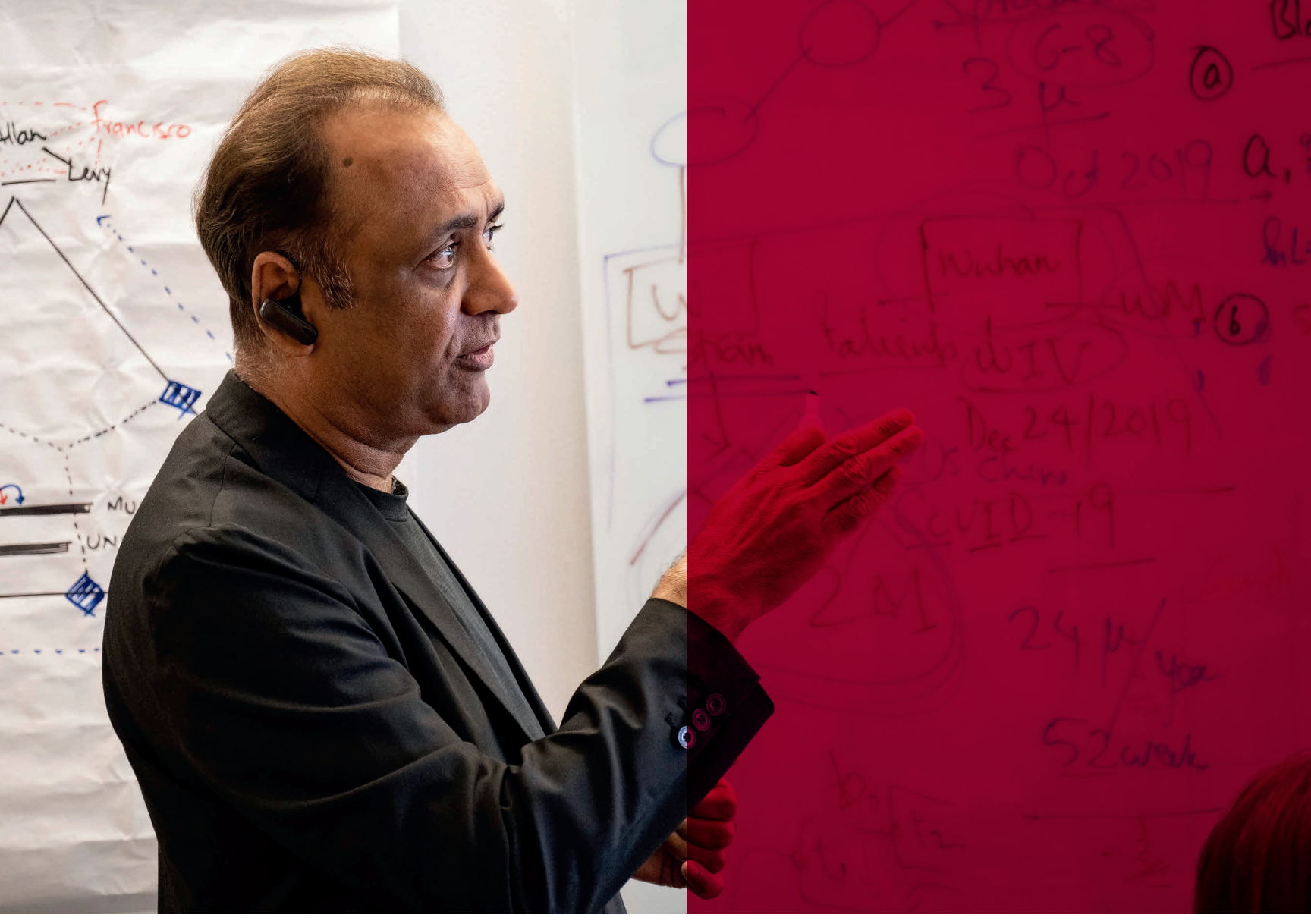
College of Science and Technology

FALL 2022

OUTLOOK

Families make CST a tradition

College of Science and Technology



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Fall 2022

Temple University
College of Science and Technology
400 Carnell Hall
1803 N. Broad St.
Philadelphia, PA 19122
215.204.2888

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

Bernd Surrow
Senior Associate Dean for Research and Operations

Susan Jansen Varnum
Senior Associate Dean for Undergraduate Affairs and Science Education

Kathy McGady
Assistant Dean for Development and Alumni Affairs

Greg Fornia
Director of Marketing and Communications

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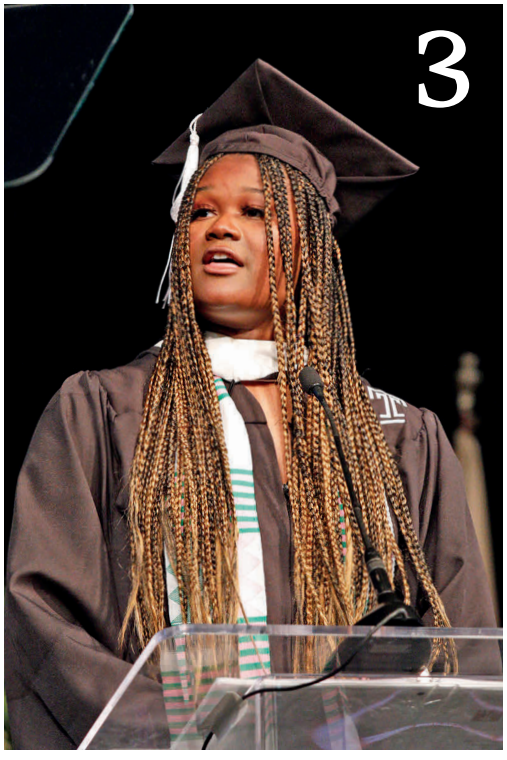

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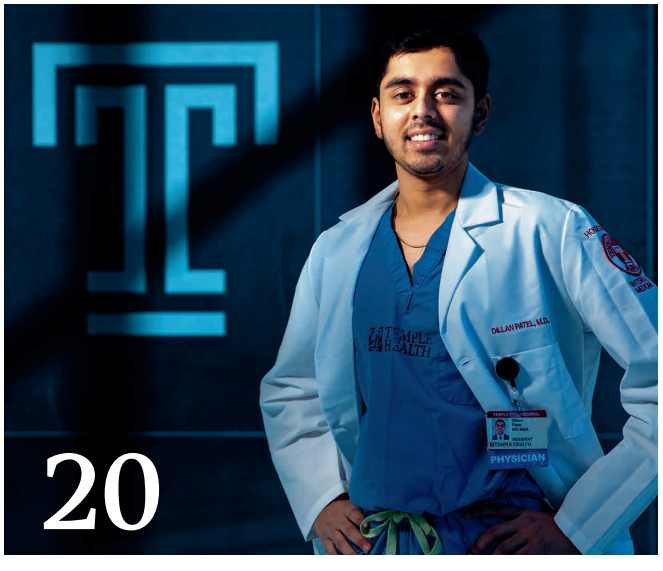


Cover photo by Joseph V. Labolito

Dean's Message

CST's 2022 Graduation ceremony, and the recent CST Convocation gathering, epitomize the spirit of Temple University. One of the largest CST graduations ever, the early May event was held in the university's largest gathering space, The Liacouras Center. Notably, it was inspiring to see so many of our students and their families celebrate this important milestone, in-person. Our speakers, from materials science pioneer Sir Anthony K. Cheetham, FRS to the impressive Guercie Guerrier, CST '22, were optimistic as they spoke of the challenges facing our world.

In August, we welcomed the Class of 2026 at our Convocation. With a modest increase over last year's incoming class—amid challenging times for higher education enrollments—CST's newest students are engaged, eager to take advantage of opportunities and willing to put in the effort to succeed.

Those qualities are what define our college, its students, faculty and graduates. In *Outlook*'s feature story, you can read about just a few of the many families who have more than one CST graduate amongst them. From sibling to sibling and parent to child, these families recognize the value of a Temple degree and a CST education. They are thriving in their careers and in their lives.

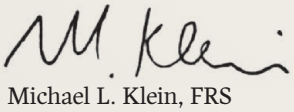
In the News section, you can learn more about our faculty research efforts, from investigating how proteins repair DNA and developing quantum computers to how desert landscapes will be altered by climate change. Beyond the lab, the STARS Computing Corps, headquartered at Temple and CST, earned a $3M National Science Foundation grant to make the study of computing more diverse and equitable.

In the Alumni section, there is a message from new Alumni Board president Mike Remaker, CST '06. I want to take this opportunity to thank the previous president, Mark Dash, CST '84, and all current Board members, for the many efforts to keep alumni engaged with today's students. Special thanks also to CST's Board of Visitors who help steer our college toward success. We also profile this year's 30 Under 30 honorees—impressive CST graduates making an impact in their fields—and several graduates from the Class of 2022.

To those of you who support our students, our faculty and their research, thank you for your confidence in our college. To the entire CST family, I wish you the very best in the year ahead.

Go Owls!

Sincerely,



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






PHOTOS: KELLY & MASSA

Graduation ceremony celebrates Class of 2022

BY GREG FORNIA

On May 4, the College of Science and Technology held an in-person graduation ceremony for the Class of 2022 inside The Liacouras Center. One of the college's largest graduation ceremonies ever, both in the number of participants and guests, this ceremony saw degrees presented at the bachelor's, master's, professional science master's and doctoral levels for more than 600 graduates.

The ceremony began with remarks from Dean Michael L. Klein, FRS, who told the graduates that their Temple experience means they "will help solve today's toughest problems."

The keynote speaker was Sir Anthony K. Cheetham, FRS, a Research Professor at the University of California, Santa Barbara, Distinguished Visiting Professor at the National University of Singapore and a leader in the materials chemistry community.

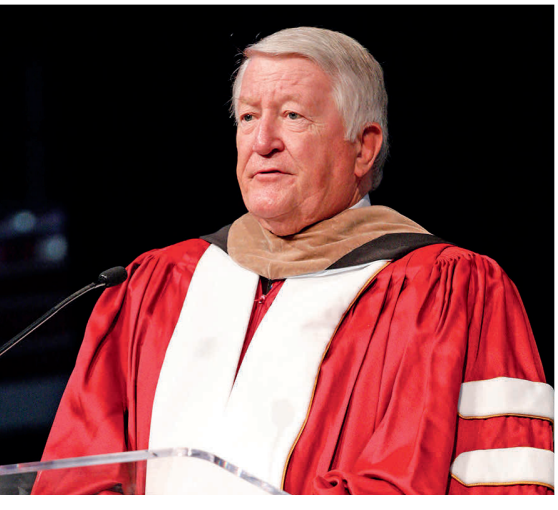
The student speaker, Guercie Guerrier, CST '22, graduated with a bachelor's in biology and a minor in sociology of health. Guerrier is now attending the University of Massachusetts Chan Medical School Postbaccalaureate Research Education Program. Her goal is to be a physician-scientist whose research positively impacts traditionally medically underserved communities.

Mark Dash, CST '84, former president of the CST Alumni Board, welcomed the new graduates into the Temple alumni community and urged them to "stay connected, and give back to students and fellow alumni."

Learn more about the Class of 2022 at cst.temple.edu/Classof2022.

CONGRATULATIONS, 2022 GRADUATES

PHOTOS: KELLY & MASSA



AVI KNOTTS, CST '25, EARNS SECOND PLACE IN FOX SCHOOL'S INNOVATIVE IDEA COMPETITION

BY GREG FORNIA

Information science and technology major Avi Knotts earned second place, undergraduate division, in the 24th annual Innovative Idea Competition, sponsored by the Fox School of Business's Innovation and Entrepreneurship Institute.

Her idea is Avi I.T., a nonprofit organization that teaches kids coding through summer camps, pop-up events and community partnerships. Based in Delaware where Knotts grew up, it hosts an annual seven-week summer program for kids ages 7-14 that is completely free.

"A program such as ours does not exist in Delaware or surrounding areas that is specifically for minorities and kids of all ages and experience levels," explained Knotts. "The main factor that separates us from similar organizations is that we are where the kids are, we travel to schools and community centers, and provide all of the necessary resources, such as devices and transportation.

"At Avi I.T., we strive to rid all barriers that may stop parents or guardians from enrolling their kids in computer science classes," Knotts said. "In doing so, we hope to mitigate the diversity gap in the computer science field by introducing computer science to kids of all backgrounds."

Comprehensive study of world's reptiles

Conservation efforts for other animals have likely helped protect many reptile species, according to a new study led by NatureServe, the International Union for Conservation of Nature (IUCN) and Conservation International. The study, published in the journal *Nature*, presents an analysis of the first comprehensive extinction risk assessment for reptiles on The IUCN Red List of Threatened Species™, which found that at least 21% of all reptile species globally are threatened with extinction.

S. Blair Hedges, Carnell Professor of Biodiversity and director of CST's Center for Biodiversity, was part of a diverse research team representing 24 countries across six continents. The group analyzed the conservation needs of 10,196 reptile species in comparison with mammals, birds and amphibians. Reptiles in the study include turtles, crocodiles, lizards, snakes and tuatara, the only living member of a lineage that evolved in the Triassic period approximately 200-250 million years ago.

"Besides revealing general patterns of extinction risk, this study has identified hot spots of threatened reptile species, such as in the Caribbean islands, where we need to focus our efforts," said Hedges. "Extinctions are already occurring from deforestation alone, and climate change is now accelerating the process, especially in countries like Haiti where nearly all primary forest has been destroyed. We are quickly running out of time."

The research revealed that efforts to conserve threatened mammals, birds and amphibians are more likely than expected to co-benefit many threatened reptiles. Although reptiles are well known to inhabit arid habitats such as deserts and scrubland, most reptile species occur in forested habitats, where they and other vertebrate groups suffer from threats such as logging and conversion of forest to agriculture. The study found that 30% of forest-dwelling reptiles are at risk of extinction, compared with 14% of reptiles in arid habitats.

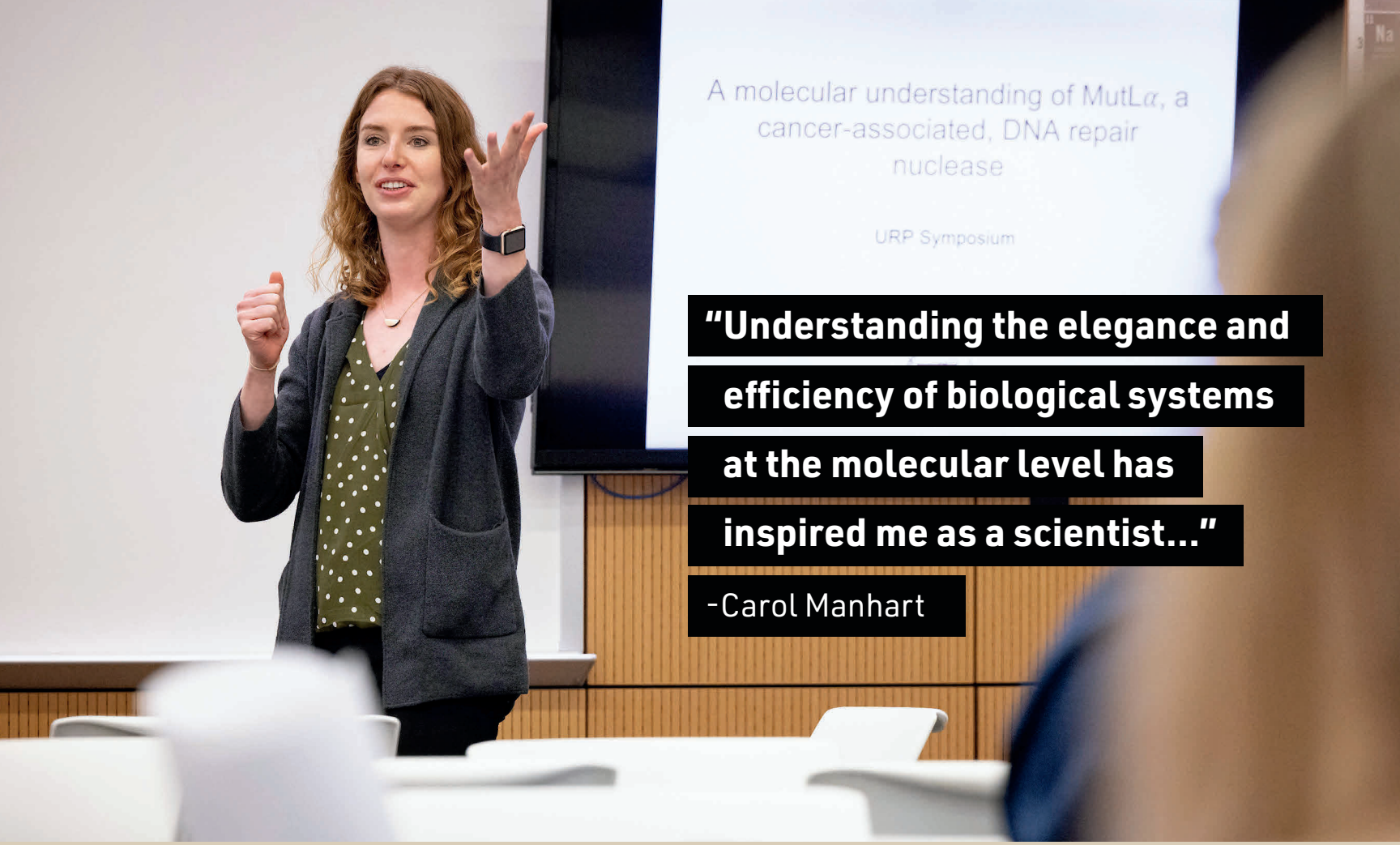


PHOTO: DAN Z. JOHNSON

NIH award supports research into how proteins repair cell DNA

BY JON CAROULIS

Carol Manhart, assistant professor of chemistry, has received a five-year National Institute of Health (NIH) Maximizing Investigators Research Award to study how proteins repair DNA in cells. Unrepaired DNA can lead to diseases in humans such as cancer.

"DNA repair is a naturally occurring process in organisms," said Manhart. "In humans, DNA repair operates, in part, to prevent disease such as cancer. In turn, when DNA repair proteins fail to do their jobs, diseases can develop, such as Lynch syndrome, an inherited disorder that increases the risk of cancers, particularly colorectal cancer."

"My research aims to understand how the DNA repair proteins know what to do and when to do it. We want to understand how the repair proteins find DNA errors and fix them while simultaneously not affecting undamaged DNA by mistake," she said.

Manhart's research isolates DNA repair proteins and rebuilds DNA repair reactions to understand how they work "without all of the cellular clutter" that can mask important parts of the reactions. "By doing this, we can break down DNA repair into steps and determine how failures in each step may contribute to disease. We can also identify how we might improve each step, which has applications in therapeutic and biotechnological design," said Manhart, who joined the chemistry department in 2018.

"Understanding the elegance and efficiency of biological systems at the molecular level has inspired me as a scientist and compels the work in my lab," she said. Manhart previously received a National Research Service Award from the NIH for her work in this field.

LORENZ EARNS GREAT TEACHER AWARD

Maria Lorenz, professor of instruction in the Department of Mathematics, has earned Temple University's Great Teacher Award.

Established in 1988 by the Board of Trustees, the Temple University Great Teacher Awards recognize faculty members annually for their continuous excellence in teaching. Each award carries a stipend of $15,000, and each awardee receives a commemorative sculpture and framed certificate. In addition, each recipient's name is engraved on the Great Teachers Wall in the Founder's Garden.

Lorenz has been a full-time faculty member in the Mathematics Department since 2001. Lorenz has earned several awards for teaching, mentoring and service, including the Lindback Distinguished Teacher Award, Temple University Outstanding Faculty Service Award, the College of Science and Technology Award for Student Mentoring and the Steven Petchon Award for Distinguished Teaching.

Within the Mathematics Department, Lorenz has served as an academic advisor to undergraduate students, faculty advisor for the undergraduate Math Club and for the Association for Women in Mathematics Student Chapter. As a member of the Provost's Teaching Academy, Lorenz has also enjoyed the opportunity to teach and mentor graduate students in mathematics as they earn the university's Teaching in Higher Education certificate.

In addition, Lorenz has facilitated many events at the Center for the Advancement for Teaching, where she is a Faculty Fellow. Lorenz, together with Irina Mitrea, former chair of the Mathematics Department, has also organized numerous outreach events for middle and high school students.

PHOTO: JOSEPH V. LABOLITO

Dean Klein wins prestigious John Scott Award

BY GREG FORNIA

Michael L. Klein, FRS, dean of the College of Science and Technology, has earned the prestigious John Scott Award for developing algorithms for the computational simulation of biological systems and the development of antimicrobial peptides.

Administered by a committee of Philadelphians appointed by the Board of Directors of City Trusts of the city of Philadelphia, the award is presented to those contributing to the "comfort, welfare and happiness" of humankind. Past winners include Marie Curie, Thomas Edison, Jonas Salk and Nikola Tesla, as well as three current CST faculty members, a CST graduate and a member of the college's Board of Visitors.

"It is very humbling, even more so when one realizes who has been honored with this award in the past," said Klein, who joined CST as Laura H. Carnell Professor of Science and director of the Institute for Computational Molecular Science in 2009. "It's especially pleasing to be recognized by the city of Philadelphia, a place where my research group has used the tools of high-performance computing to produce exciting predictions about the behavior of assemblies of all kinds of molecules under different conditions, such as gases, liquids, solids and glasses."

Klein was honored for work conducted in collaboration with William DeGrado, a researcher at the University of California San Francisco and fellow recipient of the John Scott Award, related to the discovery and development of Brilacidin, a synthetic molecule with antimicrobial properties.

"This recognition owes an enormous debt to the many dedicated members of my research group over the past 50 years or so," said Klein, who, prior to his appointment as CST dean in 2013, spent 22 years on the faculty at the University of Pennsylvania, serving as director of the National Science Foundation-sponsored Laboratory for Research on the Structure of Matter from 1993 to 2009.

Sheikh Saud Lecture features materials chemistry leader

BY GREG FORNIA

CST and the Temple Materials Institute hosted the 2022 Sheikh Saud Lecture on Advanced Materials featuring Sir Anthony K. Cheetham, FRS, a leader in the materials chemistry community and renowned for his contributions to the development of procedures to study the structures of materials and deduce their chemical, mechanical and physical properties. His lecture was titled "Chemical Synthesis and Materials Discovery."

Cheetham is a Research Professor at the University of California, Santa Barbara and a Distinguished Visiting Professor at the National University of Singapore. He is a Fellow of the Royal Society and a member of American Academy of Arts and Sciences as well as several other national academies.

Cheetham has received numerous awards for his work in the field of materials chemistry, including the Sômiya Award of the International Union of Materials Research Societies, the Platinum Medal of the Institute of Materials, Minerals & Mining and a Chemical Pioneer Award from the American Institute of Chemists. In January 2020 he was knighted by Queen Elizabeth II for "Services to Materials Chemistry, UK Science and Global Outreach."

The Sheikh Saud Lecture on Advanced Materials is named for H.H. Sheikh Saud bin Saqr Al Qasimi, United Arab Emirates Supreme Council Member and Ruler of Ras Al Khaimah. The Sheikh Saud bin Saqr Al Qasimi Foundation for Policy Research was established in 2009 and aims to establish relationships with talented scholars and world-class universities, innovative public policy research centers, established government institutions and strategic partners in the private and non-governmental sectors.

NEW TENURE-TRACK FACULTY BRING RESEARCH EXPERTISE

Rebecca Beadling, *Assistant Professor, Earth & Environmental Science*
Beadling earned a geosciences PhD in 2020 from the University of Arizona, where her research focused on the ocean's role in climate. She was a Climate and Global Change Postdoctoral Fellow at the NOAA Geophysical Fluid Dynamics Laboratory. She also held a visiting postdoctoral research associate position at Princeton University.

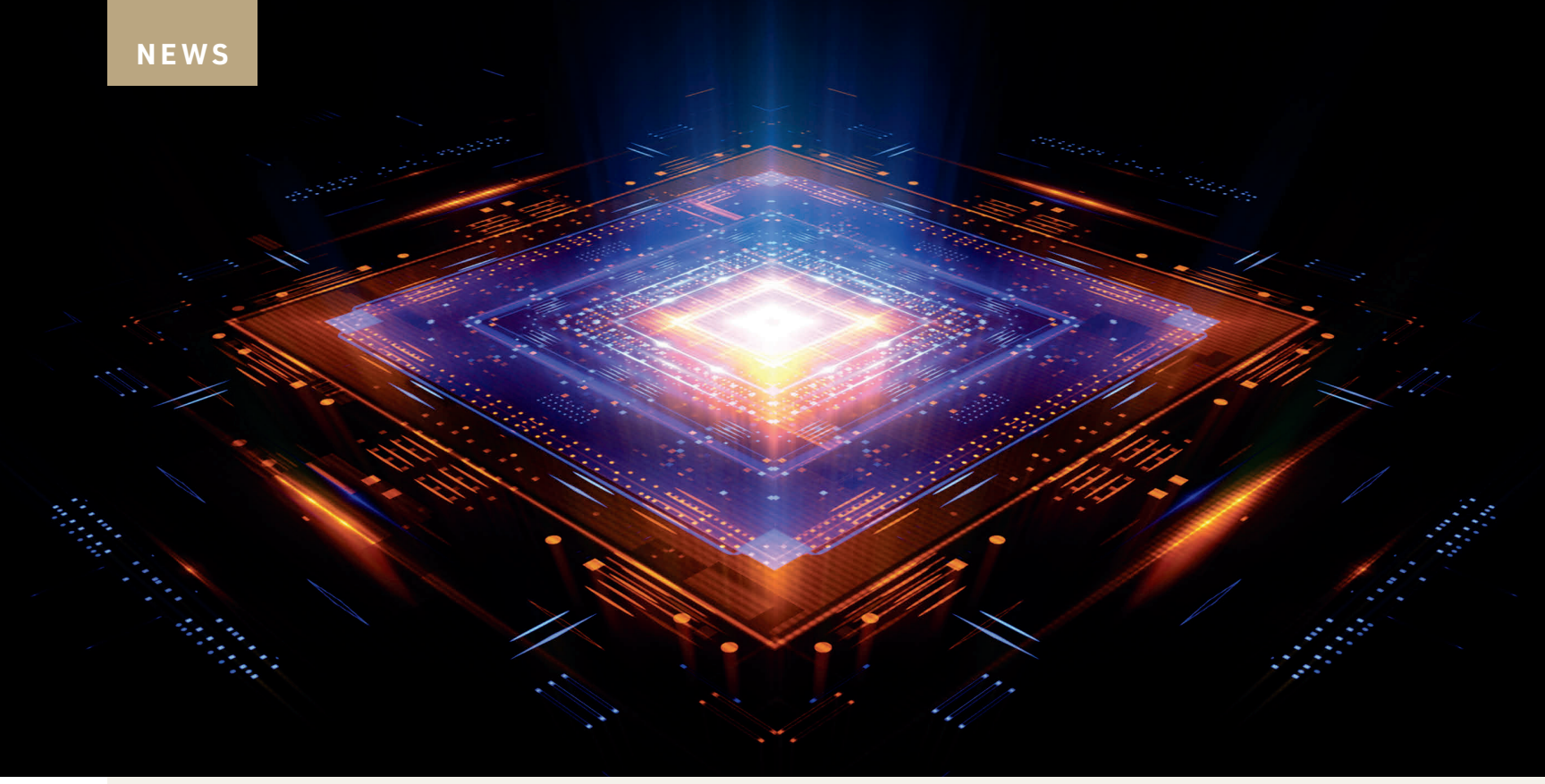
Beadling's research interest is in the ocean's role in the Earth system and climate change, including the assessment of how well models represent large-scale ocean circulation patterns and properties in ocean regions highly relevant for the climate system.

Vincenzo Carnevale, *Associate Professor, Biology*
Carnevale earned a doctorate in statistical and biological physics in 2007 from the International School for Advanced Studies in Italy. He was a postdoctoral associate at the University of Pennsylvania from 2008 to 2011. Carnevale was appointed research assistant professor of biology at Temple in 2011, then promoted to research professor in 2021.

Using high-performance computational approaches, his research looks to understand the structural dynamics of proteins. He is currently focused on membrane ion channels, investigating how specific ligands, including general anesthetics, control their activity.

Yuzhou Chen, *Assistant Professor, Computer & Information Sciences*
Chen earned a doctoral degree in statistics from Southern Methodist University in 2021. Before joining Temple, Chen was an NSF Intern Research Fellow in the Energy Storage and Distributed Resources Division at the Lawrence Berkeley National Laboratory and a postdoctoral research associate in electrical and computer engineering at Princeton University.

Chen's research interests are in machine learning, deep learning, graph mining, topological data analysis, semi-supervised classification, reliability theory, nonparametric statistics, and life-testing procedures in application to power systems, spatio-temporal datasets, and blockchain.



Iavarone joins national effort to develop quantum computers

BY GREG FORNIA

Professor Maria Iavarone's laboratory is one of 20 national partners involved in the effort to develop revolutionary quantum computers.

Led by the Superconducting Quantum Materials and Systems Center at the U.S. Department of Energy's Fermilab, the project's goal is to build and deploy an advanced quantum computer based on superconducting technologies. The potential impact is vast, from more reliable weather forecasts to developing new chemicals and medicines, finding novel materials for solar cells and improving cyber security and data encryption.

"A quantum computer can solve problems that traditional computers cannot," explained Iavarone. "It can process an enormous amount of data in a much shorter time, which means that it is possible to solve much more complex problems and handle vastly larger data sets."

However, large quantum computers need to be cooled down close to absolute zero—nearly minus 460 degrees Fahrenheit—and they are extremely sensitive to all types of interference. One of the biggest barriers to constructing such a computer is the short life span of information stored on a qubit, the quantum analog of a traditional computer bit. Today's highest-performing qubits only maintain information for up to 100 microseconds.

"One of the major problems for the implementation of large-scale quantum computing is to keep qubits operational for longer periods of time," said Iavarone. "What contributes to a qubit's extremely short life span are material defects and imperfections at surfaces and interfaces."

As part of the five-year project, Iavarone's group is using low temperature scanning tunneling microscopy in a low-vibration lab to understand the electronic properties of materials down to single atoms. The project is expected to result in $1 million in funding for equipment and to fund several research postdocs at CST.

"We are unraveling the role of atomic-scale defects in limiting the performance of superconducting quantum devices," Iavarone said. "This will allow us to address the underlying physics and materials science mechanisms that are instrumental for achieving a new level of quantum processors."

PHOTO: JOSEPH V. LABOLITO

STARS Computing Corps receives NSF grant to expand

BY MARIA KLECKO

STARS Computing Corps—a grant-funded organization headquartered at Temple that includes colleges and universities across the U.S.—was awarded $3 million from the National Science Foundation (NSF) to continue its mission and programs and develop new initiatives.

The goal of STARS is to make college computing department practices more equitable and inclusive places where individuals from historically underrepresented groups in computing—including Black, Hispanic, female and people with disabilities—can participate fully in computing education.

Initially an alliance of 10 institutions, STARS has grown to 50 colleges and universities and hopes to recruit 30 new institutions through this latest grant. "Temple is the perfect place for STARS to be headquartered because it welcomes students from a lot of different backgrounds," said Jamie Payton, chair of the Department of Computer and Information Sciences, lead investigator of the new NSF award, and executive director of STARS. "It's in a diverse city, and the student population has reflected that over the years."

In addition to continuing existing programs for students and programs that train computing faculty to apply more inclusive practices, STARS is developing new initiatives as part of the latest NSF grant including increasing support for community colleges, which have large populations of Black, Hispanic and students with disabilities, and introducing a new program focusing on entrepreneurship in computing for Black and Hispanic students.

"Temple can be seen as a national leader for justice-centered computing education," said Payton. "It can set the stage for many other institutions to focus on diversity, equity and inclusion for their students in computing degree programs."

SELECTIVE PRESSURE IS CONTRIBUTING TO FASTER DEVELOPMENT OF COVID-19 VARIANTS

BY JON CAROULIS

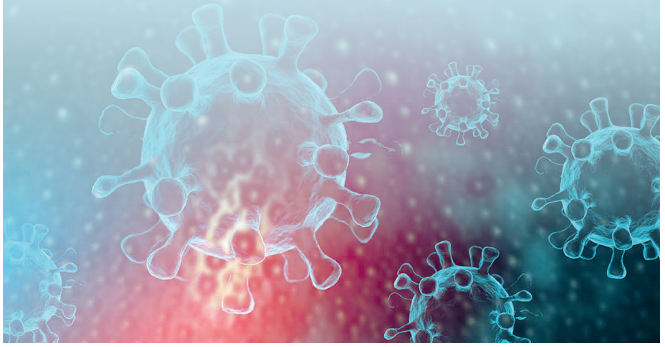
Professor Sergei Pond is part of an international team publishing research suggesting that new conditions are contributing to the faster development of variants of the COVID-19 virus.

Titled "The emergence and ongoing convergent evolution of the SARS-CoV-2 N501Y lineages," the paper appears in *Cell*, a peer-reviewed journal. Pond and his Temple colleagues collaborated with scientists at the University of Cape Town in South Africa, University of Glasgow in the United Kingdom, Pennsylvania State University and several other research institutions.

According to Pond, "selective pressure" on the virus can allow for faster-developing variants. "Selective pressure is an evolutionary force that promotes, or suppresses, certain genetic changes. In this case, the selective force that appeared in the fall of 2020 was most likely an immune response in individuals who had been infected with, and recovered from, earlier strains that same year," said Pond. "These forces remain today, and they are also augmented by selective forces exerted by the immune systems of vaccinated individuals with breakthrough infections."

"This is called convergent evolution," explained Pond, a researcher at CST's Institute for Genomics and Evolutionary Medicine. "The virus is going to the similar target (in humans) through similar pathways. It means that we can try to predict a little bit of what the virus is going to do in the future. As you might imagine this is a highly relevant question because everybody wants to know what's going to happen next."

Steven Weaver, senior programming analyst at iGEM, Stephen Shank, senior software developer at iGEM, and Alexander Lucaci, a bioinformatics graduate student, are also authors on the *Cell* paper.



USING MOTIF-CENTRIC AI TO EXPLORE NEW INORGANIC MATERIALS

BY BRUCE E. BEANS

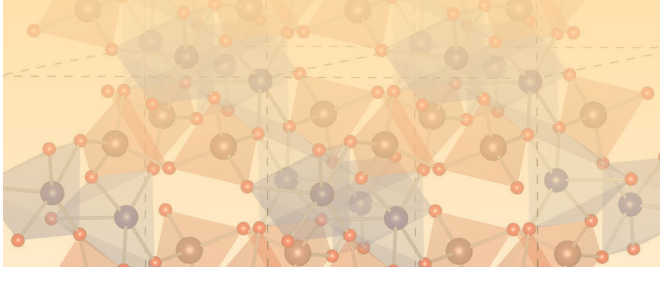
Two CST professors have developed an advanced artificial intelligence approach able to accurately predict physical properties of inorganic materials.

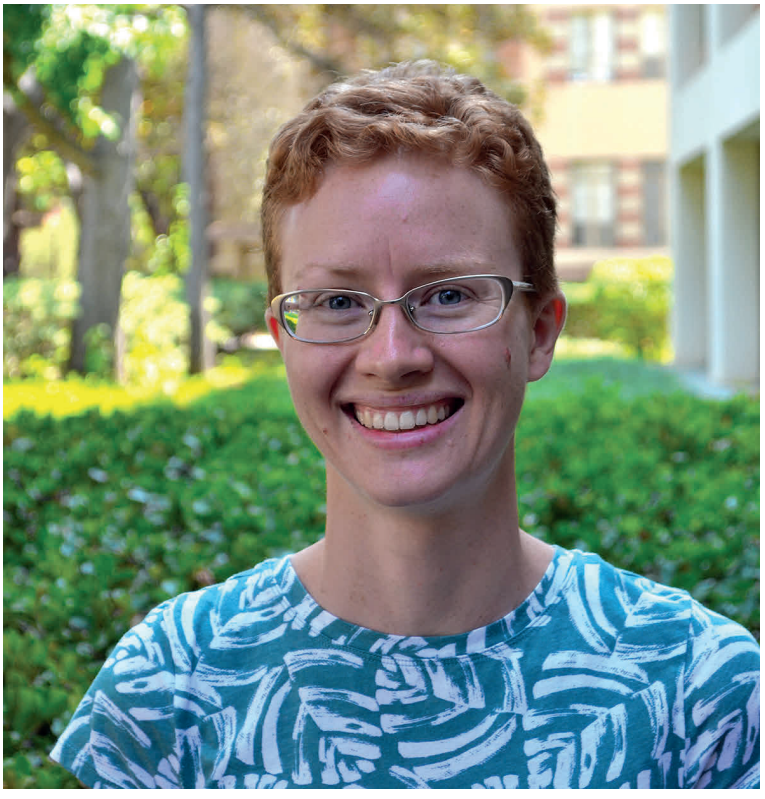
Qimin Yan, assistant professor of physics, and Slobodan Vucetic, professor of computer and information sciences and director of Temple's Center for Hybrid Intelligence, co-authored a paper outlining their research that was published this spring in the prestigious *Science Advances* journal. The paper, "Structure motif-centric learning framework for inorganic crystalline systems," is the product of a collaboration between Vucetic and Yan that began five years ago.

"By demonstrating that structure motifs in crystals, similar to those building blocks in a LEGO playset, can be incorporated into and greatly improve the prediction accuracy of a machine learning framework, our work represents a fundamental new step towards the continued development of AI for inorganic material systems," said Yan.

"Our approach is significant because it allows scientists to rapidly screen a large number of candidate inorganic materials in search for the ones that have desired chemical and physical properties. Ability to screen thousands of candidate materials per hour compares favorably to the traditional approach that requires days or weeks to computationally or experimentally characterize a single material," said Vucetic.

The researchers concluded that structural motifs found in inorganic crystals can form the basis for a machine-learning framework that is more accurate in predicting the electronic structures of metal oxides. The research, Yan said, could have potential implications for a variety of industrial applications, including the development of new photovoltaic materials in solar cells and photocatalysts for solar fuel generation.





Number theorist Lang joins Mathematics

BY BRUCE E. BEANS

Jaclyn Lang, who has spent the past five years doing postdoctoral work at some of Europe's most prominent institutions, has joined the Mathematics Department as an assistant professor. Lang's research focuses on p-adic methods to study Galois representations and modular forms, with applications to questions in algebraic number theory.

Lang earned her doctorate in mathematics from the University of California, Los Angeles in 2016. That same year, a Fulbright U.S. Student Grant and a National Science Foundation Mathematical Sciences Postdoctoral Research Fellowship enabled her to spend three years at Sorbonne Université Paris Nord sandwiched around a year at the Max Planck Institute for Mathematics in Germany.

She was a Titchmarsh Research Fellow at Oxford University—a decade after she earned the equivalent of a second master's degree at Cambridge University. "My time at the Max Planck Institute was really productive," said Lang. "It was the genesis of my work with two other postdocs on the algebraic nature of images of pseudorepresentations."

For the Bryn Mawr College graduate, both bachelor's and master's degrees, coming to Temple is somewhat of a homecoming. Citing the influence of the late Professor Marvin Knopp, who taught at Temple between 1976 and 2011, Lang said, "Temple has historically been a center for number theory in Philadelphia, and with current number theorists on the faculty at Bryn Mawr, Swarthmore College and the University of Pennsylvania, I feel like there's a lot of potential to create a strong regional number theory group here."

Invasive plants and climate change will alter desert landscapes

BY KATHERINE KORNEI

Non-native buffelgrass (*Pennisetum ciliare*), first introduced in the 1930s as food for foraging cattle, is thriving in the vast Sonoran Desert of the American Southwest and northwestern Mexico. Buffelgrass has been labeled a "noxious weed" by the Arizona Department of Agriculture, and the National Park Service regularly hosts "buffelgrass pulls."

Buffelgrass's bad reputation is well earned, said Sujith Ravi, associate professor in the Department of Earth & Environmental Science. "It slashes ecosystem biodiversity by outcompeting native grasses, leading to landscapes that are veritable monocultures," he said. "Whereas there used to be a mixture of different communities, now it's more of a single-community landscape."

That's bad news, because biodiversity has been shown to make ecosystems more stable and resilient to potentially adverse changes. With climate models predicting increasing temperatures and more frequent droughts in arid landscapes, how well will buffelgrass fare in the future compared with native plants? Ravi and colleagues began an experimental investigation of buffelgrass and its native counterpart, tanglehead (*Heteropogon contortus*), in the three-acre, glass-walled Biosphere 2 research facility in southern Arizona.

Researchers found that grasses of both species rallied after experiencing drought-like conditions at ambient temperatures. But the combination of warmer temperatures and lack of moisture killed 100% of the native tanglehead plants compared with roughly 80% of the invasive buffelgrass plants. "If something is going to come back," said Ravi, "it's going to be the invasive grass."

Drought- and heat-adapted invasive plants like buffelgrass will increasingly gain a toehold in arid regions, at the expense of native species. Climate change and biological invasions work in tandem to alter desert landscapes for the worse, explained Ravi. "They can synergistically act to drive landscapes into degradation."

Citation: Kornei, K. (2022), Invasive plants and climate change will alter desert landscapes, Eos, 103, https://doi.org/10.1029/2022EO220027. Published on 13 January 2022.

STRONG BONDS

BY ELISA LUDWIG

John Russell with his daughter, Dana Russell

Temple University is famed for its deep ties within individual families, with proud Owls spanning generations and reaching across siblings, cousins and beyond.

Dig deeper, and those same connections can be found right here at the College of Science and Technology. We profile just a few of the CST families that have made earning a Temple science degree—and using that education to make a difference in the community—traditions worth passing on.

IMPRINTING AN ETHOS

John Russell, CST '86 and Dana Russell, CST '17

When John Russell arrived at Temple in 1982, he had no way of knowing that the school would play an important role not just in shaping his career but in shaping his future children's careers. An Upper Dublin, Pennsylvania, resident, he received a scholarship and worked in a biology lab while pursuing his degree as a commuter.

After getting his medical degree at Penn State University and completing a residency at Abington Memorial Hospital, he taught at the Lewis Katz School of Medicine. Now chair of the Family Medicine department at Abington—part of the Jefferson Health network—he often sees Temple graduates coming through his residency program.

"In medicine, you have to have a good work ethic, besides being smart and well trained," explains John. "I see that work ethic in Temple students. There is always a certain kinship, and a sense that Temple tethers you together."

John has enjoyed watching his daughters pursue their own Temple educations. Dana graduated from CST in 2017 and Dana's sister Erin is currently a student at the medical school.

Dana knew going in that like her father and sister, she was interested in the sciences, but rather than work in medicine, she wanted to go into education. "I enrolled in the TUteach program and teaching every semester really gave me a chance to master my craft," she says.

More than 30 years later, Dana encountered at least one person who knew her dad while he was at Temple—now retired associate professor of instruction in biology Dan Spaeth had been a graduate student working in the same lab as her father.

One of Dana's most formative experiences at Temple was traveling to Belize with her tropical marine biology class. She was also a Hollings scholar at the National Oceanic and Atmospheric Administration, studying coral reefs. "The government sent me to Florida to create a professional development program for teachers using natural resources as a foundation," says Dana.

After completing her degree in biology with teaching, Dana went directly from a student teaching placement into a full-time job at New Foundations Charter High School in Philadelphia. She's teaching and developing the school's STEM programs, including a high-school level marine biology course. Some of her students have gone on to matriculate at Temple themselves, including in CST. On the side, she adjuncts at Temple, leading a course in coding for pre-service STEM teachers.

"The idea is to encourage more students, especially in the Philadelphia area, to get more involved in computer science and engineering. I also serve as a mentor to the current TUteach student teaching cohorts," Dana says.

Dana is now working toward her master's degree online at Michigan State University. And when she's not working or studying she's getting ready to plan her wedding to a fellow Temple alum she met during freshman orientation.

Beyond CST, another commonality in the Russell family is the desire to serve others, which John feels has only been strengthened at their shared educational institution.

"For all of us, it's important to give back, and we like to think we passed that to our children. Being at Temple, a place that reinforces the spirit of resilience and diversity, has been a key part of that."

Sisters Elana McDonald (left) and Delana Wardlaw

BRIDGING THE GAP

Delana Wardlaw, CST '96, and Elana McDonald, CST '96

Delana Wardlaw and Elana McDonald originally planned to leave the city for college, ideally at an HBCU, but the twins, who grew up in North Philadelphia, had to face the reality that their parents had limited means to send them away. Instead, they lived at home and enrolled at Temple, a life-changing decision that set them on their journey into medicine. And more than two decades later, they are still in North Philadelphia, now physicians firmly rooted in a commitment to serve their community.

At Temple, they both enrolled in the Honors Program and focused on biology and pre-med studies. On top of their natural affinity for science, they had a more personal reason for going pre-med. Their maternal grandmother died at the age of 53 from breast cancer, a death that might have been avoided had she gotten proper care in a timely manner.

As students, the sisters got involved with the Pre-Medical Society, which in turn connected them to the Medical Society of Eastern Pennsylvania, where they both interned and explored specialty areas by shadowing Black doctors working around the Philadelphia region.

"That's when it became clear that you can do this because there's other people before you who have laid the groundwork," McDonald says. "Of course, there is still more work to do. Today we're in our late 40s and African American physicians are still few and far between."

After medical school, Wardlaw pursued family medicine and is now part of the Temple Physicians practice. McDonald, who opted for a career in pediatric medicine, owns and serves as CMO at three outpatient practices: Memphis Street Pediatrics, Pizzica Pediatrics and Castor Pediatrics.

"Working in the community allows us to bring a diverse lens to diagnostic skills and

clinical management." Wardlaw says. "I can see five generations from one family on any given day, and that helps us address some of the social issues that have an effect on people's health as well."

In 2020, just a few months before the COVID-19 pandemic, the sisters founded Twin Sister Docs Organization, with a mission to improve health advocacy and literacy in communities of color and mentor young people to find their own paths to medical school and careers in medicine.

During the pandemic, the organization expanded to become Twin Sister Docs Foundation and turned its efforts toward COVID testing and vaccination, but the past two years have only underscored the existing gaps in the nation's healthcare system, making cancer screenings, cardiovascular health and diabetes management just as critical as COVID-related resources.

"We are empowering people to become advocates for themselves—knowing what to expect from a physician's visit," Wardlaw says. "The onus is on us as physicians to make sure patients understand medical conditions. It's not just about patients following recommendations but helping them find the resources they may need to do so."

"We go by three Ts: trust, translate and transform," McDonald says. "If you don't trust the messenger, you're not going to listen to the message."

The Twin Sister Docs Foundation participates in career days, college panels, Pre-Medical Society discussions, health fairs and community events to help aspiring doctors find their way through what can be a complex process, particularly for first-generation college and medical students.

Their work is being recognized. Wardlaw was named Pennsylvania Co-Family Physician of the Year in 2020, and McDonald received the Pennsylvania Medical Society's Everyday Hero Award.

"No question you have rough days," Wardlaw says. "You think *What am I doing? Why am I here?* Then you remember your passion and you see the change that you are creating. That's why we're here."

> **"For all of us, it's important to give back, and we like to think we passed that to our children. Being at Temple, a place that reinforces the spirit of resilience and diversity, has been a key part of that."**
>
> **– John Russell, CST '86**

FINDING A HOME

Dania Giaddui, CST '18 and Mohamed Giaddui, CST '23

Dania Giaddui looked at other schools for her undergraduate education but for her, Temple just felt like the only choice. That may be because her family, originally from Libya, came to the United States in 2008 when her mother received a scholarship for graduate study abroad from the Ministry of Education. Nagat Frara enrolled in the PhD program at the Lewis Katz School of Medicine and since then, all five family members have put down roots at the university in one way or another.

"Watching my mother complete her degree while having three kids to take care of was very inspiring," Dania says.

Nagat now works as an associate scientist at the medical school, focusing on the neurological reinnervation of the bladder following spinal cord injury. Over the years, Dania and her brothers visited their mother at the lab, which they say inspired all of them in turn to go into the sciences.

After graduating from Harriton High School in Lower Merion, Pennsylvania, Dania enrolled in CST with a focus on neuroscience: cellular and molecular. During her years at Temple, she was an active member of the National Society of Leadership and Success, the Pre-Dental Health Society and Temple Arab Student Society. In 2017, she was one of a handful of students selected for the Frances Velay Fellowship, a summer research opportunity.

Dania's research involved looking at how microRNA-690 affects embryonic mouse stem cell differentiation in the presence of ethanol. A year later, she was awarded the CST Scientists Symposium Sponsorship, and traveled to New York City to share her research.

Dania is now an associate scientist in cell therapy process development at the Center for Breakthrough Medicines, and recently earned her master's degree in biotechnology from Thomas Jefferson University.

"In our family we've all wanted to take our education as far as we could," she says.

Dania's brother Muath graduated from the School of Engineering with a bachelor's degree in biomedical engineering in 2020 and her brother Mohamed is entering his senior year at CST, studying biology.

"I was accepted to other schools but going to Temple felt like a no-brainer. My mother and sister had had such a good experience, and it was culturally inclusive, which was important," says Muath, who is currently conducting clinical research on post-chemotherapy side effects at Lankenau Institute for Medical Research. He's preparing to apply to medical school, and ideally would like to return to Temple for med school or beyond.

The Giaddui family, left to right: Mohamed, Dania, Tawfik, Nagat and Muath

Their father and Nagat's husband, Tawfik Giaddui, currently also works at Temple University Hospital as a medical physicist in the radiation oncology department. "That he ended up at Temple too was a very happy coincidence," Nagat says.

Sometimes the family carpools together to campus, and all consider themselves Temple Owls at heart.

"Temple's diversity is very attractive to international people," Nagat says. "It's affordable and it offers students flexibility to pursue their interests, even as their interests change. We have all found a home here."

PAVING THE WAY

Shofalarin Da-Silva, CST '17, and Shofolahan Da-Silva, CST '19

Shofalarin (Sho) and Shofolahan (Flo) Da-Silva are two and a half years apart, but the brothers have followed twin tracks through their education. That includes a transformative year in CST's Post Baccalaureate Pre-Health Program where they laid the groundwork for their respective careers in medicine and more.

Even before college, the Da-Silvas both knew they wanted to follow in their father's path. Shonola Da-Silva was trained in Nigeria and now practices pediatric intensive care medicine in Ohio. "I remember walking around the hospital with my dad, and seeing how he helps people, and it seemed like the best career choice you could ever make," Sho says.

Both brothers earned undergraduate degrees from the University of the Sciences while playing basketball there. The combination of their extensive sports commitment and the need for more preparatory coursework meant that applying for medical school would have been a challenge coming right out of college.

"The post bacc program was a real bridge for us. I don't know that I would have gotten into medical school otherwise," Sho says. "It wasn't what we studied so much as learning how to study, and gaining the skills needed for success in medical school."

For Flo, the social aspect of the program was especially important. "A couple of my best friends now were students that I met at Temple, and though none of us are at the same med school, we still talk every day. That support system was valuable at Temple and continues to be."

In 2019, the brothers cofounded, along with two other CST post bacc graduates, Tri-State Black Men in Medicine, a professional group for physicians, residents, fellows, medical students and pre-med students that offers networking and mentorship opportunities.

"I mean, our dad is a physician, and we didn't learn how to get into medical school ourselves until pretty late on," Sho says. "We knew there had to be a way to connect Black male physicians, medical students and those trying to get into the medical field, while also supporting the underserved communities that we both learn and practice in."

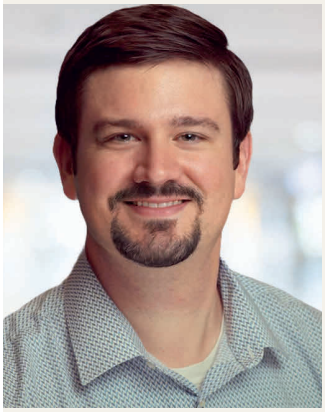
In the beginning, the brothers cold-called professionals in hospitals and doctors' offices to tell them about the new nonprofit. With word of mouth, Tri-State, grew steadily and now counts more than 60 members. Many more attend its panel discussions, mentoring events in schools, health fairs and community service opportunities.

"The reach feels vast now with everyone working on this together," Sho says. "For both Flo and me, part of the way we were raised was to give back, to reach out to your community, and help where you can."

In addition to mentoring and encouraging younger people to find their way to a medical career, the opportunities for representation in the broader community have been powerful. "When we do our health fairs, we meet people from the older generations," Flo says. "Just seeing that number of Black doctors means a lot to them."

Sho is now at Ross University School of Medicine and plans on going into gastroenterology and advanced endoscopy. Flo is at Philadelphia College of Osteopathic Medicine and is considering specializing in pediatric anesthesiology. The Da-Silvas plan to continue building Tri-State, wherever they professionally land geographically.

"I was in the mall and saw a couple of girls with Tri-State Black Men in Medicine t-shirts. That was a great feeling," Sho says. "No matter where we end up, we want to see people progress in their careers, and we want to help them succeed." ■



Message from the CST Alumni Board

When people ask me, "How did you figure out what you wanted to do?" my response is always the same: "I thought I was going to do one thing, but Temple showed me that I wanted to do something else. It changed my life."

When we talk about the college experience, it's more than just the academics. It's about the people we meet, the professors from whom we learn and the memories we have from shared experiences. The passion and drive to do what I do is moored in my experience at Temple and how individuals helped me to discover what I really wanted to do in my career.

The CST Alumni Board is a group of alumni and students with a passion to excel in their personal and academic or professional lives. The Board's mission is to empower CST students with the tools, knowledge and experience to help shape their futures and create lasting connections with fellow Owls. We do this through our scholarships and our Owl to Owl Mentor Program. Go to cst.temple.edu/o2o to learn more; we are always looking for mentors and students who want to tap into our vast network of Temple Owls!

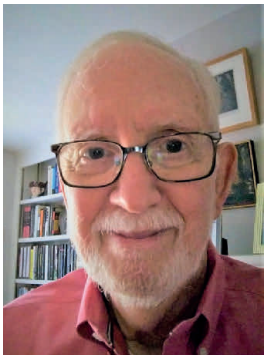
Together, Owls can change the world through collective passion and purpose. I challenge you to make a difference in any way that you can.

Sincerely,

Michael Remaker, CST '06
CST Alumni Board President

Learn more about how you can get involved at **cst.temple.edu/alumni** or email Jena Hudson, CST Alumni Affairs, at **jena.hudson@temple.edu**

George Bruce Taggart, CST '71 Named to Gallery of Success



For his 35-year-career that spanned academia, corporate America and the National Science Foundation (NSF), George Bruce Taggart has been named to Temple University's Gallery of Success. A collaboration of Temple's Office of Alumni Relations and Career Center, the honor recognizes outstanding alumni for their inspiring success.

Taggart holds a physics degree from the College of William and Mary in Virginia and a PhD from Temple. He says that he learned physics at William and Mary, but he learned how to be a physicist at Temple; he is forever grateful for both experiences.

He began his career as an assistant professor at Virginia Commonwealth University in 1971 and concluded his time there as a professor of physics in 1983. During his career, he researched at the Oak Ridge National Laboratory, Naval Research Laboratory, National Institute of Standards and Technology and the Federal University of Pernambuco in Brazil. He also conducted research in theoretical physics at Oxford University and served as visiting associate professor for a year at the University of Illinois at Urbana-Champaign.

During the 1980s, Taggart worked with several prestigious companies, including Ford Aerospace, where he worked on studies and research primarily for defense agencies. These projects included materials for space-based lasers, armor/anti-armor, low observables and applications of artificial intelligence to materials processing. In 1989, he joined NSF as a program director for condensed matter and materials theory in materials research, particularly theoretical and computational condensed matter physics and materials science. In addition to managing the theory program, Taggart was active in various initiatives, including advanced scientific computing, nanoscience and biological physics initiatives.

Taggart retired to the Philadelphia area to be closer to family and friends in 2006 and continues to support the College of Science and Technology and the Physics Department.

PHOTO: JOSEPH V. LABOLITO

Dillan Patel (CST '17, FOX '20, MED '21)

Owl, Times Three

On nights in North Philadelphia, when many of his undergraduate peers studied or socialized, Dillan Patel, was on a very different mission. Volunteering as an emergency medical technician (EMT) with Temple University Emergency Medical Services, Patel patrolled Main Campus and often arrived first at the scene of an emergency.

Eight years later, Patel is the one wearing the white coat. After earning a biology degree, Patel stayed at Temple to earn both an MBA and medical degree. He also has remained at Temple University Hospital for his residency, with plans to become a practicing ophthalmologist.

Medicine is in his family's DNA. His mother earned her degree from Temple's School of Pharmacy, while two uncles are practicing ophthalmologists. "The simplest eye problems to fix are also a leading cause of blindness," Patel said. "Surgery can be performed in just 15 or 20 minutes and can basically restore a patient's vision to 20/20."

As vice president of the Temple chapter of the Foundation for International Medical Relief of Children, Patel led a group of students to Peru. They rode eight hours on a bus to an impoverished mountain town, where they provided basic healthcare services like screenings and dental care instruction.

"People walked miles to get their blood pressure checked, and were listening intently to everything we had to say," Patel said.

As a med student, he volunteered at local schools like Kenderton Elementary near Temple Hospital to tutor math and science, and conducted a "Doctoring 101" class, complete with a white coat ceremony, for his pupils. He also dabbled in research, studying acupuncture techniques to assess their potential for lowering intraocular eye pressure for the treatment of glaucoma.

"Temple makes you work really hard," he said. "But the hard work pays off. You end up where you need to be."

After he completes his four-year residency, Patel aspires to become a retinal surgeon and, ultimately, could see a jump into healthcare administration, where the MBA he received concurrently with his medical degree would be especially applicable.

30 UNDER 30

The 30 Under 30 program recognizes trailblazing young alumni who have demonstrated professional success in any industry, significant community involvement or a commitment to maintaining a lifelong relationship with Temple University. 30 Under 30 highlights outstanding Owls from the more than 55,000 young Temple alumni who exemplify what it means to be Temple Made.

Sierra Williams, CST '16
Microbe Buster

Since ancient Egypt, scientists have sought ways to ward off infection. Sierra Williams is one of the latest researchers to pursue that quest.

"I just think bacteria are cool," Williams said. "We still don't understand a lot about them."

After earning her PhD at the University of California, Irvine, Williams is now an assistant professor of chemistry at The Claremont Colleges in southern California. She'll soon have her own lab staffed with undergraduate researchers, studying how synthetic proteins might be used to build a better antibiotic.

She started college at a small school in upstate New York, studying environmental science. When she realized it wasn't what she wanted to be doing, a professor advised her to find a university doing research that interested her.

That place was Temple, where she quickly gained access to laboratory training and funding for on-campus research. "That was crucial because it relieved the burden of me having to work, gain research experience and keep up with my classes, at the same time," Williams said.

As an undergraduate researcher, Williams created synthetic chemicals to test their effectiveness in knocking out bacteria. Her proficiency in the lab helped her land internships with Johns Hopkins University and the U.S. Naval Research Laboratory, where she studied special substances that can help treat severe trauma wounds.

CST also provided something else essential: a sense of belonging. One of her first professors was Serge Jasmin, associate professor of instruction in the Department of Chemistry.

"He helped to ease my transition," Williams said. "Having a Black professor that's teaching chemistry, it was helpful just seeing that representation in the field," Williams said.

Williams also received support from the Maximizing Access to Research Careers (MARC) Program—a federally funded program to diversify the biomedical field—which connected her to a diverse community of other recipients.

"Having those communities is really important, because it can be hard to find people who are going through similar experiences as you in the classroom and in the research space," Williams said. "You can support each other on how to thrive in those spaces."

PHOTO: DENISE CREW

PHOTO: DENISE CREW

30 UNDER 30

Shannon Hibbard, CST '17
Galaxy Guardian

Long fascinated by the cosmos, at NASA's Jet Propulsion Laboratory Shannon Hibbard is now helping identify human landing sites on Mars.

As an Ohio State University undergraduate, she first became interested in the relationship between ice on Earth and Mars. She then was attracted to CST's master's program in geology by Associate Professor Alexandra Davatzes, who had worked on a high-resolution camera on one of Mars' satellites.

At Temple, Hibbard primarily examined the geochemistry of Precambrian rocks that reveal impact cratering processes. She also independently studied ice on Earth and Mars. "Temple prepared me to be a scientist," she said. "Because it's a smaller program, you really get to know all of the professors and students and see what everyone is doing up close."

Hibbard finished her master's in geology program in two years, but subsequently was offered a prestigious internship at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California. To do so, she had to be considered a current student, so Davatzes paid her Temple tuition to ensure Hibbard could stay an additional semester.

"A support system is so key in academia," said Hibbard. "Having people rooting for you will lift you up and propel you forward. Alix Davatzes certainly did that for me."

At JPL, Hibbard worked with Matthew Golombek, known for his work on Mars landing sites. She worked with Golombek on a related SpaceX mission that never came to fruition. However, it laid the foundation for her planetary geology doctoral research at the University of Western Ontario. After earning her PhD, she returned to JPL as a NASA Postdoctoral Program Fellow, where she is working on the International Mars Ice Mapper, a new preliminary international Mars satellite mission.

"Back before I went to Temple, I knew I wanted to work on ice and frozen ground processes on Earth and Mars and to one day work at JPL," she said. "Seeing it become a reality and being able to use this knowledge to help find human landing sites on Mars is truly out of this world."

Ayodele Duyile, CST '15
Technology Futurist

For Ayodele Duyile, the future of technology is more inclusive. The senior product manager at Google dedicates his free time to mentoring people of color seeking leadership roles in tech and improving tech education access for underrepresented youth.

"Temple was my icebreaker into actively networking with people who are like me and those who aren't," said Duyile. "I also learned my work ethic and how to bring my whole self into whatever I do."

As an information science and technology major, he immersed himself in the Alpha Phi Alpha fraternity, where he was president. The first-generation Nigerian American is also a member of the National Society of Black Engineers and involved in the Organization of African Students.

After graduating, Duyile accepted a systems/software engineering job at Lockheed Martin. Later, at Facebook, he led the development for Oculus, Facebook's virtual reality (VR) program (a precursor to Meta), which included the first VR TV show. For that project, Duyile's team won the first Emmy for Outstanding Innovation in Interactive Media.

Duyile now works in Atlanta as a senior technical product manager at Google, enabling external coders and developers to code on Google products. He oversees a team of nearly 40 people.

On his own time, he tries to improve diversity and inclusion in tech. "What good is it if I can't enable more people that look like me to break into these roles?" Duyile explained. "I want to make it more equitable so that we're not just consumers, but we're also producers."

Thus began Backdoor Tech, a consultancy he launched for tech professionals of color. In the first year alone, he mentored and coached more than 100 people, many of whom have landed high-paying jobs.

Duyile also continues to volunteer at the nonprofit he co-founded in 2018 to promote access to tech education for underrepresented U.S. and Nigerian youth. Last year, the organization gave tech tutorials to more than 1,000 students and distributed 250 laptops in underrepresented communities.

"I would ultimately like to develop and create products that impact more underserved people in the tech space," he said.

PHOTO: MICHAEL A. SCHWARZ

Learn how you can be part of CST's success by contacting me at **215.204.4704** or **kathleen.mcgady@temple.edu**

Message from Development and Alumni Affairs

Outlook's cover story features four families deeply connected to Temple University and the College of Science and Technology. Sibling to sibling, generation to generation, these families—and many more—have made our college an integral part of their lives. Using their CST education and experiences, they've built successful careers, meaningful lives and stronger communities.

CST's nearly 20,000 graduates, as well as our faculty and staff, are a special group: committed to discovery and hopeful for the future. For incoming students CST is their 'home away from home,' a family they can turn to for support and inspiration.

CST families also face new challenges. Students and their families worry about college debt, living expenses and planning for the future. That's why it is so critical for CST to build the financial resources that support undergraduate scholarships and graduate fellowships. Scholarships and fellowships attract top students and reward hard work and perseverance.

Gifts toward faculty research, the Owl to Owl Mentoring Program, Undergraduate Research Program and other academic and professional development areas help ensure students received a superior education in the sciences. That provides families with confidence that their investment in Temple will pay dividends far into the future.

Your generosity has helped CST move forward in advanced research, education and community impact. We've been able to offer new majors, build advising and professional development capacity and support our internationally renowned faculty. Thank you for your ongoing support.

I encourage you to learn more about our college at cst.temple.edu and by following us on social media and in our monthly email newsletter. You can also contact me directly at 215.204.4704 or kathleen.mcgady@temple.edu to learn more about how you can play a larger role in our remarkable CST family.

Sincerely,

Kathy McGady

Assistant Dean for Development and Alumni Affairs

How can alumni and friends of CST support students?

Be a mentor.

Learn about CST's Owl to Owl program at **cst.temple.edu/o2o**

Support scholarships.

Make a gift to the Dean's Scholarship Fund at **giving.temple.edu/givetocst**

Fund young researchers.

Learn about CST's Undergraduate Research Program at **cst.temple.edu/giving/urp**

Support faculty.

Make a gift to the Dean's Endowed Term Professorship Fund at **giving.temple.edu/givetocst**

Inspired to give

Personal experiences are the foundation for support from alumni and friends

Longtime CST supporters **William, CST '58, and Sandra, CST '56, EDU '65, Flank** are deeply committed to making a difference in the lives of Temple students. Knowing how a research experience can impact a young researcher's life, they established an endowed fund that supports the college's Undergraduate Research Program (URP). URP gets talented and motivated students into the laboratory with top Temple researchers and helps remove those obstacles that keep students from participating in advanced research projects as undergraduates.

"Temple University broadened our world," explained Sandra. "From classes and social life to, for me, participating in student government and, for Bill, an independent research project in the labs. These opportunities served us well as we moved through the world."

Bill and Sandra, both chemistry majors, met at Temple, were married in 1956 and recently celebrated their 66th wedding anniversary. Sandra is now retired after a career as a professor of STEM education at Pace University. Bill had a long career in industry, including senior scientist at Union Carbide and professor of chemistry at Pace.

"I was a scholarship student, as was Bill," said Sandra, "It was our turn to pay it back."

MAKING MORE OF AN IMPACT

After many years as an annual fund donor and a supporter of emergency aid to CST students, **Carl Burke, CST '90**, and his wife, **Margaret**, wanted to make more of an impact in the life and education of an individual student. They decided to provide scholarship funding for nearly half a semester's tuition for a student who was experiencing significant financial need. Those funds helped this student complete their senior year, which may not have happened without the Burke's support.

Helping ensure that financial need does not prevent a student from attaining their educational goals, the Burke's have established a term scholarship fund that will provide this same level of support to a CST student for the next three years.

CONNECTING WITH STUDENTS

Terry Dougherty, CST '74, has contributed to Temple and CST nearly every year since his graduation. Over the years he has made unrestricted annual gifts and gifts to support the college's Owl to Owl Mentor Program.

A significant portion of his giving supports scholarships. After many years as a donor to the Hazel M. Tomlinson PhD Memorial Scholarship Fund, he helped to establish, and became a significant donor to, the CST Endowed Alumni Scholarship Fund.

In addition to his financial support, Dougherty continues to be very engaged with current students. He has been an Owl to Owl Mentor and also provides resume reviews and interviewing skills feedback at CST's Science and Tech Job Fair and through the university's Career Center.

HONORING TWO LEGACIES

Rosemary Poole established the John A. Poole Memorial Scholarship in 2011, honoring the memory of her husband who was a faculty member in CST's Department of Chemistry for 35 years. Each year, she contributes to the fund and supports the scholarships for junior or senior students enrolled in the departments of Biology, Chemistry, Mathematics or Physics who have demonstrated academic excellence.

For Poole, giving back is a family tradition. "My father believed that everyone should put more into their community than they took out," explained Poole, "and by doing so the world would certainly be a better place. That's why I believe in a Temple education and why I will continue to support CST students."

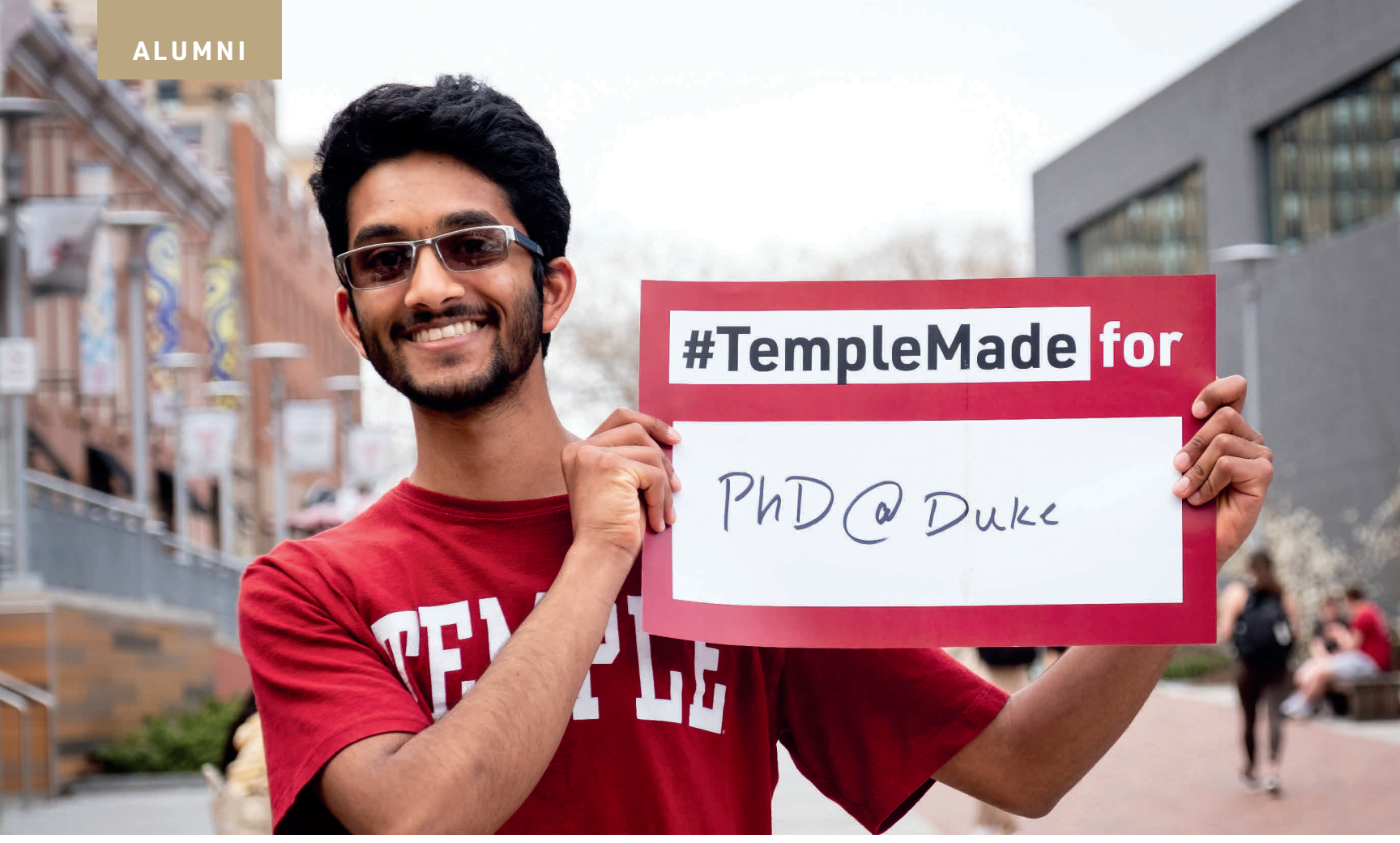


PHOTO: JOSEPH V. LABOLITO

Srikar Katta, CST '22

Using data science to impact society

BY EMILY KOVACH

After exploring his interests in a range of humanities classes, Srikar Katta discovered the field of data science—a field he is now continuing to pursue through a PhD program at Duke University.

"When COVID-19 happened, it was a breeding ground for new research questions because there was behavior no one had seen in 100 years," said Katta, who earned his BS in mathematics and computer science. "I was interested in the question: During times of disaster, will people band together to help others? We wanted to specifically look at how people treat delivery drivers. I worked with two statistics-focused professors at Fox who encouraged and motivated me. I realized then that Temple is an interdisciplinary place where I could really explore and solve problems."

During a first-year psychology research project, Katta remembers learning "a computer language called R that helps uncover a story about the data." Research became the new main pillar of his academic foundation, with much of his classes, internship and extracurriculars focused on data science. He became a "data detective." His favorite part of the study was its interdisciplinary nature and how working with data allowed him to follow his natural curiosity.

As a junior mathematics and computer science major, Katta interned at the U.S. Bureau of Labor Statistics, investigating the immigrant wage gap. While at Temple he co-founded the university's Data Science Community; worked as a researcher at the Federal Reserve Bank of Philadelphia; participated in Temple's Honors Appalachia service program; and was awarded the Provost Office's Creative Arts, Research and Scholarship Grant, which allowed him to research charitable giving behaviors during natural disasters.

Because data science is so integrated into many industries, he said he could imagine eventually working at Google, Amazon or another company that wants to solve problems with data.

"I don't exactly know what I want to do [after Duke], I just know that I definitely want to do research," he said. "And, hopefully, my work will have some societal impact or benefit."

PHOTO: JOSEPH V. LABOLITO

Areebah Rahman, CST '22

Pursuing brain research

BY EMILY KOVACH

While attending her STEM-focused high school, Areebah Rahman admits that "I didn't know research could even be a job!"

After gaining real-world experience as an undergraduate studying traumatic brain injury at the Lewis Katz School of Medicine, however, Areebah Rahman is now pursuing a PhD program at Brown University to further research neurodegenerative brain diseases.

The five-year program is a collaboration between Brown and the National Institutes of Health (NIH). During her first year, she'll split her time taking classes and doing rotations in labs. During her second year, she'll move to Bethesda, Maryland, to conduct research at NIH for her thesis.

During her sophomore year at Temple, Rahman was accepted into the Maximizing Access to Research Careers (MARC) program, which NIH funds to provide support for undergraduate students who are historically underrepresented in the biomedical sciences. She was then placed in Diane Langford's lab within the Department of Neural Science. "I came to Temple undecided, and the MARC program gave me this great community of support that encouraged me to pursue what I wanted," said Rahman.

"Being mentored by Dr. Langford while working in her lab inspired me to pursue this principal investigator role," added Rahman, who earned a BS in neuroscience: cellular and molecular. "She always made the time to meet with me, and let me take on independent roles in the lab, even though I was an undergrad."

While working in Langford's lab, Rahman explored research around traumatic brain injuries, as well as brain cancer. She was in a unique position as an undergraduate to help create and run experiments. In her future rotations at Brown, Rahman hopes to spend time in a lab that focuses on neurodegenerative diseases, like Parkinson's and Alzheimer's.

"I want to develop and nurture my interests and to become a well-rounded scientist," she noted.

Rahman added, "My main focus will be to encourage people to pursue their scientific interests. The MARC program helped me find great female mentors, and I would like to be a mentor like that for others some day."

Gabrielle Widjaja, CST '22
Hands-on tornado researcher

BY JAMES DUFFY

Gabrielle Widjaja never expected to be involved in the type of research she undertook with the Temple Ambler Field Station. Then again, no one expected a tornado to hit the Ambler Campus in September 2021.

"What's amazing is that the Field Station has taken this extremely difficult circumstance and opened up entirely new research opportunities," said Widjaja, who majored in biochemistry. "You have to adapt to what you are given. Even in the lab, most experiments don't initially go as planned. We keep on trying and finding new methods that work, which can lead to greater efficiency and better research results."

Widjaja joined the Field Station as a student research intern, "because after COVID, I wanted to get into a research group."

Guided by Mariana Bonfim, CST '21, assistant professor of research and Field Station assistant director, she worked with a team of student interns. Last fall, after the tornado hit, they conducted a standing woods survey to document which trees survived the tornado. During the spring 2022 semester, they conducted a deadwood survey to reconstruct the damaged forest. "It was very interesting post-tornado seeing what had dramatically changed—what the forest floor looked like, how the local animals responded to these changes."

While Widjaja assisted with the Field Station's overarching disturbance ecology research in the Temple Forest Observatory, she also undertook independent research projects that built off those studies.

"Disturbance ecology is any event—like a natural disaster—that affects an area and changes it significantly. We have the opportunity to study how the forest recovers from the disturbance in addition to studying how it effects other communities that rely on the forest—birds, deer, fox," she said. "My independent research focused on how the wind disturbance has negatively affected the overall diversity of the Temple Forest Observatory."

After working several years as a research technician, Widjaja hopes to pursue a biomedical sciences PhD degree. "I love learning," she said, "so I know I'm not done yet."

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