

DARTMOUTH Engineer

THAYER SCHOOL OF ENGINEERING | FALL 2025

CANCER IN CLEAR VIEW

USING INNOVATIVE
FLUORESCENT TECHNIQUES,
PROFESSOR KIM SAMKOE
LIGHTS THE WAY TO
BETTER DIAGNOSIS AND
SURGICAL PRECISION.

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BRIDGE BUILDING

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First
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SUBGLACIAL STUDIES

Professor Colin Meyer and research scientist Aleah Sommers joined colleagues from other institutions to explore the Helheim Glacier in Greenland. There, they examined the role of water in controlling glacier velocity and the ability of surface snow to store water.

Photograph by Colin Meyer



Dartmouth Engineer

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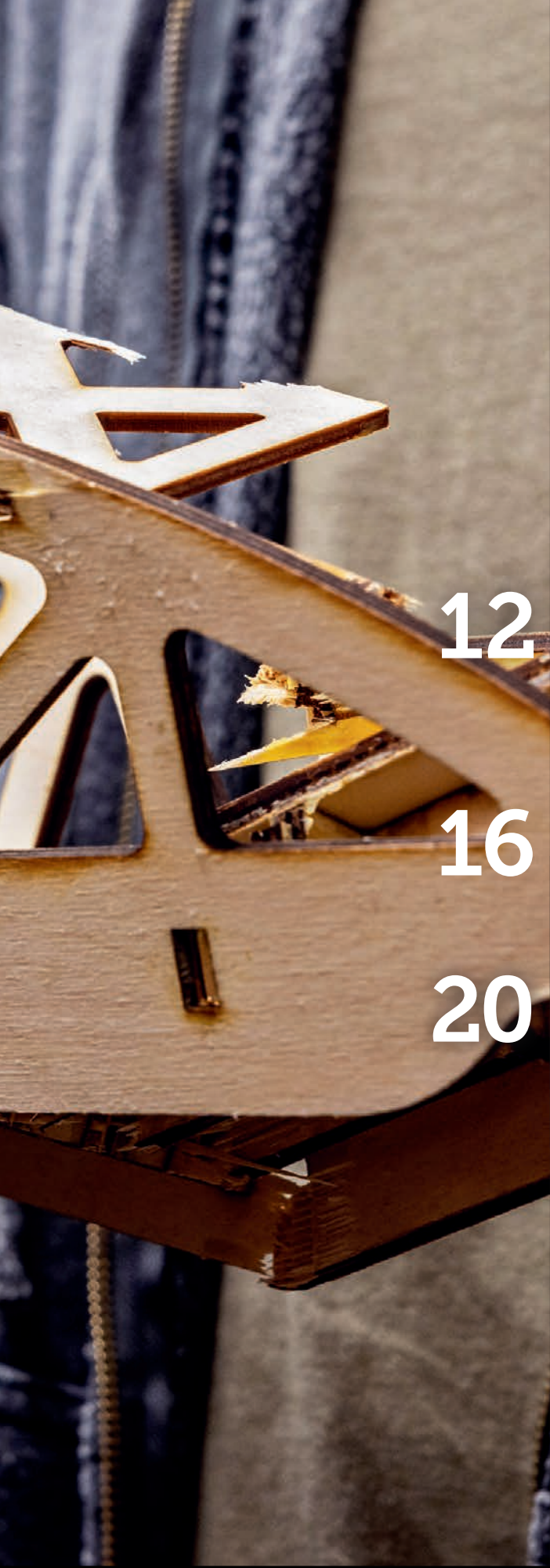
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➤ "I've seen clear improvements in design quality as we've learned from past challenges," says Professor Yan Li, who tested students' bridge prototypes in ENGS 33: "Solid Mechanics."



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Cancer in Clear View

Using innovative fluorescent techniques, Professor Kim Samkoe lights the way to better diagnosis and surgical precision. **BY MICHAEL BLANDING**

Building Bridges

Students design and test prototypes to learn how materials respond to stress.

Modern Alchemy

Samwel Bahebe '18, Thomas Cornew '18 Th'18, and Ed Cornew '18 transform small-scale gold mining with community-centered innovations. **BY THERESA D'ORSI**



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A Model Approach

Interim Dean Doug Van Citters '99 Th'03 Th'06 and Professor Klaus Keller discuss his efforts to manage risk in a changing climate.

The Hodgson Distinguished Professor of Engineering has been grappling for decades with how to make better decisions to manage the risks and impact of climate change. He shared how his lab of undergraduates, grad students, and postdocs brings together researchers, decision-makers, and communities to create smarter, more equitable solutions.

What brought you to Dartmouth in 2022?

KELLER: The work I'm excited about requires a somewhat uncommon approach. You start with a problem, then let the problem and the decision help you decide on the methods and the team. Thayer has a neat vision of human-centered engineering and a mission-oriented approach that can help to address wicked problems. Dartmouth breaks boundaries, integrating the liberal arts with engineering. That's why I am here.

What research takes place in your lab?

KELLER: I collaborate with many smart researchers at Thayer, Dartmouth, and beyond. We focus on two interrelated tasks: improving our understanding of the Earth system—including the climate system, humans, and built infrastructures—and using this information to inform the design of strategies to manage climate risks. We first identify a climate-related decision that people need to make, such as how much money to spend on decarbonizing a system. We analyze how people or institutions make this decision right now and engage with stakeholder decision-makers to understand their values and mental models to translate those values into objectives. We then approximate the system in a model. Because we do this with a computer, we can test millions of strategies and how they perform in the face of uncertainties. It is better if a strategy fails in a computer model than in real life. We search for ways to improve on current strategy and map



out important tradeoffs. In the end, we synthesize everything to come up with guidance for people making decisions.

I imagine a lot of these questions, if solved, would have extraordinary impact on society. How do you whittle it down to one situation to work on now?

KELLER: The goal is to converge on projects that work for all involved parties. Students and junior researchers want to work on hard, interesting problems relevant to decision-makers and learn cutting-edge methods. In contrast, stakeholders and decision-makers typically care less about cutting-edge methods and want actionable insights, combined with longer-term engagement and deci-

“We engage with stakeholders to understand their values.”

—PROFESSOR KLAUS KELLER



**CAMPUS
CONVERSATIONS**

Interim Dean Van Citters talks with Professor Klaus Keller outside his lab in the Irving Center.

sion support. To make this even more complicated, funding is a constant constraint. We do the best we can to find research projects that work for all parties.

What strategies ensure your models support the widest range of communities and can inform good policy?

KELLER: This is an excellent question. Many high exposure, highly vulnerable communities struggle to access high-quality information to help them manage climate risks. There are some strategies to mitigate this issue. For one, our lab develops free and open-source tools. In addition, many institutions support organizations that help to link the needs of decision-makers with research and teaching. This provides several benefits. First, decision-

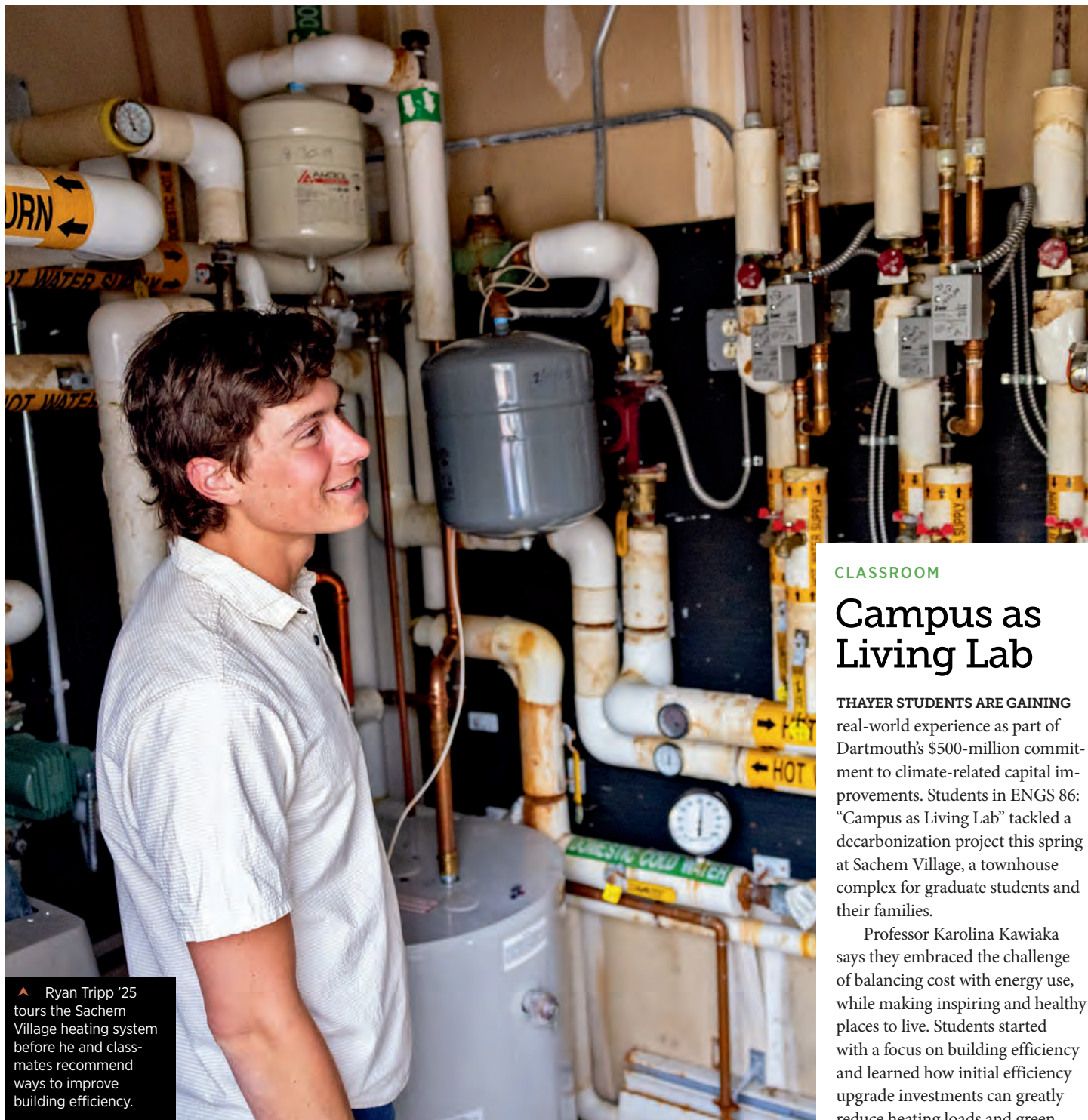
makers can benefit from new insights and tools. Second, students can identify how abstract academic concepts relate to real-world needs and can learn valuable professional skills. Third, researchers can identify new mission-relevant questions. Dartmouth has started on this path, but there is room for growth.

Here is where looking forward is really important. We are training the next generation of leaders. We, as a community, have unprecedented opportunities to improve how we manage climate risks. We face a neat nexus of access to more data, sophisticated tools to better understand the systems and tradeoffs, and a new generation of smart and excited students who want to tackle the challenges.

THE Great Hall



NEWS FROM AROUND THAYER



▲ Ryan Tripp '25 tours the Sachem Village heating system before he and classmates recommend ways to improve building efficiency.

CLASSROOM

Campus as Living Lab

THAYER STUDENTS ARE GAINING real-world experience as part of Dartmouth's \$500-million commitment to climate-related capital improvements. Students in ENGS 86: "Campus as Living Lab" tackled a decarbonization project this spring at Sachem Village, a townhouse complex for graduate students and their families.

Professor Karolina Kawiaka says they embraced the challenge of balancing cost with energy use, while making inspiring and healthy places to live. Students started with a focus on building efficiency and learned how initial efficiency upgrade investments can greatly reduce heating loads and green

ROB STRONG '04

energy costs. While in-class lessons focused on tracking decarbonization efforts, students also worked in the field with Dartmouth's facilities and sustainability staff and consultants KFI Engineers to examine Sachem's heating system and recommend upgrades.

"Sachem Village serves as a microcosm of the larger campus—and has the potential to serve as a pilot for a campus microgrid by complementing solar PV with electrical storage," says engineering sciences major Ryan Tripp '25. "To meet Dartmouth's decarbonization goals, Sachem Village needs to improve building efficiency, electrify heating sources, and add renewable generation."

Kawiaka also teaches ENGS 44: "Sustainable Design," which earned a U.S. Department of Energy "Zero-Energy Design" designation last year, a course that enables students to apply what they've learned to design affordable housing in local communities. "The course project requires designing buildings that work well for the occupants," she says, "while maximizing efficiency, minimizing cost, and using healthy and low-embodied carbon materials."

The courses are part of Dartmouth President Sian Beilock's vision to expand the concept of a classroom: "Our campus will become a living lab as our capital projects become drivers for new research, teaching, and collaboration."

Kawiaka hopes the impact will be felt beyond the Upper Valley, as graduates bring human-centered solutions to the building sector. With 35 percent of the nation's energy-related carbon emissions coming from buildings, this has become an important focus for addressing climate change, according to the U.S. Department of Energy. In the meantime, Tripp plans to share lessons learned with the next generation of students as he starts this fall as a physics teacher at Groton School: "I am hoping to teach a building science course that would be closely related to ENGS 86."

—Theresa D'Orsi



SUSTAINABILITY

The Future of Food

ADAM GRONEWOLD TH'25, A RECENT PHD INNOVATION PROGRAM graduate, is applying mobile robotics technology to make agricultural cropping systems more efficient and sustainable. "Farmers are forced to apply a variety of agrochemicals to their land, and these things are highly tied to rates of cancer and they're expensive," says the Galena, Ill., native. "I grew up in a rural area, and I want to develop technologies that help those communities."

In a recent crop study, he demonstrated a system in which mobile robots applied nitrogen fertilizer slowly over time—using 20 percent less fertilizer and gaining 10 percent more yield. "The goal is to sustainably manufacture and sell these robots to farmers," says Gronewold. "As our population grows, we desperately need to produce more food on fewer and fewer acres every single year. I'm trying to develop tools that farmers can use to produce healthier crops and get that higher yield we need to sustain our population."

"I grew up in a rural area, and I want to develop technologies that help those communities."

—ADAM GRONEWOLD TH'25

▲ Gronewold uses mobile robots in an effort to increase crop yields while reducing costs and chemicals.



▲ Online students interact with Kokko via Zoom to run their robots through the maze cluster.

INNOVATION

Online Learning, Reinvented

BY COMBINING VIDEOCONFERENCING TECHNOLOGY with wifi-enabled robots, the online MEng in Computer Engineering program is redefining remote learning as a highly collaborative, hands-on experience. “We offer online students a ‘Thayer-style’ team project that allows them to interact with students on campus and work with actual hardware,” says Professor Michael Kokko, who is the director of instructional labs and teaches ENGS 415: “Distributed Computing.”

The goal is to write code in the Go programming language that enables robots to navigate an unknown maze. At the start of the term, Kokko provides a maze simulator in Go that online MEng students use to develop distributed maze mapping code. Undergraduates on campus then use that code to design and build the robots. Online students access the maze cluster remotely to run code and interact with Kokko and his teaching assistants during live maze sessions on Zoom.

“Essentially, they’re applying principles of distributed computing that we’ve explored throughout the term with short video lectures, guided programming exercises, and two programming labs,” he says. —*Catha Mayor*



GOLDWATER SCHOLAR

“I want to explore how tissue engineering can be used to develop biomaterial-based therapies for cardiac and neurodegenerative diseases.”

—**CALISTA ADLER '26,**

A BIOMEDICAL ENGINEERING MAJOR AND ONE OF FIVE DARTMOUTH STUDENTS HONORED WITH A 2025-26 GOLDWATER SCHOLARSHIP

I'M AN ENGINEER AND ...

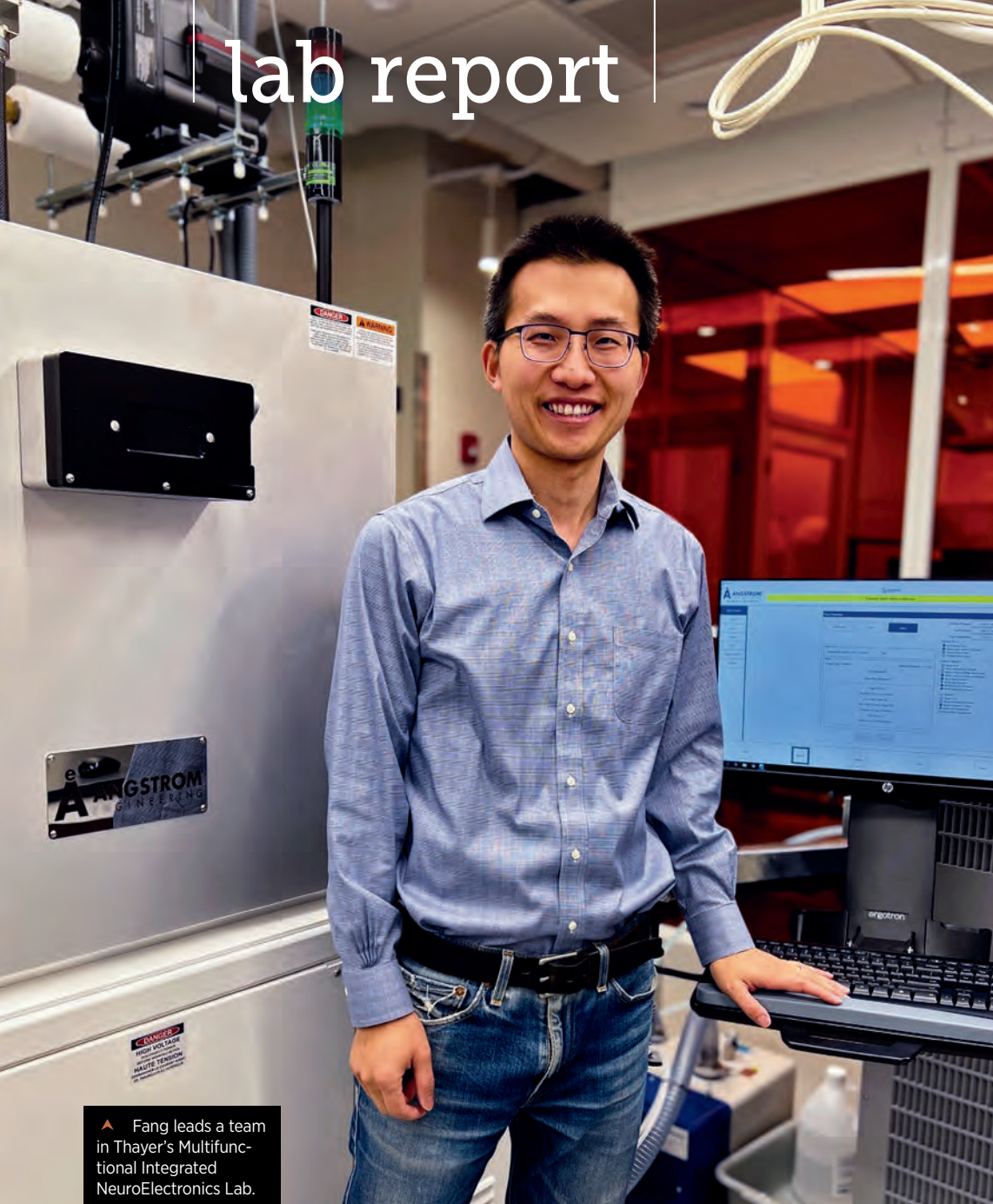
Launching a Career

CLASSICALLY TRAINED CELLIST AND ELECTRICAL engineering student Ava Rosenbaum '26 has been increasingly turning her gaze to the skies. Even as she practices for a solo performance with the Dartmouth Symphony Orchestra this spring, she continues to explore the possibility of a career in space systems. Rosenbaum spent the summer as an intern on the Rocket Lab recovery engineering team, helping design a modified barge for sea landings of its Neutron rocket. “It’s Rocket Lab’s medium-lift launch vehicle being developed for reusability and mega constellation deployment,” says Rosenbaum, who drew on her ENGS 26: “Control Theory” coursework to understand the hardware involved. “And the project portions of ENGS 26 and other Thayer coursework gave me good experience tackling problems in team settings with tight deadlines.” Looking ahead, she is drawn for the fast-paced innovations of the field. “The space systems industry is constantly pushing the boundaries of what humans are capable of—and contributing to those achievements would be incredible.”



▲ Rosenbaum won the 2025 Hopkins Center Culley Concerto Competition before starting her summer internship with Rocket Lab.

AVA ROSENBAUM



▲ Fang leads a team in Thayer's Multifunctional Integrated NeuroElectronics Lab.

“Neurotransmitters are the messengers in our brain.”

—PROFESSOR HUI FANG

LAB REPORT

Brain's Neurotransmitters Measured in Real Time

REAL-TIME MONITORING OF NEUROTRANSMITTERS IS KEY to advancing both basic neuroscience and treatments for brain disorders. New research led by Professor Hui Fang presents a unique carbon coating for sensing devices to achieve fast electrochemical measurements of neurotransmitters in the human brain.

“Neurotransmitters are the messengers in our brain,” says Fang, senior author of the study in *Nature Communications*. “There’s only a handful of ways to measure them, all with severe limitations. Traditional micro-dialysis, for example, is slow—literally pumping liquid out of the brain to measure it externally. So, you can’t do real-time measurements.”

Researchers from Dartmouth Engineering, the psychological and brain sciences department, and Weill Cornell Medicine focused on an electrochemical measurement method that causes a chemical reaction between the neurotransmitter and the electrode. “That reaction lets you see and measure the electrical current,” says Fang, “and from the current-voltage potential relationship you can tell what and how much neurotransmitter you’re sensing.”

Although this method relies on a chemical reaction—not the case for all neurotransmitters—it works for dopamine, serotonin, epinephrine, and a few others that are involved in common mental health conditions such as anxiety, depression, and mood disorders.

The challenge is around what material to use for the electrodes. Carbon fiber has been the gold standard and is reliably sensitive and inert, but it’s fragile and hard to scale up and integrate with recording interfaces.

“Our paper addresses these pain points,” says Fang. “The ability to scale up this type of sensing to many electrodes in a high-density array that covers a bigger area with higher throughput—and then easily integrate them with neural recording—that’s a big deal. So we developed a stabilized carbon coating to go on top of the conventional metal electrodes used for electrical signal recording.”

During testing, researchers found a simple thermal treatment of their coating improved stability *and* reliability, making it possible to finally marry two worlds—chemical sensing and electrical activity—simultaneously.

Fang’s research group was also recently awarded \$2.6 million from the National Institutes of Health to optimize microelectrode arrays for in vivo neuronal sensing and electrophysiological recording. “Refining and validating this type of probe would ... bring the technology a significant step closer to commercial manufacturing,” he says.

—Catha Mayor

"An Extraordinary Moment"



MARK WASHBURN

Dartmouth Engineering's 2025 Investiture ceremony celebrated the awarding of a record 384 degrees to its students—including the first MEng graduates to complete their degrees through a partnership with the Universidad de Ingeniería y Tecnología in Lima, Peru. Below are highlights from the keynote address by Joseph Helble, Lehigh University president and former provost and dean of engineering at Dartmouth.

"YOU ARE COMING FROM A PLACE— this place—that almost uniquely challenges you to think in terms of intersections of engineering and the liberal arts, of engineering and business management, of engineering and medicine, of engineering and entrepreneurship. It is never 'engineering or' at Dartmouth. It is 'engineering and.' I am making a point of this because we are experiencing a moment where that 'and' is profound, where that 'and' means nearly everything. ...

"I am convinced that those who understand and can operate in the framework of 'and' will be best prepared to navigate this extraordinary moment of change. You know the change I am referring to: generative AI, text, code, images, increasingly realistic videos, course syllabi, lectures, exams that it can grade, PowerPoints, podcasts, legal memoranda. The list of what it can do, what it can replace, is impressive.

And to many, frightening. ... And that is just the GenAI piece—throw in biotechnology, robotics, the convergence of physics, chemistry, and biology and remember nanotechnology?—and you have what many are referring to as the 'Fourth Industrial Revolution.' But as an engineer I am a technology optimist. I am optimistic, and even excited, about the future and about your future. ...

"You each embody that notion of 'engineering and.' Your engineering education teaches you to understand the core of technology, its uses, and its limits. ... Your liberal arts education teaches you to understand context, to ask why or why not, to understand history, and community, and culture. Putting these together in different ways means you are prepared to ask, and answer, questions from a range of perspectives. ...

"You, my friends, are ready and prepared to lead. Your education at this extraordinary institution in engineering and so many other things has prepared you to navigate any challenges thrown your way: generative AI, the Fourth Industrial Revolution, politics, or whatever the future may hold. I am optimistic that we will navigate these moments to create an inclusive and better future for all."

"Through five years of engineering and rowing at Dartmouth, I've learned that success ... depends on our ability to move together with purpose."

—JENNA MARTIN '24 TH '25

"Our most complex challenges are human at their core and solving them starts by treating stakeholders like family."

—PEDER SOLBERG TH '25 (PHD)

INVESTITURE BY THE NUMBERS

126

Bachelor of Arts in Engineering Sciences

127

Bachelor of Engineering

51

Master of Engineering Management

47

Master of Engineering

10

Master of Science

23

Doctor of Philosophy

Kudos

AWARDED PhD Innovation Fellow **Varsha Shukla** received the Best Paper Award at the 2025 IEEE Gender and Technology Conference for "On Addressing Bias and Fairness in Large Language Models for Responsible Innovation in Gender Contexts."

PUBLISHED A team led by Professor **Anthony Rizzo** has developed a 3D photonic-electronic platform that paves the way for next-generation AI hardware. The study was published in *Nature Photonics*.

AWARDED Professor **Hélène Seroussi** has earned a Presidential Early Career Award. She was nominated by NASA for research on "the role of ocean circulation in the destabilization of major parts of Antarctica's ice sheets."

HONORED Professor **Yoshihiro Nakayama**, whose research focuses on the rapidly changing polar oceans and cryosphere, has earned a Young Scientists' Award from the Japanese Minister of Education, Culture, Sports, Science and Technology.

SHOWCASED Members of Professor Katie Hixon's lab—PhD student **Amritha Anup Th'23**, MS-MD student **Jewelina Durant**, **Jack Flaggert '26**, **Daniel Kang '25**, **Emma Kerimo '25**, **Kristine Suritis '25**, and **Kate Wasacz '25**—presented at the 2025 Society for Biomaterials 50th Annual Meeting & Exposition.

HONORED Professor **George Cybenko** is one of four Dartmouth innovators named a 2025 American Association for the Advancement of Science fellow.

PRESENTED At the Humanitarian Demining Innovation and Technology Summit, PhD Innovation Program Fellow **Max Orman-Kollmar '20 Th'21** presented electromagnetic sensing technologies he and Professor **Fridon Shubitidze** are developing to help clear landmines.

AWARDED Engineering major **Tina Pan '28**, one of seven undergraduates earning a Gilman International Scholarship, will participate in the Aquincum Institute of Technology exchange program in Budapest, Hungary.

ELECTED Professor **Eric Fossum** has been elected to the National Academy of Engineering Council, where he will help oversee policies, programs, and funds administered by the council.

ACCEPTED Professor **Peter Chin's** lab—part of a four-year Defense Advanced Research Projects Agency effort to develop learning agents that can outsmart cyber adversaries—has produced two papers that have been accepted at the Reinforcement Learning Conference.



FORMULA RACING
Charging Ahead

“We’re the only collegiate competition in the world to host both hybrid and electric classes.”

—MIKE CHAPMAN, FH+E DIRECTOR

Dartmouth Formula Racing (DFR) finished eighth overall in a field of 29 student teams from across the United States and Canada at the annual Formula Hybrid+Electric (FH+E) competition. “Our design philosophy as a team this year was to make a car that was lighter, smaller, and more agile than the previous car,” says project manager **Kylie Osborne ’27**, pointing to the new car (above, with driver **Kivanc Toper ’27**). “Highlights from the competition include passing tech inspections on the first try, talking to and learning from other teams, and seeing our team come together to support our drivers in the endurance event.” The roughly 30 students from the Thayer team joined more than 600 undergraduate and graduate engineering students running their high-performance race cars through numerous technical and safety inspections to make it onto the track, known as “The Magic Mile.” “We’re the only collegiate competition in the world to host both hybrid and electric classes,” says **Mike Chapman ’76 Th’77**, director of FH+E, founded and run by Dartmouth. “With Formula 1 and many top-tier auto manufacturers doubling-down on hybrid power units, we expect the interest in hybrids to increase in the next few years.”

BILL GORDON

“

We're focused on prostate cancer, but this is widely applicable to any surgery."

—PROFESSOR KIM SAMKOE



Cancer in Clear View

Using innovative fluorescent techniques, **Professor Kim Samkoe** lights the way to better diagnosis and surgical precision.

Kim Samkoe can see in the dark. Using fluorescence, she can investigate inside the human body without making an incision, differentiating between healthy and unhealthy tissues, and even seeing medicine work in real time. The technology uses the same phenomenon that makes your white shirt glow purple at the club or your bowling ball light up green at cosmic bowling. “We’re using fluorescence to make tissues glow, not just to look pretty but also to give us information,” says Samkoe, associate professor of engineering at Dartmouth. “We can probe the body and see things you wouldn’t be able to see without it.”

Unlike imaging techniques such as X-rays or radioactive PET scans, fluorescence is harmless and can be used as often and as much as a doctor wants without any ill effects on the body. Samkoe is collaborating with the Center for Surgical Innovation at Dartmouth-Hitchcock Medical Center (DHMC) to create colored maps of the structures of the body to aid in prostate cancer surgery—a kind of “GPS for surgeons,” as she calls it. The effort is part of a \$31.3-million contract across seven years from the Advanced Research Projects Agency for Health (ARPA-H), part of the “cancer moonshot,” which aims to create novel surgical techniques to dramatically improve outcomes for

the disease. In her lab’s other work, Samkoe is also using her fluorescent superpowers to develop techniques to better diagnose and treat cancer with molecular therapies and customizing them to individual patients to maximize effectiveness.

COLOR MAPS FOR SURGERY

Growing up in Regina, Saskatchewan, Samkoe originally planned to become a doctor. At the University of Regina, however, she got sucked into a research project examining the structure of proteins, often the first step in developing targeted drugs. “I really loved the puzzle-solving aspect of it,” she says, “knowing once you solve one problem, there is a next step and another—you are constantly figuring out new information.”

She first encountered fluorescence while studying for her PhD at the University of Calgary in Alberta, where she became involved in research to treat an eye disease in which blood vessels grow uncontrollably. Unlike bioluminescence, which produces light through chemical processes (think fireflies), or phosphorescence, which emits absorbed light slowly through time (such as glow-in-the-dark stickers), fluorescence works by exciting special molecules called fluorophores with visible light

BY MICHAEL BLANDING • PHOTOGRAPHS BY ROB STRONG '04

or other electromagnetic radiation. When hit by a shining light of one color, such as the ultraviolet “black lights” used at the dance club or bowling alley, the molecules emit light of a different color—meaning they can be activated at will and traced by a doctor or researcher.

In the case of the eye disease, Samkoe and her colleagues were exciting fluorophores that can react with molecular oxygen and actually damage the blood vessels, stopping their uncontrolled growth. “This is where I developed my love of translational research”—the type of research that can transform discoveries in the lab into tools and therapies on the surgical bed. “Seeing the science you developed in the lab have ‘real-world’ benefits is highly rewarding.”

Coming to Dartmouth for a postdoctoral fellowship with Brian Pogue, now the Robert A. Pritzker Professor of Biomedical Engineering at Thayer, she changed her focus to applications in which fluorescence isn’t being used as a therapy but to highlight cells and tissues to make other therapies and surgeries more effective. Along with Pogue, she developed techniques to attach fluorophores to cancerous tumors for the first time in humans, showing how they could highlight malignant tissues in head and neck, brain, and bone. “Kim was really running that project,” says Pogue, who worked to create a professor position for her in the surgical department at Geisel School of Medicine. She later transferred to Thayer.


In her current collaboration with the Center for Surgical Innovation around prostate cancer, Samkoe has expanded on those techniques by attaching fluorophores both to cancerous cells and critical normal structures such as nerves to better guide surgeons in removing tumors. Previously, surgeons just opened up the belly and cut out the entire prostate, a plum-sized organ surrounded by nerves and blood vessels, cutting through the urethra and nerves in the process, says Ryan Halter, a colleague and associate professor of engineering. “When you do that, a man has challenges after surgery with urinary incontinence and erectile dysfunction, so quality of life is really, really reduced,” he says.

Contemporary robotic surgery techniques offer less-invasive options, in which tools are inserted through small incisions and controlled remotely by doctors to remove tissue. Without being able to directly feel the tissue, however, they are often unable to differentiate tumors from other tissues. “It just looks like a red-and-pink mess,” Halter says. Samkoe’s innovations can light the path for surgeons to ensure removal of all the cancerous tissue while sparing nerves and blood vessels.

Techniques she’s developed even excite fluorophores with different wavelengths of light to tell exactly how deep the nerves are embedded in the tissue. Samkoe compares it to putting a flashlight under your chin and seeing your cheeks glow. “The reason they glow red isn’t because there is blood inside them,” she explains. Rather, it has to do with the relative wavelengths that make up white light; since red wavelengths are the longest, they go through tissue more easily, lighting up your cheeks with spooky red light.

By the same principle, she can excite fluorophores with multiple wavelengths of light and then look at the mathematical relationship between them to determine how deep they are within the tissue. Those data are then translated into a “color map” on the screen showing relative depths of objects that a surgeon can use to guide robotic implements.

The end goal is a 90-percent reduction in nerve injury during surgery—results that could dramatically improve a patient’s



quality of life. “We’re focused on prostate cancer, but this is widely applicable to any surgery,” Samkoe adds. The same sorts of damage are observed in gynecological and gastroenterological surgeries, for example. “The wonderful thing about the ARPA-H project is that it’s bringing together large teams of people to attack a problem from many different directions,” Samkoe says.

Samkoe is primarily focused on the chemical basis for the mapping, while Halter and fellow engineering professors Keith Paulsen and Scott Davis tackle electronic imaging. “Kim’s very thoughtful and interested in the work we are doing,” says Halter, who appreciates how collaborative Samkoe has been in adapting her techniques to produce better imaging. “She listens and assimilates opinions from other colleagues to develop more impactful technology beyond just her focus.”

In addition to Thayer and DHMC, the team is collaborating with researchers from Johns Hopkins University and Oregon Health and Science University as well as companies including Intuitive Surgical, Trace Biosciences, and Dartmouth Engineering startup QUEL Imaging. “We’re bringing together leaders in optics, instrument design, image technology, and molecular agent design,” says Samkoe. “These technologies can often take a long time to produce—hopefully funding like this will help bring solutions to the clinic more quickly.”

PERSONALIZED THERAPIES

Along with applying fluorescence to surgery, Samkoe has been working on techniques to improve cancer treatments involving molecular therapies. Those therapies work by injecting agents into the body to target proteins or other molecules within cancer cells, disrupting their growth or function. “Cancer cells are normal cells gone awry,” Samkoe says, “so they are not doing what they are supposed to anymore.”

For example, cancer cells might hijack normal cell processes to sprout more growth receptors on the outside of a cell, leading to uncontrolled cell growth that causes a tumor. “A normal cell might have 1,000 but a cancer cell has 1,000,000,” Samkoe explains. A molecular therapy might target those growth receptors,



blocking them to turn them off like a switch, stopping cancerous growth. The challenge? These proteins are hard to target since they are naturally occurring molecules within the body and may vary greatly from patient to patient or even cell to cell.

“Oftentimes to know whether a person is eligible for a therapy, you have to take a biopsy of the tumor to test if a person has a protein a drug is targeted to,” Samkoe says. Her methods can help diagnose cancer cells without surgical intervention by attaching fluorophores to molecules that bind to these proteins, lighting them up like bowling pins in a cosmic alley to show where to strike. Once identified, those proteins can be targeted where they occur.

Samkoe has even created ways to better determine proper dosage, in part by adapting techniques she first developed as a postdoc with fellow postdoc Ken Tichauer, now associate professor of biomedical engineering at the Illinois Institute of Technology. “Inherently, fluorescence is a qualitative measure that can tell you whether something is there, but not really how much there is,” Samkoe says. She and Tichauer have cleverly worked around this limitation by using fluorophores with two different colors simultaneously—one that binds to the protein and one that doesn’t.

By injecting both at the same time and shining a light on

Samkoe’s innovations highlight the path for surgeons to ensure removal of all the cancerous tissue while sparing nerves and blood vessels.

them, researchers can monitor how the colors change, showing how much of the fluorescence is being bound and how much is being washed away. “Dividing one by another shows us how much of the target is present,” Samkoe says. “These techniques can show us how much is there, how long it is there, and how strongly it is binding—all information relevant to therapy.”

With her chemistry background, Samkoe has spearheaded the molecular basis for the techniques, while physicist Tichauer focused on the mathematical modeling. Together, they’ve collaborated on nearly 50 papers during the past 13 years. “Kim is one of my favorite people,” he says. “She’s brilliant but also generous and extremely collaborative—she makes the hardest of science fun to work on.” Through the years, he’s learned to stay quiet in the face of obstacles and watch Samkoe work out a solution. “She’s an outstanding problem solver. She’s always looking for the right things to do—not just blindly solving issues but thinking about how to get technology into the clinic.”

One of the challenges is that molecular therapies are so individual to patients that these potential solutions often fail in clinical trials due to difficulty in determining a common dosage. “Many new and exciting cancer therapies fail in clinical trials because of this variability and our inability to repeatedly test the cancer before and during treatment due to the need to remove tissue samples or undergo imaging with potentially harmful side effects,” Samkoe explains.

Using similar techniques with two differently colored fluorophores, she has experimented with safe and noninvasive ways to show in real time how effectively a therapy is working, monitoring patients across days or even weeks to see if the amount of a particular target decreases. “Sometimes medicine doesn’t get to the cells it’s supposed to because of the particular characteristics of a tumor. Because we have this ratio information, we realized we can actually use it to visualize therapeutic agents binding in real time,” says Samkoe, who recently published the findings in the journal *Molecular Pharmaceutics* with Tichauer and other colleagues, including Thayer’s Xiaochun Xu and Sassoan Hodge and Geisel’s Yichen Feng.

By monitoring real-time changes in the tumor, she says, a doctor could gauge effectiveness much more rapidly rather than waiting weeks or months to see if a tumor changes in size. “Every tumor is different, and every patient is different—sometimes even every cell in the tumor is different,” she says. “Instead of giving every patient the same dose of medicine, the idea is to figure out what medicine is going to work best for that patient and how much to give them.”

Using these fluorescent imaging techniques could lead to the holy grail in medicine—individualized treatments that customize therapies and dosages to target the proteins expressed in a particular patient or tumor. By more precisely attacking cancerous cells, clinicians increase the likelihood they can defeat the cancer for good. “From a scientific standpoint, this is exciting because we are developing new methods to visualize and assess biological processes that could have far-reaching effects,” Samkoe says, “improving not only clinicians’ ability to treat patients, but also patients’ overall health and longevity.”

MICHAEL BLANDING is a Boston-based journalist whose work has appeared in *Wired*, *Smithsonian*, *The New York Times*, *The Nation*, and *The Boston Globe Magazine*.

A group of students are gathered around a wooden table in a workshop, looking intently at a prototype bridge structure made of cardboard. The students are diverse in age and appearance. One student in the foreground is wearing a black t-shirt with yellow text. Another student is wearing a green sweater and glasses. The background shows a workshop environment with various tools and equipment.

Building Bridges

Students design and test prototypes to learn how materials respond to stress.



It is incredibly rewarding to see the innovative designs and witness new records in load-to-weight ratios," says Professor Yan Li, whose ENGS 33: "Solid Mechanics" course combines lectures, labs, and the always-engaging bridge building—and destroying—project. Through the project's four phases, students learn the essentials of stress analysis and load management, use advanced computational tools to predict performance, and build and test prototypes. "This structure aligns well with my teaching philosophy, which emphasizes critical thinking, hands-on learning, and practical application," says Li. "Students apply solid mechanics theory to design, analyze, and construct a wooden bridge that fulfills technical requirements, economic efficiency, and aesthetic appeal."

Each of the seven bridge teams in last fall's core engineering course used SolidWorks to analyze the maximum load their design could support as well as how far the bridge roadway will bend—without breaking—at a load of 1 kilonewton (kN). At the end of the term, students—with support from MShop Instructor Joe Poissant and Couch Lab Manager Daniel Cullen—laser cut and glued together the various plywood parts for models they calculated would carry pedestrians and small vehicles over a river. Then the big day: Couch's Instron machine put their predictions to the test. Crowding into the lab, team members and fellow students cheered as each prototype passed the 1-kN minimum load requirement and even the 4-kN mark before yielding to the crush of the Instron machine.

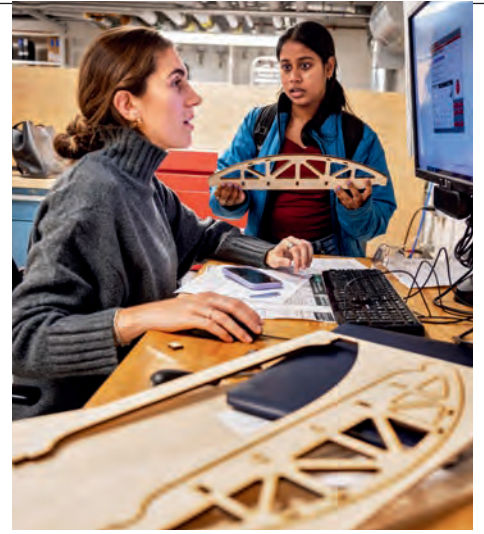
"Since I took over the course in 2020, I've seen clear improvements in design quality as we've learned from past challenges," says Li, who provided feedback after each test to encourage students to learn from their models' failures. "At some point, we plan to compile past designs and apply machine learning to explore further optimization possibilities. I'm curious to see if future students can outperform machine learning!" —Theresa D'Orsi

► Professor Yan Li (right) explains to a student team how they might have strengthened their prototype.



◀ Every design far surpassed the 1-kN minimum load requirement before being crushed by the Couch Lab's Instron machine.

▶ Victoria Cubina Lopez Th'25 (left) trained in laser cutting in the MShop so she could move her team's design from Solidworks to parts, including the truss held by Victory Kumbula '26.



► The team of (from left) Ben King Th'27, Nathaniel Pierce Th'27, Lawrence Martin Th'27, Jake Crawford '27, and Henry Heilman Th'27 scored a record 16.5 kNs before their design failed.

▼ Ly Nguyen '25 Th'25 (from left), Elijah Butler '26, and Lopez painstakingly apply wood glue to parts before curing with clamps.



◀ This student team—(from left) Nguyen, Kumbula, Butler, Yehalah Fernando '26, Ava Politis '26, and Lopez—passed the 10-kN mark before trusses broke. “We had to balance force and weight,” says Lopez of the grading rubric. “It was really good if it’s very light and very strong, and we did a good job predicting what it can hold compared to what it really holds.”

MODERN



» Cofounders (from left) Thomas Cornew '18 Th'18 (CEO), Samwel Bahebe '18 (managing director), and Ed Cornew '18 (president) in Tanzania

ALCHEMY



**SAMWEL BAHEBE '18,
THOMAS CORNEW '18 TH'18,
AND ED CORNEW '18
TRANSFORM SMALL-SCALE
GOLD MINING WITH
COMMUNITY-CENTERED
INNOVATIONS.**

During his junior year, Bahebe presented a challenge to his friends and Chi Heerot fraternity brothers: Develop a more sustainable and profitable gold-mining process. The engineering sciences major is a native of Tanzania, where he saw firsthand the harmful impacts of artisanal mining—the world’s largest source of mercury pollution. Twins Thomas, a mechanical engineering student, and Ed, an economics major pursuing a minor in human-centered design, joined Bahebe in launching gold-mining startup Mwamba, Swahili for “rock.” The trio persevered through a ban on gold exports, industry skepticism, and COVID to lead an effort now recognized by the UN, World Bank, and World Gold Council as a for-profit model for holistic development.

How did you become aware of the gold mining ecosystem?

Bahebe: I was born and raised in Mwanza, the northern region of Tanzania known for having the largest population of small-scale miners in the country. Being part of the community, I became aware of all the problems and challenges involved with the industry. One of my missions was to study abroad and come back to make a difference. I remember sneaking into my dad's room to look at his mining licenses so that when I got to college they would remind me that the mission is to learn about geology, learn about mining, come back, and do something about it.

One thing that really drove me at Dartmouth was the holistic approach to education. You can learn anything without overly specializing, which builds and shapes you as an entrepreneur because you need to learn economics, psychology, and all those different subjects to take on the challenges you will encounter later. That's proven really helpful as a cofounder and director. Everything that comes to you is new, so you need to be multifaceted to understand the different aspects of everything.

How did you connect with Thomas and Ed?

Bahebe: I think it was during orientation week...

Thomas Cornew: We shared a lot of classes and we became close. The end of junior year is when the first little nuggets of maybe we should try to do something together started to form.

Bahebe: It started with a project class at Thayer where you had to find a problem and then come up with a solution. It was perfect—we'd been starting to talk about maybe trying to do something in the gold-mining space. A huge, pressing issue is the rampant use of mercury as an extractive agent, so our initial idea was to build a mercury retort, essentially a fume hood that's got a back-end distilling unit. It captures and condenses all of the mercury vapor coming off of the burnout process to prevent it from going into the environment.

Bahebe: While we were thinking about solutions, the brainstorming process helped us realize there's a bigger problem. This is an industry that was producing 5 percent of the world's gold. So, we're thinking, "We've got 500,000 people producing billions of dollars' worth of gold with shovels, buckets, towels, and a little bit of mercury. Imagine what they could do if they had proper backing and support and industry-norm technology." Everyone knows mercury is evil, but they've got to feed their families that night. Miners make five times more than their counterparts working in the agricultural industry. It's a huge economic uplift in these rural communities to start engaging in gold mining.

Cornew: We agreed to do anything meaningful, we would have to build processing infrastructure to fully discontinue use of mercury. During winter our senior year, Ed and I went with Sam to visit Tanzania for three weeks to look at this problem firsthand. We left incredibly encouraged. The tricky part was that the technology we were trying to deploy is well understood but very expensive. Everybody we talked to was desperate for the system, called a CIP [carbon-in-pulp] plant. It uses a different extractive agent that can be very easily controlled, and there's zero environmental harm if you're managing it properly. The yield goes from 30-percent extraction rate with mercury and gravity to 95-plus with this CIP system—but it costs millions of dollars to build one of these facilities.

How did you begin pulling funding together?

Cornew: The base funding came from an on-campus phone and computer repair business I sold to underclassmen my senior fall. It let us go buy permits, gold, go to Tanzania, and get the initial attempt going. We also had other investors who were classmates of my sister [Sophia Tu'19] at Tuck. Then Professor Bruce Sacerdote ['90], who was Ed's economics professor at the time, said, "What you're telling us sounds great, it's checking all the boxes, but it's Africa. We don't know anything about Africa. You don't know anything about Africa. Why should I give you my money?" So it was a big test to prove we could export gold—at an absolute minimum get it out of the country and sold—and then we'd be able to get some seed funding.

Bahebe: One of the biggest challenges at that time in Tanzania was the president had stopped all mining companies from exporting gold. Luck played a real big role there: We were the first company to be granted an exportation permit when the country reopened. My brother showed up to our graduation with a couple of ounces of gold, proving to potential investors that we could export gold. That closed the initial funding, and we all said "no" to the jobs we had lined up.

Did things start to fall into place after that?

Bahebe: No. You have to understand, we were nobodies. We learned it all by stubbing our toes on every corner in the dark to figure out which way was straight. ... The first year and a half we were just broker-dealers. We were taking money, buying gold, and flipping it for arbitrage. It was ruthless.

Cornew: In that time, we were also building on the ground, staying connected with the locals and doing a lot of research. Sam traveled the entire northern region; he went from mine to mine, spending a lot of time in the villages and talking to people and getting to know the challenges, finding out how the gold is produced and really learning the reality of the entire supply chain, from production to how the gold gets traded, aggregated, and exported.

Bahebe: We gained all this knowledge from the ground, we had to teach ourselves and learn the complexities of the process. You can't just show up and say, "Hey, I want this deal." You've got to talk to people, be part of the community, to have access to the information and tribal knowledge that led to the development of this industry. The risk was so high. You have to understand what you're paying for: Is it actual gold? Where does it come from? You learn the hard way that trust is earned.

Are you also considering your first processing center?

Cornew: It was only about 18 months ago that we started construction and eight since we started producing our own gold. From 2019 to 2022 we got a little dazzled by some slightly larger opportunities that existed in the country. We met two established geologists who owned medium-scale mines that were drilled out and weren't developed yet.

Bahebe: This was far more in line with what international investors were used to seeing. Tanzania is at the bleeding edge of all the regulations for small-scale gold mining. For most established mining investors, you say the word "artisanal," and the only thing they think about is the illegal miners they are in constant conflict with. Trying to convince investors that you're raising money to



» Bahebe (blue shirt) discusses construction updates to Mwamba's Miti Minane underground mine in Geita, Tanzania.

“YOU’VE GOT TO TALK TO PEOPLE, BE PART OF THE COMMUNITY, TO HAVE ACCESS TO THE INFORMATION AND TRIBAL KNOWLEDGE THAT LED TO THE DEVELOPMENT OF THIS INDUSTRY.”

—SAMWEL BAHEBE '18

How is it different this time around?

Bahebe: In the mines we operate, it's a joint venture with the small-scale miners. So each day we'll reconnect and engage with the small-scale miners to be able to run operations.

Cornew: And Mac connected us with the world's second-largest gold mining company, Barrick Gold. We're now in a joint venture where they have committed \$23 million to explore the area. When Barrick builds a mine, it usually has a multi-billion-dollar price tag. By partnering with us at the scale that they did, it cemented us as a reputable player in the mining industry. All of a sudden, that partnership let us raise a ton of private capital that we funneled into what we originally wanted to do: build processing centers and work with local miners.

Bahebe: Almost our entire team is Tanzanian, which is one of the reasons we've been so successful. We are a local foreign mining company. We can approach every conversation with trust and a kind of openness that doesn't exist if you arrive as a foreigner. And now we have the government's full support.

What are your next steps?

Cornew: We were invited in 2019 to be an advisor to the UN Environment Programme's planetGold project. It's part of a huge international push to formalize and regulate artisanal and small-scale gold mining because it produces 40 percent of all the mercury that's introduced to the environment every year. This is a domain that Ed generally owns—he's been the one really driving all these initiatives.

Bahebe: They really like what we were doing because we're a for-profit company pursuing social impact goals, whereas the only other players in the space are NGOs that aren't sustainable after the money runs out. And the World Gold Council recently published a study where we one of only two companies in the world named as notable success stories.

Cornew: The support of the UN and World Bank is great, but it is only supercharging what we are already doing. We have three active mines, a processing center, and a growing pipeline of future projects we are building in collaboration with the local community. From a metric point of view, we'll measure success by how many kilos of gold we're producing a month across how many sites and how many mines. From a social impact point of view, it's going to be how many young adults from the local community we trained to be competent welders, boilermakers, metallurgists; how many careers we created; how many tons of mercury we prevented from being introduced to the environment, how much money we reinvested into the community. We want to take this model and build more centralized processing facilities, partner with local miners, make the needed investments to modernize their operations, and hugely boost the economic output to generate real wealth for these communities.

work with these people just didn't go anywhere. So we thought, “Okay, we've got these two medium-scale mines that represent a pretty sizable amount of gold in the ground. If we can find the funding to develop both, that'll establish us as a reputable, solid medium-scale mining company.” That led us to a crazy fundraising period, where we exploded in pretty dramatic fashion after a failed merger with a public Canadian mining company. Three weeks later, Covid hit.

Cornew: For about a year, Mwamba turned into a side hustle, which was tough. Then Sam—who was in Tanzania keeping the team alive—found us some money.

Bahebe: None of us gave up. We were still communicating with people, networking, and doing research. I narrowed my research to people from Dartmouth who had taken geology classes and now worked in the mining industry—and came across Mac Jackson [’83]. We sent him an email about Mwamba, and he was intrigued. We scheduled a call and sent a geological report that supported the potential of the projects.

Cornew: Together, we had synergy, the same focus, the same vision. Within less than a month he was able to invest—and Mwamba was reborn. After looking at the data, Mac's feedback was to “buy every piece of land you can in this area.” That's all we focused on for eight months. Established mining companies weren't making any further investments to find the next mines and grow their portfolio in Tanzania. So that left huge vacancies over one of the only parts of the country where you could reliably find gold mines. The exploration licenses we own now total 1,900 square kilometers [1,200 square miles] over this region.

Alumni News

FROM AROUND THE WORLD

spotlights

The Advisors

Thayer's Board of Advisors gained global perspectives into engineering and innovation at its annual off-site meeting, held in May in London. Advisors took a technical tour beneath Tottenham Stadium, visited the Imperial College of London Dyson School of Design Engineering, and met with the president of the Royal Academy of Engineering. The board also met with London-area alumni, parents, and incoming members of the class of 2029.



Thayer's Board of Advisors ▲

The Advocate

The community will gather in Hanover in October to honor **Barry MacLean '60 Th'61** and his half-century of service to Thayer School. His deep commitment to Thayer began in 1974 with his election to what is now known as the Board of Advisors—a position he has held since, including time as chair. In addition

to providing vision and direction, MacLean ensured the school had the funding it needed as Thayer's chair of the Will to Excel campaign in the 1990s, committee member of the Campaign for the Dartmouth Experience in the 2000s, and member of the Thayer Advancement and Campaign Committee through 2023. He advocated for Dartmouth Engineering as a College trustee from 1991 to 2001 and supported a range of campus activities as a member of the friends of rowing, football, and skiing, as well as club sports, the Hood Museum, Skiway, and libraries. For his commitment to Thayer and Dartmouth, MacLean has earned numerous honors: Sylvanus Thayer Fellow (1979), Robert Fletcher Award (1989), and Dartmouth Alumni Award (2007). In 2010, Dartmouth awarded him an honorary degree. Former **Dean Charles "Hutch" Hutchinson**, who served 1984-94 and 1997-98, credits MacLean with saving Thayer: "Barry MacLean ... helped recruit me to be dean of Thayer in 1984. It was a very difficult time. Thayer was in danger of going under financially and being closed down by the College. Barry, [Thayer Advisor] Jake Krehbiel, and some others really went to bat for Thayer, shoring up its finances and helping to convince the College that Thayer should stay intact. ... In the end, their efforts saved Thayer." As chair and CEO of Chicago-based MacLean-Fogg—a family-owned company and global provider of automotive and truck components and devices for power utilities worldwide—MacLean was named to the Illinois Manufacturing Hall of Fame. He and wife Mary Ann, who predeceased him in 2016, raised children **Margaret '87, Duncan '94 Th'95 Th'96, Gillian '95, Elizabeth, and Adrian.**



Mira Murati Th'12 ▲

The Visionary

With technical skills, elite backing, and a mission to open the black box of AI, **Mira Murati Th'12** may reshape the way the world builds and interacts with intelligent systems. The former chief technology officer of OpenAI and a central figure behind ChatGPT has launched her own AI startup—and she's doing it in blockbuster fashion. This summer, her Thinking Machines Lab was raising a \$2-billion seed round at a \$10-billion valuation—a practical necessity since training large models and building scalable infrastructure requires capital on a massive scale. It's also a high-stakes bet to reshape the way AI is built and understood. Thinking Machines Lab will focus on making AI "more widely under-



"Barry ... really went to bat for Thayer, shoring up its finances and helping to convince the College that Thayer should stay intact."

—DEAN CHARLES "HUTCH" HUTCHINSON

On the Job

DEEPA PODUVAL TH'01 | GLOBAL SUSTAINABILITY LEADER

Poduval is responsible for building and implementing the sustainability strategy at the engineering and construction firm Black & Veatch. Named as a “Top 50 Women Leaders of Houston” by Women We Admire in 2023 and 2024, she also serves on the board of the American Society of Mechanical Engineers Committee on Sustainability and as executive mentor with CEO Action.

What is your current role?

I focus on corporate sustainability and the steps we need to take to achieve net-zero emissions as a company and achieve positive environmental impact when it comes to water and waste. Our clients come to us with complex challenges surrounding energy and water infrastructure. Their preference is for renewable energy, but they also recognize that's not necessarily available at scale for everyone, so we help them consider and think through everything from natural gas to nuclear to geothermal energy solutions.

How has your Thayer education served you in your career?

Today's problems require a multidisciplinary approach. That's where the MEM program really shines. Having the Irving Institute [for Energy and Society] fully integrated makes the business case and the value proposition that much stronger. Having a multidisciplinary approach has given me the experience to be able to talk to engineers and finance experts and translate between the two.

Climate change news can feel disheartening. What keeps you positive?

I think of it more as a GPS destination: We might hit some lights along the way or traffic jams and take slightly different routes to get to where we're going, but our march toward this destination is robust. Overall, technologies such as solar energy are becoming cheaper, and the penetration of cleaner, lower-carbon technologies will continue to increase through time.

Why do you stay connected to Thayer and support the MEM program?

I decided to contribute to Thayer's professional development fund to support MEM students so they can go to conferences and network and get a taste of the real world. It's not just about academics. I believe we should also be teaching students how to integrate with the world and its current problems and challenges.

—Betsy Vereckey

“So much of the work I focus on is related to sustainability and the energy transition—and those issues have never been more important.”

—DEEPA PODUVAL TH'01

spotlights

stood, customizable, and generally capable,” highlighting a shift toward both transparency and user control, according to the company website. That positioning places it in competition with AI giants such as Google’s Gemini and Elon Musk’s xAI, as well as OpenAI, where she spent more than six years contributing to the development of ChatGPT and other advanced AI projects. If she succeeds, Murati’s new venture will be one of the most well-capitalized AI startups in the world—and one of the first led by a woman.

The Competitor

Olympic rower and entrepreneur **Judy Geer ’75 Th’83** received an honorary doctor of humane letters at Dartmouth’s 2025 Commencement ceremony. As a student, Geer transferred to a newly coeducational Dartmouth, joining the class of 1975 her junior year. She immediately took advantage of life in the north woods, majoring in ecology, singing with the Handel Society choir, helping found the women’s swim team, and most notably, rowing with the women’s crew team. With the encouragement of her coaches—and while pursuing her AB and BE—Geer tried out for the U.S. Olympic rowing team and went on to compete in the 1976 and 1984 Summer Games (the United States boycotted the 1980 Games). “I was actually training for the Olympics all the way through engineering school,” she says. “I really think balance is important ... going out and getting a workout would refresh my mind and I would come back and be more efficient and organized.” Geer then joined Concept2, a Vermont-based rowing equipment and exercise machine company cofounded in 1976 by Dick Dreissigacker, who would later become her husband. “My education prepared me really well for working in a small business because I could understand the engineering and I could write,” she says. “I became a translator of the engineering and technical information we had to get to our customers.” In 2008, Geer and Dreissigacker bought the Crafts-



bury Outdoor Center, which serves athletes with a focus on the lifelong sports of rowing, cross-country skiing, biathlon, biking, and running. Geer is the ideal role model, having won the 40-49 women’s single division at the 2001 Head of the Charles. She continues to row, work, and enjoy time with family, including children **Hannah ’09 Th’10**, **Emily ’11**, and **Ethan ’13 Th’15**.

The Racer

Louis Latulippe ’25 Th’25 came to Dartmouth for the skiing. But it was the engineering courses and hands-on projects in the MShop that fill his time off the slopes. “Since high school, I’ve been trying to combine school and skiing to reach the highest levels in both,” says the Quebec native, who has raced slalom for the Big Green in every regional carnival, scoring his first Eastern Intercollegiate Ski Association win as a senior. His other first as a senior: earning the George A. Coligan Memorial Prize—awarded to an undergraduate in recognition of outstanding performance in materials science—during Investiture. As he looks for his next challenge, Latulippe insists his two passions

take a similar approach: “Sometimes, when you’re going through a difficult time on the slopes, it’s like working hard toward some engineering problem you can’t solve. Taking a step back and trying to look at the problem in a different way is something that’s useful both in engineering and racing.”

The Scholars

Two engineering graduates will go overseas this year and engage with other countries and cultures as Fulbright scholars. Engineering sciences major **James Quirk ’25** will teach English in Switzerland. A former fellow with the Dartmouth Center for Social Impact, he has competed with the alpine ski club and as a U.S. Chess Federation-rated player. “I have transformed into a children’s storyteller, a chess coach, and a teaching assistant, but I have always loved expanding my worldview as a teacher and a learner. I wish to participate in Fulbright because of each grantee’s responsibility to uphold both roles throughout the program,” Quirk says. Biomedical engineering major **Danny Will ’25** has received a Fulbright award to Erlangen, Germany.

Louis Latulippe ’25 Th’25 ▲

Will was a recipient of five undergraduate research award grants, a pitcher on the baseball team, and cofounder of the nonprofit Teen Vision. “The goal of my Fulbright research project is to help engineer a new family of bioactive glass, a biomaterial that has potential use in human bone and soft tissue regeneration,” Will says. “Additionally, I hope to develop personal friendships by mentoring Erlangen youth and playing and coaching baseball with the Erlangen White Sox.”

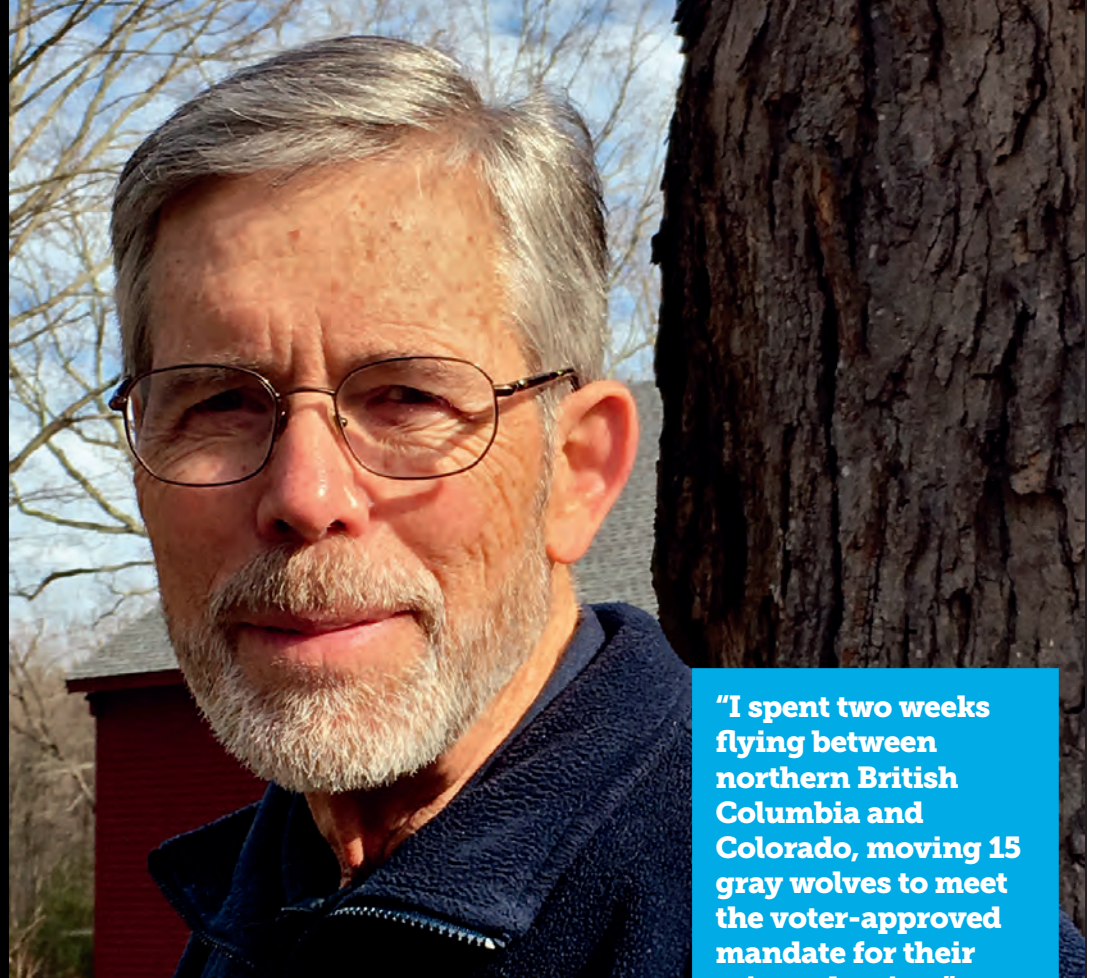
Meeting the Demand

Mine water engineer **Larry Breckenridge ’95** works in the hard-rock mining industry—“and we are in the middle of a mining boom,” he says. “We are trying to supply the world with the copper, critical metals, battery metals, and precious metals required for de-carbonization.” It’s an effort to meet the unprecedented demand for metals and minerals used to develop advanced materials for windmills, solar panels, batteries, and electric cars. As principal environmental engineer at Denver, Colo.-based Global Re-

source Engineering, Breckenridge applies his double major in environmental science and engineering to counter the opposition to mining while building projects to protect water. “I joke that I’m strip mining to save the world, but it’s not a joke,” he says. “The world has a choice: One mountain in Panama or the Great Barrier Reef (and a livable climate). I know for certain which one I will choose.” Breckenridge, who recently hired chemistry major **Yuliya Subotskaya ’24**, remains committed to demonstrating that the world does not have to choose between clean water and mining. For a recent project in Armenia, for example, he designed a mine tailings closure cover that produce near-zero leachate, which through time will prevent metal and salts from leaching into the surface and groundwater after the mine’s closure.

The Translator

As a research software engineer at the Topos Institute, **Kristopher Brown ’14 Th’15** tackles the big, global questions. “I work on helping scientists and engineers represent their knowledge and models of the world,” he says. “We accomplish this with a branch of math called ‘category theory,’ which formalizes the notion of a ‘good analogy’ in a practical, computable way.” It’s an effort that builds on his PhD research at Stanford, where he applied machine learning to computational chemistry problems and studied knowledge and data integration issues more broadly. At the Berkeley, Calif.-based Topos, he takes a four-pillar approach to building a society in which all communities flourish. The nonprofit’s mission is to pioneer mathematical systems science, develop tools for collective modeling, forge new practices for pro-social technology, and create new sustainable structures for public good. Brown’s latest effort intertwines an interest in philosophy with his research. “I now collaborate with renowned philosopher Robert Brandom on how recent developments in the philosophy of language can lead to practical tools for self-understanding and communication, with consequences for our understanding of science and AI.”



“I spent two weeks flying between northern British Columbia and Colorado, moving 15 gray wolves to meet the voter-approved mandate for their reintroduction.”

—JIM BECKER ’69 TH’70 TU’75 TH’76

On the Job

JIM BECKER ’69 TH’70 TU’75 TH’76 | CEO, LIGHTHAWK

As CEO of LightHawk, a nonprofit that advances conservation efforts through flight, the serial entrepreneur and pilot draws regularly on his 60 years of experience at the controls.

Why did you decide to study engineering at Thayer?

As a kid, I was up to my elbows in engines, radios, and anything I could take apart. Dartmouth’s combination of liberal arts and engineering really appealed to me. I enjoyed the hardcore electronics courses, where we wire-wrapped the hardware and programmed in machine language. I had to write a cross assembler for the Intel 4004, the first microprocessor. When I go back to Dartmouth now and tour the labs at Thayer, I am amazed at what a rich environment it is.

Where did your career take you?

After graduation, I got a deep immersion in finance at W.R. Grace and in technology at Digital Equipment Corp. I got bit by the entrepreneurial bug, secured some patents, and created a couple of startups. One focused on software for clinical trials for pharmaceutical companies. The second developed specialized communications software for airlines. I consulted for many years after that and was invited to be on the board of LightHawk

by a friend who was the board chair. That led me to my role as CEO.

How is LightHawk addressing climate change?

LightHawk offers the power of aviation to enhance the rate and effectiveness of conservation work, often in ways that are not immediately obvious. Through the generosity of our volunteer pilots, LightHawk provides an aerial perspective to monitor ecologically important landscapes, coastal ecosystems, vital wetlands, and river systems. We can track changes through time, showing the impact of change and helping enhance climate resilience. An important part of our mission is endangered species recovery and wildlife monitoring.

How have recent changes in federal policy impacted your work?

With the reversal of much of the federal funding to support conservation, we’ve seen a significant increase in requests for LightHawk’s services. There will be much development pressure on public lands that had been previously reserved. Along with our conservation partners, we’ll help to document those changes through time.

—Betsy Vereckey

thayer notes



| 1960s |

John Lo '63 Th'65 Th'67: I am interested in predicting the future GDP scenario for 2 billion people in China by 2776—1,000 years since the United States was founded—to see how this Western Hemisphere startup can impact an Asian society. Common artificial intelligence (AI) will lead to collaborative innovation and breakthroughs in all fields of research and development and especially in biotechnology and neuroscience (such as gene editing). The world is ecologically betting on clean nuclear energy to control climate change while its capital flows are allocated in the direction of long-term development of water and food management systems to accommodate 20 billion people in the year 3000. Thayer has significantly increased its capacity to contribute toward that buildup, and China could one day create a similar campus in that country. It is a great experiment in human history.



Gallery

1 Thayer and Dartmouth alumni (from left) **Dieter Ulber**, **Ulrich Meingast**, **Paola Vasquez Brown Th'98**, **Melanie Blanchard Adv'98**, **Amy Myers Adv'99**, and **Carlos Alberola Lopez** reunite in Brittany.



2 **Steve Lentine '77** (kneeling), **Tom Barnico '77**, **Bill Ablondi '77 Th'80**, **Shoun Kerbaugh '76**, **Stan Raggio '77**, **David Van Vliet '77**, **Bob Freidl '76**, **John Reidy '76**, **Joey Gleason '78** and **Paul Centenari '79** (kneeling) visited the Second Battle of Bull Run.



3 **Josephine David Feinbloom Th'85** and family travel in Greece.

4 **Scott Gardner '92** is president of Svante Development Co.

| 1970s |

Shoun Kerbaugh '76 Th'77: A mixed group of Dartmouth alumni in May visited the site of the Second Battle of Bull Run, where we saw the marker in honor of Col. Fletcher Webster (Daniel Webster's son) on Chinn Ridge, where he died during the third day of the battle. The group consisted of me, **Bill Ablondi '77 Th'80**, **Tom Barnico '77**, **Paul Centenari '79**, **Bob Freidl '76**, **Joey Gleason '78**, **Steve Lentine '77**, **Stan Raggio '77**, **John Reidy '76**, and **David Van Vliet '77**. In addition, we visited the site of the First Battle of Bull Run as well as the Antietam battlefield in Sharpsburg, Md.

| 1980s |

David Feinbloom Th'85: My family and I have already returned from our summer adventure, finally getting to Greece. The trip was originally intended for 2020 (when

you-know-what happened) to celebrate the high school graduation of our daughter. Fast-forward to 2025 and we ended up also celebrating her college graduation, son Danny's veterinary school graduation, and Lisa's and my 30th wedding anniversary. We enjoyed a one-week cruise followed by three days on Santorini and three days in Athens. Next up was helping Danny move from Columbus, Ohio, to Gainesville, Fla., where he is doing a small animal rotating internship. We moved Rosie to Charlotte, North Carolina, last year, and I have the sneaking suspicion we'll be moving her somewhere new in 2026. Lisa and I are still living in the Detroit, Mich., area and are still working, me in product development at Stellantis and she in her own insurance sales business—for how much longer I cannot say, as neither of us has set a date.

| 1990s |

Scott Gardner '92: I started a new role last month as president of Svante Development Co. (SDC). SDC is a subsidiary of Svante Technologies, a Vancouver, Canada-based company that is a leading carbon capture and removal solutions provider. Svante makes filters and modular rotary contactor machines that capture and remove CO2 from industrial emissions and the air. At SDC I lead a team that brings commercial structuring of carbon credit sales, evaluation and contracting with geologic sequestration partners, and project financing to support the construction of industrial-scale post-combustion carbon capture projects that implement Svante's solid sorbent technology. I still live in Boulder, Colo., but was recently at the newly opened manufacturing facility in Burnaby, British Columbia, that can produce enough filters to accomplish 10 million metric tons per annum of CO2 capture. We are working on several projects that will implement simi-

lar machines at host industrial sites. Carbon capture and storage is an important pathway for carbon mitigation and carbon removals from the atmosphere, as the world continues the climate fight. It requires a synthesis of regulatory policy, government incentives, private market commercial structures and financing, and, of course, technology to bring projects together.

Jeremy Howick '92: I recently had my inaugural lecture at the Global Empathy in Healthcare Network Symposium 2025—“Rehumanising Healthcare in a Divided World”—celebrating my promotion to professor at the University of Leicester, United Kingdom. (The promotion was in June 2022 but there was a backlog due to Covid.) I am professor of empathic healthcare and director of the Stoneygate Centre for Empathic Healthcare at Leicester Medical School.

Paola Vasquez Brown Th'98: On June 14, a special reunion brought together Thayer School of Engineering alumni and longtime friends in the breathtaking Brittany region of France. I joined Dieter Ulber and Ulrich Mein-gast (exchange students from Germany), Carlos Alberola López (a visiting scientist under Professor George Cybenko in the late 1990s), math major Amy Myers Adv'96 Adv'99, and their families for a memorable gathering hosted by chemistry major Melanie Blanchard Adv'98. What made this reunion even more meaningful was the group's shared history—we had all lived in the international graduate student housing on North Park Street during the 1996-97 school year. Though that housing no longer exists, it remains deeply embedded in our memories as a place where lifelong friendships were forged, fueled by the unique camaraderie of an international community. Set against the stunning coastal landscapes and rich history of Brittany, we reflected on

our Dartmouth days, celebrated enduring friendships, and embraced the joy of reconnecting after years apart. This gathering was a testament to the lasting bonds formed at Dartmouth and the spirit of collaboration that continues to define Thayer alumni.

| 2000s |

Robbie Barbero '01 Th'02: I've joined a new organization, Renaissance Philanthropy (renaissancephilanthropy.org). We partner with individuals, families, and foundations interested in building ambitious philanthropic initiatives, reducing the barriers to designing and implementing large-scale high-impact philanthropic strategies. I'm going to be a senior fellow working on identifying and leading time-bound, thesis-driven programs that can achieve an ambitious goal or solve a critical problem—primarily focused on the life sciences space. I have a PhD in bioengineering and more than 20 years of experience operating across a range of responsibilities in the biotechnology and life sciences sector, including in public policy, research and development, business development, startup management and fundraising, and quality and manufacturing roles.

Bryan Bollinger '03 Th'03: I am happy to report I am returning to Dartmouth this summer as a professor of business administration at Tuck. Before joining Tuck, I was a professor of marketing at the NYU Stern School of Business, where I served as the academic director of doctoral studies. My interdisciplinary research portfolio aims to understand the causal effects of marketing and policy decisions and the interdependent reactions by consumers and firms. Examples include drivers of solar adoption and pricing, the role of home-automation and dynamic pricing on demand response, and response to information. My research has been supported by grants from the U.S. Department

of Energy, National Science Foundation, Environmental Protection Agency, and others. At Tuck, I will be teaching customer analytics and a course I developed while at NYU titled “Sustainability and Marketing.” I am excited to return to the Upper Valley for many reasons, one of them being the terrific access to the outdoors (another being Lou's breakfast). I am excited to be back at Dartmouth and hope to be able to interact with Thayer and Revers Center initiatives, given my research on sustainability and renewable energy.

| 2010s |

Sharang Biswas '12 Th'13: I wanted to draw your attention to the publication of my first book, *The Iron Below Remembers*. Set in an alternate version of the British Isles where South Asian imperial interest colonized much of the globe thanks to its advanced technology, Professor Laxman Yadav is dating Saviour, one of the world's most famous superheroes, while also investigating possibly the most important archeological find of all time. Equal parts pulp caper and meta-textual academic text, this novella leans as heavily on footnotes as it does on explorations of queer romance.

Steven Jin '12 Th'12: I am a senior software engineer at a Series B startup. I switched careers several times and now I feel I'm happy with the career I've chosen.

Evan Landau '15: Toward the end of 2024, I cofounded a carbon removal startup based in Spain. Along with a team spanning six countries, I am working as the head of industrial design and production helping to build small-scale, low-maintenance, and user-friendly direct air carbon capture hardware. The company is currently in a prefunding prototype development stage and in the process of speaking with potential investors,

with an official launch targeting late summer or early fall.

Anna Miller '16 Th'17: For the past year and a half, I've been working at an interesting startup in Seattle called Starfish Space (starfishspace.com). We're developing a servicing satellite that can dock with other satellites to provide lifetime extension (propelling satellites when they run out of fuel), space debris removal, and eventually in-orbit assembly and repair. We have a launch coming up for a prototype that will attempt the first-ever commercial satellite docking—it's a very exciting time!

Andreas Tzavelis '17 Th'17: I just finished my MD/PhD at Northwestern and moved to Philly to start my research track residency in anesthesiology at Penn Medicine!

| 2020s |

Vanessa Pinney '21 Th'22 Th'23: Things have been very exciting of late! I switched jobs and am now working for New Energy Risk as a business development associate helping first-of-a-kind clean energy projects get financed by underwriting their technology risk. It's been a super-interesting job at the intersection of infrastructure, climate finance, novel project development, and insurance. I assess the financial models and engineering design documents of first-of-a-kind technology projects. In addition, I have been running the Young Professionals in Energy chapter in Boston, which plans two-plus events per month to get recent graduates and professionals in their 20s and 30s involved in the energy industry. Many of the events are regular networking events, but we also organize a variety of tours, panels, and even some collaborations with local nonprofits to increase access to renewable energy in underserved communities!

| in memoriam |

ALVIN O. CONVERSE

— 1932-2025 —

“Passion for Creative Design”



Emeritus Professor Alvin Omar Converse, who served on the Thayer School faculty from 1963 to 2000, died on January 10.

Throughout his extensive tenure on campus, Converse helped shape Thayer’s engineering curriculum during the 1960s and spearheaded a research program in the use of enzymes to convert biomass to ethanol. He taught both undergraduate and graduate courses—in thermodynamics, transport phenomena, chemical reactor design, and energy conversion—and championed the School’s signature learn-by-doing approach.

“Many generations of thermodynamics students probably have memories of building Stirling engines as part of his class,” says Professor and Interim Dean Doug Van Citters ’99 Th’03 Th’06. “Consider the record size of our programs and yet our continued emphasis on individualized learning by doing. Al’s dedication to hands-on, project-based learning, passion for creative engineering design, and his teaching and scholarship have been integral to shaping Thayer into who we are today.”

He and his family lived across the river in Norwich, Vt., where he served on the school board for several years. An avid hiker, he helped establish the Bill Ballard and the Converse loop walking trails in Norwich. Converse loved music, especially opera, taught himself to play the recorder, and performed locally in a recorder ensemble. He enjoyed his family and friends, skiing or walking in the woods, having good conversations, and fine woodworking. Converse was a poet and published a collection, *Downward-Growing Trees*. He spent the last 14 years in Santa Fe, N.M., with his wife of 70 years, Merry. He is survived by his wife; sons David, Tom, and James; two grandchildren; and two great-grandchildren.

obits

James R. Prew ’47 of Franklin, N.H., died April 13. He entered the U.S. Navy in 1944 under the officers training program at Dartmouth. He completed his AB in civil engineering and graduated with a commission of ensign, j.g. In 1948 he began studying for the priesthood with the Carmelite Fathers in Brookline, Mass., and was ordained in 1956. He returned to the United States in 1957 to serve in the Carmelite Order in several parishes in Milwaukee, New York, Washington, DC, and Boston. In 1968 he left the order to begin work in private industry, starting with Liberty Mutual Insurance in Boston for 10 years. Using his background in civil engineering, plus a love of art and architecture, he restored two antique homes. He was predeceased by wife Jean and brothers Ed and Bob ’52.

Robert M. Kirby ’50 Tu’51 Th’51 died January 13 at home in Princeton, N.J. He graduated from Bronx High School of Science, and in his senior year was recruited into the Army and served as quartermaster in the last few months of WW II. He entered Dartmouth on the GI Bill as a sophomore and pursued a five-year program in engineering and business. After graduation he took courses at Columbia and started Kirby Computers, later called Kirby Microprocessors. In the 1950s and 1960s, it was one of the first businesses to successfully harness the power of new technology. He had many interests: skiing at 91 years old, playing tennis until a month before his death, flying small airplanes, and sailing his 34-foot Irwin. He is survived by his wife, Brownlee.

Albert G. Melcher ’53 died December 15, 2024, in Aurora, Colo. He graduated cum laude with an AB in engineering sciences and earned his MS in civil engineering. After service as an ensign in the Navy Civil Engineer Corps, he became a partner at Denver, Colo.-based engineering firm Borman/Melcher & Associates. In 1969 he founded Omni Research and Engineering, consulting on environmental planning for national and Colorado projects. He became executive director of the Rocky Mountain Center on Environment, an eight-

state nonprofit where he managed ecological planning for industrial and land use projects. He was deputy director of the Colorado Energy Research Institute at Colorado School of Mines and in 1968 was appointed to the Colorado State Highway Commission, where he developed the design process for the I-70 Glenwood Canyon construction. He is survived by wife Rosemary and children Albert and Sarah ’82.

Norman Michael Fine ’55 Th’56 passed away August 16. After earning his MS in electrical engineering at Thayer, he spent three years at Raytheon, where he helped develop a large-screen radar display for air traffic controllers. Following that experience, he and a colleague formed Beta Instrument Corp. in 1962. Fine took pride in his company’s role in several historic firsts, including the development of display scopes to receive the slowly transmitted signals from NASA’s *Apollo 11* mission, enabling the public to watch Neil Armstrong take his first steps on the moon. He is survived by his wife, Marilyn, and children Lisa and Robin.

George W. Johnston ’57 Th’58 of Wellesley, Mass., passed away on January 3. At Dartmouth, he earned an AB in engineering sciences and an MS in mechanical engineering, played soccer, and was active in Alpha Delta Chi, Glee Club, and ROTC. He then served in the U.S. Marine Corps, training at Quantico, and completing Camp Pendleton Atomic, Biological and Chemical Defense School. He served as battery commander of the 1st Light AA Missile Battalion, Fleet Marine Force, in the Pacific, before he was honorably discharged with the rank of first lieutenant. He began his career at Isbrandtsen’s venture capital subsidiary, joined Price Waterhouse’s executive recruiting practice, then moved to human resources recruiting firm Parker, Eldridge, Sholl, and Gordon Inc. He was predeceased by his wife, Ann, and is survived by daughter Margaret and family.

Kenneth D. Rakouska ’57 passed away on January 17 in St. Augustine, Fla. He majored in civil engineering at

Dartmouth, was in the NROTC program and Delta Tau Delta, and rowed crew. He graduated from Thayer with distinction. The day June 9, 1957, was a defining one: He was commissioned as a Navy ensign at 10 a.m., graduated from Dartmouth at 1 p.m., and married Dorothy, his childhood sweetheart, at 4 p.m. at the Church of Christ down the street. He served in the Navy and went on to build a successful career in engineering and business. He held multiple patents and was known for his innovative mind and tireless work ethic. He was predeceased by Dorothy and son Ken Jr. He is survived by granddaughters, a daughter-in-law, a niece, and nephews.

Ken Johansen '60 Th'62, recipient of a 2013-14 Dartmouth Alumni Award, died January 29. He earned his AB and MS in mechanical engineering from Dartmouth and was active in Air Force ROTC, intramural athletics, and Delta Kappa Epsilon. He went on to enjoy a 40-year career in paper manufacturing, retiring from International Paper Co. His community service included 18 years on the Montvale (N.J.) school board, serving as chief negotiator with the teachers' union, president, and vice president. He was an active alumnus, serving as class president, alumni councilor, Dartmouth Club of Dallas president and treasurer, and Alumni Fund volunteer. He is survived by wife Ruth and daughters Karen and Kathy and their families.

Raymond A. Sonntag '65 of Shelburne Falls, Mass., died March 2. He attended Dartmouth on a football scholarship and went on to earn his BS in industrial engineering from NYU. Most of his career was spent as a systems analyst with Northrup Grumman Aerospace Corp. Ray and his wife of 44 years, Mary, raised their nine children, who recall him building innovative forts and backyard play structures. A devout Catholic, he maintained a leadership role in Nocturnal Adoration on Long Island and was an active member of the Holy Trinity Lay Community in Heath. He is survived by children Daniel, Kristine, Joseph, Virginia, Jon, Joshua, April, and Holly and 31 grandchildren.

Russell L. Adams '71 Th'72 of Tewksbury, Mass., passed away on January 8. He followed older brother Bill '67 to Dartmouth, where he earned his AB in engineering sciences and BE. He pursued a career as a civil engineer, working on the design or program construction management of major projects for the Metropolitan Water Reclamation District of Greater Chicago and Massachusetts Water Resources Authority, including the Skokie (Ill.) North Side Sewage Treatment Plant and the Deer Island (Mass.) Wastewater Treatment Plant. In 2006, he worked as a contractor with the U.S. Federal Emergency Management Agency, aiding in the recovery following Hurricane Katrina. He served as president of the New England Water Environment Association. He was predeceased by wife Mary Louise and is survived by sons Jonathan and Matthew.

Zachary B. Kratochvil '16 Th'16 died April 23 in Medford, Mass. While in high school, his love of science and research brought him to Dr. Hal Blumenfeld's neurology lab at Yale University. He was invited to return after he had earned his AB in engineering sciences, with a minor in neuroscience, and his BE. Subsequently, he earned an MS in data science from Tufts and became a software engineer. He is survived by wife Allison, sister Leah, parents Nancy and Thomas, and grandparents Marie, Judith, and Stephen.

Quang Dang '19 Th'20 died March 7. Professor Sol Diamond '97 Th'98 recalls his efforts as a Cook Engineering Design Center (CEDC) fellow and a teaching assistant during Covid: He was a creative force of nature and spark of joyfulness for transforming ideas I had about mechanical clocks and home 3-D printing into the inspiring, lived experiences of the students and staff at a time of intense uncertainty and fear. Quang and I also put our heads together in a series of human-centered design sessions envisioning the future of the CEDC. Many elements of that vision are now shaping the lives of so many students." He is survived by his parents, Bich and Yennga, and sister Thienan '16.

| in memoriam |

MICHAEL B. MAYOR

— 1937-2025 —

Improved Orthopedic Implants Worldwide



Orthopedic surgeon and adjunct professor of engineering Michael B. Mayor died at Kendal at Hanover on March 31.

He was raised on a farm in Mt. Kisco, N.Y., and attended Deerfield Academy, where an X-ray revealed a tumor on his femur, requiring an above-the-knee amputation. He went on to earn his bachelor's in electrical engineering in 1959 and his M.D. in 1965 at Yale. Mayor began his surgical training at the University Hospitals of Cleveland, where he assisted in and then taught the first U.S. hip joint replacements. A National Institutes of Health fellowship in bioengineering solidified his interest in research.

As a surgeon at what is now Dartmouth-Hitchcock Medical Center for more than 40 years, Mayor replaced an estimated 3,000 hips and 4,000 knees. Mayor joined the faculty at Dartmouth Medical School and cofounded the Dartmouth Biomedical Engineering Center (DBEC) with Professor John P. Collier '72 Th'75 Th'77. They collaborated to develop a new porous coating for orthopedic implants and implement DBEC's program for retrieval analysis to study these devices and provide direct feedback to the manufacturers and surgeons.

"The implant retrieval lab was what permitted us to have all our breakthroughs, and that was 100-percent Michael's idea," says Collier. "He was the magnet. Devices came to him. The mail was full of them and he would analyze every single one. It provided a pedestal for perspective that allowed us to understand implant failure in a way that no one else could." With more than 20,000 retrievals, DBEC remains one of the largest such labs in the world, responsible for critical advances and profound quality-of-life improvements for millions of patients worldwide.

He is survived by his wife, Lili; children Rowland, Anna, Sloane, and Catha; and 10 grandchildren.

"Dr. Mayor made me think about why we do what we do as engineers. I'm now driving what I learned from Dr. Mayor into how I run a school. ... You do it with compassion, thinking about how you solve problems in a way that you touch the maximum number of lives."

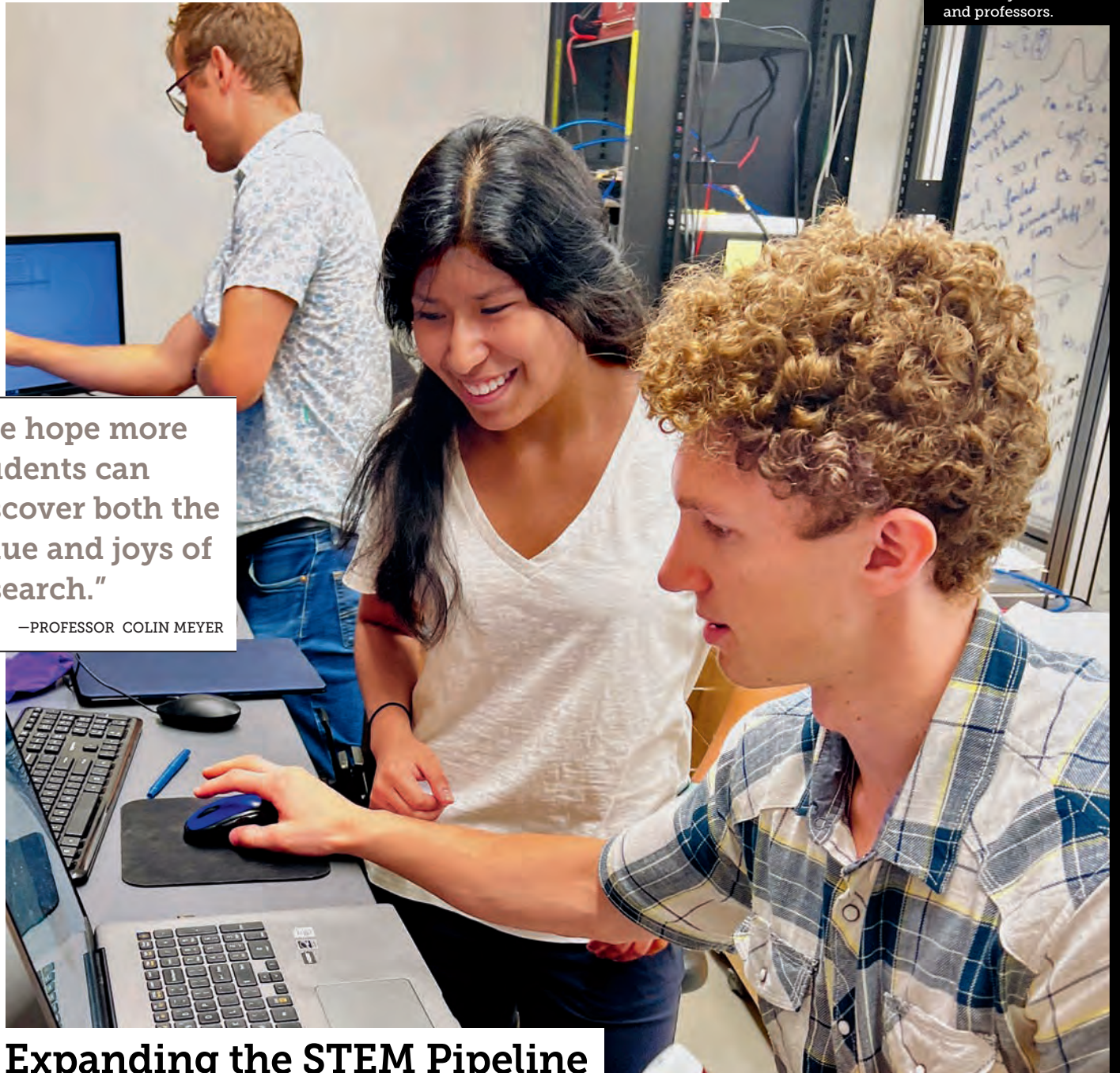
—INTERIM DEAN DOUG VAN CITTERS

Collaborations

Students from schools without research programs learn in labs with Thayer students and professors.

"We hope more students can discover both the value and joys of research."

—PROFESSOR COLIN MEYER



Expanding the STEM Pipeline

A new program—Dartmouth Engineering Summer Research Experience—offers undergraduates from schools without research opportunities the chance to engage in high-impact research in Dartmouth's labs.

"We are excited to create this opportunity for students to collaborate with Dartmouth faculty and students and be a part of research that will someday have a big societal impact," says Profes-

sor Wesley Marrero, program co-coordinator with Professor Colin Meyer. The program admitted and covered most costs for four students—one is working on campus and three are remote—in its inaugural cohort June 22 to August 9.

The initiative is funded by Dartmouth NEXT, a \$100-million university-wide effort that connects 10 programs across campus to help students understand the many STEM support options available.

At Thayer, research opportunities include the First-Year Research in Engineering Experience, and Research Experience for Undergraduates, a National Science Foundation-funded initiative that focuses on materials science—all part of an effort to strengthen the graduate research pipeline to address a growing national need for industry-ready STEM professionals in the U.S. workforce.

—Eun Lee Koh '00



IN THE NEWS

"America's Explainer-in-Chief" CBS Sunday Morning

While visiting the National Building Museum in Washington, DC, **Senior Lecturer David Macaulay** showed CBS correspondent Martha Teichner how sketching can help one see things such as the Ledyard Bridge in a new way: "My goal is to have people open their eyes to the things they take for granted," says the creator of *The Way Things Work*.



"Inside a New Quest to Save the "Doomsday Glacier" " MIT Technology Review

Professor Colin Meyer discusses cofounding the Arête Glacier Initiative and his research to assess and minimize the risk of sea-level rise in coming decades. "This improved understanding would help cities plan where to build new bridges, buildings, and homes and to determine whether they'll need to erect higher seawalls or raise their roads," he says.



"Small Ways to Spark Joy in Your Teaching" Chronicle of Higher Education

Professor Eugene Korsunskiy dismisses the false dichotomy that having fun is at odds with doing rigorous work. The article points out that joy has cognitive benefits that support creativity, problem-solving, and teamwork. "Joyful learning environments," he says, "help students thrive."



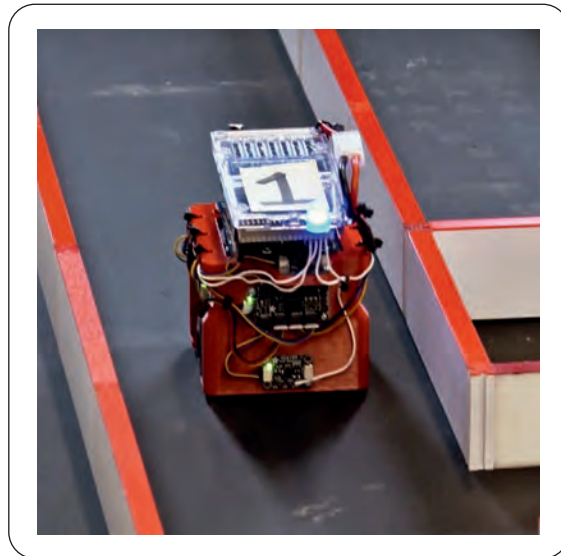
"The Top AI Engineers in America" AIM

Professor Geoffrey Parker, faculty director of the Irving Institute for Energy and Society, and **Mira Murati Th'12**, Thinking Machines Lab founder and former CTO of OpenAI, are named to the listing of the top 100 AI engineers in the United States.



Faculty Research

Professor Katie Hixon describes her work collaborating with students and clinicians on research involving tissue engineering, including biomaterial scaffolds that help injured tissues—such as bone, tendons, and skin—heal better.



Online Learning in "Distributed Computing"

Dartmouth online MEng student Eddy Fabery highlights the course's hands-on approach to learning complex computing theories and their real-world applications.



Online MEng student Benson Liu, based in Tokyo, met President Sian Leah Beilock during her spring international tour, when she visited students, alumni, and families in 16 cities on three continents.



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Fall Fun

Students and staff get creative when Thayer Council hosts an afternoon of pumpkin carving to celebrate the season.