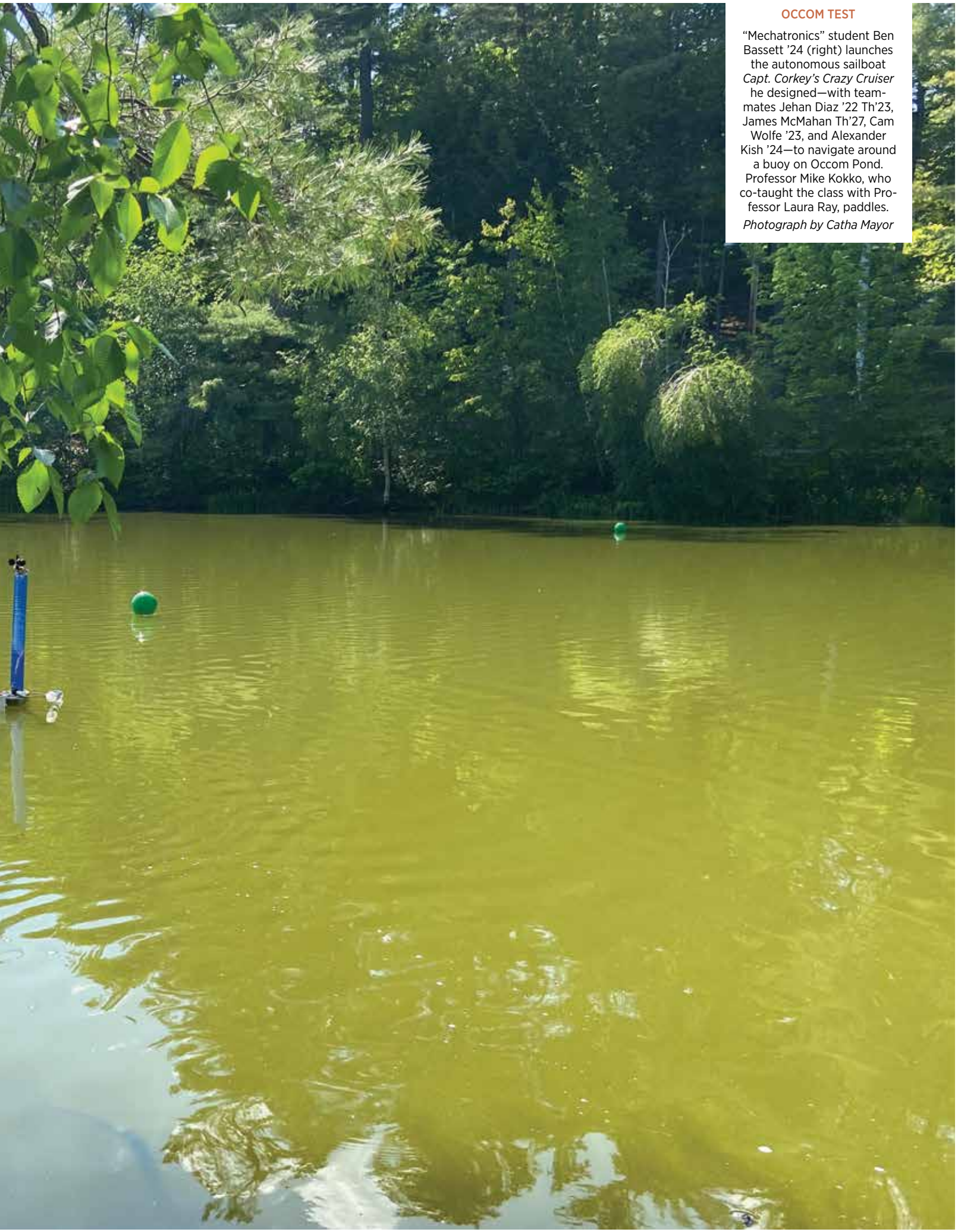
DARTMOUTH
Engineer
THAYER SCHOOL OF ENGINEERING | FALL 2023

"A BRAVE SPACE"

PRESIDENT SIAN LEAH BEILOCK AND DEAN ALEXIS ABRAMSON GATHER WITH FACULTY AND STUDENT LEADERS TO IMAGINE A MORE INCLUSIVE, WELCOMING FUTURE.

inside

First Look



OCCOM TEST

"Mechatronics" student Ben Bassett '24 (right) launches the autonomous sailboat *Capt. Corkey's Crazy Cruiser* he designed—with teammates Jehan Diaz '22 Th'23, James McMahan Th'27, Cam Wolfe '23, and Alexander Kish '24—to navigate around a buoy on Occom Pond. Professor Mike Kokko, who co-taught the class with Professor Laura Ray, paddles.

Photograph by Catha Mayor

Dartmouth Engineer
Volume 18 / Number 1

Contents

Contact Us
Office of Communications
Thayer School of Engineering
15 Thayer Drive
Hanover, NH 03755

dartmouth.engineer@dartmouth.edu
Tel. 1+ (603) 646-3521
Fax: 1+ (603) 646-9133

Dartmouth Engineer Online
dartmouthengineer.com

Dartmouth Engineering Website
engineering.dartmouth.edu

Report Address Changes
engineering.alumni.records@dartmouth.edu

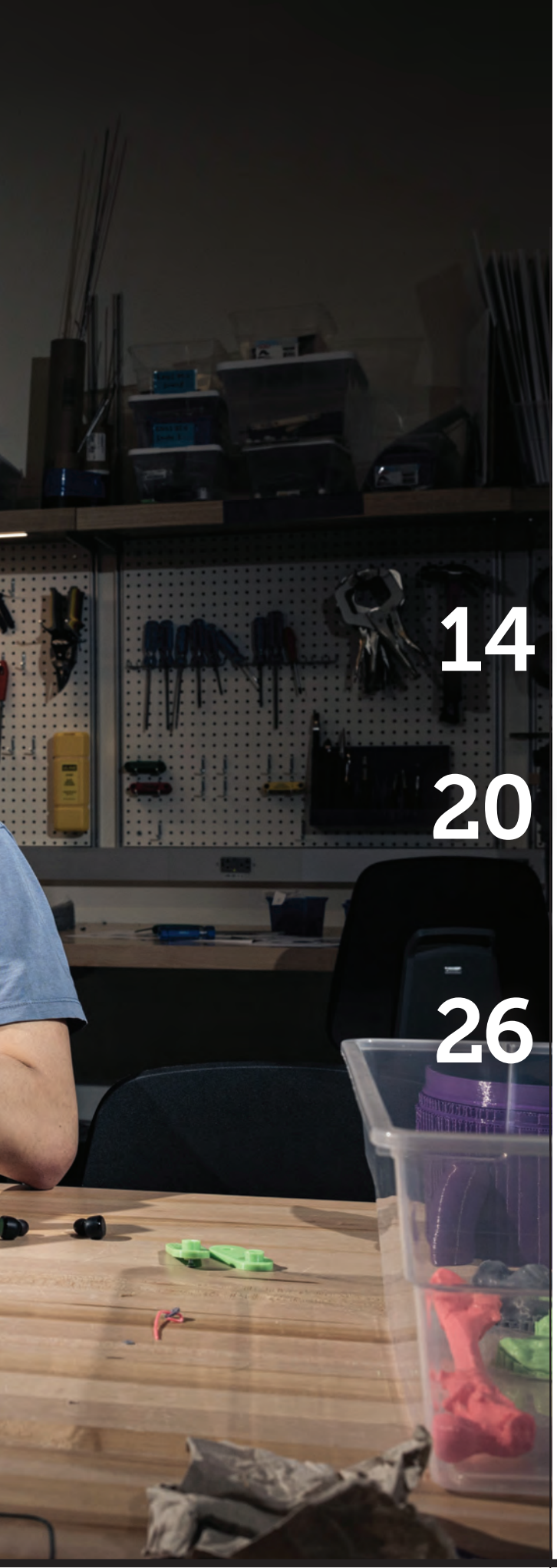
DARTMOUTH ENGINEER
is published twice a year for the Thayer School of Engineering at Dartmouth community.

Printed by Villanti Printers

FPO
Villanti: add FSC certification here

➤ Harold Than '23 puts the finishing touches on his walking dinosaur in the Cable Makerspace at 10 p.m. May 31. See "After Hours" on page 20.

Photo by Rob Strong '04



"A Brave Space"

President Sian Leah Beilock and Dean Alexis Abramson gather with faculty and student leaders to imagine a more inclusive, welcoming future.

After Hours

The recently renovated campus at the end of Engineering Drive is designed to encourage innovation without boundaries. Perfect for powering student efforts beyond the 9-to-5.

On Target

Saryah Azmat '11 Th'11 galvanizes investors, big pharma, and biotech in targeted drug therapy efforts to solve one of the world's greatest healthcare challenges. **BY THERESA D'ORSI**

DEPARTMENTS

Leading Thoughts

"All the work my team and I do is inspired by real-world problems."
—PROFESSOR WESLEY MARRERO

CAMPUS CONVERSATIONS
Dean Alexis Abramson (left) talks to Professor Wesley Marrero.

On Making Better Decisions

Dean Alexis Abramson speaks with Professor Wesley Marrero on how he is leveraging data to improve lives.

Professor Marrero uses data to help practitioners and policymakers make better decisions across a range of health fields: mental health, neonatology, cardiovascular disease, organ transplantation, and substance use disorder. Drawn to Dartmouth in 2021 by what he calls "the culture of translation from research to practice," he shares his approach to collaboration—including managing a growing team and new research areas.

Would you describe your research?

MARRERO: My team and I develop decision-support tools that address challenges associated with the implementation of data, such as inequity—which is a very big thing at Dartmouth Health—the lack of interpretability within the AI world, need for flexibility, and irrational behavior.

Irrational behavior as it pertains to the patient or the healthcare system?

MARRERO: Patients or providers. As human beings, we don't necessarily want to optimize things, we're more than happy just satisfying certain criteria. An example is someone who is terribly afraid of or just hates to take medications. A doctor may recommend three pills. But because I really do not like pills, I take just one. I will probably not have a heart attack, but at the same time, I'm not going to follow the full recommendation.

How is your approach unique?

MARRERO: Everything we do is data driven. My dual expertise in operations engineering and statistics give me a distinctive perspective. I and the members of my team are always working with that interplay to narrow the gap between decision-making theory and practice by creating methods that leverage the increasingly available data across different domains.

What is an example of an application?

MARRERO: My team and I are interested in the where and when to place and move mobile health units to address two big problems within the area of opioid use disorder: access to treatment and the morbidity and mortality of opioid-related causes. The main challenge is that vulnerable populations are more likely to suffer from opioid use disorder and they're more likely to die from it. But they have much lower access to treatment—and we aim to address that with the allocation of mobile health units.

It sounds as though you work with various partners in the medical field.

MARRERO: I have been able to connect with such bright minds across different domains through collaborations with Dartmouth Health and the Geisel School of Medicine as well as the Massachusetts General Hospital, the University of Michigan Medical School and School of Public Health, and the U.S. Department of Veterans Affairs. I have partnered with mental and public health professionals, neonatologists, cardiologists, and hepatologists—relationships that have ensured the acceptance and usability of my work in practice.

So you have to understand how a doctor or a patient is thinking.

MARRERO: There have been two vital skills I have had to develop over time. The first one is just learning how to listen—not just what people are saying, but where they put the emphasis, their intonation, their body language. The second one is simply recognizing when I'm wrong, when I don't know the answer. Something else I have had to develop working in these multidisciplinary teams is identifying people with at least interest in quantitative techniques. They serve as translators among the team.

What drew you to Dartmouth?

MARRERO: The big thing for me was the culture of collaboration, the passion for teaching, and the idea of having a human-centered impact. I love designing mathematical models and developing solution techniques, but all the work my team and I do is inspired by real-world problems. I'm thrilled about the prospect of impacting people's lives for the better through my work.

PHOTOGRAPH BY ROB STRONG '04

THE Great Hall

NEWS FROM AROUND THAYER SCHOOL

Tomlinson preps ice samples for her research, while Buffo (top right) collects ice samples at Last Chance Lake in British Columbia.

COURTESY TARA TOMLINSON

ADVANCES IN ICE

A Cool Compound

TARA TOMLINSON TH'23 IS growing samples—of Earth's sea water and other mixtures that resemble ice on Jupiter's and Saturn's moons—as part of her PhD research on the behaviors of ices in the outer solar system. "We really want to know as much as we can about the ocean underneath the ice, because anywhere with liquid water is a good place to look for life," says Tomlinson. But without direct access to that ocean, scientists must instead use clues from the ice on the surface."

"It's *incredibly* difficult to land on another planet or moon, so for these locations far out in the solar system we can only understand them from what we see from orbit," she says. The goal is to understand the physical properties of various types of ice—made from water as well as nitrogen, carbon dioxide, methane, and other materials prevalent in the cold reaches of space—so scientists can develop better-informed models.

Tomlinson and research scientist Jacob Buffo grow the samples in Dartmouth's Ice Research Lab in collaboration with lab manager Andrii Murdza Th'20 and Tomlinson's advisor, Professor Colin Meyer. "Each of the ices is made of different mixtures of chemicals," she says, "which affect the way the water freezes and can change a lot of properties of the ice that are relevant for geophysics and remote sensing." She's currently testing how different types and amounts of salts in water affect the inter-

Jacob Buffo

"For these locations far out in the solar system … anywhere with liquid water is a good place to look for life."

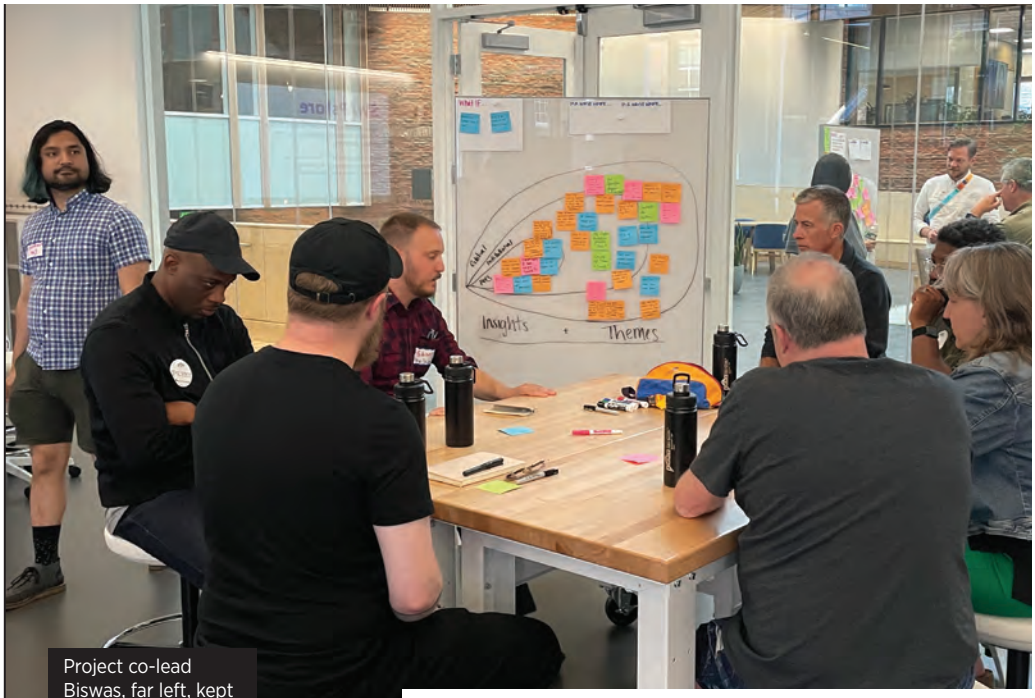
—TARA TOMLINSON TH'23

nal structure and strength when frozen.

Buffo is leading another ice project with funding from the Planetary Society's Science and Technology Empowered by the Public (STEP) program. "The grant will fund field work to study hypersaline lake systems in central British Columbia, Canada, for me and six co-investigators across six different institutions," he says. The lakes are analogous to what may exist on other planets and moons and can provide insights into what is possible in those conditions.

The salt in Earth's oceans is mostly table salt, which is not as prevalent in the salts found on Mars and in the subsurface oceans of Jupiter's Europa and Saturn's Enceladus. Buffo will study lakes containing sodium carbonate, sodium sulfate, and magnesium sulfate, which more closely mirror the compositions of these alien oceans.

In year one, the team will carry out field investigations to create multiscale profiles of the ice-brine-sediment systems of five lakes in the Cariboo Plateau. In year two, researchers will use what they have learned to predict what they will find at two additional unexplored lakes, carrying out a simulated planetary mission to evaluate their methodology and science.



Project co-lead Biswas, far left, kept participants on track during the June symposium.

DESIGN METHODS

Imagining the Future

MEMBERS OF THE DARTMOUTH COMMUNITY AND BEYOND ARE collaborating on a collection of human-centered fiction that draws on faculty research to help illustrate what the future could look, sound, feel, and even taste like. The Design Initiative at Dartmouth (DIAD) has launched the Dartmouth Speculative Fiction Project, led by Professor Sol Diamond '97 Th'98, English lecturer Rebecca Clark, and artist Sharang Biswas '12 Th'13.

"Interdisciplinary collaboration is a core value of DIAD that we believe is necessary to co-create a better future," says Diamond, DIAD co-director. "True collaboration requires deep listening and engagement to the point where we can tell each other's stories and envision the future together."

The anthology project brings together six Dartmouth organizations—the Irving Institute for Energy and Society, English and creative writing department, Ethics Institute, Leslie Center for Humanities, Neukom Institute for Computational Science, and Society of Fellows—as well as external partners Sawtooth Kitchen and Still North Books & Bar in Hanover and the Science Fiction and Fantasy Writers Association.

"When people ask me, 'What made you think about bringing together artists and researchers?'" says Biswas, anthology co-editor, "I challenge them to instead ask, 'Why aren't artists further incentivized to seek inspiration from scientists and scholars? Why aren't researchers encouraged to engage with the visions of the world that artists disseminate?'"

Seven science fiction, fantasy, and horror writers, in addition to Biswas, paired up with faculty in April and used design methods to stimulate cross-disciplinary explorations of the professors' research; they gathered again for a symposium in June. The project—and writing—is ongoing, with students invited to submit stories for the anthology, scheduled for publication in 2024.

"Speculative fiction is less about prophecy than imaginative problem solving," says Clark, "immersing us in possible futures that make our present seem ripe for change." —*Catha Mayor*

"Collaboration requires deep listening and engagement to the point where we can tell each other's stories and envision the future together."

—PROFESSOR SOL DIAMOND '97 TH'98

STCIKER: TOMO GREENBERG '25; TOP: CHRIS CARR/GEORGIA TECH; RIGHT: DIAD PROGRAM MANAGER PAULA OLSON

"A bicycle is a mechanical engineer's dream."

—WELLS WILLETT '24

MAJOR: MECHANICAL ENGINEERING

For Wells Willett '24, the decision to major in mechanical engineering was inextricably tied to his enduring love of biking. "In one way, they're so simple and useful, but they can also be really complex and very cool to study and build."

Some of the first engineering classes Willett took at Dartmouth—including "Introduction to Engineering" with Professor Elizabeth Murnane—helped him connect his interests in math and hands-on project work. "I realized I loved the process of figuring out how to solve a problem," he says. "I became especially interested in topics such as fluid mechanics because they're key to understanding the operation of bikes."

As president of the College's cycling team, Willett continues to race competitively and last year was the top overall finisher at the National Collegiate Cycling Championships. Any free time is spent in Fahey and McLane, working in the Dartmouth Bikes shop. An initiative of the Sustainability Office, the group collects and refurbishes abandoned bikes to rent to students. "I've gotten even more into tinkering by working at the bike shop," he says. "Dartmouth has opened up so many opportunities that have helped me figure out that I want to be an engineer." *—Erin Burnett*

PROFESSORS

New Faculty

ALEXANDER BOYS

WEI OUYANG

Dartmouth Engineering welcomed three new faculty during the summer and fall terms.

Assistant Professor **Alexander Boys** is a materials scientist and biomedical engineer whose work lies at the intersection of tissue engineering and bioelectronics. His research focuses on developing bioelectronic implants that interact with the body. Boys earned his MS and PhD from Cornell University and was a Human Frontier Science Program fellow and postdoctoral researcher at the University of Cambridge (U.K.) working on bioelectronic implants for interfacing with the nervous system.

Biomedical engineer **Tucker Burgin**'s research focuses on the use of molecular simulations and machine learning to computationally engineering enzymes and other proteins. Prior to joining Dartmouth as assistant professor, he was a postdoctoral fellow at the University of Washington. He earned his PhD in chemical engineering from the University of Michigan, where he developed ATESA, a software package to automate and improve unbiased discovery of rare event mechanisms with transition path sampling.

Assistant Professor **Wei Ouyang** develops bio-integrated microsystems for neuroscience and healthcare innovation, with a focus on microelectromechanical systems, implants, and wearable devices. Prior to joining Dartmouth, he was a postdoctoral fellow at the Querrey Simpson Institute for Bioelectronics at Northwestern University. He earned his BS in microelectronics from Peking University (China) and SM in electrical engineering and computer science and PhD in electrical engineering from the Massachusetts Institute of Technology.

Burgin focuses on ways to engineer enzymes.

FAR LEFT: DON HAMERMAN; NEAR LEFT: COURTESY TUCKER BURGIN

SMARTER DIAGNOSIS Ziray Hao '22 looks through RavaOne while fellow DALI Lab students Lauren Goyette '23, Jorie MacDonald '25, and Alex Carney Th'23 discuss the project.

KATIE LENHART

A Digital Makeover for Microscopes

INSTEAD OF USING SAMPLES MOUNTED ON GLASS slides, a new smart microscope created by Dartmouth Health dermatopathologist Aravindhan Sriharan and students at the Digital Applied Learning and Innovation (DALI) Lab allows clinicians to diagnose disorders from digital images.

By combining the brains of a computer with the design of a medical microscope, RavaOne is poised to integrate traditional microscopy with rapidly emerging healthcare technologies that rely on artificial intelligence and expand the possibilities of telemedicine, says Sriharan.

Biomedical engineering major Lauren Goyette '23 began working on the project as a designer last fall. "Pathologists are so efficient with microscopes," she says, adding that the challenge was to help them work at speed as they made the transition to the digital microscopy world. She worked on creating RavaOne's chassis using 3D printing. "The goal is to make a product that someone would be comfortable using for multiple hours a day to do real work—real research and diagnostics," says Alex Carney Th'23, who has also been with the project all along as a developer.

Sriharan believes the technology can transform healthcare in resource- and expertise-limited regions. The device would help providers on the ground screen cases to identify the ones that need immediate attention, sending them on to colleagues and volunteers across the globe. "We can actually bring first-world medicine—not watered down, but high-tech and cutting edge—to people who need it most," he says.

RESEARCH

Tool Narrows Focus on New Metal Alloys

PROFESSOR GEOFFREY HAUTIER AND postdoctoral student Wei Chen are part of an international effort to develop a model to help materials scientists decide which metals to try mixing together in the lab. Their method, published in *Nature Communications*, narrows down the hundreds of thousands of possible combinations for new metal alloys—which could significantly speed up the process of finding the next revolutionary material.

"If you take the 40 most common metallic elements and calculate the number of possible five-element combinations—there are more than 650,000 possibilities!" says Hautier. "We developed a model using thermodynamics and quantum mechanics to predict what combination of elements would mix favorably."

Alloys—mixtures of two or more pure metals—usually offer improved properties such as better corrosion resistance, lower costs, higher strength, and better workability. For the most part, alloys must be made. Historically, the creation of new alloys has been a driver of innovation. Modern airplanes, for example, can fly because of alloys that are both light and strong. No alloys, no airplanes.

Traditional alloys consist of a main component with only small amounts of other metals mixed in. During the last decade, interest has grown in going beyond traditional alloys and making what are called high-entropy alloys. Although hundreds of high-entropy alloys have been made, it has been a guessing game to determine which metals will mix well and offer the desired properties.

"We plan to use this model to explore alloys that perform well at high temperatures for use in engines to improve efficiency."
—PROFFESOR GEOFFREY HAUTIER

"Using our model, Wei Chen made a website [mpea.pythonanywhere.com] where you can actually type in five elements and get the answer: Will it form or not? And why or why not? So we call it a map because, with so many possibilities, it can help researchers know which direction to go," Hautier says. "At Dartmouth, for example, we plan to use this model to explore alloys that perform well at high temperatures for use in engines to improve efficiency."

—Catha Mayor

FIELDWORK

Solar Fish-drying Project Up for Arctic Award

QAANAAQ TEAM Local hunter-fisher Toku Oshima (front row from left) and Professor Mary Albert are leading a group to improve food security.

PROFESSOR MARY ALBERT IS LEAD RESEARCHER ON A PROJECT selected by UArctic as one of four Frederik Paulsen Arctic Academic Action Award candidates that "show great potential for improving the ability to deal with specific major issues raised by climate change." The winner, to be announced at the Arctic Circle Assembly in October in Reykjavík, Iceland, will receive 100,000 Euro of unrestricted funds to facilitate project development and increase impact.

"The prize would help us implement one of our research discoveries in Greenland," says Albert. The project, "Community-led Investments in Climate and Food Security: An Inclusive Model for Arctic Energy Transitions," focuses on developing solar-powered, portable fish-drying chambers for coastal communities to improve food security and increase fishers' incomes.

The solar fish-drying chambers are part of a larger effort funded by the National Science Foundation to partner with Qaanaaq—an Arctic community in northern Greenland—to facilitate residents' transition to renewable energy and produce sustainable technological solutions for those facing the effects of climate change. "This innovation answers the need to transition to low-carbon energy while preserving ways of living and working that other Arctic communities could easily adapt," wrote Melody Brown Burkins, director of the Institute of Arctic Studies at Dartmouth, in her nomination letter.

Albert's team includes Qaanaaq hunter-fisher Toku Oshima, fellow Dartmouth Engineering professors Christopher Polashenski and Weiyang (Fiona) Li, research scientist Hunter Snyder, and PhD student Alyssa Pantaleo Th'24.

Kudos

AWARDED SME named Professor **William Scheideler** a 2023 Delcie Durham Outstanding Young Manufacturing Engineer. Scheideler, who also earned the school's Woodhouse Excellence in Teaching Award, researches fabrication of 2D-metal oxides for electronics and energy applications.

PUBLISHED PhD student **Andrew Hederman Th'24** and **Professor Margie Ackerman** coauthored "Leveraging Deep Learning to Improve Vaccine Design," published in *Trends in Immunology*.

RECOGNIZED **The Class of 1982 Engineering and Computer Science Center** was awarded Leadership in Energy and Environmental Design (LEED) platinum certification, the U.S. Green Building Council's highest designation for sustainable design.

AWARDED The ENGS 89/90 capstone project, "Low Cost, Open Source PFAS Filter Design for Small Cleaning Businesses and Beyond," received a $10,000 grand prize from the National Council of Examiners for Engineering and Surveying. The student team of **Ariana Arvelo Marchan '23, Abbi Fitzpatrick '22 Th'23, William Gano '22**, and **Eliana Ray '23** also received the inaugural **Don Stayner Th'16** Changemaker Award during Investiture.

HONORED The Dartmouth Graduate Student Council recognized **Professor Kimberley Samkoe**'s commitment to fostering the professional and personal development of graduate students with its 2023 Guarini School Faculty Mentoring Award.

PUBLISHED PhD students **Julia Huddy Th'24** and **Huan Zhao Th'26**, research associate **Anand Tiwari**, and **Professors Yan Li** and **William Scheideler** coauthored "Graph Theory Design of 3D Printed Conductive Lattice Electrodes," published in *Advanced Materials Technologies*.

AWARDED PhD Innovation student **Andrew Closson Th'23** received second prize and $10,000 from the inaugural Dartmouth Innovation Accelerator for Digital Health (DIADH). Andrew—along with **Billy Jin Th'23** and **Professor John Zhang**—is developing a wearable blood pressure monitor called PulseFlex.

LOADED **Professor Simon Shepherd**'s latest addition to the international Super Dual Auroral Radar Network (SuperDARN)—profiled in the Fall 2022 issue—is fully functional and collecting data.

APPLIED Research scientist **Aleah Sommers** and **Professor Colin Meyer** have successfully applied a subglacial hydrology model to the Helmheim Glacier in Greenland to predict high water pressure and other variables in seawater movement under glacial ice. Their findings were published in the *Journal of Glaciology*.

PLACED PhD student **Savannah Decker Th'25** won second place at the 2023 Early-Career Investigator Symposium of the American Association of Physicists in Medicine with "Expanding the Inclusivity of Cherenkov Surface Dosimetry by Quantifying the Effects of Skin Tone in a Multi-institutional Human Study."

AWARDED **Professor Weiyang (Fiona) Li** earned the National Science Foundation's Faculty Early Career Development Award—with nearly $700,000 in research support. Li is developing nonflammable solid-state electrolytes for use in batteries.

PUBLISHED PhD students **Becca Thomson '22 Th'21 Th'22** and **Afton Limberg Th'27** and **Professor Douglas Van Citters '99 Th'03 Th'05 Th'06** coauthored the review paper, "Nanoparticles in Joint Arthroplasties," published in *Nano Life*.

ATTENDED The largest delegation of Dartmouth representatives to date gathered in Houston, Texas, for CERAWeek '23, one of the world's most significant climate and energy conferences. The Arthur L. Irving Institute for Energy and Society led a group of Dartmouth faculty, students, and staff, including **Dean Alexis Abramson**, who participated in a panel on "Energy Efficiency and Making the Built Environment More Energy Efficient," and **Professor Erin Mayfield**, who participated in panels on "Building Equity and Fairness in Climate Solutions" and "The Current State of Climate Change."

COMMUNITY EFFORT

Students Spark Interest

"We must keep striving to push for further progress."
—DEAN ALEXIS ABRAMSON

Members of Dartmouth's Society of Women Engineers (SWE) brought 13 students from fifth to 11th grade to the West End for Women in Engineering Day. Thayer students led activity stations—including building and racing cars that use water as fuel (above)—and shared their experiences in STEM. "I attended a similar event when I was in middle school, and it really sparked my interest in pursuing engineering," says organizer and SWE board member **Abigail Hughes '25**. "I'm proud SWE was able to pass the same great experience to the next generation of emerging engineers!" It was the type of community effort that earned Dartmouth Engineering a silver award—the highest level of distinction—from the American Society for Engineering Education (ASEE) Diversity Recognition Program. Thayer was recognized for its representation of women among faculty and graduate students as well as "commitment and efforts made toward infrastructure, recruitment and access, community engagement, and retention and success," according to ASEE. At Thayer, female faculty comprise nearly 25 percent of engineering faculty, exceeding the national average of 19 percent; students comprise 47 percent of students enrolled in master's programs, exceeding the national average of 30 percent.

SHYAM MANNETI TH'23

INVESTITURE BY THE NUMBERS

90
Bachelor of Arts in Engineering Sciences

89
Bachelor of Engineering

52
Master of Engineering Management

14
Master of Engineering

4
Master of Science

21
Doctor of Philosophy

"We all have a world of potential within us—it just takes a little trial, error, and iteration."

—VANESSA PINNEY '21 TH'22 TH'23, INVESTITURE SPEAKER

INVESTITURE

"We Serve Humanity"

Dartmouth Engineering's 2023 Investiture ceremony June 10 at the West End Circle honored graduating BE, MEM, MEng, MS, and PhD students through the presentation of academic hoods, caps, and awards. This year's ceremony included several milestones—the celebration of the 1,000th MEM graduate since the program's inception, the 50th anniversary of the first women to earn a master's in engineering from Dartmouth, and the second time since 2016 women earned more undergraduate degrees than men. Below are highlights from the keynote address by Gilda Barabino, president of Franklin W. Olin College of Engineering.

"MY TEACHING AND RESEARCH MANTRA IS TO LOVE, act, discover, and innovate—or LADI. 'Love' isn't a word we hear a lot in engineering, but it must be at the heart of everything we do. One of the pledges of the professional engineers' creed is that we serve humanity. I quote, 'Engineers shall place service before profit, the honor and standing of my profession before personal advantage, and the public welfare above all other considerations.' Service before profit, public welfare above all other considerations—that's love. It's love for our profession; compassion, empathy, and love for our fellow human beings; and love for our entire planet. …

"What can we learn from other planets, what kind of scientific answers can we discover to help us understand life here on Earth? I believe that you, Dartmouth engineers, will turn the impossible into possible! Ultimately, engineering, science, exploration, and discovery are about raising humanity's potential. Investment in science, research, and technology helps reimagine our energy distribution systems, helps cure disease and feed the world, and enables exploration of the oceans and planets. Your research, your technical ideas and inventions will expand the horizons of human possibility, lifting us all up!

"As an aerospace engineer and rocket scientist, I have come to understand how critical bringing together many viewpoints, voices, and perspectives is to addressing society's biggest challenges. I have spent my entire career dedicated to furthering STEM education, but to make it more inclusive—to really encourage anyone of any background to engage with this field—I like to put a different spin on it: I call it STEAMD—I bring in the arts, I bring in design. Design and the arts are an integral part of how we explore, innovate, and embrace novel ideas. Sally Ride, the first American woman to travel into space, said, 'You can't be what you can't see.' Looking at all of you here today, I see the future."

STUDENT LIFE

Campus Leader

WHEN ASKED ABOUT THE ROOTS OF HER MILITARY and academic pursuits, biomedical engineering major Karina Mitchell '23 mentions her father, a civil engineer serving in the U.S. Army. "I have a core memory of my dad's deployment … and then the joy of him coming home safe," she says. "I look up to people in my family who were in the military because they taught me the importance of being willing to serve outside yourself."

She followed in the footsteps of her father and grandfather, a Navy veteran, as company commander of Dartmouth ROTC, where she leads the College's 13 cadets. As co-captain of the women's varsity basketball team, Mitchell is focused on creating a community and culture. "That starts by helping people become accustomed to living a championship lifestyle," she says. "A pillar of my basketball career has been leaving this place better than I found it."

When not on the court or in the classroom, Mitchell can be found in Professor Katie Hixon's tissue engineering lab. There, she studies wound care, "which is especially applicable to both the Army and athletics," she says. "Using biomedical engineering, we can develop products that surgeons can use to heal soldiers and athletes." Mitchell, who was commissioned into the Army the day before Commencement in June, plans to complete graduate work in biomedical engineering before pursuing a career as an orthopedic trauma surgeon in the military.

"Using biomedical engineering, we can develop products that surgeons can use to heal soldiers and athletes."

—KARINA MITCHELL '23

DON HAMERMAN

From left:
Professor Petra Bonfert-Taylor,
Adrianne Gowie Th'27,
Dean Abramson,
Abby Hughes '25,
President Beilock,
Melody Cruz '25,
Professor Vicki May,
Micah Green '25,
Professor Laura Ray

THE ROUNDTABLE

"A BRAVE SPACE"

PHOTOGRAPHS BY ROB STRONG '04

PRESIDENT SIAN LEAH BEILOCK AND DEAN ALEXIS ABRAMSON GATHER WITH FACULTY AND STUDENT LEADERS TO IMAGINE A MORE INCLUSIVE, WELCOMING FUTURE.

Dean Abramson invited new Dartmouth President Beilock and engineering faculty and student leaders to a roundtable this summer to talk about the future of leadership. The conversation took lively turns—into issues of changing culture, the importance of diversity, challenging others, and welcoming different perspectives. Joining the conversation were Professor Petra Bonfert-Taylor, associate dean for diversity and inclusion; Professor Vicki May, engineering education program lead; Professor Laura Ray, senior associate dean for faculty development; PhD student and GEM Fellow Adrianne Gowie; Melody Cruz '25 of the Society of Hispanic Professional Engineers; Abby Hughes '25 of the Society of Women Engineers; and Micah Green '25, co-president of the Dartmouth Black Students Athletes Alliance and member of the Greek Leadership Council. (A full transcript, along with audio, is available at www.dartmouthengineer.com.)

ABRAMSON: Let's start our discussion with President Beilock. You're the first woman president of Dartmouth, but just as importantly, you bring significant experience in higher education, previously as a college president at Barnard, as vice provost and professor, and as scientist and researcher. Can you talk about how those roles have shaped you and how you would describe yourself as a leader now?

BEILOCK: Something I bring to what I do as a leader is really embracing that I have multiple selves. I'm a president, I'm a researcher, I'm a mother, I'm a woman—all of those things come into what I do. Oftentimes, leaders only want to focus on the fact that they are in a leadership role, but I think all those aspects of myself are important to who I am and how I lead. And we know from psychology research that having these multiple selves can be really important. When I have a horrible day as a president, I can go hug my daughter and feel better. And when I'm a horrible parent, which happens all the time, according to my 12-year-old, I can think about some of the other things I do. I bring this perspective that having many dimensions of yourself is really important for your own health and well-being and for how you think about the world.

ABRAMSON: We think about our faculty and staff and student who also represent many diverse populations, various backgrounds and experiences, cultures that they bring when they come to work and to school every day. Can you speak on how Dartmouth can lead in helping to prepare our diverse population of students and thinking about engaging diverse faculty and staff? How can Dartmouth lead to help us all work together to solve the world's current and future challenges?

> **"Diversity of thought and lived experience ... is key to what we do on our campus."**
>
> —PRESIDENT SIAN BEILOCK

BEILOCK: The data are really clear that the best ideas come when you get people with different perspectives and different lived experiences at the table feeling they belong and can push at each other. I talk a lot about creating what I call a "brave space," a space where we feel we can make mistakes, where we feel not everyone has to think the same way we do, where it's okay to have very different points of view and still be close with someone. I think Dartmouth can really be a leader here. One, because of our size and scale, we're tight-knit, we do this across faculty, students, and staff; and another, because we attract such great students from all over the world and help them be here, regardless of their means. I think this notion around embedding a brave space in everything we do, from in the classroom to the research lab, can make Dartmouth stand out.

ABRAMSON: Micah, building off what President Beilock has shared, can you share some examples from your experience at Dartmouth or in your life where diversity and taking advantage of the amazing community we have here has influenced you and what you're choosing to do?

GREENE: I think one example would be my [ENGS 33: "Solid Mechanics"] class. We had to construct a wooden bridge and test force loads in the middle of the bridge. My group had a person from Canada, a person from Germany, and then myself, being from Indianapolis, I'm kind of the Midwestern person. We would talk about stuff outside of the project, like life in general, how the day was going, what they do, and even the fact that their first time in America, up here in Hanover, is a challenge. Their perspectives were very beneficial for me because being from Indiana—I went to public school, I did a lot of programs throughout middle school and high school—it was kind of normal for me to be in this type of setting. It was interesting to hear their perspectives on the project and life in general.

ABRAMSON: And how was your bridge? Did it withstand the weight?

GREENE: It definitely stood the weight: We had to hold 1 kilonewton, and we held 11.

ABRAMSON: Abby, how about you?

HUGHES: One experience that comes to mind is my time in [ENGS 21: "Introduction to Engineering"] with Professor Vicki May. I was in a cohort of four women in a project on improving access to rural cooking methods through a stove that reduces smoke output. Being on that team of all female peers was something I was excited about and hadn't encountered in my other experiences with engineering prior to coming to Dartmouth.

Something I've [also] really tried to push forward is my experience in the Society of Women Engineers. In May we put on an event called Women Engineering Day, which was sparked from an experience I had in middle school back home in upstate New York. We had students from

middle school to high school come on one Saturday to Thayer and we put on different activities in structural engineering with a spaghetti challenge and we talked about polymers with slime. That was just an impactful experience to be able to give back to the community I was able to benefit from.

ABRAMSON: So, Vicki, when you think about the teams you have overseen over the years, how has diversity played a role in the team effectiveness or the actual product they end up building?

> **"I'm very mindful when I step into leadership positions to incorporate different ways for people to voice their opinions."**
>
> —MELODY CRUZ '25

MAY: I would say the more diverse teams definitely have better projects. Abby's team was all women, but it was diverse on a lot of other scales—and I think that was part of the reason you were so successful—from different countries, different backgrounds. Some had human-centered design experience; some were totally math geeks. But it fit together. It is something I try to engineer in my teams. I often say I don't need an engineering degree, I need a psychology degree. I try to get to know the students and figure out their interests and [create] teams that have common values and interests but then are diverse on skill sets and tools and the way they look at problems. I stole that from Scott Page [author of *Difference*], who says the same thing. I do try to match interests, but then diversify, especially on the skill sets.

ABRAMSON: So having these diverse teams helps you identify the real needs of humans and come up with solutions in a more efficient and effective way.

BEILOCK: I think it's not just from the research and my experience as a leader, it's not just having different people at the table, it's really creating an atmosphere where you feel you can say, "No, I don't agree with you" or "I don't think that's the way to do it." I'd love to hear from some of the students who took this course, did you have experiences like that where you had to negotiate and go back and forth to get to the right outcome?

GREENE: I can talk about that. Now I'll bring in football. Me and my teammates, we have conflicts every single day. We like to talk about controversial issues and a lot of people have different political views and social views. It's ultimately good to hear different perspectives. Conflict is what drives change. We never really agree with each other, and that's why we become closer and find solutions to problems. Having somebody who opposes you and being willing to challenge them and talk things through is what's most important in growth, because when you don't do that, people don't listen and they don't understand the other side of things.

BEILOCK: And your ideas don't get better. You don't have to agree in the end but having to try and convince someone else of your point of view is such a good exercise in understanding how you think about an issue as well.

GREENE: One hundred percent.

BEILOCK: I think it goes to this idea that it's okay to be uncomfortable sometimes; that's how you learn and change. I'm uncomfortable constantly, but you have to lean into it somewhat because that's how we get better at things. Are you uncomfortable?

ABRAMSON: All the time.

BEILOCK: I think it's important to have our professors and our leaders talk about that. Oftentimes, students think, oh, your path was linear and you knew what you were doing. I can tell you I had no idea what I was going to do when I was in college. I had eight different majors my first year. I had no idea. And I think we often perceive people who are in positions of power as sort of having it all, knowing what's going on. One of the ways that leaders fail is when they don't have people who are pushing at them, who are saying, "No, I don't believe in your idea" or "You need to look at this or that." It's that kind of input that leads to the best outcomes.

CRUZ: In terms of incorporating a diverse leadership, it's also important to have people from underrepresented backgrounds because you have to be very aware of contextual cues. Some people may veer more toward agreeableness. So even though they may have a challenging thought, they may feel uncomfortable voicing that. I veer toward agreeableness, so I'm very mindful when I step into leadership positions to incorporate different ways for people to voice their opinions—maybe staying a little after the meeting and chatting to someone one on one or, if you see a newcomer in a group project or a club meeting, going to the corner and saying hi.

BEILOCK: I love that, Melody. I think it really makes clear the onus is on the leader to get the best out of everyone. And that means there's not just one way to do it. So for me, for example, when I'm going to have a senior team at the table talking about something, I often pull people who I know might not be as likely to talk in the meeting ahead of time and ask them for their opinion or I'll send them an email afterwards. I think it's really the leader's responsibility to figure out how to get the best out of everyone. And it's not just one size fits all.

HUGHES: That really reminds me of my experience as a trip leader at Dartmouth for our first-year orientation. I've always thought the best leaders are not the ones in front walking steadfast ahead; it's the people behind with their arm around someone navigating as a group. There were times when these really excited but nervous, brand-new students were just trying to navigate these new experiences and relationships and also hike the Appalachian Trail for three

days and sleep under a tarp and get rained on. I was able to go back and talk to the students that were a little bit quieter or reserved and make sure that they were feeling included and excited about taking on that journey.

ABRAMSON: That sense of belonging—which I think we'll always be working on, how do we better make everybody feel included and that they belong—is so important to their success and to the success of whatever it is they're trying to achieve.

GOWIE: I wanted to make a comment on belonging because this is the first time I've moved away, even though I did an undergrad degree and a master's degree before this. I think Dartmouth and Thayer make an excellent effort to make sure that everyone feels included. And I love that there are so many women. I used to be the only woman in any given room coming from a mechanical engineering background, so it's nice to be surrounded by other females and other ideas and it's just very encouraging and uplifting. I feel very united in community here.

ABRAMSON: That's wonderful to hear. And now you're doing the PhD program with Professor Baker. From a research perspective—research being one of those areas where we need diverse perspectives digging in and trying to solve the world's problems—can you talk a little bit about the importance of diversity in research?

GOWIE: I love being in Dr. Baker's lab. I think his lab is the biggest group we have at Thayer, and there's a lot of people from a lot of different backgrounds. If I'm having an issue completing a task, I can ask any one of my peers to show me how to mill a powder or analyze a sample, which were all new things to me going toward a more materials focused major here.

BEILOCK: I always thought graduate school was about figuring out who around you could help you do things because you can't do everything yourself. As a cognitive scientist, I talk about it as distributed cognition: Your brain and everyone's brains are what lead to an outcome. And so maybe you don't have to be the expert at milling a powder, there's someone who can help you. And the idea is to figure out how to rely on those people around you so you can get to the best outcome.

GOWIE: I would say collaboration is definitely the biggest part of graduate school because no man is an island. I've realized that if I don't ask questions, I'm not going to get that much done.

ABRAMSON: So true. We have a lot of shared resources here and a lot of collaboration across departments to make our community feel a lot stronger in all these different ways. Petra, you are leading our new strategic planning effort around diversity, equity, and inclusion. I'm curious, what rings true for you when you hear these comments?

"I love the feeling of belonging … it's the culture that we need to build to then support the diversity we want to see."

—PROFESSOR PETRA BONFERT-TAYLOR

BONFERT-TAYLOR: Everything rings true. It's wonderful to hear all the voices basically echo what we are trying to work on. I love the feeling of belonging, which is one of the most important things we're working on. It's the culture that we need to build to then support the diversity we want to see around the table; we can't just bring diversity in and hope for the best. Hearing the voices of diverse teams and experiences on diverse teams, feeling included in the research group, working together as a community, it's wonderful to hear.

I speak from a lot of experience myself, having come from an international background. In my former life, I was a mathematician, and so I have seen a different style to approach problems and I can now compare these two different styles of approaching problems—working on your own and making sure it's perfect before you talk to anyone about it versus collaborating, giving it a try. And even those diverse perspectives help in making sure everybody can feel included because not everybody thrives from the same methodologies.

ABRAMSON: We're thinking about changing our approach to undergraduate education and what we need to be doing differently as the world changes. So maybe you can talk a little bit about the future of undergraduate engineering education and what you're working on.

BONFERT-TAYLOR: I try to take a lot of inspiration from how I learn best. How do I learn best when I have a new car, for example. Do I really read that entire manual first and then start driving the car and remember everything I just read or do I get to the gas station and don't know where the gas cap is or how you open the gas cap? Experiential learning—that's how I learn.

We're developing this new pathway into the major that incorporates the math in a just-in-time fashion rather than in just-in-case fashion. So the math is introduced in an engineering context—this is why we're going to need this math concept. We're trying to build this bridge and we need to measure, we need to predict how strong it's going to be. How are we going to do that? The math is going to be introduced in a context is much stickier in your brain than something that's front-loaded.

BEILOCK: I love that. And it follows so well from psychology research showing that when you have some sort of idea about why you're learning something, you remember it better. Having some idea and direction and purpose for what you're learning can be helpful in terms of how you understand it, how you remember it, how you apply it, and how you make meaning.

ABRAMSON: Laura, maybe we can turn to you. Can you talk a little bit about your experience as a faculty member here and how diversity has played a role?

RAY: When I came to Dartmouth in 1996, we had a woman dean. I was one of three women on the faculty, plus the dean. And I thought, hmm, okay, 10 percent, that's about what my undergraduate class size was in terms of number of women. And it wasn't as collaborative back then for me. I had to find my collaborators over time, and they really did help shape my career at that point. Over time we hired more women [and] we've seen a significant growth in diversity of our student body, including the recent decision to and means to provide support to international students' financial aid.

> **"Conflict is what drives change … having somebody who opposes you and being willing to talk things through."**
>
> —MICAH GREENE '25

My own college experience has played a role in how I advise, how I teach. I was a first-gen student. I walked into my first physics class not very well prepared at all; you had to figure it out on your own, kind of in isolation. Now, I often have advisees who are also first-gen students in these very difficult prerequisites and they're struggling. I tell them [about] the first midterm in physics I failed. And I say, "Some of your classmates have taken calculus in high school over one or two full academic years, and you're compressing that all into 10 weeks." And they say, "Oh, I get it." And I think it gives them that boost of confidence. It's not them, it's really the time span and what's being demanded of them.

ABRAMSON: I also want to talk a little about the Supreme Court ruling on affirmative action.

BEILOCK: First, I think it's important to point out that people can have different points of view about the Supreme Court decision. Part of my goal as a leader is to create a big tent where we can have those conversations. But aside from that, or above and beyond that, what I want to underscore is that diversity of thought and lived experience—which includes racial diversity—is key to what we do on our campus. Of course, we'll comply with laws and rulings, but I think it puts the onus on us as an institution to be even more creative in terms of how we go out and build our class and ensure we get those diversity of perspectives and lived experiences at the table. It is okay to have different views on the case, but what is nonnegotiable, in my mind, is that a diversity of lived experience, a diversity of thought, diversity of people leads to better outcomes. We are an institution focused on academic excellence and impact. As part of our mission, we have to continue to ensure we have those differences around the table, that people feel they belong, that people feel they can have different opinions, push at each other to get to the best answers.

ABRAMSON: At Thayer we take a human-centered approach to engineering, and that means we really focus on the needs of the people, of society, of the planet at our center of the education we deliver and the research we do. Often that also calls us to think about more than just the science or engineering but who and what is really at the center, what are their needs? Who and what might we be forgetting? So maybe we can talk about the bright future ahead and what that might look like when leaders and decisionmakers include more insights and voices of the people around this table, the people in our community.

CRUZ: I think a lot of the most pressing issues that affect our society are super complicated and don't have one tangible root cause or one solution either. So having a diverse body of people in leadership allows us to tackle complex issues through different lenses and address the many different ways in which they intersect.

HUGHES: I agree a diverse range of perspectives and a breadth of epistemologies deserve to be valued. [For example] my experience with the Dartmouth Energy Justice Clinic has been exciting. Just as energy issues are changing rapidly, so too are issues of access. In that clinic we're able to speak with community members, Indigenous leaders and work with well-renowned practitioners and researchers to consider the non-technical aspects of the energy transition.

BEILOCK: I just want to point out that this group here is the kind in which problems get solved. I don't know any other institution in the country that would bring undergraduates and PhD students and professors and the dean and the president together to have a conversation about this. This is an example of what makes Dartmouth so special, that faculty work with students, that we're thinking alongside each other. It's a perspective of different generations that comes together to impact what we do as well, which is pretty cool.

ABRAMSON: When you think about the future of Dartmouth, what are some of the things we could be doing to make the world a better place?

BEILOCK: I'm here because I see a powerful institution that can do even more. As Melody said, there's lots of sticky problems that we're dealing with and lots of opportunities and challenges in our future. And those challenges are going to be solved at intersections. It's not just mathematicians sitting in a room by themselves; it's not just humanists. It's people thinking in a human-centered way about how we work to make our planet sustainable, how we think about income inequality, how we think about international security, how we think about everything from digital health to bioengineering. And I really do believe that Dartmouth's size and scale makes us especially well poised to be a leader on a lot of these intersectional challenges.

ABRAMSON: Absolutely. Well, thank you everyone, I think more conversations to come because these are critical to help us all think how we can work together to have even greater impact on the world.

AFTER HOURS

The West End is buzzing. It's a late spring night at the end of term and students majoring in engineering, computer science (CS), and more are making the most of the complex's resources. They're powering up spiders in the Reality & Robotics Lab, tinkering on final ENGS 21 prototypes in the Couch Project Design Lab, and classifying lung obstructions in the Analog Lab. The recently renovated campus at the end of Engineering Drive is designed to encourage innovation without boundaries. The addition of the five-story Class of 1982 Engineering and Computer Science Center (ECSC) on one end and the Arthur L. Irving Institute for Energy and Society on the other, connecting with walkways and tunnels through MacLean and Cummings Hall, ensure a smooth transition between disciplines. "Everything—from the floors to the furniture and to the tools in every classroom—encourages connection, creativity, collaboration, and active learning," says Dean Alexis Abramson. Perfect for powering student efforts beyond the 9-to-5.

PHOTOGRAPHS BY ROB STRONG '04

In the Materials Processing Lab, mechatronics major Micah Green '25 creates alloy samples. He and fellow members of his ENGS 24: "Science of Materials" student team will laser treat the samples into low-melting-point optical fibers later that night.

➤ *Biology major Hannah Spindler '23 and human-centered design majors Danni Lu '25 and Sasha Fear '26 gather in Couch Design Lab II to work on their final project for ENGS 12: "Design Thinking." They were developing a web program to connect freshmen with alumni for short-term job shadowing opportunities.*

➤ *In the Irving Institute atrium, economics and geography major Jaime Chuidian '23 works on a final paper examining electric vehicle markets and how incentives vary by state. Located between Thayer and Tuck School of Business, the 55,000-square-foot institute has become one of the more popular study spaces for students across all disciplines since it opened last year.*

➤ *BE students Gebriel Belaineh Th'23, Walter Mwaniki Th'23, and Phyo Kyaw Th'23 put final projects through their paces for ENGS 26: "Control Theory."*

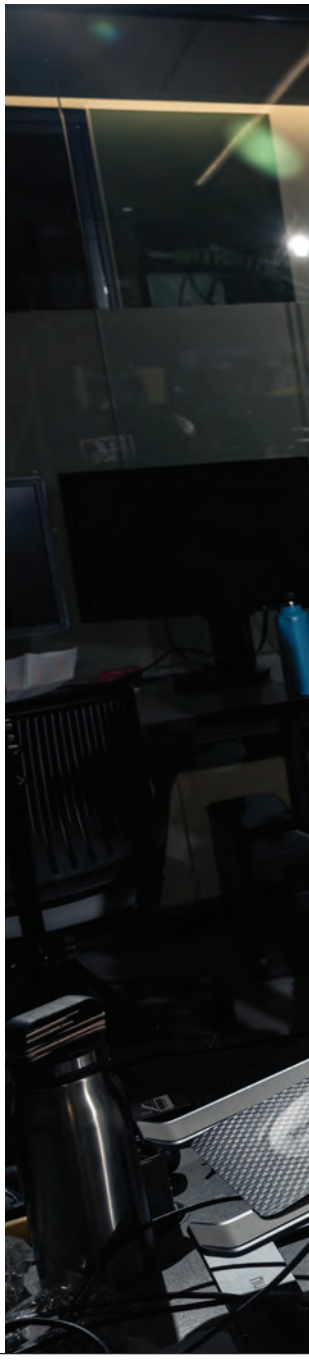
➤ *In the ECSC atrium, Meghan Kerfoot '26 interviews Amaya Bonn '26 and Lily Chabica '26 for a "need" video on the problem of food waste on campus for ENGS 12: "Design Thinking."*

➤ *Engineering physics major Neo Cai '25 finalizes his team's design for ENGS 21: "Introduction to Engineering" in Couch Project Design Lab. Given a "play and games" theme by Professor Elizabeth Murnane, Cai and classmates Janelle Annor '24, Eva Ferrari '24, Maria Cristoforo '24, Claire Green '25 designed a post-workout muscle roller for athletes. The team began by studying research by Professor Douglas Van Citters '99 Th'03 Th'06 to determine ideal roller time, then developed a foam prototype with a 12-LED strip that starts glowing red and transitions to green when the ideal one-minute cycle is complete.*

➤ *CS major Devon Starr '25 (near left photo) studies in the Digital Applied Learning and Innovation (DALI) Lab, where he is a developer.*

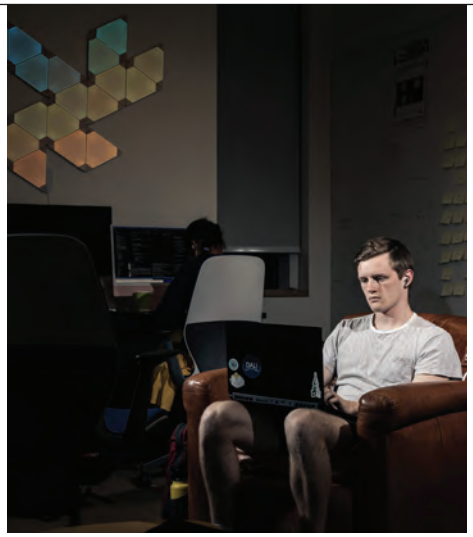
➤ *In the Cable Makerspace (middle), engineering major Ericka Tamayo-Guevara '24 uses a 3D printer to create pieces for a box with a clear acrylic lid.*

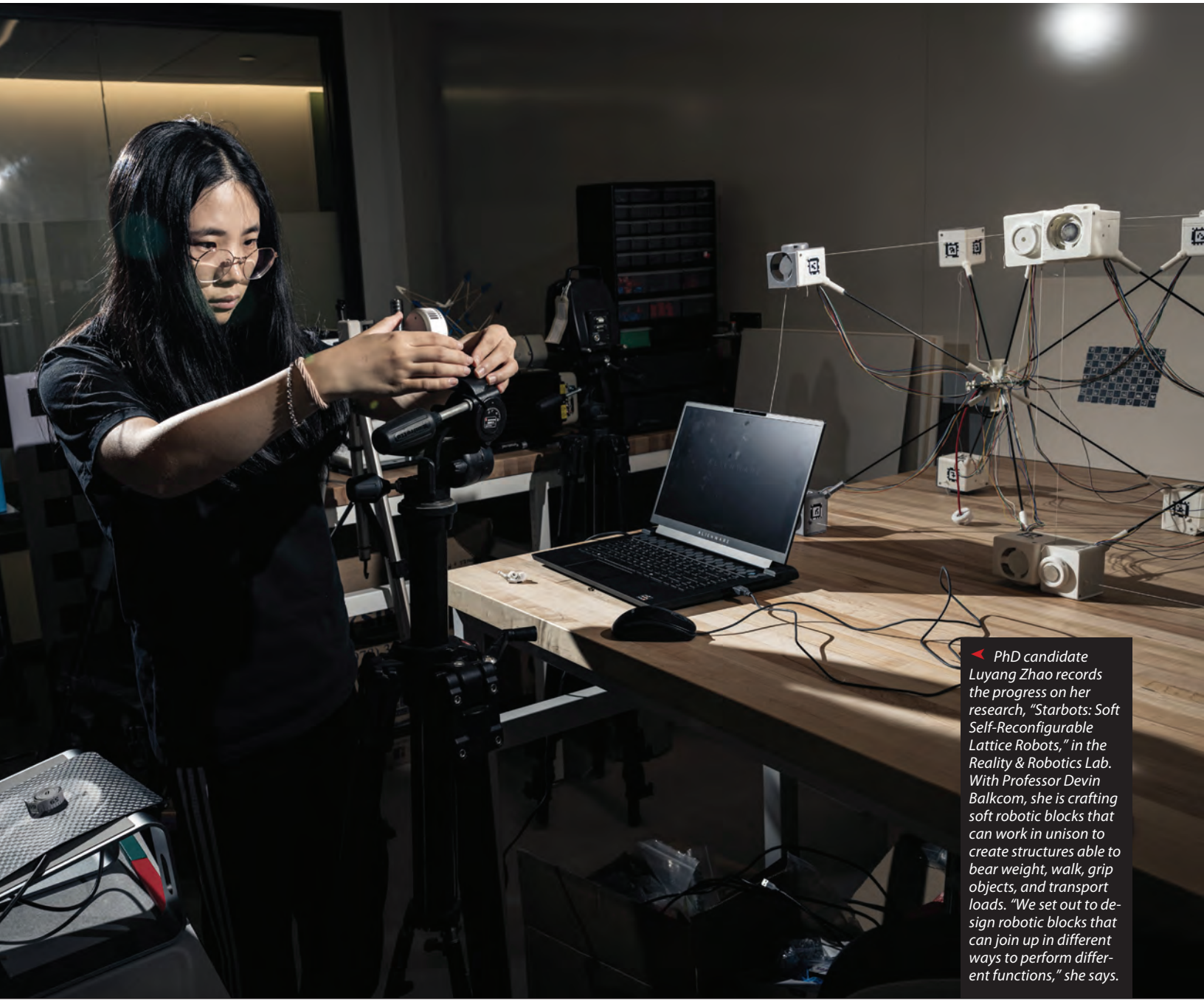
➤ *Across the room in Cable, CS major Harold Than '23 (far left) finalizes the walking dinosaur he created to study the mechanics of joints and rotation.*



➤ *In the Irving atrium, Shaochen Shi '25 writes a final paper on Sparta excavation sites for his archaeology class, "Rediscovering Sparta." "I like the study space," says the classics major.*

➤ *Two members of the Robotics Club—CS and digital arts major Ian Kiplagat '25 and CS and neuroscience major Edwin Onyango '25—work on a spider robot as a "simplified" way to study locomotion. The new Reality & Robotics Lab in the ECSC supplied all the tools and parts needed to get the prototype moving.*





PhD candidate Luyang Zhao records the progress on her research, "Starbots: Soft Self-Reconfigurable Lattice Robots," in the Reality & Robotics Lab. With Professor Devin Balkcom, she is crafting soft robotic blocks that can work in unison to create structures able to bear weight, walk, grip objects, and transport loads. "We set out to design robotic blocks that can join up in different ways to perform different functions," she says.

"It's about taking an innovative scientific idea and turning it into a drug that ... gets the world believing, hey, we actually might have something that can help cure cancer."

ON TARGET

BY THERESA D'ORSI

Saryah Azmat '11 Th'11 galvanizes investors, big pharma, and biotech in targeted drug therapy efforts to solve one of the world's greatest healthcare challenges.

The biomedical engineering major is driving the direction of next-generation cancer treatments with a tireless effort to link researchers with resources. Previously Bristol-Myers Squibb's global oncology business development lead, Azmat now guides a more collaborative approach as CBO of San Diego-based Turnstone Biologics. Azmat determined to pursue cancer research after losing her father to gastric cancer when she was 11. At Dartmouth, she studied tumors as a Howard Hughes medical intern and therapeutic targets for pancreatic cancer as a Presidential Scholar, then entered the healthcare industry as a consultant to global biopharma clients. Fast-forward a dozen years and she's managing teams to support a pipeline of cancer immunotherapies, directing theoretical advances toward applications. "It's important for me to drive the science to move the needle in a real-world setting and not just as an academic exercise," she says.

What is your role as chief business officer?

One of the primary functions is business development. Turnstone is focused on developing immunotherapies for oncology, specifically tumor-infiltrating lymphocytes (TILs). Our lead TIL product is currently in a Phase I clinical study, and we also have a pipeline of preclinical programs. So, I think strategically about partnering opportunities, whether it's talking to big pharma partners to ask, "Are you interested in collaborating on or licensing our technology?" or seeking out strategic collaborations with other biotech and academics, saying, "We have certain specialized expertise and you have certain specialized expertise so why don't we partner together, share some financials, and really develop an asset together." We do a lot of that work because it's not efficient to always own and develop every relevant technology in the space. We can tap into so much more innovation if we can leverage another partner's complementary technology or expertise.

I also spend a lot of time working on our corporate strategy and financing initiatives. The focus here is to help potential investors better understand our technology, data, overall vision, and positioning so we can continue to raise capital to develop our assets. It's important to be able to break down the science and help investors understand our story and why our technology has the potential to be transformative for patients.

The other side of the business, which I have evolved into over the course of the past two years, is the operational side. I have program leadership and management reporting to me, [areas] driving cross-functional teams to advance our programs. We've got research, clinical, manufacturing—and they need to operate as a single team so everybody is talking to each other and joined at the hip and moving things forward. We want to make sure we're talking about all the right risks and all the right mitigation strategies.

What drew you to Turnstone?

When I joined at the end of 2019, the company was very interested in accelerating its strategic growth. I was coming from Bristol-Myers Squibb, where I looked at hundreds and hundreds of oncology companies over the course of several years. My first goal at Turnstone was to see if we could expand our portfolio and have multiple technologies—because cancer is a hard problem, and you may need multiple shots on goal to be able to solve this.

Most of 2020 I spent seeking out and reviewing technologies we could add to our portfolio that would be synergistic and transformative for the company. My efforts culminated into a transaction around a small company that was developing a TIL technology. It was still very nascent and in preclinical development at the time. We acquired that company, integrated the technology into our portfolio, and advanced its development into the clinic. Fast forward to today and our leading clinical asset is based off this TIL technology and is the biggest value driver for the company.

What are some of the qualities you look for in a collaborator or investor?

It really depends on who you're collaborating with. When it comes to academics and biotechs, it's really about innovation. Are they doing something that's exciting that we couldn't do ourselves? Can we collaborate to develop a better asset and a better program for cancer patients?

"Cancer is a hard problem, and you may need multiple shots on goal to be able to solve this."

—SARYAH AZMAT

» Azmat led Turnstone's recent acquisition of Myst Therapeutics with ongoing input from Mike Burgess, chief medical officer.

When it comes to pharma partners, it's very different. Are they interested in taking risks and driving toward novel, complex therapies? Most pharmas like to keep it simple, such as small molecules and antibodies that are easy to manufacture. But to drive the next wave of innovation, they need to have an appetite for complexity—we've tried the simple solutions for cancer and many of them don't work after decades failure.

The investor mindset differs. Venture capitalists have to believe, fairly early on, in the potential of not only the science, but also the vision of the company to bridge the gap between early innovation and when the science may be mature enough for pharma or the public markets to be interested in funding further development. When pharma evaluates an opportunity, they are thinking, "If we invest in developing this therapy today, can we commercialize in five, 10, or 15 years?" The investor time horizon is shorter in comparison, typically less than five years. Ultimately, biotech investors take the risk early because they share in your vision and believe what you're doing is going to generate something that has meaningful value for patients and, subsequently, value from a financial perspective.

What characteristics define your industry?

The most important one for me is that people are still passionate about developing new treatments for cancer after decades of failure. I know that throughout my career I'm probably going to fail 10 times over. But that's okay because I'm resilient—and I love that resilience in the industry as well. I think there's no amount

of money or value you could put on helping a single patient and changing how they've experienced cancer. I lost my father to cancer when I was 11 years old. He was diagnosed six months before he died; the time from his diagnosis to his death and the journey after that was incredibly difficult and quite traumatic for me, particularly at such a young age.

It's a big part of what has made it my life's purpose to save someone else from the pain of losing a parent or a loved one to cancer. But the other part of it is the intellectual problem, the magnitude and complexity of what cancer is. And what good intellect doesn't like a really complex problem to solve? So, what gives me hope is the level of excitement, commitment, and innovation around solving this complex problem, to help patients, and to work for something that is bigger than all of us.

What's your favorite part of the process in getting to where you are today?

When I was at Dartmouth I was purely focused on the sciences. I thought I was going to become a principal investigator and discover the cure to cancer in a lab somewhere. But what's drawn me to where I am today, and what keeps me hungry for more, is the intersection between science and business. It's really about taking an innovative scientific idea and turning it into a drug that can treat a patient—and that requires connecting a lot of dots across the scientific and business side—and gets the world believing, hey, we actually might have something that can help cure cancer.

For me, it's been more than a decade of evolution and learning to really understand how to turn a cool scientific idea into a drug. It's a very expensive business and a painstakingly long process to yield results that by default have a higher chance of failure than success. It takes hundreds of millions invested across several decades and a whole army of expert drug developers to go with it just to develop a single drug. And the sad part is you know that there will be numerous setbacks along the way. As an industry, we just don't understand enough about the human body and biology to be able to predict what's really going to happen in patients in the clinic. So, there is still a ton of progress that needs to be made, and we have our work cut out for us. Therein lies the opportunity to develop better and more efficient solutions.

How does your engineering mindset help?

I think the mind of an engineer is always looking for the most efficient way to solve a problem, and it is always paired with a thirst of knowledge to better understand all systems involved. My focus has always been to learn as much of the technical subject matter I can—across both the science and business side—and then come up with the most efficient solution to solve the problem at hand. My time at Dartmouth was really foundational at helping me develop this skillset. I had the freedom to dive into the more traditional cancer biology and pursue lab-based research to really understand cancer as a disease. At the same time, I was building a rigorous problem-solving skillset across the standard engineering disciplines. Ultimately, I combined both in a way that has helped me build a path to where I am today.

I have a fierce passion for science and an unrelenting personal commitment to advancing cures for cancer—and it's important for me to drive the science to move the needle in a real-world setting and not just as an academic exercise. I am always trying to connect the dots. Oftentimes I'm thinking, "Hey, this is a really interesting technology. What if we combine this with this? Could that transform the end result?" The nature of business development is connecting the dots—but I also do it on the corporate and investor level. I'm always trying to distill what's most meaningful and what's most powerful for each audience. That's where the magic happens.

What do you see on the horizon that gives you hope?

Whether it's five years, 10 years, or 100 years from now, it is wonderful to think that it will be on our shoulders that others will be standing, just as we are standing on the shoulders of those that preceded us. That speaks to the enormity of the problem that is cancer and how it necessitates the collaborative nature of what we do and the patience for how long it can take. Every single person in this field knows they alone cannot solve this problem. They know it requires teamwork. This is why pharma collaborates with biotech, why investors put money in, why academics still do research.

We're all figuring out imperfect ways of working with each other. Yes, we're trying to differentiate from our competitors, but if you think in macro terms, we're still all on the same team, we're all still trying to cure cancer. And it's going to take a lot of really bright minds and a whole heck of lot of money to solve this problem. And if we fail, it's okay—you pick yourself up and you keep pushing forward. Because the solution is out there, and we will find it.

Alumni News

FROM AROUND THE WORLD

spotlights

The Energy Futurist

Energy technology and policy expert **Rose Mutiso '08 Th'08**—research director for the Washington, DC-based think tank Energy for Growth Hub and cofounder of the Nairobi, Kenya-based Mawazo Institute—has earned the 2023 McGuire Family Prize for Societal Impact. "The thing that connects everything up for me is the power of science and innovation to solve big problems," says Mutiso. The $100,000 prize, established through a gift from **Terry McGuire Th'82** and **Carolyn Carr McGuire Tu'83**, recognizes members of the Dartmouth community who are making a significant positive impact on humanity, society, or the environment. "I'm hopeful the prize can help bring more attention to the issues I work on: amplifying African voices and agency in the shaping of Africa's climate and energy future." From Thayer, Mutiso earned her PhD in materials science and engineering at the University of Pennsylvania and pursued a postdoc through the American Institute of Physics and the American Association for the Advancement of Science, working on energy and innovation policy issues in the U.S. Senate, followed by a senior fellowship at the U.S. Department of Energy. But she never forgot her Kenyan roots. With classmate **Rachel Strohm '08**, she cofounded the nonprofit Mawazo Institute, which supports early-career female researchers. Her current work at the Energy for Growth Hub centers on "using data and evidence to help solve the twin crises of climate change and energy poverty in developing countries," she says. "This incredible honor inspires me to look forward and ask myself: What can I do with this to inspire others, in particular those with nontraditional backgrounds like me, and to further the work?"

"The thing that connects everything up for me is the power of science and innovation to solve big problems."

—ROSE MUTISO '08 TH'08

The Deconstructionist

His research into cellulosic biofuels with Professor Lee Lynd's group earned **Matthew Kubis Th'23** his PhD—and some insights into more efficient industry processes. "Efficient deconstruction and conversion of inedible plant biomass, 'lignocellulose,' is critical to decarbonizing the energy system," says Kubis. However, this biomass resists deconstruction, typically requiring energy- and capital-intensive thermochemical pretreatment. For his thesis, Kubis evaluated the use of a thermophilic anaerobe, Clostridium thermocellum, to deconstruct and convert lignocellulose without costly thermochemical pretreatment. In addition to characterizing the biological conversion, Kubis also developed a novel bioreactor design and assessed the economics and emissions of adding carbon capture and storage technologies to cellulosic biofuel production at an industrial scale. Next up: He is focused on making ethanol from industrial emissions as an R&D process engineer at LanzaTech.

MARK WASHBURN

Matthew Kubis Th'23 ▶

Board Updates

The Dartmouth Engineering Board of Advisors honored one long-term member for his service while welcoming another member this summer. The board celebrated the 24 years of service of **Edward "Skip" Stritter '68** at its May meeting. A math major at Dartmouth, he went on to earn MS and PhD in computer science at Stanford before working as chief architect of the Motorola 68000, the first 16-bit microprocessor. This is the chip that powered the Apple Macintosh from its launch until the last few years and on which the workstation industry was built. He went on to found MIPS, NeTpower, and Clarity Wireless. Dean Alexis Abramson also recognized his commitment to underserved communities: "As founder of VillageTech Solutions (now Looma Education Co.), you have worked closely with our BE and MEM students to sponsor ENGS 89/90 and 390 projects for more than a decade—advising and mentoring numerous student teams on real-life projects that have improved the

"The climate we share globally is under stress. Our company, my family, and I do not look the other way."

On the Job

JOHN RAJALA '88 | FOREST MANAGER

Five generations of Rajalas have crafted wood products from the forests of northern Minnesota. As the current owner of the family forest products business, he takes the long view in managing its 10,000 acres of timberland for future generations.

What influences your management style?

I was involved in and exposed to our family business at my first steps. I worked there as a teen and through college. I majored in engineering and economics at Dartmouth, which was as valuable to me as a more traditional engineering path is to most. Then, I worked for two years in Andersen Consulting's (now Accenture) manufacturing productivity consulting practice. Those experiences helped us build a business in which what's good for our bottom line is good for the environment and our communities: A whopping 30 percent of our revenue is invested in ecological forest restoration. Most of the rest goes into sustaining the jobs of the families who provide us their time and talents.

When did you return to the woods?

At age 24 it was time for me to return to the family business in force. Since then, I've done just about everything: forestry, sales, marketing, manufacturing, human resources, maintenance, major projects. My father, mentor, and partner died in 2016, and I took the opportunity to fully embrace the part of the business that was his baby—our forestry.

Based on his work and now mine, I consider us the most vertically integrated sizable forest products company in the world. We manage forests in a manner that mimics natural disturbances—wind, drought, insects, disease—on our 10,000 acres of timberland. These disturbances, along with frequent actual natural disturbances, result in natural regeneration of more than 20 native species of trees. We then intensively tend these forests using ecological silviculture methods to promote changing climate mitigation and adaptation, health, and productivity.

What's on your horizon?

Our business plan looks out 500-plus years. The rural extreme north United States communities in which we live and work are under stress. The climate we share globally is under stress. Our company, my family, and I do not look the other way: We think globally and act locally when it comes to our culture and our climate.

THE CALL TO LEAD
A CAMPAIGN
FOR DARTMOUTH

THANK YOU FOR MAKING HISTORY!

Your generosity has touched more lives than we imagined and helped amplify our capacity to prepare more students for lives of human-centered leadership and impact.

$193.4 million

CLASS OF 1982 ENGINEERING & COMPUTER SCIENCE CENTER

Your gifts have helped provide the perfect backdrop for all Dartmouth students to engage in hands-on, collaborative, interdisciplinary learning and research in engineering, computer science, design, and entrepreneurship

$55.7 million

THAYER ENDOWMENT

You have helped double the number of endowed professorships, allowing us to recruit top faculty with expertise in energy, climate, and health, expand experiential learning opportunities, and increase undergraduate and graduate financial aid and fellowships, including for the Bachelor of Engineering program

$14.9 million (7-year total)

THAYER SCHOOL ANNUAL FUND

This campaign helped energize giving across the board, with record alumni giving to the Thayer School Annual Fund, which enhanced support for mission critical programs, operational needs, and financial aid.


Stritter


Pierrepont

lives of schoolchildren in parts of the developing world, including an arsenic well-water removal project that won first prize in the National Collegiate Inventor Competition and the current Looma project that provides low-powered computer and technology devices to schools in Nepal."

In July, the board welcomed **Seth Pierrepont Th'07**, a general partner at London-based ICONIQ Growth, a global growth equity platform focused on partnering with entrepreneurs and leaders from early growth stage to IPO and beyond. He previously spent almost a decade investing in early- and growth-stage technology companies across Europe and Israel as a partner at Accel. At Thayer, Pierrepont earned his MEM and BE in mechanical engineering and was co-captain of the Dartmouth Formula Racing team; he served on the Dean's Council from 2016 to 2019.

Driving Change

After retiring as senior director at planning and analytics firm Resource Systems Group (RSG), **Robert Chamberlin Th'83 Th'02** founded Chamberlin Analytics. He's currently helping the Utah Department of Transportation implement a road usage charge (RUC) system—widely considered the successor to gasoline tax as a source of transportation funding. The biggest changes he has observed in the transportation industry involve the application of electronics and computing to mobility and planning. "On the mobility front, we have increasingly 'smart' highways and intersections that can detect and classify all types of users, assess tolls electronically, weigh vehicles in motion, and transmit real-time information to travelers and mobility managers," he says. Connected systems are also making travel safer, with vehicles that can detect—and avoid—potentially conflicting paths of other vehicles and pedestrians. But conflicts remain: "The greatest transportation solution still needs broad public support," he says. "All projects should be scrutinized for their social and environmental impact, but having narrow self-interest cloaked as the public good does not serve us well."

The Innovator

As a graduate student at Thayer, **Aditya Bhasin Th'96** felt most at home in the lab. Whether he was collaborating with fellow students or assisting Professor George Cybenko with research projects, the lab was an incubator for ideas with real-world impact. "The lab was very collaborative, very much a family-type environment, with lots of big, creative thinking but a lot of real action, too," he says. "I think that's a big part of what I took away from my time at Thayer—how to come up with innovative ideas that have a practical purpose." Today, Bhasin cultivates that same spirit of applied entrepreneurship in his role as chief technology and information officer for Bank of America. The firm has been earning numerous accolades with Bhasin as CTO, including *Fortune*'s 2023 list of "America's Most Innovative Companies."

—Betsy Vereckey

NSF Honors

Seven engineering students and alumni are among the 18 Dartmouth members awarded 2023 research fellowships from National Science Foundation (NSF). The program is designed to maintain a strong "human resource base of science and engineering in the United States," and fellows receive a three-year annual stipend of $37,000 along with a $12,000 allowance for tuition and fees. New fellows include biomedical engineers **Carl Harris '21, Kevin Hoffer-Hawlik '19**, and **John Heggland Th'27**; glaciologist **Logan Mann Th'26**; electrical engineers **Allen Nguyen Th'27** and **Charlie Reeder '22**; and environmental engineer **Lucy Tantum '19. Isabella Caruso '17 Th'17** received an honorable mention for her work in sustainable chemistry.

On the Job

NATHALIE RIVEST PRAMANIK '10 TH'11 | COFOUNDER, LITTLE CHOMPIONS

CEO Pramanik is revolutionizing the baby feeding industry with innovative kits designed to walk caregivers through babies' early feeding stages. She brings business expertise—honed at McKinsey and Co., LCatterton, and DoorDash—and insights as a new mother plus some Thayer talent to the table. As a sponsor in Professor Peter Robbie's "Product Design" class last spring, she worked with students to develop a better baby cup prototype.

Can you elaborate on the insights you bring?
My business partner is a child development expert, and her experience shapes things from a content perspective. I'm running all things business and strategy, bringing a blend of skills and experiences from my journey in the business world. Personally, as a new mom, I've lived the beautiful, stressful, messy journey of introducing solid food to my baby. This firsthand experience has made me aware of challenges caregivers face during this special phase, which motivates me to make Little Chompions a supportive and understanding resource for other parents.

What makes your feeding kits unique?
Our kits provide the information and equipment caregivers need to confidently introduce solid food to their babies. Setting the tone with early feeding victories can foster speech development, decrease potential sensory challenges, combat picky eating, and ease caregiver anxieties. The kits include a curated selection of feeding tools tailored to specific development stages. Perhaps the most important part are the feeding and toolkit guides, filled with age-specific information, tips and tricks, and food ideas to get babies ready to start their solid food journey.

Any highlights from your return to campus?
Working with Thayer students during the last six months has been amazing. Between sponsoring the "Product Design" class and working with interns Carolina Stedman '24 and Ari Garnick '24 this summer, it's humbling to see how much students accomplish. We're bringing the straw training cup initially designed by Professor Robbie's students to market. We've been working with Clay Burns '87 to refine the initial prototype and plan on launching the product on Kickstarter in the fall.

1

2

3

4

Gallery

1 Andrew Herchek Th'08 Th'09 is COO at high-purity water company East Range Partners.

2 George "Jojo" Boateng '16 Th'17 and his parents celebrate the completion of his PhD.

3 David Black-Schaffer '00 is a new dean of research at Uppsala University.

4 Brian Mason '03 Th'04 Th'05 skied Tuckerman Ravine with his wife, Jocelyn '05.

thayer notes

| 1940s |

Sam Florman '46 Th'73: As I pass by 98 years, I'm not quite as lively as I once was. But as two granddaughters graduated from Dartmouth these past few years—Julia in 2020 and Rachel in 2021—I'm pleased with the way destiny seems to be evolving.

Warren Daniell '48 Th'50: I am writing because of the Vermont flooding, which has been much in the news lately. If my memory serves me correctly, my master's thesis at Thayer had to do with the factors influencing flood control in the upper Connecticut River valley.

| 1950s |

Ron Read '57 Th'58: Engineering work experiences have the side benefit that we gain knowledge and wisdom. Mine started during summer breaks from Dartmouth. My dad worked at the salt mine under the city of Detroit, Mich., and so each summer I was given the instruction to "return to the salt mines." On returning each fall, when asked by my fellow students what I did last summer, I told them I had been relegated to the salt mines. They often thought my summers were a waste of time, but the engineering education I received from working 1,100 feet underground was invaluable to me. We worked on automated conveyor systems, surveyed 40-by-25-foot haulways, innovated ways to use optics to separate dark impurities from pure crystal salt, and solved corrosion problems that could shut down mechanical systems—the challenges were never-ending. This job gave me the insight that work gives you a chance to learn something new. But the true satisfaction with learning is sharing your new knowledge with someone else. Later, as a director of engineering, I began to do some part-time teaching. I went on to teach for 25 years at UCLA and University of Wisconsin in their technical management programs, helping engineers who were proficient in their technical roles accomplish the transition to management.

| 1960s |

Richard Hanson '64 Th'65: I retired from a major laser equipment manufacturer in 2018 and have continued to maintain a small consulting and tax practice. I have just completed my three-year term on the Dartmouth Alumni Council, serving as contact with West Coast alumni and on the new alumni committee (where we created a total of eight regional playlists posted in Spotify for the 2023 graduating class). I have also continued on the board of directors of the Dartmouth Club of Oregon as treasurer and membership contact.

| 1970s |

Jim Lay '74 Th'78: After 29 years in the private sector, I joined the U.S. Chemical Safety and Hazard Investigation Board in 2005 as a lead incident investigator. Fascinating work, and I was able to participate in the production of a number of the CSB's well-regarded safety videos, including for the Acetylene Service Company Gas, Synthron, and Valero-McKee Refinery incidents. I moved over to the directorate of enforcement programs at the U.S. Department of Labor-OSHA in 2008 as a principal safety engineer specializing in interpretation and enforcement of process safety management. I set up Lay PSC LLC for what I anticipated would primarily be process safety consulting for OSHA and private companies. Surprisingly, most of my work has turned out to be in aerospace, specifically ground support system design for rocket launch facilities, including the now-under-construction Mobile Launcher 2 at the Kennedy Space Flight Center and a variety of projects at the Mid-Atlantic Regional Spaceport at Wallops Island, Virginia. I did quite a bit of cryogenic systems design in my private-sector positions, and those old skills have turned out to be in demand.

My most rewarding work has been mentoring younger engineers on my projects. What I've been doing is not bleeding edge—cryo is well understood—but it is a niche area not all that many people are ex-

perienced in. With the explosion in launch companies and space utilization, there is great demand for cryo experience and still room for imaginative engineering solutions. My latest jump has really integrated many aspects of my career: process safety, cryogenic engineering, incident investigation. I get bored easily, so it's been great to have a wide variety of challenges to work on. The multi-disciplinary approach to problem solving that is the essence of the Thayer experience has served me extremely well during my career and continues to do so now.

1980s

Scott Sabol '88 Th'88: Among the big things in my professional life recently is the transition of my college to become Vermont State University, unifying multiple Vermont state colleges as one institution. Also, it was exciting for my specific program, architectural engineering technology, to be named one of only 17 inaugural zero-energy design designation (ZEDD) programs worldwide by the U.S. Department of Energy late last year. We had to show we prepare students for a zero-carbon future through a building science education curriculum that includes zero-energy-design best practices. We integrated zero-energy building design learning modules into our curriculum, for example in our heating, ventilating, and air-conditioning engineering design course. We also had to show how our students get a practical application of zero-energy concepts, which we do by entering the U.S. Department of Energy Solar Decathlon design competition annually. Our goal is to have our graduates enter the workforce ready to implement zero-energy approaches to design, which they do through becoming engineers, HVAC system commissioning agents, architects, or other professionals. Outside of academia, I continue to chair the Vermont Board of Professional Engineering, which deals with licensure, disciplinary, and similar issues for practicing engineers. It brings back memories of Dr. Carl Long, P.E., who taught about professional licensure and ethics back in my days at Thayer.

2000s

David Black-Schaffer '00: I have been appointed dean of research for the faculty of science and technology at Uppsala University in Sweden. The faculty is reasonably large—1,900 employees, 206 professors, 6,000 full-time students, 588 PhD students—and very diverse, as it includes both natural sciences and engineering. My role is to address faculty-wide issues such as research infrastructure, quality evaluation, long-term research strategy, the balance between applied and basic research, and resource distribution, as well as participate in the overall leadership of the faculty. This is an amazing opportunity to work more broadly across the university, particularly as we are facing significant changes from the increasing costs of large-scale research infrastructure and the wide-ranging impact of advances in artificial intelligence. (I do not doubt that Dartmouth and Thayer are facing similar challenges.)

As background, after Dartmouth I got an MSc and PhD in electrical engineering from Stanford and then worked at Apple before moving to Uppsala University in Sweden. (My wife is originally from Sweden, and we met at Stanford; she is now a professor in condensed matter theory.) At Uppsala University, I am a professor in the department of information technology specializing in computer architecture (such as how to make computer processors more efficient so our phone batteries last longer). As a faculty member, I have been a cofounder of two startups: one that sold our research in memory system design to Samsung, and one that developed a teaching tool—a spin-off of my award-winning flipped-classroom teaching—used by more than 80,000 students around the world.

Brain Mason '03 Th'04 Th'05: In April, my wife, Jocelyn '05, and I ventured up to Tuckerman Ravine on the back side of Mount Washington. The last time we did it was when we were dating at Dartmouth in 2001. So, 22 years later, we hiked in with some friends and enjoyed a beautiful warm day in the bowl skiing the chutes. In other news, Jocelyn and I are settled into our home in Lexington, Mass., after 14 years in the Bay Area. I am working at Abiomed, Jocelyn is a reading specialist, and our three children are in elementary school and enjoying our new puppy, Salty (dog).

Andrew Herchek Th'08 Th'09: Professionally, I am the chief operating officer at East Range Partners (www.eastrangepartners.com), a portfolio of high-purity water companies in the United States and Canada. We provide full water system integration, incorporating treatment technologies that include reverse osmosis, deionization, filtration, disinfection, and water-quality instrumentation. We support the world's leading companies that require ultra-pure water in their processes in verticals such as biotech, pharma, hospitals, life sciences, industrial manufacturing, and academic institutions (including Dartmouth!). Personally, my wife, Whitney, and I live in Concord, Mass., with our children Noah (8) and Isabel (5) and dog Bailey. I stay connected to Thayer by sponsoring ENGM 178: "Technology Assessment" each fall and joining review boards for various projects throughout the year.

2010s

George "Jojo" Boateng '16 Th'17: I finished my PhD at ETH Zurich at the end of last year, then started as a postdoctoral researcher and core director at ETH Zurich at the start of this year. I was also recently recognized among the 2023 *Forbes*' "30 Under 30 Europe" list and as a 2023 LinkedIn "Top Voice in AI Europe."

Chris Frangieh '17 Th'17: I received my PhD in electrical engineering and computer science from MIT under the supervision of Professor Feng Zhang and Professor Aviv Regev. My thesis, titled "Methods and Models of Screening Genomic Variants," spans topics from computational biology and genomics to biochemistry and gene editing. My first project, in collaboration with the Broad Institute of MIT and Harvard and the Dana Farber Cancer Institute, used CRISPR-Cas9 perturbations to uncover novel mechanisms of immune evasion in metastatic melanoma. My second project explored the use of eukaryotic retroelements as next-generation gene editors to make large, targeted insertions in human cells. I am passionate about translational technologies that can have large clinical impact and excited about a career in advancing early-stage technologies into the clinic.

Robert Halvorsen '17 Th'17: I have been working with **Ian Speers '17** for the past year on a startup, Pacto Medical (www.pactomedical.com), and we recently won multiple prizes from the Harvard Ingenuity Lab, including the President's Innovation Challenge. Our technology reduces the packaging volume of pre-filled syringes by 40 percent for the same dosage of medication, making pre-filled syringes less expensive to ship and easier to store, helping expand access to this life-saving technology.

Rose Wang '17 Th'23: I am moving to N.Y.C. to start as a vice president on the equity derivatives strategy desk at BNP Paribas. I would love to connect with Dartmouth alums in the area.

Daniel Lein '19 Th'20: I recently moved up to Ithaca, N.Y., to work on the underwater remote-operated vehicle Icefin, which primarily conducts operations under shelf ice in Antarctica, where I will be deploying this winter for a few months.

2020s

Keji Wei Th'20: I have been starting my tenure track in research and teaching in the field of operations, and I also hold a part-time position as senior operations engineer at CAE. As an assistant professor at the Tongji University School of Economics and Management, I have been focusing on the application of data analytics, optimization, and transportation in various industries, with a particular interest in the aviation sector. My primary role is to leverage data to enhance the efficiency and effectiveness of aviation operations. This involves various tasks, such as generating optimal flight timetables and providing new aircraft itineraries in the event of disruptions. By analyzing and utilizing data, I aim to optimize various aspects of aviation operations and contribute to the industry's success.

Collaborations

Students (from left) Roe, Kanno, and Edelman test a sealed door with local contractor Michael Goetinck.

DARTMOUTH/KATIE LENHART

> "Our students are putting a big, national challenge such as energy efficiency into focus here in the local, campus context."
>
> —ROSIE KERR '97
> DIRECTOR OF SUSTAINABILITY

Energy Audit

For their capstone project, five engineering students assessed the energy efficiency of the College's Montgomery House—identifying retrofits that could save $3,000 in annual energy costs. The house overlooking Occom Pond was built in 1924 and serves as the residence of visiting fellows. "The Montgomery fellows program was created with the undergraduate student population in mind," says director Steve Swayne, "so it made sense to reach out to undergraduates to get their input on how the house might be upgraded to meet the energy demands of our current moment." Students Sophie Edelman '22 Th'23, Kaulana Kanno '23, Harrison Munden '23, Nate Roe '23, and Adelina Sederman '23 analyzed insulation, estimated the amount of heat escaping through walls and chimneys, and combed through electricity and fuel oil bills. It's "a wonderful example of a project that allows students to use our campus as a laboratory," says Rosie Kerr '97, Dartmouth director of sustainability. Their efforts also benefitted campus: "They have sussed out things that we did not know about the house," adds Swayne, such as crossed wires that caused heating and cooling systems to run simultaneously. The team proposed adding insulation to the basement and attic, improving air seals, and upgrading light fixtures and heating systems. "It will be exciting to see some of these changes get implemented over the next five or so years," says Edelman.

@thayerschool

Capstone project "Low Cost, Open Source PFAS Filter Design for Small Cleaning Businesses and Beyond" received a $10k grand prize Engineering Education Award from the @NCEES , and inaugural Don Stayner Th'16 Changemaker Award at this year's Investiture!

@thayerschool

Dean Abramson (@Abramson Alexis) and Prof. Laura Ray hosted the Women of Thayer Reception at the Dartmouth Organic Farm–an afternoon for faculty, staff, and students to celebrate the growing network of women at Thayer providing representation, mentorship, friendship, and support.

@thayerschool

A patent for an optical breast imaging device designed to improve cancer diagnosis and monitoring was filed by Professors Shudong Jiang and Keith Paulsen, PhD student Mengyang Zhao and @DartmouthHealth

@nhbiomade

Our Undergraduate Research Training (URT) student Lois Szulc spent her summer at @thayerschool in @KatieRHixon lab where she researched electrospinning and 3D printing to support tissue interface in osseointegration.

@thayerschool

Women Engineers (SWE) hosted "Women in Engineering Day at Dartmouth" at Thayer.

@thayerschool

How Professor Charlie Sullivan gets to work!

@thayerschool

Some clips from Thayer's first "Wags 'n' Waffles" event today! Dean Abramson shared her signature waffle recipes and toppings, and two therapy dogs (Shelby and Charlie) visited Thayer!

DARTMOUTH ENGINEERING
1867
15 THAYER DRIVE
HANOVER, NH 03755

NON-PROFIT
U.S. POSTAGE
PAID
DARTMOUTH COLLEGE

Design Launch

Students in Professor Eugene Korsunskiy's "Senior Design Challenge" class collaborate on paper airplanes as part of a team-building exercise. From left, David Kaufmann, Kiera Bernet, Allie Gies, Josh Ocampo, Allison MacLeod, and Monxell Mariano launch their designs from the third-floor atrium balcony in the Engineering and Computer Science Center. This year, four multidisciplinary teams worked on projects with COVER Home Repair, the Hanover Economic Development Council, N.H. Healthcare Workers for Climate Action, and a local school district.