

SYNTHESIS

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College of Science
THE UNIVERSITY OF UTAH

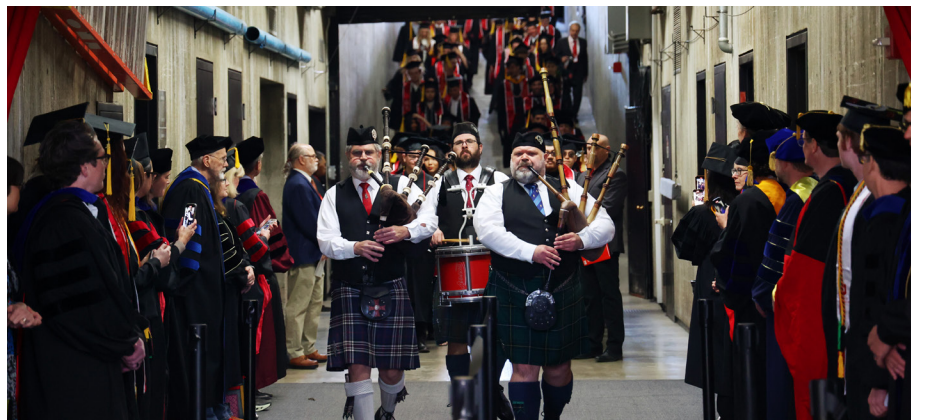


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LETTER FROM THE DEAN



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DEAR FRIENDS OF THE
COLLEGE OF SCIENCE,

I'm thrilled to share the 2025/2026 issue of Synthesis with you as the newly appointed dean of the College of Science. This past year as interim dean has deepened my appreciation for the remarkable community we've built here—one defined by curiosity, collaboration, and a commitment to addressing some of the world's most pressing challenges.

The stories included here showcase why I'm so optimistic about our future. Our researchers are leading the way in areas that will shape the next generation of scientific discovery. From the Arctic, where Ken Golden and Jody Reimer are unlocking the mathematics of sea ice in our rapidly changing climate, to the cosmos, where our physicists and astronomers are probing the mysteries of dark energy, our college is at the forefront of scientific exploration.

While the College of Science continues to drive innovation across a wide range of disciplines, its impact throughout Utah is profound (highlighted in the graphics on pages 24-25). For example, researchers from across the college play important roles in exploring the complete life cycle of critical minerals, from extraction to application. Their work, in coordination with the U's newly announced Institute for Critical

and Strategic Minerals, reflects our college's broader commitment to research that is both scientifically rigorous and responsive to the priorities and challenges facing our region and beyond.

Other groundbreaking work featured here includes research on methane-eating molecules in the Department of Chemistry and vital research on Great Salt Lake. These aren't just academic pursuits, they're also pathways toward solutions for our future.

We're also expanding the ways students can connect their scientific training to the broader professional world. The Science Research Initiative (SRI), our undergraduate research program that immerses undergraduates in real laboratory experience from the moment they arrive on campus, is just one example of the abundant opportunities we offer. Building on that foundation, in the coming academic year we're expanding SRI to serve more students than ever, while also scaling the SRI Career Accelerator Program (SRI-CAP), which supports our juniors and seniors in developing skills, exploring career pathways, and building the professional networks that will shape their futures. Through workshops, industry speakers, and hands-on programming, we are offering students more experiences than ever before, equipping them with the

tools, perspectives, and confidence to excel in rewarding careers. This commitment to student success is a priority for the College of Science, and I'm proud of the momentum we're building.

The individuals and achievements highlighted in these pages represent just a fraction of the innovation happening across our college every day. Our faculty, researchers, and students are asking bold questions and pursuing new solutions. As you read through this publication, I hope you'll feel a sense of possibility about what lies ahead.

If these stories inspire you as they do me, I invite you to join us in this work. Your support helps ensure that the College of Science continues to lead, discover, and make a lasting difference.

Sincerely,

Dean Pearl Sandick

SALT AND DUST

THE DYNAMIC SCIENCE OF GREAT SALT LAKE

by NATHAN MURTHY

THOUGH ITS SALTY WATERS ARE STAGNANT, ITS HISTORY HAS BEEN DYNAMIC

In 1991, Utahns and visitors flocked to the eastern end of the Syracuse causeway—which connects Davis County to Antelope Island—waiting for the historically high water levels of Great Salt Lake to fall. At this point, the causeway had been closed for eight years. It was submerged under more than five feet of water in a swollen Farmington Bay.

As many hoped for, water levels did fall. But, they kept on dropping and dropping. Eventually, in 2022 the lake

reached its lowest elevation on record of 4,188.5 feet. This drastic, 23-foot drop diminished the lake by 2,350 square miles, an area larger than the state of Delaware.

These days, Farmington Bay is nearly bone-dry aside from its confluence with the Jordan River to the south. Now, many Utahns are hoping—and even praying—for Great Salt Lake to rise.

THE WIDESPREAD DECLINE OF TERMINAL LAKES

Terminal lakes around the world are largely in decline, and believe it or not, other lakes have fared worse. The

Aral Sea in present day Uzbekistan and Kazakhstan used to be the fourth largest freshwater lake in the world at 23,600 square miles. Then, during the 1950s, the Soviet Union began to divert its water sources for irrigation—largely for cotton farming.

As by design, the newly irrigated fields produced high yields of cash crops. With this, came a sizable economic boost to the region.

However, what was once a vast lake soon lost its magnificent deep-blue color. The lake that was once home to plentiful fish and thriving wetlands was largely replaced by barren

lakebed. The lake was so depleted that fewer than 10 percent of its former self remained. Soon after, dust storms began to wreak havoc, Aral trout and endemic sturgeon died off, freshwater turned saline, and millions of birds either perished or moved elsewhere.

These tragic and devastating stories like the Aral Sea's can serve as a warning. We know that when you deplete a natural resource to exhaustion, something else in that system is affected.

CATALOGING THROUGH SEDIMENTATION

Great Salt Lake has had pressure on its water resources since the Mormon pioneers began settling in Utah beginning in 1847. In fact, research by Geology and Geophysics Professor Gabriel Bowen tells us a pretty clear story of human influence on the lake.

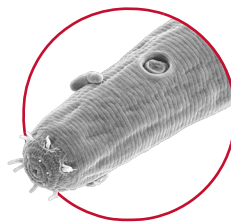
Bowen looks at sedimentation of Great Salt Lake, the terminal point for not only water but solid particles (sand, mud, organic bits), and he catalogs events impacting the lake via that sedimentation.

During the mid 19th century, settlers arrived in the Salt Lake Valley via Emigration Canyon. Upon their arrival, irrigation projects of a grand scale were planned and installed. Wetlands gave way to canals which delivered water to freshly tilled farmland. The valley that was once a desert turned green. Bowen found that around this time, an unprecedented amount of organic

matter reached the lake—a clear indication of an increase in agricultural runoff.

Then, in 1959 the Lucin Cutoff was constructed by Union Pacific Railroad. This feat of engineering split the lake into the North and South arms. Prior to that, the sediments deposited indicate that the South Arm had equal ratio of water evaporation to input—a state of equilibrium.

However, after 1959 these levels lowered substantially creating two different systems: a South Arm that now acts like an open system (exorheic) and a North Arm that remains a terminal lake (endorheic). As a result, the South Arm remains fresher with levels today hovering around 12.5 percent salinity while the



EXTREME CONDITIONS STILL HARBOR LIFE

We are reaching a level of extreme that feels beyond extreme. That's why it's so hard to believe that this lake can still harbor aquatic life and plenty of it. For a long time, we have known that brine shrimp and brine flies were capable of surviving in Great Salt Lake. But in 2024, U postdoctoral researcher Julie Jung and faculty member Michael Werner discovered a new species of nematode, a microscopic worm commonly referred to as a "roundworm," hiding right under our nose.

Found in the South Arm, the species likes to reside in the reef-like microbialite structures that cover about one-fifth of the lakebed. This is the most saline environment where nematodes have ever been discovered. Recently, Werner officially

described the new species as a tribute to the ancestral lands of the nearby Shoshone tribe *Diplolaimelloides woabi*—cementing this discovery permanently.

"We are reaching a level of extreme that feels beyond extreme. That's why it's so hard to believe that this lake can still harbor aquatic life"

North Arm is nearly three times as salty—around 33 percent.

Water can hold approximately 350-360 grams of salt per liter. Currently, salt levels in the North Arm hover around 330 grams per liter. But, in certain parts of the North Arm this saturation level has already been reached and halite salt crystals can be seen floating in the water.

Even the hypersaline North Arm contains life. Its waters are pink due to halophilic bacteria which we have known of for years. As waters in the North Arm receded, many gypsum crystals, which can be capsules of life, were exposed. The outer layer of these crystals has been known to protect and enclose microbial ecosystems. Current U doctoral candidate Paulina Martinez-Koury and Westminster University Professor Bonnie Baxter

decided to investigate what life may live inside those ecosystems. Within the minerals they found microbes, pollens, and a staggering 200 bacteria species—a testament to life's innate ability to survive. Scientists say it may hold clues for life on other planets, too, especially Mars, which was once replete with salty lakes that dried up as the Red Planet lost its atmosphere and magnetism.

DUST IN THE WIND

The newly dried lakebed, also known as "playa," provides fascinating opportunities for discovery, but at its core it is its own issue. The playa emits high levels of particulate matter PM10 and PM 2.5, the latter of which can penetrate deeply and be fully absorbed by our lungs to deleterious effect. Kevin Perry, U atmospheric science faculty member who has surveyed dust hotspots around the lake, found that every playa soil measurement of arsenic was ten times beyond the EPA's recommendations.

But work is being done to understand the implications here as well. Perry has worked alongside his colleague Derek Malia to understand where the dust is likely to impact. Farmington, West Valley City, and Salt Lake City are hit the hardest leaving more than a million people at risk.

Perry is trying to figure out how to prevent this dust from becoming airborne in the first place. It turns out that if you water the playa, the crust can re-form—trapping the dust in place. Interestingly enough, this water



Thunderstorm sweeping across the Great Salt Lake playa. Credit: Kevin Perry

could even come from below the lake itself. The presence of phragmites, an invasive grass species on the playa, suggests that there is groundwater present. Geology and Geophysics Professor Bill Johnson confirmed the presence of groundwater using airborne electromagnetic surveys. The water is contained within tightly packed sediments that start at 30 feet below the surface of the lake and descend to 10,000 feet. But more work needs to be done to determine if there is water across this entire range or just a portion.

TEAM GREAT SALT LAKE

Watering the playa is a viable temporary solution, but experts at the Great Salt Lake Strike Team have determined that the most cost-effective long-term method of lake recovery is to simply increase inflows to the lake. The Strike Team was formed in 2022 and includes faculty from the U like William Anderegg and John Lin of the Wilkes Center for Climate Science and Policy, as well as Perry, and fellow atmospheric scientist Court Strong. Also on hand are state leaders and researchers from Utah State University. Together, the team is working to combine reliable data and actionable policy to make the recovery of Great Salt Lake a reality.

This task will be no easy feat, but the Strike Team is committed for the long haul.

The decline of Great Salt Lake is more than concerning, it's an emergency underscored by an intimidating list of "what ifs." However, many from the U are actively navigating this complex dilemma to solve it.

Bringing the lake back to its historically healthy levels of 4,198 feet will require major investment and sacrifice. But it is important to note that dedicating time and energy to the lake pays dividends. A stable lake means greater lake effect snow, millions of migratory birds, and clean air. Additionally, taking the time to understand the lake can teach us about Utah's hydrology, extreme organisms that live within the lake, and even life on the planet of Mars 140 million miles away. If we take the road of inaction, we might find ourselves in a similar predicament to the Aral Sea. That said, it is quite clear that the true sacrifice here would be to lose the lake entirely. That's why it's important that work on the lake continues. If it does, it's not likely that the lake is going anywhere anytime soon. ◀



SEDIMENT STORIES

UNRAVELING THE CHANGING LANDSCAPE OF THE COLORADO AND SAN JUAN RIVERS

Returning Rapids researchers investigate reservoir sediments exposed within Nokai Canyon on the San Juan River, April 2023. Credit: Elliot Ross

SOMETIMES GEOLOGIC INQUIRY PRESENTS ITSELF SO FORCEFULLY AND ON ITS OWN TIMETABLE THAT RESEARCHERS HAVE LITTLE CHOICE BUT TO "GO WITH THE FLOW," AS IT WERE.

That has certainly been the case of late in the American Southwest as mega-drought conditions have plunged the nation's largest reservoirs to new lows, and terrain, underwater for decades, is quickly being daylighted.

University of Utah geologists Cari Johnson and Brenda Bowen are at the forefront of a remarkable collaborative effort to understand the dynamic transformation of the river corridors entering the Lake Powell Reservoir, in particular the Colorado and San Juan Rivers.

DEEP TIME, MODERN MOMENT

Johnson, a deep time stratigrapher, brings a unique perspective to this contemporary geological puzzle. Traditionally, her work involves studying sedimentary layers millions to billions of years old, but now she finds herself in an extraordinary "time machine"—the Colorado River, its tributaries and their surrounding landscapes—where she can observe sedimentation processes in near real-time.

"The Glen Canyon Dam, completed in 1966, created a closed lake basin that's essentially a living laboratory," Johnson explains. "We have an incredibly detailed instrumented record of lake-level history, river discharge, and sediment load. It's like a long term, regional-scale experiment that began with construction of the dam, the results of which are exposed for us to study now, due to falling reservoir levels."

Bowen complements Johnson's approach by focusing on geomorphic evolution in response to human infrastructure. "We're not just collecting data," Bowen emphasizes. "We're contributing to an interdisciplinary community trying to understand active landscape changes and potentially inform management decisions."

Central to their work is the Returning Rapids project, a collaborative effort bringing together researchers, government agencies, nonprofit organizations, and tribal representatives. Johnson and Bowen's research has yielded fascinating discoveries, including "sediment volcanoes"—small mud formations that emerge as reservoir levels drop, releasing gases from decomposed organic material.

With an estimated 8 percent of Lake Powell already filled with sediment, the researchers are keenly aware of broader implications. "Our primary message is simple," Johnson states. "Sediment is an integral part of water systems. You can't separate water management from sediment dynamics."

CAPTURING CHANGE IN REAL-TIME

Publications are typically the final resting place for research, but Johnson and Bowen's priority is first capturing a moment of extraordinary geological transformation. "We're witnessing amazing landscape changes over short time scales," Bowen reflects. "Our role is to document, understand and help inform future management. It is both daunting and exciting to be collecting sedimentologic data with direct implications for important and pressing water management decisions."

In the dynamic terrain of the American Southwest, these geologists are not just observing change—they're helping humanity understand its own impact on the natural world. And sedimentation is telling that story. ◀

FROM EARTH TO INDUSTRY

BUILDING AMERICA'S CRITICAL MINERALS PIPELINE

60

**CONTEMPLATE FOR A MINUTE
WHAT THAT MINICOMPUTER IN
YOUR POCKET, YOUR PHONE, IS
MADE OF. HOW IT WORKS. ITS
COMPLEXITY. WHAT IT'S MADE
OF AND WHERE IT COMES FROM.**

The origin story of, among other components—mobile phones, drones, electric cars, and windmills involves an intricate life cycle. That cycle includes the discovery, extraction, and processing of critical minerals and rare earth elements.

And like any good story, there's a narrative arc that moves through a beginning, a middle and an end. It's a story that the average American is now learning about even as policymakers have long been concerned that a single geopolitical actor dominates control of this critical supply chain.

One takeaway is certain: if the US doesn't up its game in finding, securing, mining, and processing materials from the earth that our modern civilization requires, we won't be in a position to dictate the future direction of that civilization.

The College of Mines and Earth Sciences (CMES) at the University of Utah, along with its state, national, and global partners, is poised to play a significant role. The college, made up of scores of researchers at the bench and in the field, offers a sequential through-line to get critical minerals and materials into the hands of manufacturers sooner than later.

Featured here are only a few of the many dedicated scientists and engineers at the College of Science whose work is coalescing towards a common goal of critical mineral research, development, and production.

both a faculty member in Geology & Geophysics and associate dean in the college, explains that the search for minerals has evolved significantly in recent years, now focused on a long list of elements that are considered critical and found in many different minerals in a variety of geologic and geographic settings.

"We are trying to quantify the amount of critical minerals in the rock and which minerals are present," Birgenheier says. "Is there enough? Is it enough to be of interest rather than just a trace?"

This question of concentration is critical for the next phase of the continuum. Birgenheier notes that recent regional critical mineral characterization efforts provide a solid foundation of data across the Rocky Mountain region that will be built into a more robust understanding of resource volumes in these key areas and settings.

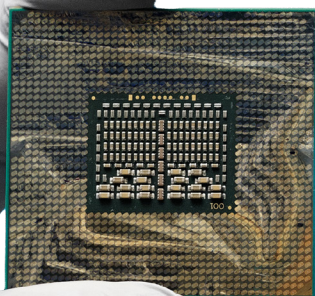
Recent discoveries, like the treasure trove of critical minerals reported by Ionic Mineral Technologies near Utah Lake in Eureka, demonstrate the potential of the region. But discovery is only the beginning of a long journey.

**ART AND SCIENCE OF
EXTRACTION: MINING ENGINEERS**
Once natural resources are located, mining engineers take over with the complex task of extraction. Mining

FINDING WHAT'S BENEATH: THE GEOLOGIST/ GEOPHYSICIST

The technology assembly line begins with discovery. Before materials can be mined, they must be located by

geologists who employ methods from drilling cores to different types of geochemical analysis. Lauren Birgenheier, who serves as



isn't simply about digging—it requires careful consideration of economic, environmental, and social sustainability from the outset.

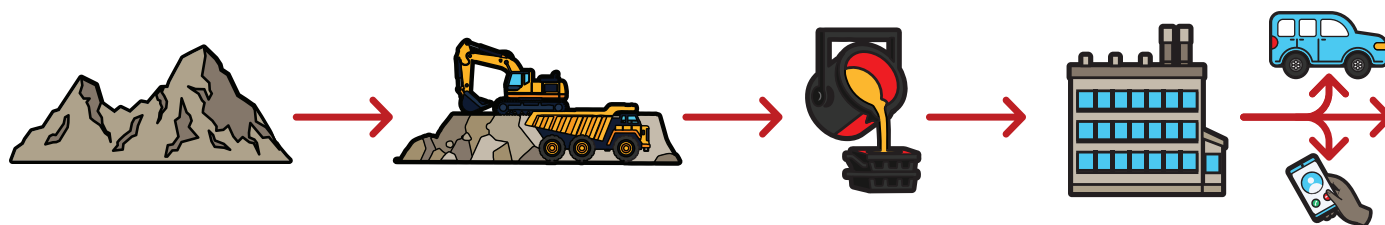
"It's one thing to find critical minerals; it's another thing to be able to say, okay, how can we extract them?" says Pratt Rogers, professor and chair of the Department of Mining Engineering. "Are we able to set up mines and processes that can move material and extract it?" Rogers'

which mines gold, and other companies as well as federal agencies including U.S. Department of Energy (DOE) and Department of State are current or recent funders of Ganguli's work.

"We'll mine it by developing earthwork infrastructure on the surface or underground," explains Rogers, "and then mineral processing experts will—once it's crushed—liberate those small minerals out of the ore." He is quick to point out the

"We're starting with unconventional resources to build a larger supply chain here in the US," Free explains. "We are exploring new approaches that are more environmentally friendly. Some of the technologies we're developing, like our magnetic separation process, use no additional chemicals."

The challenge of separation is immense. Prashant Sarswat, one of Free's collaborators,



colleague Jessica Wempens applies hyperspectral imaging to assess stability in surface and underground mines. Simultaneously, she reminds us, "My goals as a researcher, educator, and mining engineer are to mentor the next generation of mining professionals, advance responsible practices, and leverage innovative technology to address technical challenges."

"Deposits," is a nebulous concept at best according to faculty member Rajive Ganguli who works with rock that is extracted and then undergoes initial chemical processing to create mineral concentrate. He uses systems engineering and artificial intelligence to help interpret data, collected under harsh conditions, and to quantify resources, and optimize various mining processes while dealing with data issues. Denver-based Newmont,

strong ethical framework for mining in the U.S. that enforces rules and regulations that minimize environmental impacts, including, eventually the need to return terrain to reclaimed state.

SEPARATION AND PURIFICATION: METALLURGICAL ENGINEERS

Mining delivers ore, but manufacturers need pure metals. This is where metallurgical engineering becomes crucial. Mike Free, associate chair of the Department of Materials Science and Engineering, leads groundbreaking work that has

"Is there enough? Is it enough to be of interest rather than just a trace?"

secured major funding from the DOE as well as funding from the Defense Advanced Research Projects Agency (DARPA).

emphasizes the difficulty: "The properties of rare earth elements are so similar that existing methods and technologies are not very effective at separating them. With our methods, whether it's magnetic or physical separation or adsorption, we can handle that challenge."

The work of Xinbo Yang, also in the Department of Materials Science, focuses on extractive metallurgy. "I study how to extract, separate, and purify critical materials from both primary resources and recycled or waste materials," she says. "I see

this as a continuum—building on fundamental extractive metallurgy knowledge while developing new, more efficient, and sustainable approaches to strengthen the critical minerals supply chain." Adjacent to her research, Yang acknowledges a growing talent gap.

continued...

"Training the next generation of engineers and scientists is essential for sustaining innovation and advancing responsible resource development."

Other researchers, such as Professor Zak Fang, are working on the conversion of rare earth elements and critical minerals from oxides to metals so they can be used to make commercial products such as high power magnets.

The U's critical minerals research involves students and mentoring. These research endeavors allow students to gain valuable experience in performing experiments, analyzing data, and developing and testing new technologies that can provide great benefits to society. "It's really cool to be at the cutting edge of this industry, sponsored by DARPA and the DOE, working on something crucial to our economy and the country's welfare," Easton Sadler, a metallurgical engineering PhD student, reflects. "That makes me feel good; keeps me going in the lab."

THE STAKES: NATIONAL SECURITY AND ECONOMIC INDEPENDENCE

The urgency of creating a sustainable supply chain of critical materials extends far beyond academic research. "Right now, foreign countries are supplying 80 to 100 percent of many critical metals, which puts us in a vulnerable supply chain position. Some of the critical metals are strategic for the defense industry, making this a national security issue," Free notes. The U is leading a DOE-funded regional consortium worth \$9.6 million to assess critical materials resources across the Rocky Mountain region, building on partnerships with the University of Wyoming, New Mexico Tech, and Colorado School of Mines.

Rogers and many others at the U recently participated in the Western Critical Minerals Summit where they explored collaborative opportunities that extend to advanced energy technologies and materials integral to national defense. "There's resources in Arizona, there's resources in Utah, Nevada, all across the West that we could potentially mine and go after," Rogers says. "They have skill sets that we don't have, and vice versa."

These projects require decades-long timelines, an aspect that both the

Utah State Legislature and Governor Spencer Cox have acknowledged. In the 2026 legislative session, S.B. 254 established long-term state objectives to capture 20 to 25 percent of U.S. domestic critical mineral demand and to process 50 percent of minerals extracted within Utah inside the state. Among other initiatives and incentives, the legislature established the Minerals for Industrial, National and Economic Security (MINES) Center to support research, workforce training, and technology commercialization.

Political will of this sort in concert with ethical and environmental oversight will only further propel the College of Mines and Earth Sciences, already fronting the expertise, partnerships, and vision necessary to help the nation secure its technological future—one element at a time. ◀

Outside of CMES at the U, many other departments are working on critical mineral development. As an example, the Department of Chemistry is contributing to efficiencies, separation techniques, and recycling. Read about chemist and department chair Aurora Clark's research on pg. 21.

A new institute focused on building the future of critical minerals, The Institute for Critical and Strategic Minerals, was approved by the Utah System of Higher Education on May 14, 2026 and is led by Mike Free. You can learn more at criticalminerals.utah.edu.



Aerial view of the new Silicon Ridge mine in Utah County. Credit: Ionic Mineral Technologies

TIP OF THE CAP

SRI SISTER PROGRAM 'CAPS' UNDERGRAD RESEARCH EXPERIENCE

SINCE ITS LAUNCH IN 2020, THE UNIVERSITY OF UTAH'S SCIENCE RESEARCH INITIATIVE (SRI) HAS GIVEN COLLEGE OF SCIENCE STUDENTS ACCESS TO DISCOVERY-BASED RESEARCH FROM THEIR VERY FIRST DAY ON CAMPUS—NO PRIOR EXPERIENCE REQUIRED.

Today, more than 600 students are enrolled across 63 research streams spanning topics from quantum materials to microalgae in Great Salt Lake.

Building on that foundation, January 2025 saw the debut of **SRI-CAP (SRI-Career Accelerator Program)**, a companion initiative designed to help students turn their research experience into career momentum. While SRI connects students with cutting-edge science, SRI-CAP focuses on the next step: preparing them for life after graduation.

"The program aims to assist College of Science students getting closer to graduation, giving them a leg up in their post-graduate journey," says Ryan Stolley, associate director of SRI, who designed the program alongside Associate Director

Heather Briggs and Director Josh Steffen. Initial funding from the Utah System of Higher Education was directed at supporting Utah's fast-growing biotech sector.

The pilot launched in spring 2025 with 70 students and featured workshops on translating research into resumes and CVs, building a personal brand, and navigating internship and job searches. Industry representatives from companies like ARUP and bioMérieux presented on how to identify and apply for opportunities at their organizations. Fall 2025 shifted focus toward helping students seek internships and explore graduate and medical school pathways.

Students who went through the program describe it as a confidence-builder. "It made me realize that I belong and am capable of succeeding in STEM," says recent graduate Derek Mansfield. Chelsea Bordon, who stayed on with SRI director Josh Steffen after finishing her degree, says CAP came at exactly the right moment. "Going through CAP really helped me get my CV ready and network with people for jobs," she says. It also helped her recognize skills she had undervalued: "Experiences that I generalized on my CV provided many more skills than I initially thought."

In 2026, SRI-CAP scaled up enrollment while maintaining its core priorities: free, voluntary workshops tailored to individual students, close collaboration with U Career Success, and one-on-one support through embedded college career coaches.

"As SRI and SRI-CAP continue to grow," says Dean Pearl Sandick, "we are working to ensure these incredibly impactful programs grow sustainably and that as many students as possible can benefit from them." <



METHANE ON THE MENU

U CHEMISTS DISCOVER BACTERIA THAT OXIDIZES POTENT GREENHOUSE GAS

by **BRIAN MAFFLY**

BECAUSE OF ITS POTENT GREENHOUSE PROPERTIES, METHANE GAS IS A SIGNIFICANT CONTRIBUTOR TO CLIMATE CHANGE.

It also feeds microbes known as methanotrophs that convert the gas into carbon dioxide and biomass, but scientists have been unsure how these microbes get all the nutrients they need to accomplish this task.

Now, a University of Utah chemistry lab has developed a novel technique for studying these microbial communities and has used it to discover a new molecule that enables methane-oxidizing bacteria to acquire iron from the environment, which is important for understanding how these organisms sequester methane, keeping it out of the atmosphere.

The findings, published in PNAS, also provide information that could be useful for harnessing methanotrophs to convert methane into useful chemicals and liquid fuels, according to principal investigator **Aaron Puri**, an assistant professor of chemistry and member of the U's Henry Eyring Center for Cell & Genome Science.

"Understanding these types of mechanisms that they use to interact with their environment is critical if we're going to optimize using them

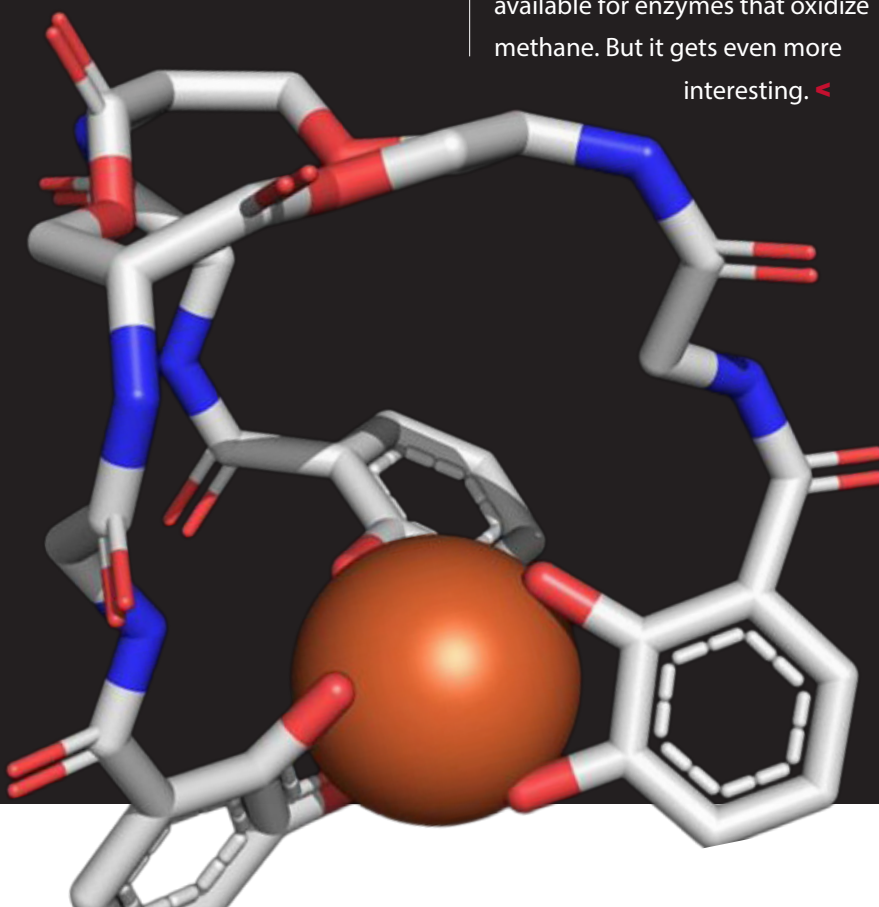
for useful tasks," Puri says. "We've also identified a key link between how iron exists on Earth and how gases are cycled in the atmosphere, which is through these methane-oxidizing bacteria, and more specifically through this new molecule that we've discovered."

Methane, or CH₄, the simplest hydrocarbon molecule, is the main ingredient of natural gas that fuels home appliances. This gas is also released from decomposing organic matter, commonly at landfills or swamps. It packs about 80 times more heat-trapping power in the short term than carbon dioxide, a longer-lived gas that is the main driver of anthropogenic climate change.

Microbes naturally break down CH₄ through an oxidation process that yields carbon dioxide and organic compounds.

Puri's study introduces a new tool called "inverse stable isotope probing–metabolomics," or InverSIP, which links genes found in microbial DNA with the actual small molecules called metabolites those genes produce. Using this method, the Puri Lab discovered a previously unknown iron-grabbing molecule made by methane-eating bacteria. They dubbed the molecule methylocystabactin.

It functions like a claw that pulls iron from the environment and makes it available for enzymes that oxidize methane. But it gets even more interesting. <



HINTS THAT DARK ENERGY MAY EVOLVE

Star trails above Kitt Peak National Observatory in Arizona. Credit: KPNO / NOIRLab / NSF / AURA / B. Tafreshi

"WE NOW HAVE A BETTER UNDERSTANDING OF WHERE THE PREFERENCE FOR EVOLVING DARK ENERGY ARISES IN THE DATA," SAYS UNIVERSITY OF UTAH GRADUATE STUDENT

QINXUN LI.

By comparing distance estimates from the Dark Energy Spectroscopic Instrument (DESI) against those from less distant supernovae and predictions from the cosmic microwave background (CMB), researchers can test whether an evolving dark energy model fits the data better than the standard one. As Li puts it: "We can illustrate how a model with time-evolving dark energy describes the data better than does the standard model for the universe."

New results from the DESI collaboration use the largest 3D map of our universe ever made to track dark energy's influence over the past 11 billion years. Researchers see hints that dark energy, widely thought to be a "cosmological

constant," might be evolving over time in unexpected ways.

DESI is an international galaxy survey experiment with more than 900 researchers from over 70 institutions worldwide, including the University of Utah, and is managed by the U.S. Department of Energy's Lawrence Berkeley National Laboratory.

Taken alone, DESI's data align with our standard model of the universe: Lambda CDM. However, when paired with other measurements—including the cosmic microwave background, exploding stars, and gravitational lensing—there are mounting indications that dark energy's impact may be weakening over time.

The preference for evolving dark energy has not yet reached the "5 sigma" gold standard for discovery in physics. However, different combinations of DESI data with other datasets range from 2.8 to 4.2 sigma.

"These new DESI measurements are not just more precise, but have also been shown to be extremely robust," says Li, who developed several additional quality assessment tests on the DESI data.

The new analysis uses data from the first three years of observations and includes nearly 15 million galaxies and quasars—more than double the dataset from DESI's first analysis.

"With only three years of data from DESI, we have far more precise measurements than were obtained in ten years using similar techniques in the previous galaxy survey," says Kyle Dawson, a professor in physics and astronomy at the U and former DESI co-spokesperson. "I anxiously await the results from the next few years of DESI and other cosmological programs to see if these 3-4 sigma results fade away or if indeed they stick and reveal new physics beyond what we had assumed in our standard model." ◀

Story adapted from DESI.

TAILOCINS

THE NEXT GENERATION OF ANTIBIOTICS MIGHT JUST COME FROM UNDERSTANDING THE VIRUSES THAT INFECT BACTERIA

by TANYA VICKERS

FROM MULTICELLULAR ORGANISMS TO SINGLE-CELL BACTERIA, LIVING THINGS FACE CONSTANT ATTACK BY VIRUSES.

Talia Backman, a University of Utah doctoral candidate in the School of Biological Sciences, has found her niche studying bacteria and the viruses that infect them—specifically, how bacteria create and use weapons called "tailocins" by repurposing genes from viruses.

"I'm especially interested in how bacteria have taken this a step further," Backman says, "using remnants of past viral infections as a novel defense mechanism."

Working with Talia Karasov, assistant professor of biology and principal investigator, Backman recently helped make an unexpected discovery about how bacteria weaponize viral components.

"We looked in the genome and learned that the bacteria had taken a phage and repurposed it for warfare with other bacteria, now using it to kill competing bacteria," Karasov says.

REPURPOSING VIRUSES

"The bacterial strains (*Pseudomonas*) that I am studying are essentially repurposing the viruses that infect them," Backman says, "retaining features from the infectious particles that ultimately help them to kill or co-exist with other strains of bacteria." These repurposed phage parts are called "tailocins."

Understanding tailocins' role in shaping bacterial prevalence, survival, and evolutionary success is a major focus of research in the Karasov lab.

"What we know, and are learning about microbes," Backman continues, "is considered 'foundational or basic science,' but it's anything but 'basic.' Understanding how life works can lead to new ideas and innovations. Today, human health, and the medicines we rely on, are challenged by the failure of antibiotics, medicines critical in combating bacterial infection."

A NOVEL SOLUTION TO THE ANTIBIOTIC CRISIS

Research on bacteria and their viral pathogens might offer a breakthrough solution to antimicrobial resistance. The World Health Organization warns

of "a major gap in the discovery of antibacterial treatments," presenting "a serious challenge to overcome the escalating pandemic of antimicrobial resistance."

"Perhaps tailocin therapy and training our cells to identify and destroy bacterial invaders by using bits and pieces from the pathogens that infect us," Backman says, "will be the next generation in antibiotic medications."

"My research, and ongoing efforts in labs like Dr. Karasov's in the School of Biological Sciences, is at the forefront of providing insight into the mechanisms that organisms use to live, reproduce, and overcome infection."

The research was published in the journal *Science* in June 2024, and funded by the National Institutes of Health. ◀

Adapted from a longer version of the story first published in biology.utah.edu

BIOINFORMATICS OPENS DOORS TO THRIVING CAREERS

AT THE NEXUS OF DATA SCIENCE AND LIFE SCIENCES, BIOINFORMATICS APPLIES INTENSIVE COMPUTATIONAL METHODS TO ANALYZE COMPLEX BIOLOGICAL INFORMATION RELATED TO HEALTH, GENOMICS AND MORE.

The U's bioinformatics degree provides rigorous interdisciplinary training to help undergraduates thrive in rapidly growing sectors.

"This major represents a pivotal step in keeping our students at the forefront of biotechnology," says

Tommaso De Fernex, outgoing chair of the Department of Mathematics.

"It embodies true interdisciplinary collaboration, drawing expertise from biology, chemistry, and computer science faculties."

The "study of life" is decidedly complex, says Fred Adler, who has joint faculty appointments in biology and mathematics and directs the U's School of Biological Sciences.

"Unraveling that complexity means combining the tools developed in the last century: ability to visualize and measure huge numbers of tiny

things, technology to store and analyze vast quantities of data, and the fundamental biological and mathematical knowledge to make sense of it all."

"Students with quantitative expertise, like that offered in the new bioinformatics degree, are in high demand in the life sciences industry," says Peter Trapa, Vice Provost and Senior Dean of the Colleges of Liberal Arts & Sciences. "This degree is designed to prepare students for success in these thriving job markets." ◀

THE SILENCE OF SAFETY

by **MICHAEL JACOBSEN**

SAFETY'S GREATEST SUCCESS IS SILENCE—THE ACCIDENTS THAT NEVER HAPPEN, THE LIVES QUIETLY PRESERVED.

Since the imperative of on-the-job safety is invisible when things are going perfectly, the U's Mine Rescue Team highlights the intense, round-the-clock dedication of these first responders who train relentlessly to prevent, manage, and survive disasters. The student-led

organization trains and competes alongside industry professionals across the country.

Training of this kind is urgent as extracting ore containing much-needed critical minerals is ramping up. This past year, the team made its mark on two fronts—competing against industry professionals at a regional skills competition in Price, Utah, where all five U students outperformed some coal mine veterans, and helping

organize the first-ever university mine rescue skills competition at the national SME conference this past February in Salt Lake City. Industry partner Kennecott has been instrumental, donating equipment and providing expert instructors to help the program grow.

The message the team carries into their careers is simple: not only is the aspiration to be the silent mover but to make sure everyone goes home. ◀



The 2025 Mine Rescue Team

CELEBRATING EXCELLENCE

TWO FACULTY RECOGNIZED AS PRESIDENTIAL SCHOLARS

TWO COLLEGE OF SCIENCE FACULTY MEMBERS HAVE BEEN RECOGNIZED AS PRESIDENTIAL SCHOLARS OVER THE PAST TWO YEARS.

This award, provided to each by an anonymous donor, is accompanied by \$10,000 in funding per year for three years. Recipients can use these funds at their own discretion to support their scholarly, teaching, and/or outreach activities.



**SEAN
LAWLEY**
MATHEMATICS
2024-2025

To hear Sean Lawley talk about the power of math, you would think he was describing a magical tool that answers the unanswerable and predicts the future. To an extent, you'd be right. Lawley has published more than 70 papers, many with undergraduate mentees—in less than 10 years—about the power of probabilistic models and analysis to answer questions in physiology and medicine. He uses stochastic math to answer questions like: can a cryopreservation procedure delay menopause? If so, how much tissue and what age is needed to be most effective? What nutritional

supplements can speed up arsenic detoxification of the body? What should you do if you miss a dose of a prescription medication?

Through math, Lawley is able to answer questions that couldn't be found in a lab or by any other means. "The equations become the laboratory from which you can explore and do experiments and solve some of these things," Lawley says. "What I get really excited about and am passionate about is using mathematics to improve public health, to make an impact. I think mathematics is a very purposeful tool—a very big hammer."



**JAMIE
GAGNON**
BIOLOGY
2025-2026

"I hope our research is valuable because some of the specific insights we make might ultimately help us think about treatments for humans," says newly announced University of Utah Presidential Scholar Jamie Gagnon. "But I think our greatest impact will be sharing the joy of scientific discovery with the world and helping them see the joy of simple experiments."

One of three scholars announced

October 29, 2025 by U President Taylor Randall, Gagnon is associate professor in the School of Biological Sciences and a former recipient of the Mario Capecchi Endowed Chair.

"What connects this year's Presidential Scholar cohort is their commitment to turning research into real-world impact," said Randall when the awards were announced. "Whether uncovering how zebrafish heal, how our metabolism adapts to modern life, or how science is learned, each of these scholars is advancing knowledge and discovery with the power to change lives."

Gagnon is interested in learning how animals change as they grow, age, and face challenges in their environment. Using the zebrafish as a model organism, he manipulates their genes, cells, and environments to better learn how vertebrates function when faced with specific problems such as injury, aging, and infection. He runs the Gagnon Lab, which employs students who get to conduct projects of their own. Recently, one of those students conducted research that led to the lab discovering how zebrafish create their own sunscreen to protect themselves from harmful UV radiation—a skill Gagnon hypothesized has been lost in mammals. ◀



THE NEW SPIN DOCTORS

by LISA POTTER

OUR DATA-DRIVEN WORLD DEMANDS MORE CAPACITY, MORE EFFICIENCY, MORE COMPUTING POWER.

To meet society's insatiable need for electronic speed, physicists have been pushing the burgeoning field of spintronics.

Traditional electronics use the charge of electrons to encode, store, and transmit information. Spintronic devices utilize both the charge and spin-orientation of electrons. By assigning values to electron spin (up=0 and down=1), spintronic devices offer ultra-fast, energy-efficient platforms.

Researchers at the University of Utah and the University of California, Irvine have discovered a new type of spin-orbit torque. The study, published in *Nature Nanotechnology* last year, demonstrates a new way to manipulate spin and magnetization through electrical currents—a phenomenon dubbed the anomalous Hall torque.

"This is brand new physics, which on its own is interesting, but there's also a lot of potential new applications that go along with it," says **Eric Montoya**, assistant professor of physics and astronomy at the U and lead author of the study. "These self-generated spin-torques are uniquely qualified for new types of computing like neuromorphic computing, an emerging system that mimics human brain networks."

UNDERSTANDING THE PHYSICS

Electrons have minuscule magnetic fields with spins oriented "up," "down," or somewhere in between. In some materials, electricity will sort electrons based on their spin orientation, influencing properties like the directional flow of a ferromagnet's magnetic field.

The anomalous Hall torque relates to the anomalous Hall effect, discovered by Edwin Hall in 1881. When an external electrical current is applied to a material, a spin current flows 90 degrees to the electrical current flow with the spin-orientation along the direction of magnetization.

"It really comes down to the symmetry," Montoya says. "The different Hall effects describe the symmetry of how efficiently we can control the spin-orientation in a material. As material scientists, we can really tune these properties to get devices to do different things."

A TRIAD OF TORQUES

Together with the spin Hall torque and planar Hall torque, the anomalous Hall torque completes a triad of "Universal Hall torques" present in all conductive spintronic materials. The researchers demonstrated that spin-orientation could be transferred from a ferromagnetic conductor to an adjacent non-magnetic material, eliminating the need for complex multilayer structures and building the first-ever spintronic prototype exploiting this effect. ◀

Adapted from a longer version which first appeared in @ The U.

EQUATIONS ON ICE

A TRIP TO THE ARCTIC TESTS MATHEMATICAL MODELS

by IZABELLA BOURLAND & MICHAEL JACOBSEN

UNDERSTANDING THE INTERSECTION OF MATHEMATICS, PHYSICS, BIOLOGY AND ENVIRONMENTAL SCIENCE OFTEN REQUIRES STEPPING OUTSIDE THE CLASSROOM AND INTO THE NATURAL WORLD.

For **Jody Reimer**, assistant professor in the Department of Mathematics and the School of Biological Sciences, and **Ken Golden**, distinguished professor in the Department of Mathematics, this means venturing into the Arctic where they study how the physical environment affects life in and on the ice with the help of mathematical models.

In May 2024, Golden and Reimer co-lead a field research trip to Utqiagvik, Alaska—Golden's 19th excursion to the frozen poles. This trip was special:



Reimer and Golden in their lab space processing melted sea ice core samples. Credit: Nash Ward

they brought a varied team of mathematics students ranging from high schoolers to PhD candidates, providing invaluable hands-on experience in the extreme conditions of the Arctic ecosystem.

Reimer focuses on how changes in sea ice impact polar bear and seal populations and the microbes that inhabit the ice itself. Golden's research focuses on the complex multiscale physical properties of ice, from modeling macroscale ice floe dynamics to calculating microscale brine inclusions. Together, they explore the complex interplay between physics and biology.

Golden eagerly explains the far-reaching implications: "The math doesn't care. It cross-pollinates all over the place. The same mathematics we use to analyze how algae get nutrients from the brine phase can be used to monitor the onset and progress of osteoporosis in human bone!"

This interdisciplinary work demonstrates why mathematics research is so critically important—it discovers patterns that ripple across the scientific community.

The expedition required careful planning, including land use permits from local Iñupiat groups and coordination with the Barrow Arctic Research Center. Students played hands-on roles, packing equipment and troubleshooting issues in the field while braving wind chills as low as 20 degrees below zero.

Reimer explains that "Mathematics isn't relegated to the realm of puzzles and isolated problems. There's fundamental and deep connections that affect all regions of life." Research like this perfectly demonstrates these connections.

"We're laying the groundwork for a broader suite of physical measurements, and ramping up on the biological side of things," says Golden about their next expedition, funded by the National Science Foundation through the Applied Math Research Training Grant. ◀

Adapted from a longer version which first appeared as the cover story of Aftermath, the official publication of the Department of Mathematics at the U.

IN A WHILE, CROCODILE



Irmis faces off with a fossil Borealosuchus skull from the Natural History Museum of Utah's collection. Credit: Jack Rodgers/NHMU

**RANDY IRMIS, PROFESSOR
IN THE U'S DEPARTMENT OF
GEOLOGY & GEOPHYSICS AND
CURATOR OF PALEONTOLOGY
AT UTAH'S NATURAL HISTORY
MUSEUM HAS CO-AUTHORED
GROUNDBREAKING RESEARCH
ON CROCODYLIAN SURVIVAL
THROUGH MASS EXTINCTIONS.**

The study examined skulls from 99 extinct and 20 living species across 230 million years. The paper published in April in *Palaeontology*, is the first to reconstruct the dietary ecology

of crocodylomorphs to identify characteristics that helped some groups persist and thrive through the end-Triassic, about 201.4 million years ago (Ma), and the end-Cretaceous, about 66 Ma.

Irmis cautions against oversimplifying ancient patterns for modern conservation, noting that while generalist diets appear advantageous across both mammals and reptiles, predicting individual species survival remains difficult.

He hopes people will appreciate crocodylians' remarkable evolutionary journey rather than viewing them merely as dangerous predators. As Irmis notes, crocodylians have endured over 200 million years of tumultuous planetary changes and are equipped to survive future challenges—if humans help preserve their habitats. For endangered species like the Gharial and Cuban Crocodile, this flexibility offers hope amid habitat loss. ◀

SEPARATION ISSUES

**OUR ENVIRONMENT IS
FILLED WITH MIXTURES, AND
SEPARATING THEM IS CRUCIAL
FOR HUMAN HEALTH—FROM
CREATING CLEAN WATER TO
RECYCLING MATERIALS.**

U Chemistry Professor and Department Chair **Aurora Clark** is tackling this challenge using computational methods.

"A major issue is that separating materials currently consumes a massive amount of energy," Clark explains. She's developing low-energy separation methods that work spontaneously by leveraging thermodynamics—specifically entropy changes.

This research could revolutionize recycling of rare materials like

palladium, found in mobile phone capacitors. Using supercomputers to simulate separation processes, Clark studies interaction patterns in complex mixtures to control entropy, making it favorable for molecules and metals to selectively move across separating barriers. If successful, this approach would dramatically reduce energy consumption and improve material self-sufficiency. ◀

WILKES CENTER CELEBRATES CLIMATE INNOVATION

THE WILKES CENTER FOR CLIMATE SCIENCE & POLICY AT THE UNIVERSITY OF UTAH HAS AWARDED ITS PRESTIGIOUS CLIMATE LAUNCH PRIZE TO GROUNDBREAKING CLIMATE SOLUTIONS THREE YEARS RUNNING, ESTABLISHING ITSELF AS ONE OF THE LARGEST UNIVERSITY-AFFILIATED CLIMATE AWARDS WORLDWIDE.

In 2024, Applied Carbon claimed the \$500,000 prize for its revolutionary agricultural robot. The California-based company developed a mobile pyrolyzer that transforms post-harvest crop waste into biochar in a single field pass. The machine heats biomass to 1,000°F in limited oxygen, creating carbon-rich biochar that's immediately deposited back onto fields. This process locks carbon away for millions of years while simultaneously improving soil health,

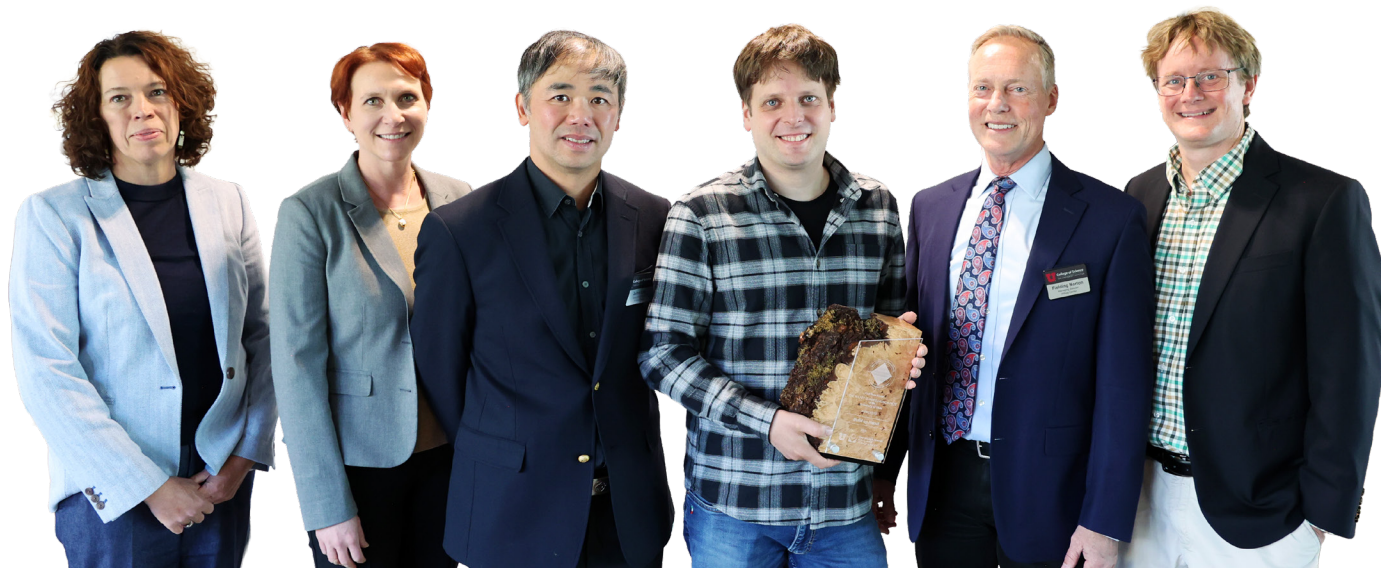
boosting crop yields, and reducing fertilizer needs.

"Programs like the Wilkes Climate Launch Prize fill a crucial funding gap," says Jason Aramburu, Applied Carbon's CEO. The prize directly enabled the company to build additional units and demonstrate scalability to future investors.

The 2025 prize of \$250,000 went to Build up Nepal, which replaces polluting coal-fired bricks with eco-friendly compressed stabilized earth bricks. Using locally available materials with minimal cement, their interlocking bricks require no firing and provide safe, affordable housing for poor communities devastated by earthquakes. Nepal's coal-fired brick industry accounts for 37 percent of the country's combustion-related CO₂ emissions, making Build up Nepal's alternative particularly impactful.

From across the globe, the annual prize evaluates submissions for feasible, scalable impact and potential co-benefits to communities, economies, or ecosystems. "It's exactly the type of scalable and impactful solution that the Wilkes Climate Launch Prize seeks to supercharge," says William Anderegg, Wilkes Center's inaugural director.

Nine finalists for the 2026 Climate Launch Prize were announced in May at the Wilkes Climate Summit: Agros from Singapore, ucrop.it from Delaware, Fabumin from Israel, Gyre Energy from the UK, Solidec from Texas, Solid Sky from Michigan, UnBOXED from New York, WAS Company from Mexico and WoodSyn from Arizona. The winner will be announced in September. ◀



2025 Prize winner, Söderberg (center right), along with Dean Sandick (second from left) and Wilkes leadership members.

WHERE INQUIRY MEETS IMPACT

U OPENS NEW APPLIED SCIENCE BUILDING

THE UNIVERSITY OF UTAH CELEBRATED THE OPENING OF THE L. S. SKAGGS APPLIED SCIENCE BUILDING ON JULY 16, 2025, COMPLETING THE \$97 MILLION APPLIED SCIENCE PROJECT.

Together with the renovated historic William Stewart Building and Crocker Science Center, the structures form the Crocker Science Complex—a 275,000-square-foot hub fueling Utah's booming STEM economy.

At the ribbon-cutting ceremony, donors, policymakers, and university leaders praised the investment as transformational for scientific research and student innovation.

"At a time when the federal government is cutting back on funding for scientific initiatives, which I think is a mistake, Utah is saying the exact opposite," said Utah Governor Spencer Cox. "We're not just solving Utah's problems anymore, we're solving the world's problems, and we're doing it right here."

The project was made possible by a \$67.5 million state appropriation and significant donations from Gary and Ann Crocker and the ALSAM Foundation, founded by L. S. and Aline W. Skaggs.

The complex serves nearly 5,000 students annually and will house the Departments of Physics & Astronomy and Atmospheric Sciences, plus the Wilkes Center for Climate Science & Policy. With a 56 percent increase in experimental and computer physics labs, every College of Science student can now participate in hands-on research, even during their first year.

The facilities include rooftop monitors tracking air quality, state-of-the-art telescopes for classroom use, and public amenities like free weekly stargazing parties. The historic Stewart Building preserves original architectural elements, honoring its legacy as an elementary school that served Salt Lake City residents until the 1960s.



Mark Skaggs, representing the ALSAM Foundation, noted his family's commitment during uncertain times for U.S. research funding: "Thank you for believing in what we believe in and what we've always believed in, and what hopefully would be a right future in this country, as far as research for all of these people."

The complex positions Utah as a leader in science-based research, education, and commercial innovation. ◀



IMPACT REPORT

2025

\$65 
Million

GRANTS & CONTRACTS

INCLUDING:

NSF FUTURES ENGINE | UTAH FORGE | ARPA-E | NSF CAREER

5X force
multiplier*

\$325 
Million

UTAH ECONOMY



COLLEGE OF SCIENCE GRADS WORKING
IN STEM FIELDS EARN, ON AVERAGE,

\$21,000 MORE ANNUALLY THAN
THOSE IN THE NON-STEM LABOR FORCE*

HEALTHCARE

BIOTECHNOLOGY

ENERGY

MINING/MINERALS

QUANTUM

OVER THE LAST 5 YEARS

9 
TECHNOLOGY
LICENSES

99  **38**
US PATENTS
FILED US PATENTS
ISSUED

7 
NEW
STARTUPS

- LIGHTWORKS METROLOGY, LLC
- SVS-UOU-3, INC
- QUANTUM SNOW
- TMCLEAR, LLC

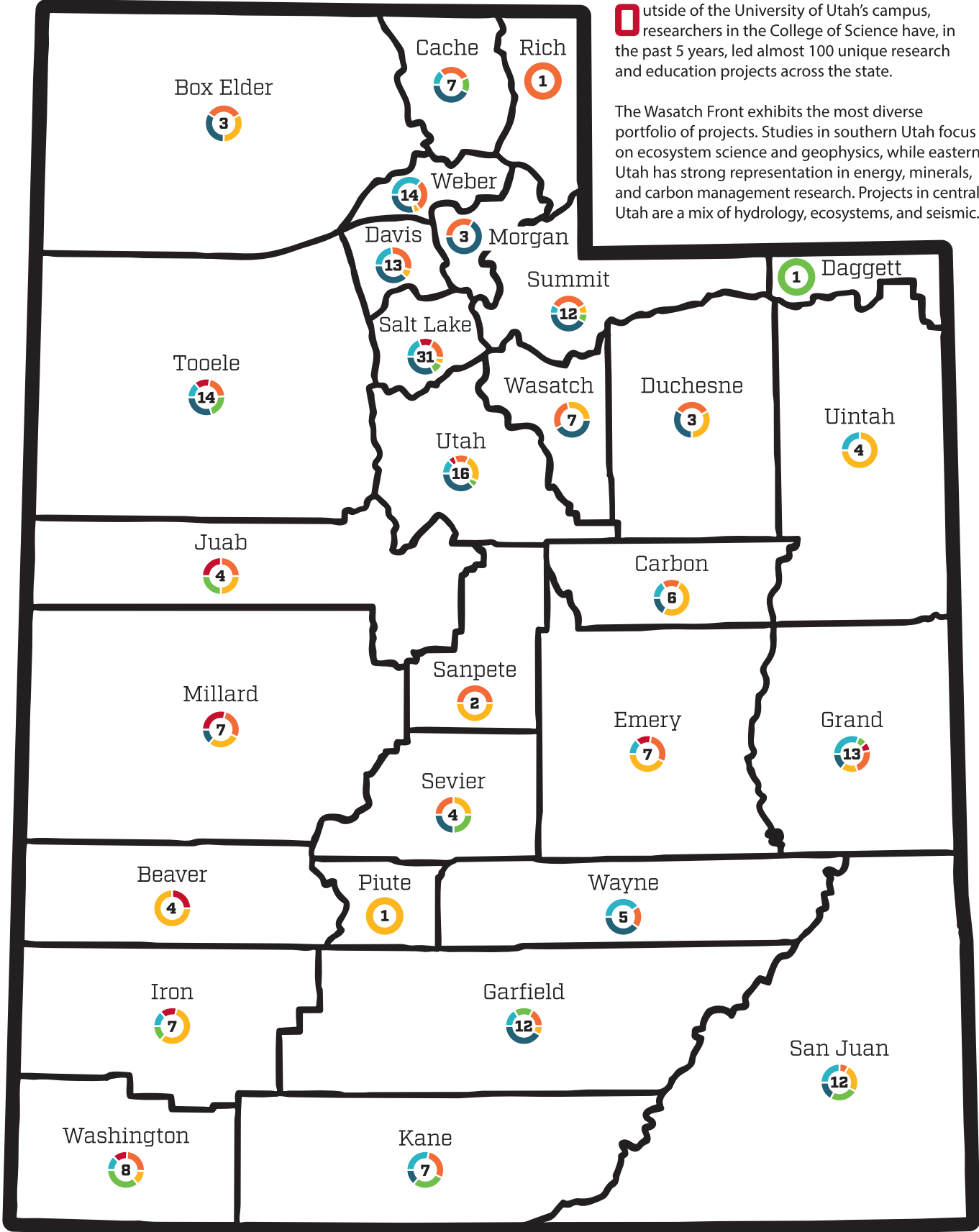
- AMERICAN GREEN ELEMENTS, LLC
- SETHERA THERAPEUTICS, INC
- TRACE AIR QUALITY INC

*BF Jones & LH Summer 2022 Innovation & Public Policy

+National Science Board-2026-1 | February 12, 2026

Outside of the University of Utah's campus, researchers in the College of Science have, in the past 5 years, led almost 100 unique research and education projects across the state.

The Wasatch Front exhibits the most diverse portfolio of projects. Studies in southern Utah focus on ecosystem science and geophysics, while eastern Utah has strong representation in energy, minerals, and carbon management research. Projects in central Utah are a mix of hydrology, ecosystems, and seismic.



THE UNIQUE COLORS BELOW ARE ASSOCIATED WITH PROJECT TYPES IN THE MAP ABOVE.

Air, Climate & Health	Education & Outreach	Geology, Geophysics & Hazards
Ecosystems & Biodiversity	Energy & Minerals	Water, Snow & Hydrology
# of Projects		

WHAT'S NEW IN THE COLLEGE...

DEAN TRANSITIONS



Former College of Science Dean

Peter Trapa was selected to serve

as the inaugural vice provost and senior dean of the Colleges of Liberal Arts & Sciences. In this role, Trapa is providing strategic advancement and management of the College of Humanities, College of Science, and College of Social and Behavioral Science. Together, these units form the cornerstone of enrollment at the U, and Trapa is playing a pivotal role in shaping the educational experience of students across disciplines.



Replacing Trapa is Dean **Pearl Sandick**, former associate dean and a theoretical particle physicist

studying physics beyond the Standard

Model, including possible explanations for the dark matter in the Universe.



Professor of Mathematics **Akil Narayan** is the

associate dean for undergraduate and graduate studies. He has a broad

research agenda at the forefront of computational innovation, machine learning, model reduction, and uncertainty quantification, among others.



As the new Associate Dean for Faculty Affairs, Geology & Geophysics Professor **Lauren**

Birgenheier's research sheds light on the processes that shaped our planet's past with a view toward implications

for energy development, critical mineral exploration, carbon storage, and paleoclimate reconstruction.



Distinguished Professor of Biology and former School of Biological Sciences Director

Denise Dearing will serve as interim associate dean for research. Her research sheds light on how mammals evolve to survive toxic diets, with implications for dietary specialization, detoxification genetics, and the discovery of pharmacologically active molecules with broad medical applications. <

DEPARTMENT & SCHOOL LEADERSHIP



GANNET HALLAR
Atmospheric Sciences



FRED ADLER
Biological Sciences



AURORA CLARK
Chemistry



GABE BOWEN
Geology & Geophysics

THERE'S A NEW DIRECTOR IN TOWN



DAVID STROUPE,
**ASSOCIATE DEAN
FOR RESEARCH
AND PROFESSOR
OF EDUCATIONAL
PSYCHOLOGY IN**

**THE COLLEGE OF EDUCATION, HAS
BEEN APPOINTED DIRECTOR OF
THE CENTER FOR SCIENCE AND
MATHEMATICS EDUCATION.**

The program enhances K-12 math and science instruction, undergraduate support, and promotes student success in STEM fields.

"David's leadership arrives at a pivotal moment, as STEM education undergoes rapid transformation to meet shifting societal demands," says College of Science Dean Pearl Sandick.

"Dr. Stroupe brings a mix of scholarly

rigor and visionary leadership," adds Education Dean Frankie Santos Laanan. "His recent election as a Fellow of the American Association for the Advancement of Science is a testament to his national impact in science education."

Stroupe's appointment represents an inter-college partnership focused on improving graduation and job placement outcomes. <

RECOGNITION

CHRISTOPH BOEHME

Distinguished Professor (2026)

THURE CERLING

Penrose Medal

DENISE DEARING

Governor's Medal for Science and Technology in Academia/Research (2025)

JAMES GAGNON

University of Utah Presidential Scholar (2026)

ADELINE HIMESTRA

Goldwater Scholarship and Excellence in Education Foundation (2026)

YAO-YUAN MAO

Cottrell Scholar (2026)

HENRY WHITE

Rosenblatt Prize (2026)

WILLIAM ANDEREGG

Presidential Early Career Award for Scientists and Engineers (2026)

SEAN LAWLEY

University of Utah Presidential Scholar (2025)

SYLVIA MESICEK

Goldwater Scholar (2026)

TINO NYAWELO

Presidential Societal Impact Scholar (2025-2026)

KURT VINHAGE

Sloan Fellow (2025)

LUCY LEARY

Fulbright Scholar (2026)

PIERRE SOKOLSKY

Yodh Prize (2025)

MATT SIGMAN

American Academy of Arts and Sciences (2026)

KIP SOLOMON

Distinguished Professor (2025)



DMITRY BEDROV
Materials Science
& Engineering



CHRISTOPHER HACON
Mathematics



PRATT ROGERS
Mining Engineering



CARSTEN ROTT
Physics & Astronomy



Generous and thoughtful alumni and donors like you are improving the College of Science and impacting students' lives in profound ways. Your support is vital to our mission!

To meet the tremendous demand for STEM graduates in Utah, the College of Science's top priorities include the Science Research Initiative (SRI) and the SRI Career Accelerator Program (SRI-CAP).

SRI provides practical hands-on training and research experiences

for first-year students at the U. This innovative program jump-starts students on the path to academic success. This past academic year, more than 550 students participated.

Following SRI is the SRI-CAP, which bridges science research to specific careers by providing advanced students with active research projects, mentored by faculty, plus industry connections and personalized career support. We empower students to gain real-world experience and build successful futures in Utah's thriving STEM economy.



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of Development
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Please consider contributing here:
science.utah.edu/giving

SHARE YOUR FEEDBACK

