanks to the following donors, both campaigns surpassed their goals of $3,500 and $2,500, respectively.

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CST Instructor Claudia Pine-Simon with (left) Moriah Baxevane-Connell (BA ’13, IST) and (right) computer science student Andrea Chang at the Grace Hopper Conference.
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Alumni Scholarship awardee Laura Baratta (third from left) and her family at CST student awards ceremony

ALUMNI BOARD IMPACT
To support talented students at the college, the CST Alumni Board established the Alumni Scholarship Fund in 2014. Thanks to the generosity of the Board and others, the college was able to present the first scholarships this year. Congratulations to students Steven Liu, CST '18, Bio; Laura Baratta, CST ‘16, Chem; and Dustin Huinh, CST ‘16, IST. The CST Alumni Board is led by president Jim Guare (BA ‘77, MA ’83, Chem), vice president Sina Adibi (BA ‘84, CIS, FOX ’86) and Christian Obasi (MS ’08, EES), chair of the Board's scholarship committee.

ENDOWED PROFESSORSHIPS
To recruit and retain outstanding research faculty, the college launched a $1 million campaign to fund two endowed term professorships within the college. The fund is now more than halfway towards its goal. These endowed positions will help attract the best researchers from top institutions, and the income the endowment generates offers a guaranteed source of funding to cover laboratory expanses, freeing up money for equipment direct support for research and the dissemination of knowledge.

ONLINE GIVING
All donors, whatever the size of their gift, play a vital role in the life of the college by supporting CST’s academic initiatives. Through Temple’s OwlCrowd online funding site, CST supporters fully funded students attending the Grace Hopper Celebration of Women in Computing Conference and the field camp capstone project for geology majors. Supporters also came out for Temple Toast, an online event celebrating Russell Conwell’s birthday. For this one-day giving campaign, CST’s alumni, faculty, staff, students and friends helped give CST one of the highest gift totals among Temple University’s schools and colleges.
THEODORE LARGMAN, BA ’48, CHEM had a solo exhibit in the Linda Grandis Blatt Gallery at Temple B’nai Or in Morristown, New Jersey. His pieces consist of three-dimensional shadow boxes that contain found objects.

RICHARD A. SPARKS, BA ’58, PHYSICS was named an honorary life member of the Microwave Theory and Techniques Society of the Institute of Electrical and Electronics Engineers.

DAVID R. RUSSELL, BA ’70, CHEM; DEN ’74 was awarded the Pennsylvania Dental Association’s 2015 Public Service Award for developing a dental clinic for the homeless patrons of Bethesda Mission of Harrisburg. Established in 2009 as a small treatment room, the clinic in 2014 expanded into a new 4,000-square-foot facility paid for with private donations.

DAVID D. SPAULDING, BA ’72, MATH earned a doctorate in finance and international economics from Pace University in New York.

JERRY A. LINDHEIM, BA ’83, BIO; LAW ’88 presented a lecture in Copenhagen to members of the Danish bar who practice personal injury and insurance 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.

PAUL CURCILLO, BA ’84, BIO is president-elect of the Temple University Alumni Association, which represents Temple’s more than 300,000 alumni living in 50 states and 143 countries. He will assume the TUAA presidency next year.

MARILOU E. 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.

GWENDOLYN M. KINEBREW, MA ’92, PhD ’97, BIO was awarded a 2014 Woodrow Wilson Ohio Teaching Fellowship from the Woodrow Wilson National Fellowship Foundation. The fellowship recruits top-quality teacher candidates to teach math and science in high-need Ohio schools.

MATTHEW FENTY, BS ’07, BIOPHY; FOX ’12 is director of innovation and strategic partnerships at St. Luke’s University Health Network.

KANYEBA ILUNGA, BA ’08, BIO has joined the College of Science and Technology’s Alumni Board.

MATEUSZ DOBROWOLSKI, BS ’12, BIOCHEM is currently a neuroscience doctoral candidate at Johns Hopkins University.

SEAN McWILLIAMS, BS ’13, CHEM is now in the third year of a chemistry PhD program at Yale University where he is investigating nitrogen activation.

ANDREA WATTERS (right), BS ’13, NEURO is investigating targeted therapies for melanoma metastasis in the brain at Philadelphia’s Wistar Institute.

CARRIE CARSON, BS ’14, BIOCHEM is research scientist with C3 Jian, a clinical-stage biotech company in Marina Del Ray, California, that develops oral plaque solutions.

KAY YA LI, BS ’14, BIO recently entered the Cooper Medical School of Rowan University.

AVIRUP SIL, PhD ’14, CIS is a research scientist at IBM’s T. J. Watson Research Center working on NLP, information extraction and machine learning.

ELIZABETH SZABILYA, BS ’14, BIO/TEACHING is keystone preparation coordinator at the Philadelphia Electrical & Technology Charter High School.

VICTORIA SAMUelsen, BS ’15, GEO recently completed her hydrogeology field course at Western Michigan University.

Frank Bowers (BA ’52, Bio)
Joseph Honigman (BA ’58, Bio)
Richard H. Katz (BA ’70, Bio)
David J. Kelly (MA ’68, Chem)
Mary McFadden Lutz (MA ’67, Math)
Charles H. Mintz (BA ’60, Bio; MED ’64)
Edward W. Naegele Jr. (BA ’48, MA ’50, PhD ’55, Chem)
Kush S. Patel (BS ’09, Bio)
Robert G. Rothberg (BA ’51, Bio)

RALPH E. JENKINS, Senior Associate Dean, retired
GRANT KROW, Professor of Chemistry, retired
GENE ULMER, Professor Emeritus of Geology

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Each year, the College of Science and Technology brings STEM (science, technology, engineering and math) education and activities to hundreds of young people across Philadelphia.

Working with Caring People Alliance Community Centers in Philadelphia, CST students are helping to run an intergenerational science reading program and a project in which students reverse engineer a racecar for better performance.

Another group of CST students offers a mini-prep course in general chemistry to high school students. CST students also offer SAT preparation with Let’s Get Ready, an organization that helps students gain admission to, and eventually graduate from, college.

Students in CST’s TUtach program for future science teachers are instructors, coaches and counselors for two residential summer camps at Temple University: STEMwork at Sea, which demonstrates how engineers make ship systems work, and ExxonMobil Bernard Harris Summer Science Camp, named for a NASA astronaut.

— Greg Fornia, SMC ’92
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