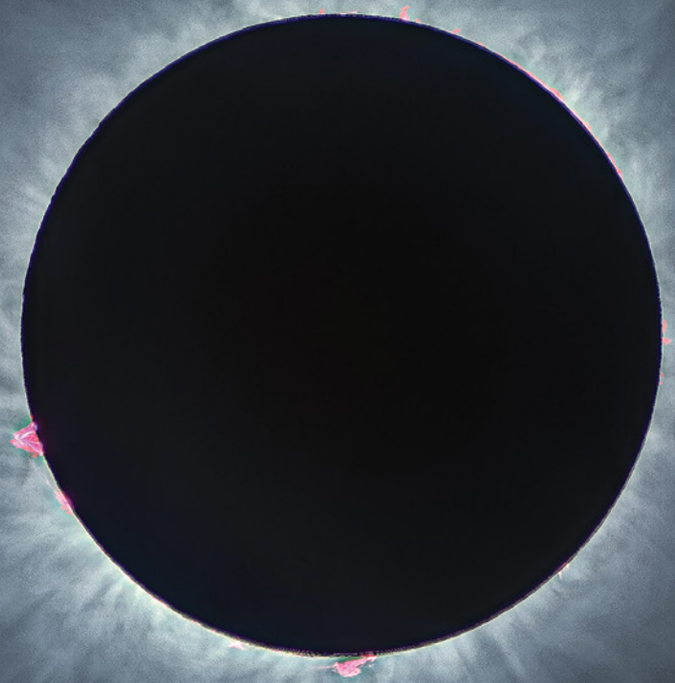
RESEARCH & CREATIVE WORK

2023–24



POWERING CLIMATE SOLUTIONS

NSF funds CO-WY Engine to drive climate innovation and economic growth

THE QUANTUM FUTURE IS *HERE*

Research, education, workforce, partnerships and investment converge in Boulder

TRANSCENDING TRADITIONAL NOTIONS

Tsouhlarakis challenges expectations of Native American art

Research & Innovation Office
UNIVERSITY OF COLORADO **BOULDER**

Colleagues and friends,

This year, the University of Colorado Boulder attracted more than $740 million in funding to fuel the research, scholarship and creative work of our faculty, researchers, students and staff.

It is the impact we create that makes the achievement so meaningful. Each dollar makes possible an important discovery, a novel innovation, a creative connection with humanity or a real-world solution for people in Colorado, across the U.S. and around the world.

A few of this year's "firsts" include:

- **Leadership in climate resilience** (p. 2-3): CU Boulder is a founding partner of an NSF Colorado-Wyoming Climate Resilience Engine that will transform the region into a national leader in climate resilience technologies.
- **Advancing quantum science and technology** (p. 14-15): CU Boulder won its first NSF Mid-Scale Research Infrastructure 1 program award for the National Quantum Nanofab, which will provide nationwide access to nanofabrication tools for creating new technologies.
- **Driving new osteoarthritis therapies** (p. 20-21): A CU Boulder-led team won the university's first award from the Advanced Research Projects Agency for Health, to develop new therapies for the painful, degenerative disease affecting 32 million Americans.
- **A new peak in CU startups:** CU Boulder helped launch 35 startups with discoveries and inventions created at CU last year, surpassing our previous peak of 20 startups and marking a milestone for CU Boulder's growth in research translation and entrepreneurship.

These pages offer a glimpse into advances CU Boulder is making in established strengths like aerospace, environment and sustainability, biosciences and quantum, as well as progress in other areas of excellence like the arts and humanities, social sciences, artificial intelligence and more.

I hope you enjoy these highlights from CU Boulder's research, scholarship and creative work in 2023-24.

Best regards,

Massimo Ruzzene
Vice Chancellor for
Research & Innovation and
Dean of the Institutes,
Research & Innovation Office

CONTENTS

On the cover: The 2024 North American total solar eclipse brought together scientists, students and staff from the U.S. National Science Foundation National Solar Observatory and CU Boulder for rare opportunities in research, education and outreach. Coronal image from Carbondale, Illinois.

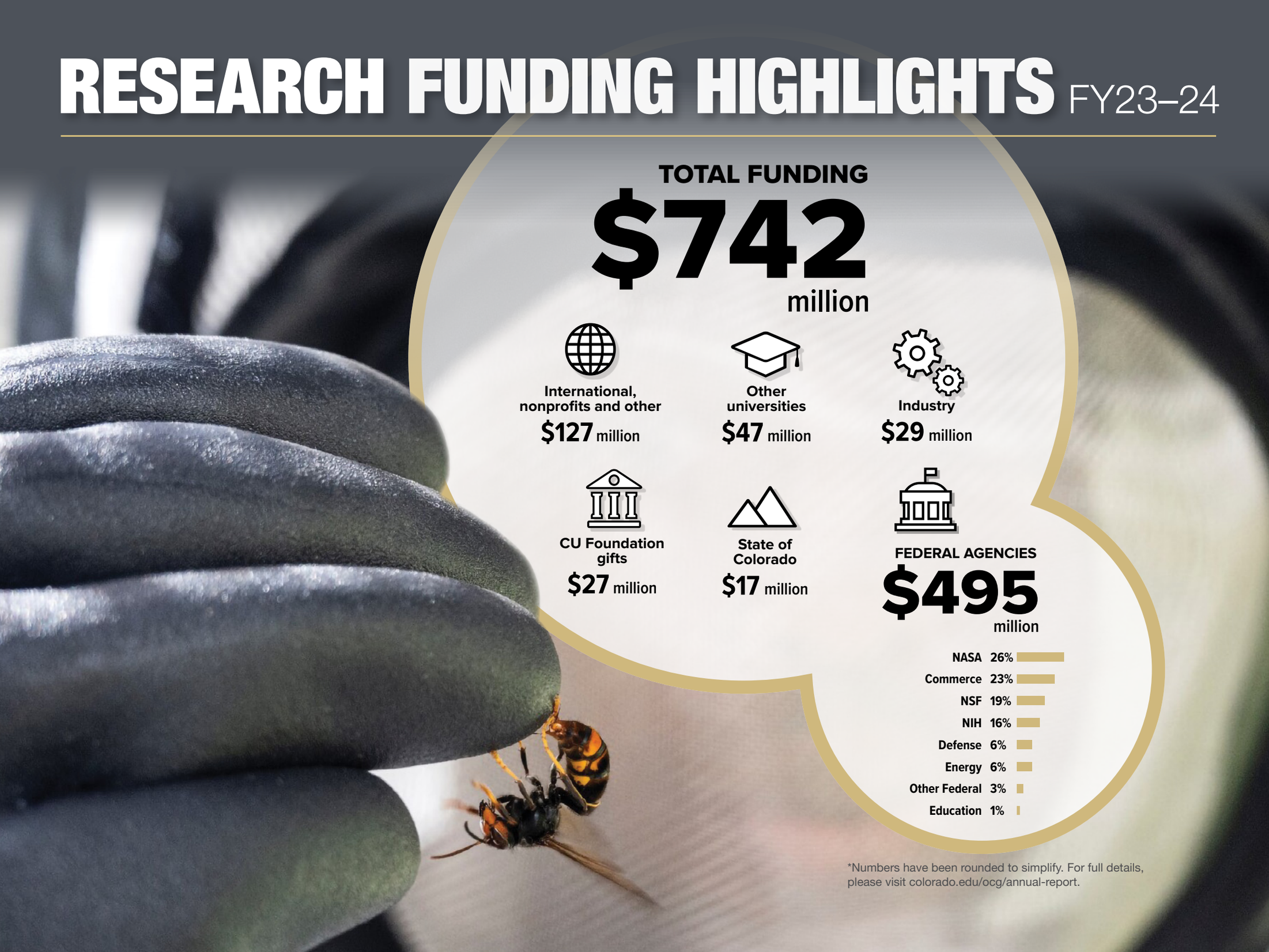
Photo: Sang Lapinee/SuperKT Team/NSO/AURA/NSF.

Bee focused

Samuel Ramsey, an assistant professor of ecology and evolutionary biology at the BioFrontiers Institute, is taking on the *Varroa destructor* mite in a race to save honey bee colonies and help protect vital crops worldwide. Learn more on pages 18-19.

Photos: Shin Arunrugstichai

RESEARCH FUNDING HIGHLIGHTS FY23–24



TOTAL FUNDING

$742 million

International, nonprofits and other
$127 million

Other universities
$47 million

Industry
$29 million

CU Foundation gifts
$27 million

State of Colorado
$17 million

FEDERAL AGENCIES

$495 million

NASA	26%
Commerce	23%
NSF	19%
NIH	16%
Defense	6%
Energy	6%
Other Federal	3%
Education	1%

*Numbers have been rounded to simplify. For full details, please visit colorado.edu/ocg/annual-report.

CU BOULDER SECURES $15M FOR CLIMATE RESILIENCE

NSF award funds CO-WY Engine to lead innovation in climate tech, boost regional economic development

By Heather Hansen

Principal
Bryn Rees

Funding
National Science Foundation (NSF)

Collaboration + support
CU Boulder's Earth Lab, Mortenson Center in Global Engineering & Resilience, Venture Partners at CU Boulder; Parag Chitnis, Mike Freeman, Christa Johnson, Tim Jones, Cass Moseley; Innosphere Ventures; more than a dozen federal labs, government organizations, higher education institutions and companies

The Colorado-Wyoming Climate Resilience Engine (CO-WY Engine), of which CU Boulder is a founding partner, was chosen as an inaugural National Science Foundation Regional Innovation Engine (NSF Engines). The CO-WY Engine is slated to receive up to $15 million over the next two years to transform the region into a national leader in developing climate resilience technologies.

The NSF Engines program—established in the 2022 bipartisan CHIPS and Science Act—invests in U.S.-based STEM research and development and is focused on funding regional hubs that will increase the speed and scale of emerging, critical and use-inspired technology to drive industry and boost job growth and ultimately, according to NSF, "solve the grand challenges of our time."

As the West suffers climate emergencies, from unprecedented wildfires to devastating droughts and heatwaves, the CO-WY Engine itself is a groundbreaking initiative to develop and commercialize advanced climate-resilient technologies. It's poised to revolutionize how we understand, predict and mitigate complicated challenges. It also aims to empower communities, governments and industries by helping them to effectively navigate and adapt to climate change.

Its innovators, including key contributors CU Boulder's Earth Lab and the Mortenson Center in Global Engineering & Resilience, plan to reshape the landscape of climate technology and regional economic development in Colorado and Wyoming by focusing on topics like wildfire mitigation, earth sensing, methane emissions analysis, water resource management, sustainable agriculture and adaptation to extreme weather events.

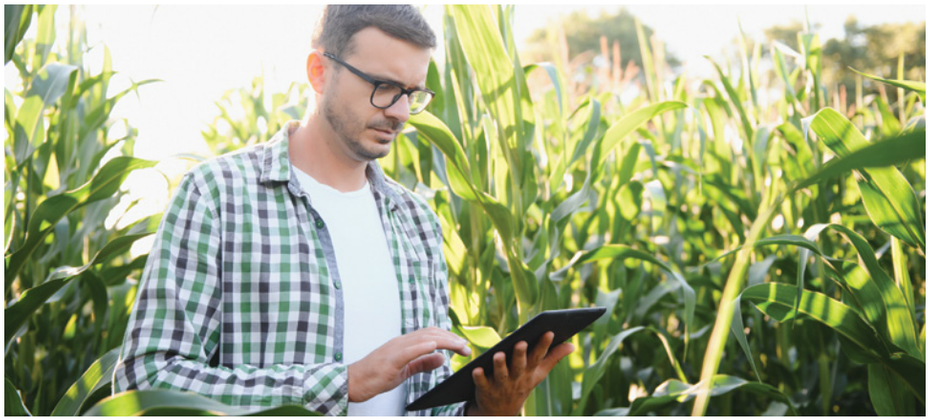
CU Boulder's track record in launching startups is another huge asset to the CO-WY Engine's mission to find and implement widespread, impactful solutions. The university's proven strengths in translating innovations into real-world applications also positions the CO-WY Engine to profoundly impact workforce development and community engagement while placing a strong emphasis on inclusive growth, ensuring that economic benefits reach across diverse communities.

"Colorado is known for creating new businesses, creating new startups, especially those that spin out of the research institutions—and CU Boulder drives that," said Bryn Rees, associate vice chancellor for research and innovation and managing director for Venture Partners at CU Boulder. "So we're taking that pipeline of startup creation and applying it to the climate resilience research in the Engine, which will be expanding and strengthening it further."

In addition to research universities, the CO-WY Engine includes several community colleges and federal labs, regional economic development organizations, policy- and community-focused entities, industry partners, investors and startup accelerators. That level of regional collaboration made the CO-WY Engine a winner, according to Rees. "The critical factor that makes this successful is the multidisciplinary, multi-sector partnerships, and I think that's what the Colorado-Wyoming Engine has done really well," he said.

In its first grant cycle, announced in the summer of 2024, the CO-WY Engine launched its Use-Inspired and Translation Grant opportunities to accelerate the research, development and commercialization of innovations into tangible products, services or solutions that address climate resiliency.

The NSF Engines program is one of the single largest investments in place-based research and development in history—putting science and technology leadership as a central driver of regional economic competitiveness. This prestigious award allows the CO-WY Engine to compete for up to $160 million total funding over the next several years.



Photos: iStock.com/arinahabich, PavloBaliukh, Serhii Hryshchyshen, Tenedos, Wildnerdpix, (opposite page) grinvalds

Climate communication by and for kids

By Bradley Worrell

Can the common barn swallow help promote awareness of climate change while encouraging greater diversity in STEM?

A group of CU Boulder faculty believes so—and they recently won a five-year grant worth nearly $2 million from the National Science Foundation (NSF) to fund their endeavor.

Their project will recruit high school students from Denver area schools, who will create small, touring art-science exhibits about humanity's relationship with birds. A primary goal of the project is to instill a deeper connection between nature and young people, who should gain more of an understanding of bird biology, local environments and climate change through their participation.

Securing the competitive NSF Advancing Informal STEM Learning grant was rewarding for the team, said Rebecca Safran, professor of ecology and evolutionary biology and environmental studies.

Principals Beth Osnes and Rebecca Safran (co-PIs); Chelsea Hackett; Shawhin Roudbari

Funding National Science Foundation (NSF)

Collaboration + support Bird Conservancy of the Rockies; Denver Botanic Gardens; Denver Museum of Nature and Science; Denver Public Schools; Environment for the Americas; Miramontes Arts and Science Program

(Left to right) Shawhin Roudbari, Chelsea Hackett, Rebecca Safran and Beth Osnes.

Photo: Kylie Clarke, CU Boulder
Illustration: iStock.com/ Mikhail Seleznev

Illustration: iStock.com/enotmaks

Renewable energy and storage solutions summit

By Heather Hansen

In a first-of-its-kind summit, Venture Partners at CU Boulder and Industry & Foundation Relations brought together dozens of renewable energy and storage ecosystem stakeholders to discuss opportunities and innovations with a goal of addressing the world's most pressing energy challenges.

CU Boulder researchers, venture capitalists, companies and entrepreneurs, federal lab researchers, and local government leaders contributed to a day of networking and discussions to inform impactful, commercially relevant energy research at CU Boulder, introduce external partners to innovative university efforts, and partner startups and researchers with potential funders.

"We're putting the right people in the right place at the right time to foster important relationships that actually solve problems," said Kate Havey, event organizer and assistant director of licensing at Venture Partners, the commercialization arm of CU Boulder.

Collaboration + support Venture Partners at CU Boulder; Industry & Foundation Relations

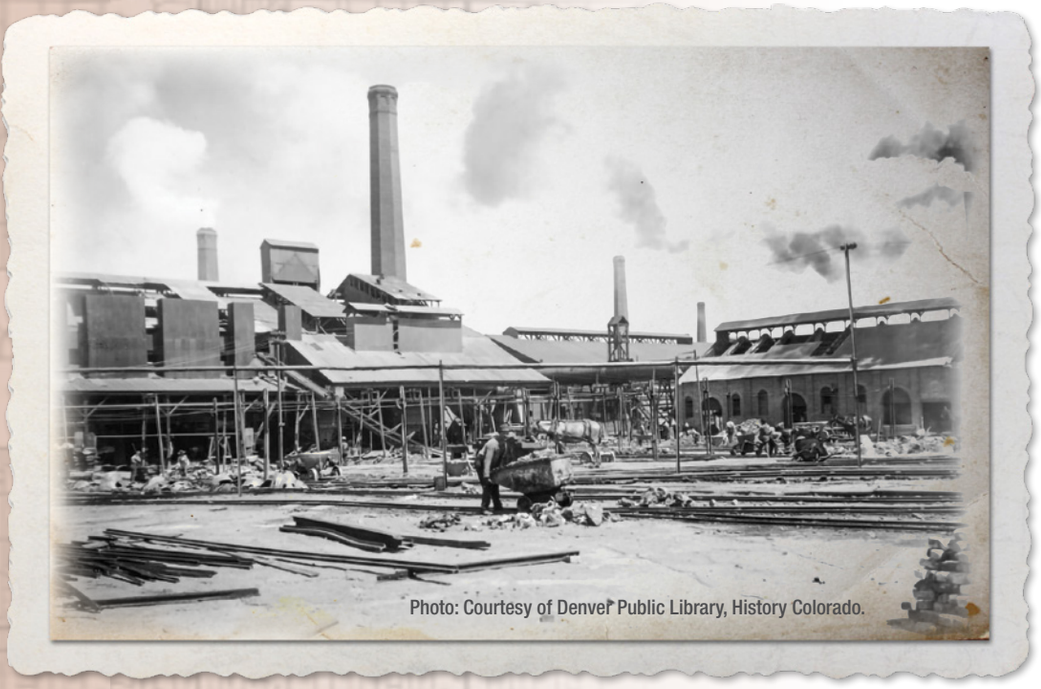
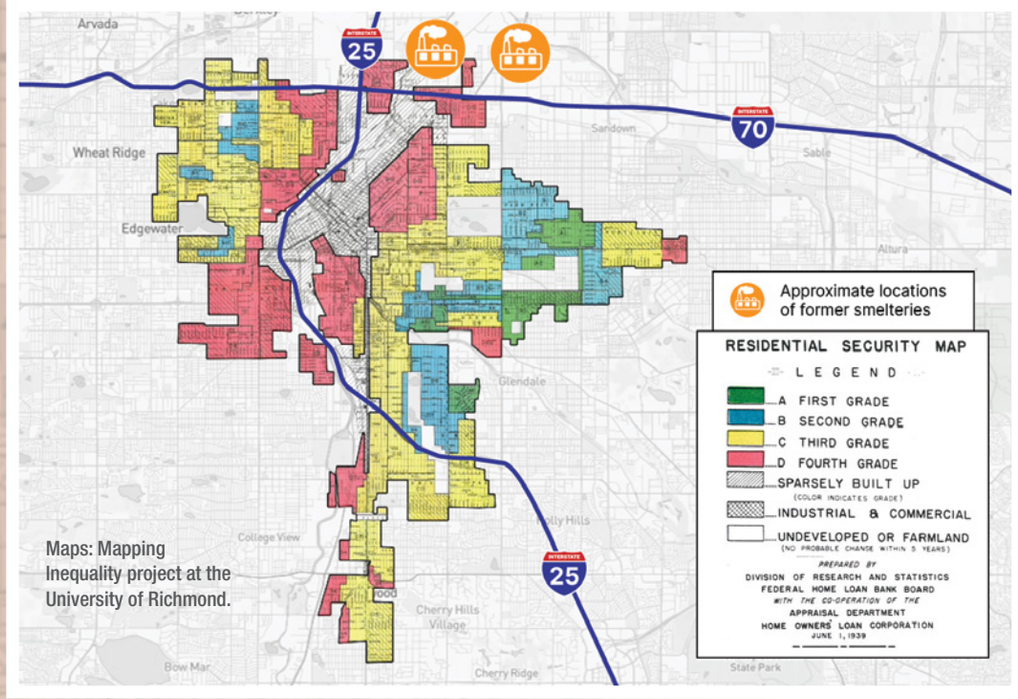


Photo: Courtesy of Denver Public Library, History Colorado.

Denver Globe smelter (above) and historical redlining maps of the Denver area.



Maps: Mapping Inequality project at the University of Richmond.

Communities of color breathe Denver's worst air

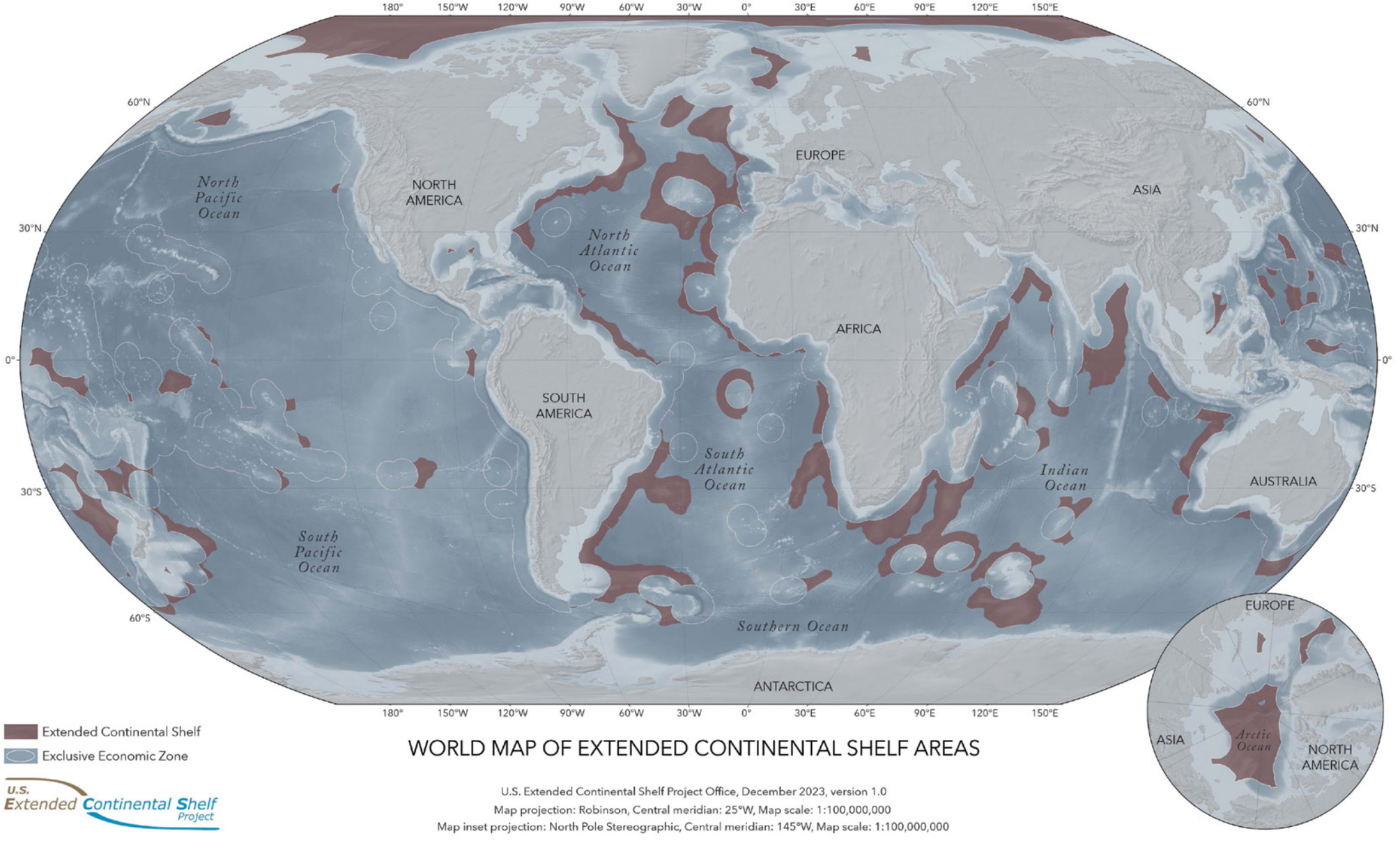
By Stephanie Maltarich

History determines who gets to breathe clean air in Denver, according to a CU Boulder and Cooperative Institute for Research in Environmental Sciences (CIRES) study. The research—which used satellite pollution data, historical redlined maps, census tracks and fuel emissions data from the National Oceanic and Atmospheric Administration (NOAA)—found that past redlining and discriminatory lending practices are linked to inequities in air quality today. The result: air quality is worse for communities of color.

CU Boulder PhD student Alex Bradley and CIRES Fellow and Chemistry Professor Joost de Gouw led the work. Going into the study, one could have expected that people in Denver are exposed more evenly to air pollution, de Gouw said. "But that is not what we found. It still matters where you live and how close you are to industrial sources and highways inside the city boundaries."

Principals Alex Bradley, Joost de Gouw

Collaboration + support Cooperative Institute for Research in Environmental Sciences (CIRES); National Oceanic and Atmospheric Administration (NOAA)



WORLD MAP OF EXTENDED CONTINENTAL SHELF AREAS

U.S. Extended Continental Shelf Project Office, December 2023, version 1.0
Map projection: Robinson, Central meridian: 25°W, Map scale: 1:100,000,000
Map inset projection: North Pole Stereographic, Central meridian: 145°W, Map scale: 1:100,000,000

Image: U.S. Extended Continental Shelf project

CU BOULDER HELPS DEFINE EXTENDED CONTINENTAL SHELF

CIRES researchers help map one million square kilometers of new U.S. seafloor in historic project

The United States has established sovereign rights over an additional one million square kilometers of seafloor, thanks to a government-led project that included a team of CU Boulder researchers.

The U.S. Extended Continental Shelf Project was a collaborative, multi-agency effort to map and define the boundaries of the country's extended continental shelf (ECS)—the portion of the continental shelf beyond 200 nautical miles from the coast.

In geologic terms, continental shelves are the edges of continents that are submerged under the ocean. In legal terms, the continental shelf is the extension of a country's land territory under the sea.

Besides adding a million square kilometers of seafloor to the U.S.—an area roughly twice the size of California—researchers discovered interesting undersea features, including a 1,400-meter-high methane plume off the California coast. They were also able to determine the precise depth of the Challenger Deep—the deepest spot in the ocean—at 10,994 meters (36,070 feet).

Scientists at the Cooperative Institute for Research in Environmental Sciences (CIRES) at CU Boulder took the lead in analyzing the geophysical data used to determine and document the U.S. ECS outer limits. The U.S. Department of State announced those outer limits in December 2023, more than 20 years after the project began.

"We've established the limits of the U.S. continental shelf and it's now up to us to explore, learn new science, and then steward, manage and help preserve these areas for future generations," said Barry Eakins, a marine geophysicist working in NOAA's National Centers for Environmental Information (NCEI) who led the CIRES ECS team.

In the early 2000s, government officials began planning to map and define areas where they suspected the U.S. had ECS. Data collection began in 2003 and involved mapping the seafloor topography to define where the physical continental shelf and slope end and determining sediment thickness in some areas.

The National Oceanic and Atmospheric Administration (NOAA), with help from CIRES scientists, led the seafloor mapping effort. Over the course of the project, NOAA mapped more than three million square kilometers of seafloor—an area larger than Alaska, California and Texas, combined.

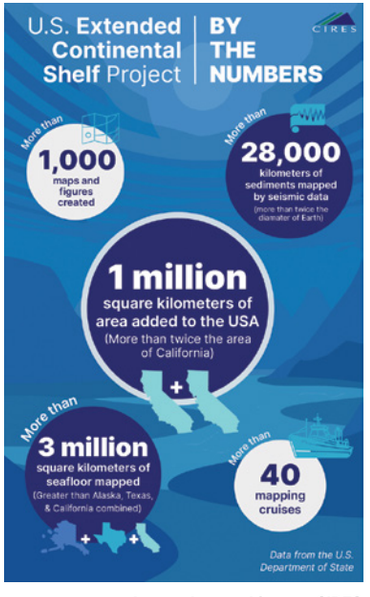


Image: Lauren Lipuma, CIRES

With expertise in marine geophysics, data management, Geographic Information System (GIS) and cartography, Barry Eakins and his CIRES team led the effort to analyze the data collected. The monumental task involved evaluating all three million square kilometers of newly mapped seafloor and interpreting the geologic features in key areas.

The ECS Project Office used CIRES scientists' analyses of seafloor features to determine the precise boundaries of U.S. ECS in seven different regions. Eakins said what made the project so successful was the team's careful attention to detail; they wanted to be confident that their results would be robust and defensible, he said.

Determining the ECS limits helps scientists understand the geologic history of remote areas of the seafloor and contributes much-needed data to the ongoing international effort to map the entirety of Earth's seafloor by 2030.

"The United States has established the limits of the seafloor that it has sovereign rights to, and that seafloor is still largely unknown," Eakins said. "So, this is a tremendous opportunity to go out and explore the geologic features, the sediments that are down there, but the life that is down there as well."

By Lauren Lipuma

Principals
CU Boulder/CIRES research scientists Barry Eakins, Finn Dahl, Rick Saltus, Elliot Lim, Erin LeFevre

Funding
CU Boulder; National Oceanic and Atmospheric Administration (NOAA)

Collaboration + support
Cooperative Institute for Research in Environmental Sciences (CIRES); NOAA; University of New Hampshire; U.S. Department of State; U.S. Geological Survey

TOTAL SOLAR ECLIPSE FUELS RESEARCH, EDUCATION

CU Boulder and NSO collaborate to explore solar mysteries, engage communities through unique eclipse research efforts

By Jorge Perez-Gallego

Principal investigator
U.S. National Science Foundation National Solar Observatory

Funding
U.S. National Science Foundation (NSF)

Collaboration + support
City of Eagle Pass; Crab Orchard National Wildlife Refuge; Del Rio Consolidated School District; Eagle Pass Independent School District; Perot Museum of Nature and Science; Southwest Research Institute; Southwest Texas Junior College; Sul Ross State University; University of Colorado Boulder

On April 8, 2024, the North American total solar eclipse, one of nature's most marvelous spectacles, brought together people from all over—including U.S. National Science Foundation (NSF) National Solar Observatory (NSO) scientists and CU Boulder researchers and students. Opportunities like this have been possible since NSO's relocation to CU Boulder, where a strong student body and solar physics tradition have greatly contributed to both research and outreach efforts at the observatory.

Southwest Texas became a beacon for eclipse chasers on Oct. 14, 2023, when an annular solar eclipse crossed the same region. NSO's focus on the area was rooted in this coincidence, as well as an NSF CAREER Fellowship awarded to NSO scientist Maria Kazachenko, a CU Boulder assistant professor in Astrophysical & Planetary Sciences (APS).

Kazachenko's team—which included NSO scientist Ryan French and APS graduate students Marcel Corchado-Albelo and Dennis Tilipman—joined NSO educators and communicators to deliver outreach activities for over 1,500 K–12 students in Eagle Pass and Del Rio ahead of the eclipse and host a watch party at Eagle Pass' Student Activity Center on eclipse day.

From NSF studios in Washington, D.C., NSO co-produced "The Science of a Total Solar Eclipse," a livestream featuring teams in the field, solar physics segments, and NSO scientists and facilities—bringing the eclipse, and the ways the Sun is studied today, to audiences beyond its path.

Elsewhere, NSO scientists and CU Boulder students prepared experiments to study the corona, the Sun's faint outer atmosphere that becomes visible during totality. One of those experiments, SuperKT, led by NSO scientist Kevin Reardon, used a spectrograph to obtain broadband spectra of coronal electrons to derive their temperatures and velocities. One setup was deployed in Mazatlán, Mexico, by NSO scientists Sanjay Gosain and Gianna Cauzzi, along with APS graduate student Kenny Kenny; and another was run in Dallas by a group of CU Boulder students.

Overcast skies threatened the observations in Texas, so Reardon's team drove to Carbondale, IL. The team included two APS Hale Graduate Fellows, Sarah Bruce and Ayla Weitz, who ran the livestream equipment. Several CU Boulder undergraduates were also essential to the experiment: Carina McCartney (aerospace engineering), worked on telescope control software; Sang Lapinee (astronomy and geology) helped with telescope setups and alignment; and Rosilio Roman (computer science) developed camera control software. The team enjoyed outreach opportunities with the public; and for McCartney, Lapinee and Roman, it was their first view of a total solar eclipse.

Additionally, NSO supported the Citizen Continental-America Telescopic Eclipse (CATE 2024) experiment, led by Southwest Research Institute, and modeled after NSO-led CATE 2017. The experiment supplied 35 groups of amateur astronomers along the path with identical telescope setups with the goal to produce a 60-minute film that allows access to the solar corona on timescales greater than possible from one site.

Finally, atop Maui's Haleakalā, the NSF Daniel K. Inouye Solar Telescope, the world's most powerful solar telescope, operated by NSO, also aimed at the eclipse—even if just partial from Hawaii. Its measurements were done in coordination with other experiments on the ground, and in space—highlighting a golden era for solar physics research.

From Texas to Hawaii, Mexico to Illinois, along the path and beyond, everyone's eclipse experience was unique—yet all were united by a common curiosity and desire to see a world beyond our own.

Dr. Jorge Perez-Gallego, NSO's Head of Education, Public Outreach, and Communications, on set for "The Science of a Total Solar Eclipse" livestream.

Dr. Sanjay Gosain sharing the moment with Mazatlán community members.

Skies darken and cheers roar as a partial eclipse looms.

Photos: NSO/AURA/NSF; Background Photo: John Williams/NSO/AURA/NSF

In Eagle Pass, TX, the moon revealed only the faint outer atmosphere of the Sun.

A horn antenna from the early ’50s.

MacGregor and Connors’s students pointing their radio antennas to the sky outside Duane Physics.

Photo: Courtesy of Meredith MacGregor and Jake Connors

Mapping the Milky Way in an olive oil can

By Daniel Long

Assistant Professor of Astrophysics Meredith MacGregor and NIST Physicist Jake Connors taught their graduate students how to build and use radio horn antennas to locate neutral hydrogen in space.

Their novel idea: Why not teach students how to build and use pyramidal horn antennas as do-it-yourself radio telescopes?

State-of-the-art radio antennas can cost billions of dollars, but perfectly serviceable ones can be made for less than $100.

For the horn, which acts as a radio-signal funnel, students used metallized home insulation. And for the waveguide, which picks up the signal at the narrow end of the horn, they used olive oil cans from Whole Foods.

Graduate student Jay Chittidi said building the antennas “was one of the most engaging hands-on labs that I have had as a grad student.”

Principals Jake Connors; Meredith MacGregor

Collaboration + support Astrophysical and Planetary Sciences; National Institute of Standards and Technology (NIST)

Background photo: iStock.com/den-belitsky

Unraveling the mysteries of space chemistry

By Kenna Hughes-Castleberry

The interstellar space between stars is far from empty, despite how it looks. Atoms and more reside in this ethereal environment known as the Interstellar Medium (ISM).

The ISM has fascinated scientists for decades, as at least 200 unique molecules form in its cold, low-pressure environment. It's a subject that ties together the fields of chemistry, physics and astronomy, as scientists work to determine what types of chemical reactions happen there.

In the recently published cover article of the *Journal of Physical Chemistry A*, JILA Fellow and CU Boulder Physics Professor Heather Lewandowski and former JILA graduate student Olivia Krohn analyzed chemical reactions in simulated ISM conditions by using Coulomb crystals, a cold pseudo-crystalline structure, where they hoped to learn what drove these interactions.

Principal investigators Heather Lewandowski; Olivia Krohn (former JILA graduate student)

Funding Air Force Office of Scientific Research (AFOSR); National Science Foundation (NSF)

Collaboration + support JILA

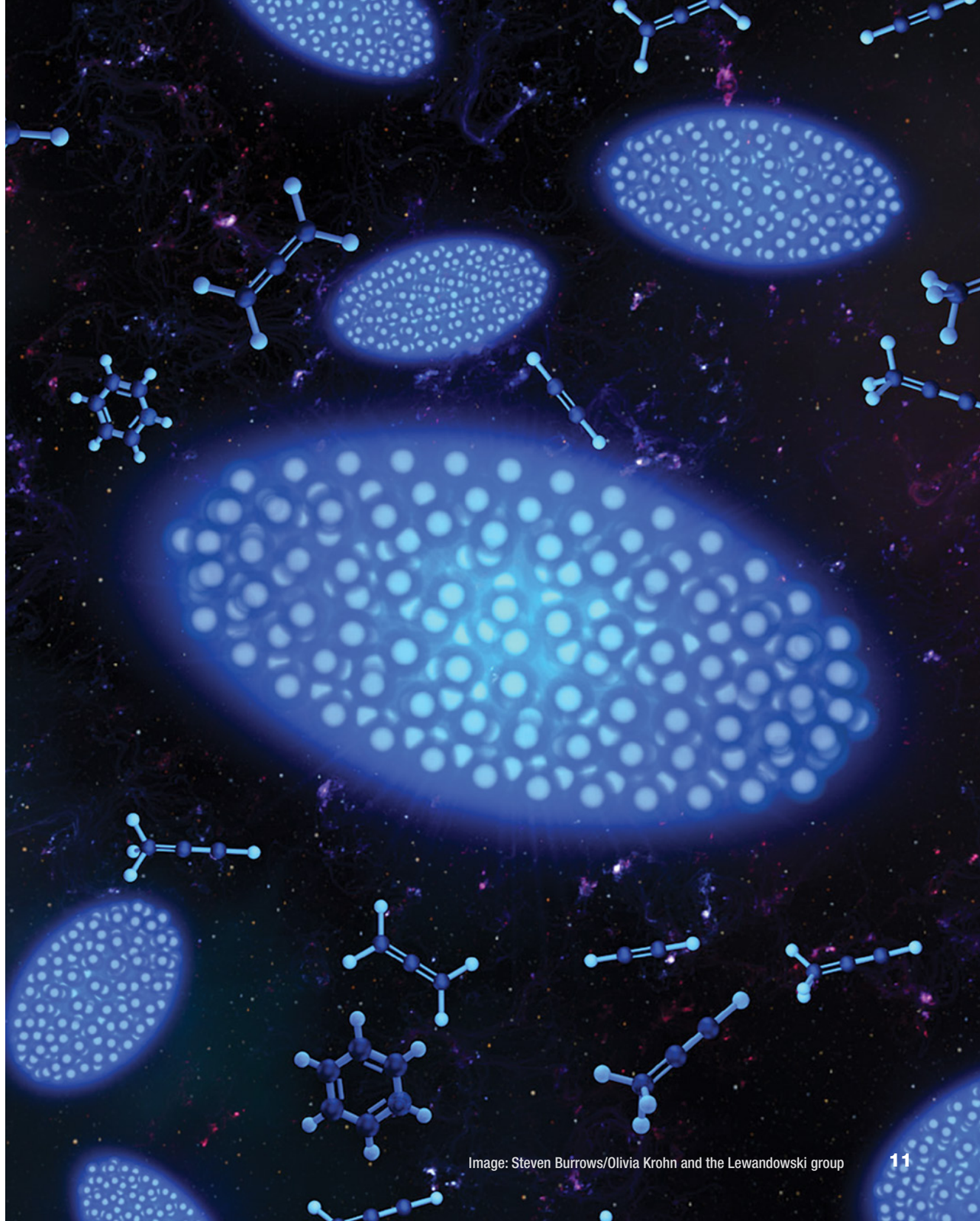
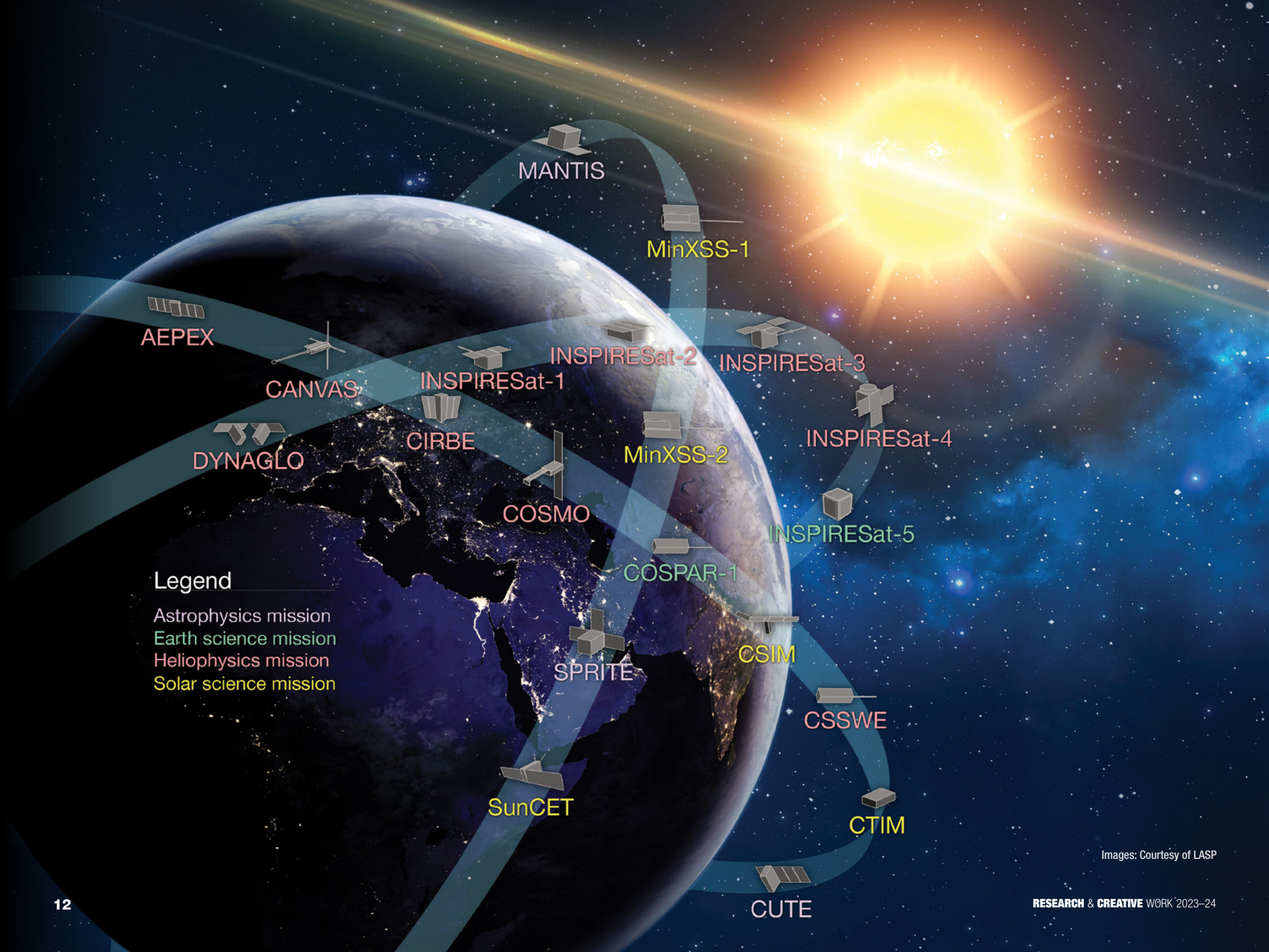


Image: Steven Burrows/Olivia Krohn and the Lewandowski group



Images: Courtesy of LASP

LASP NAMED FIRST COSPAR CENTER OF EXCELLENCE

CU Boulder's space lab leads global effort to empower developing nations with CubeSat technology and scientific discovery

In May 2024, the Committee on Space Research (COSPAR) designated the Laboratory for Atmospheric and Space Physics (LASP) a COSPAR Center of Excellence for Capacity Building in CubeSat Technologies. The partnership was announced by COSPAR President Pascale Ehrenfreund at a ceremony at LASP, which was attended by CU Boulder administrators, LASP senior leadership and scientists, and representatives from industry and NASA.

The goals of the program are to foster excellence in developing countries, share scientific knowledge and build capacity in science, which can also lead to improvements in applied science, health and education.

"Establishment of the COSPAR Center of Excellence aligns with COSPAR's recent efforts in small satellites, specifically targeting institutes and universities in developing countries to engage in CubeSat technology development," Ehrenfreund said. "It will help make space exploration accessible to everyone and empower the next generation of space scientists and engineers."

In announcing the partnership, Ehrenfreund cited LASP's record of pioneering CubeSat missions and its leadership in the International Satellite Program in Research and Education (INSPIRE), a consortium of universities around the world formed to advance space science and engineering and further space science education in developing countries. INSPIRE is spearheaded by CU Boulder and led by Amal Chandran, LASP CubeSat Program lead.

"It is an honor and a privilege for LASP to be named the first COSPAR Center of Excellence for Capacity Building in CubeSat Technologies," LASP Director Dan Baker said. "With science returned on all our small satellite missions to date, and a proven record of successfully miniaturizing a range of scientific instruments, LASP has become an established leader in the SmallSat revolution. We're dedicated to using this expertise to build small satellite capacity to further scientific discovery and train the next generation of space scientists."

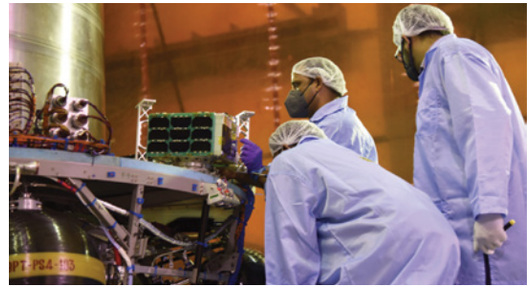
The INSPIRE program was founded in 2015 and received seed funding from the CU Boulder's Office of the Provost in 2017. The program connects students, instructors, universities, industry and space agencies around the world to educate new engineers and scientists, build and launch new space missions, and drive leading-edge scientific discovery and technology.

Speaking on behalf of CU Boulder Provost Russ Moore at the event, Vice Chancellor for Academic Resource Management Ann Schmiesing said, "CU is proud to continue LASP's long legacy of achievement in this exciting effort, and to play a vital role in this international capacity-building program, which will foster professional links and global collaboration."

As of 2023, 43 COSPAR capacity-building workshops have been held in 22 developing countries, with participation by more than 1,200 students from 70 countries.

In summer 2024, the first joint COSPAR-LASP SmallSat summer school was held at LASP with five COSPAR-sponsored interns from the National University of Engineering in Lima, Peru. The students worked on COSPAR satellites that, when launched, will provide space weather data as part of the COSPAR Task Group for establishing a Constellation of Small Satellites (TGCSS), of which Baker and Chandran have been chair and vice chair, respectively, since its inception in 2020.

In opening remarks at the ceremony, which was held in May before his retirement, CU Boulder Chancellor Philip DiStefano said, "For decades, the work of the Committee on Space Research has been a critical part of the international collaborations that are necessary to advance science and develop new space disciplines. It is exciting to have the opportunity to advance global collaboration through our work specifically with small satellites, and CU Boulder is thrilled to be recognized as COSPAR's first Center of Excellence for Capacity Building in CubeSat Technologies."



By Sara E. Pratt

Principal investigator
Amal Chandran

Funding
Committee on Space Research (COSPAR); Laboratory for Atmospheric and Space Physics (LASP)

Collaboration + support
COSPAR; LASP

THE ENGINE POWERING COLORADO'S QUANTUM BOOM

From nanofabrication breakthroughs to workforce expansion, CU Boulder is fueling Colorado's rise as a quantum technology hub

By Heather Hansen

Principals
Scott Diddams; Jun Ye; others

Funding
Colorado Office of Economic Development and International Trade (OEDIT); National Science Foundation (NSF); U.S. Department of Commerce's Economic Development Administration (EDA)

Collaboration + support
CU Boulder CUbit Quantum Initiative, JILA; Elevate Quantum Tech Hub; National Institute of Standards and Technology (NIST); quantum companies across Colorado; hgher education and K–12 partners across Colorado

CU Boulder, already an established leader in quantum science and technology, continues to blaze trails in research, education, commercialization and job creation, cementing the university as an international hub of excellence providing real-world impact.

Thanks to globally significant discoveries at CU Boulder, Colorado has an illustrious history in quantum science and technology, including groundbreaking work emerging from JILA, a collaboration between CU Boulder and the National Institute of Standards and Technology (NIST). The four Nobel Prizes awarded to CU Boulder faculty for quantum insights are just one example of the university's world-class quantum legacy.

CU Boulder continues to lead the science of small particles in a big way. The CUbit Quantum Initiative reinforces Colorado's prominence in quantum science and technology by catalyzing research on campus, expanding education and workforce opportunities and connecting quantum advancements to industry.

Most recently, CU Boulder was awarded $20 million from the National Science Foundation (NSF) to build the National Quantum Nanofab, a unique 'maker space', led by principal investigator Scott Diddams (electrical, computer and energy engineering), that will provide nationwide access to nanofabrication tools for creating new technologies like quantum computer chips that could outperform even the fastest computers available today.

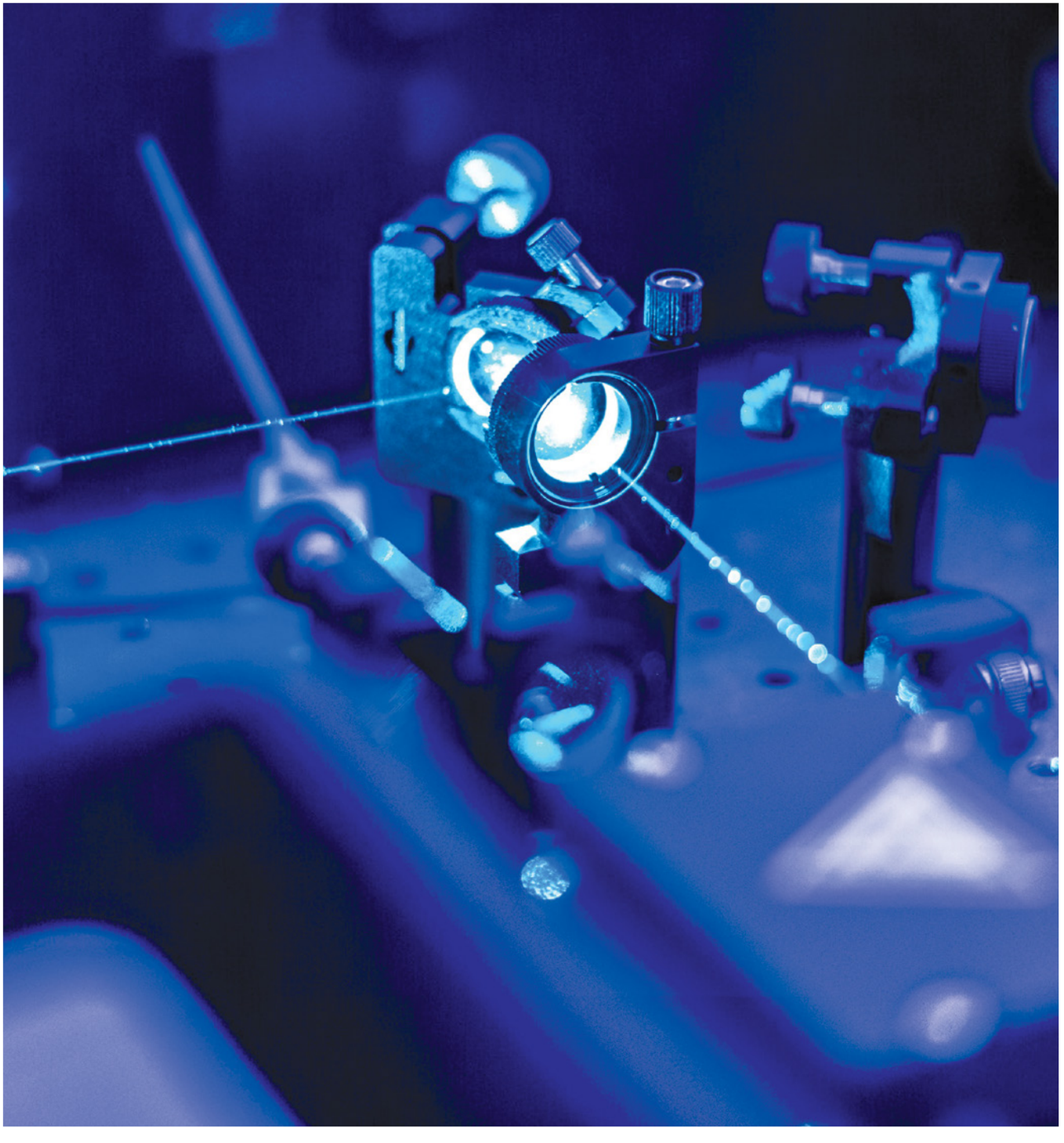
Another CU Boulder-led center having national impact—the Quantum Systems through Entangled Science and Engineering (Q-SEnSE)—is in its fifth year of expanding quantum initiatives by advancing new frontiers in quantum sensing, developing and applying novel technologies and training a quantum-savvy workforce. Q-SEnSE is a $25 million NSF-funded Quantum Leap Challenge Institute led by physicist and JILA fellow Jun Ye in partnership with 11 other research organizations in the U.S. and abroad. Q-SEnSE has been awarded an additional $5 million for a sixth year based on its achievements and vision for quantum research and education.

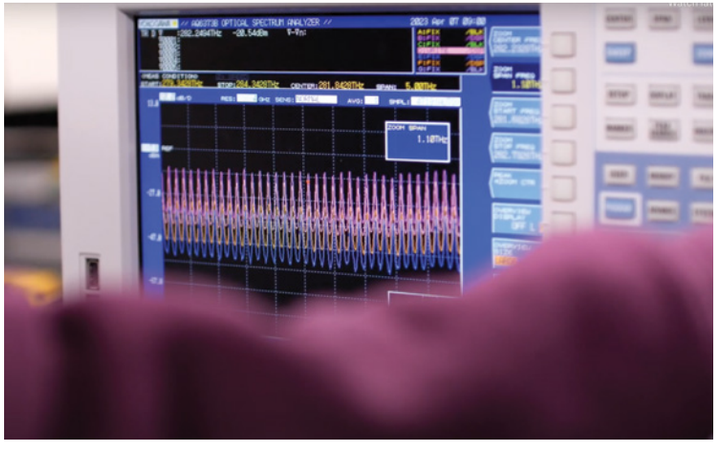
CU Boulder is also a key partner of Elevate Quantum, which recently received a Tech Hubs Phase 2 award from the U.S. Department of Commerce's Economic Development Administration (EDA). On top of $40.5 million in initial EDA funding, the coveted award unlocked more than $127 million in new funds including $74 million in state tax incentives for businesses and research organizations in a new bill signed on campus by Governor Jared Polis. The award is expected to drive more than $2 billion in additional private capital and create over 10,000 quantum jobs.

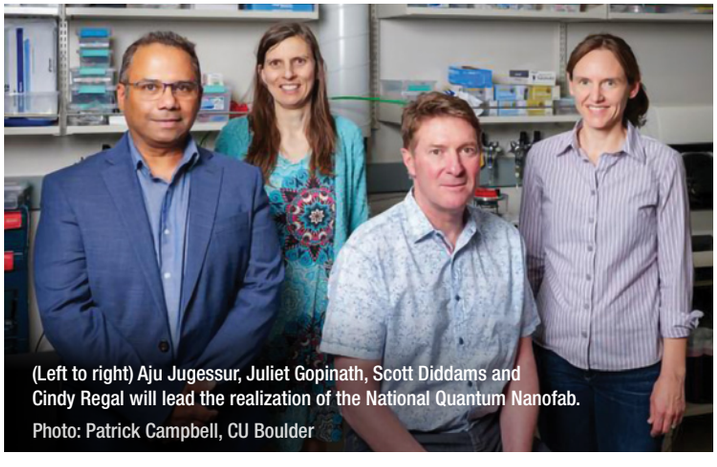
About 3,000 Colorado workers already power dozens of cutting-edge quantum companies—making Colorado the largest cluster of quantum businesses in the nation. CU Boulder's robust ecosystem for spinouts and commercialization ensures that groundbreaking research translates into businesses offering those work opportunities. Faculty members and alumni have been instrumental in founding and leading a number of quantum companies including Infleqtion (formerly ColdQuanta), Vescent Photonics, LongPath Technologies, FieldLine, Atom Computing, Stable Laser Systems, KM Labs, Mesa Quantum Systems and Icarus Quantum.

Researchers looking to accelerate discoveries toward commercialization now have additional fuel for quantum translation. In partnership with the Colorado Office of Economic Development and International Trade (OEDIT), the CUbit Quantum Initiative recently administered seven $50,000 translational quantum seed grants to incentivize quantum innovations launched from labs across the state. This program is providing $1.2 million in funding over three years.

At the same time, a statewide consortium of higher education and industry partners outlined the "Creating a Colorado Quantum-Ready Workforce in Service of the Nation" vision. The concept is focused on translating the state's quantum know-how into workforce development and educational opportunities for learners and workers across Colorado—meeting them where they are, professionally and geographically, to create a diverse and inclusive quantum-ready workforce.

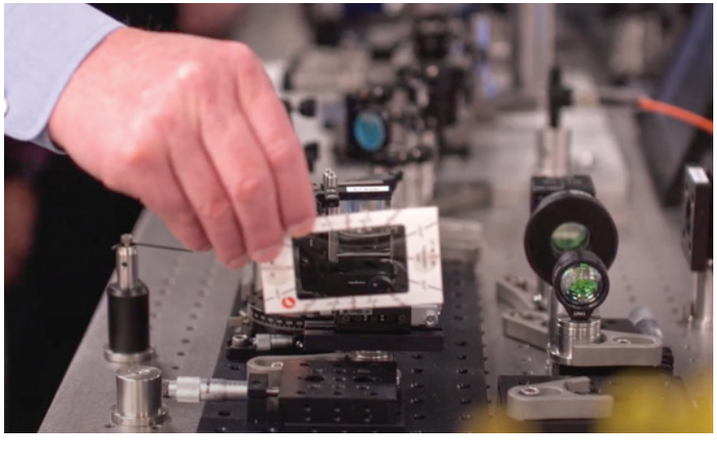






(Left to right) Aju Jugessur, Juliet Gopinath, Scott Diddams and Cindy Regal will lead the realization of the National Quantum Nanofab.

Photo: Patrick Campbell, CU Boulder



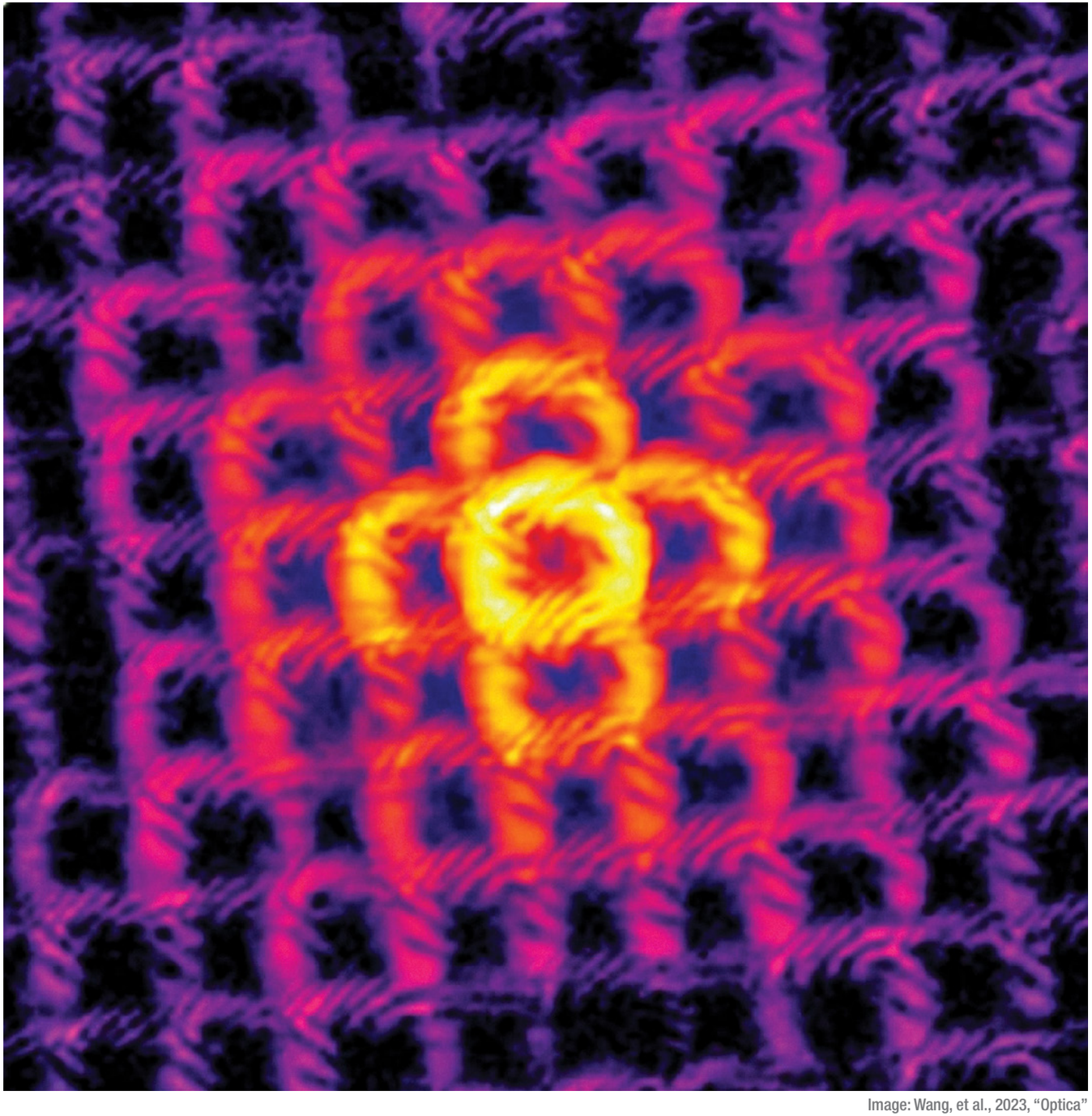


Image: Wang, et al., 2023, "Optica"

'Doughnut' beams help reveal incredibly small objects

By Daniel Strain

The future of imaging extremely small objects may come down to doughnut-shaped beams of light, according to a study from researchers at JILA and the Department of Physics.

The study explored the challenge of viewing nanodevices, or machines that are too small or delicate to see with traditional microscopes. In the research, physicists generated beams of light, then twisted those beams into the shape of a vortex. (When such beams shine on a flat object, they make the shape of a doughnut.) Next, the researchers aimed their beams at small objects and examined how the light scattered.

The researchers reported that their doughnut beams could map out certain kinds of nanodevices in never-before-seen detail—and could even spot defects in devices that were just 10 to 100 nanometers in size, or many times smaller than a millionth of an inch.

Principal investigators Henry Kapteyn; Margaret Murnane

Funding National Science Foundation (NSF)

Collaboration + support STROBE NSF Science and Technology Center at CU Boulder; KM Labs

Research computing team spearheads federal AI pilot

By Chris Yankee

CU Boulder is providing leadership to a key working group under the National Artificial Intelligence Research Resource (NAIRR) pilot project launched in January. NAIRR is a joint federal agency effort that bridges the gap for researchers lacking access to artificial intelligence (AI) resources, to drive innovation and address societal challenges.

AI has the potential to accelerate discoveries and address critical societal and global issues, but many researchers lack access to AI resources needed for conducting research and training the next generation of researchers.

The project's focus is to connect U.S. researchers and educators with essential AI resources. Advanced Cyberinfrastructure Coordination Ecosystem: Services and Support (ACCESS) Deputy Director Alana Romanella and Assistant Vice Chancellor Shelley Knuth of CU Boulder's Research Computing team are spearheading efforts to enhance user experiences and support researcher objectives.

"We are excited to represent CU in this incredibly important endeavor for our nation," said Knuth.

Principals Shelley Knuth; Alana Romanella

Funding National Artificial Intelligence Research Resource (NAIRR); National Science Foundation (NSF)

Collaboration + support CU Boulder Office of Information Technology

Image: iStock.com/HappyBall3692

Photo: Glenn Asakawa, CU Boulder

Investing in interdisciplinary research to address societal challenges

By Chris Yankee

This year, the Research & Innovation Office, along with the College of Arts and Sciences, the College of Engineering and Applied Science and the School of Education, launched the New Frontiers Grant Program to cultivate new, interdisciplinary research strengths for CU Boulder.

In the inaugural competition, which requires teams to include two colleges or schools and at least one institute, the four awarded Planning Phase projects are addressing significant societal challenges from sustainability and health to AI and education.

The awards included two $50,000 grants and one $35,000 grant, given to three teams. The fourth team, distinguished for its commercialization potential, was awarded $50,000 by Venture Partners at CU Boulder.

Teams have a year to advance their projects before competing for a $200,000 Launch Phase grant, to be awarded in June 2025.

Funding CU Boulder's College of Arts and Sciences, College of Engineering and Applied Science, Research & Innovation Office and School of Education

Collaboration + support Venture Partners at CU Boulder

THE RACE TO SAVE HONEY BEES

CU Boulder's Samuel Ramsey tackles the Varroa mite, a parasite devastating bee colonies and endangering vital crops worldwide

By Yvaine Ye

Principal investigator
Samuel Ramsey

Funding
National Geographic Wayfinder Grant; Project *Apis m.* research grant; U.S. Department of Agriculture (USDA)–Animal and Plant Health Inspection Service (APHIS) Cooperative Agreement

Collaboration + support
BioFrontiers Institute; Hiveflow; Manuka Doctor

In an age where environmental threats loom large, a CU Boulder entomologist is pioneering an effort to save one of nature's most crucial pollinators—the honey bee.

Over the past few years, Samuel Ramsey, assistant professor of ecology and evolutionary biology at the BioFrontiers Institute, has traveled around the world, from Thailand and Bangladesh to Taiwan, to study a parasitic mite wreaking havoc on honey bee colonies worldwide.

"The parasite is a huge issue on top of all the other threats our pollinators are dealing with, like climate change and habitat loss," Ramsey said.

The mite, *Varroa destructor*, is responsible for the recent sharp decline in honey bee health around the world. The small parasite uses enzymes to dissolve bees' livers and makes them more vulnerable to other diseases, if not killing them directly. It is estimated that beekeepers in the U.S. lost more than 48% of their honey bee colonies last year, with *Varroa* as the main culprit.

By studying the mite, Ramsey and his team at the Boulder Bee Lab are racing to put an end to the pollinator pandemic.

Honey bees are more than just honey makers. They are among the most efficient pollinators in nature, contributing to about $18 billion worth of crops in the U.S., including apples, peaches and potatoes.

"If we lose these bees, we're going to lose a lot of food," Ramsey said, adding that the impacts of food insecurity can be far-reaching. "When people are hungry and don't have necessities, conflict arises, which spills over and makes the world a more difficult place to live."

Beekeepers have been using pesticides to control the mite, but the pesticides also harm the bees and the environment.

"There are so many honey bee colonies in the U.S., and with each of them being an additional place where chemicals are being applied, it keeps us on this pesticide treadmill that we would love to get off," Ramsey said.

In his latest effort, Ramsey is exploring if he can tweak the bees' genes to make them immune to *Varroa* and reduce pesticide use. He has previously discovered that bees in Southeast Asia, where *Varroa* originated, are largely resistant to the mite's attacks, partly because of the genes they carry. If scientists could transfer these genes to honey bees in other parts of the world, it might help bees develop immunity against *Varroa*.

The Honey Bee-nome Project took Ramsey to Thailand, Bangladesh and Taiwan this summer, where he sampled local bees' genomes, as well as other bee parasites and diseases that are threatening bee health. The *Tropilaelaps* mite, for example, is a cousin of *Varroa* that can spread even faster across colonies. These mites, originally from Southeast Asia, have begun to spread beyond the continent. Ramsey is closely monitoring their progression to the West in a bid to find a solution before they arrive in the U.S.

Solving the honey bee crisis will need diverse perspectives, and this holds true for many other significant challenges humanity faces today, Ramsey said.

"One of the clearest things that we've seen in biology is that a robust ecosystem is a diverse ecosystem. I'm glad that I get to be one of the quirky human beings who gets to focus on solving the bee problem and bring the different perspectives to the table in the entomology community," Ramsey said.

Bee Photo: iStock.com/DanielPrudek Illustration: iStock.com/Oksana Kovaleva

Photos: Shin Arunrugstichai

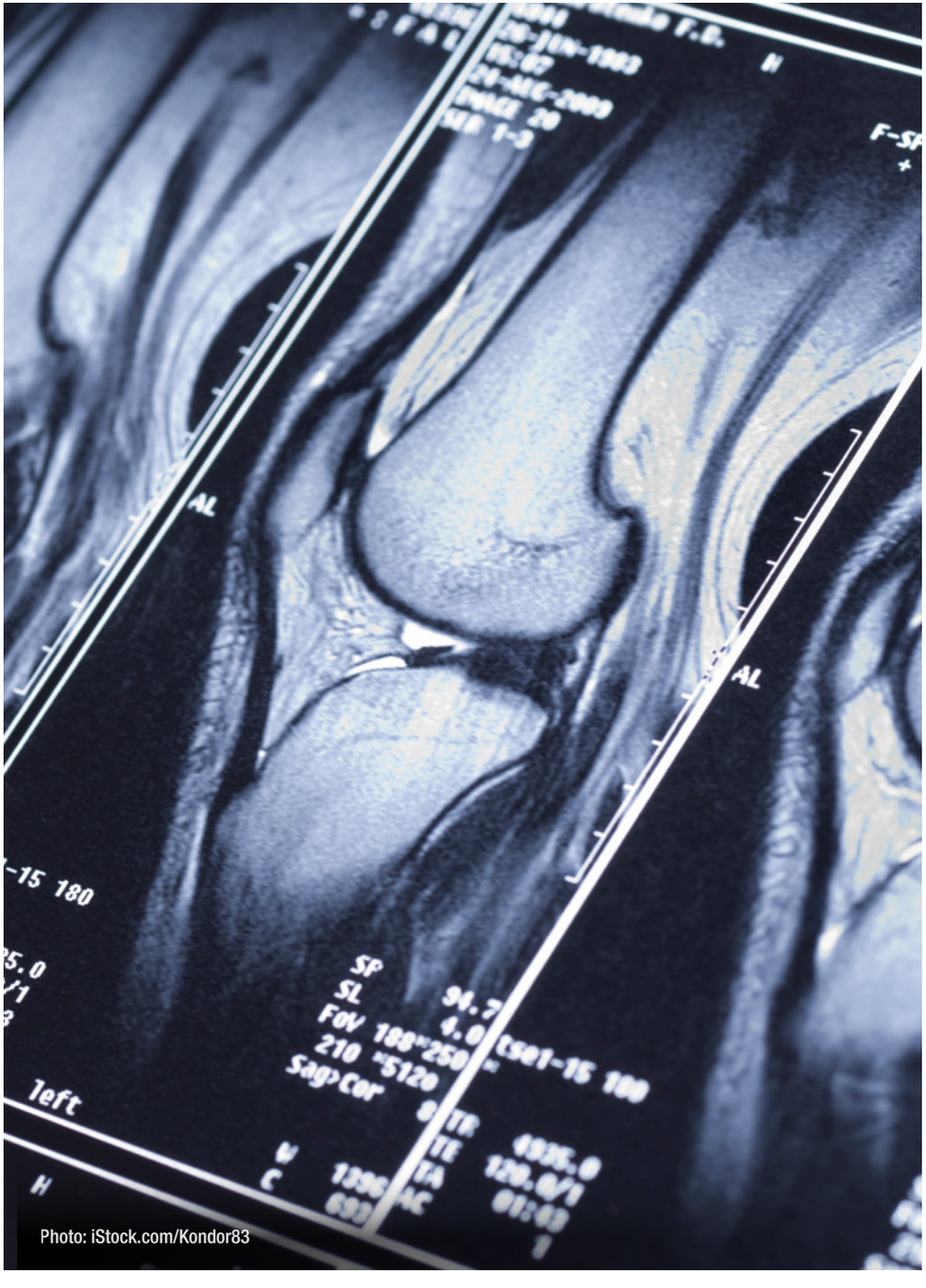


Photo: iStock.com/Kondor83

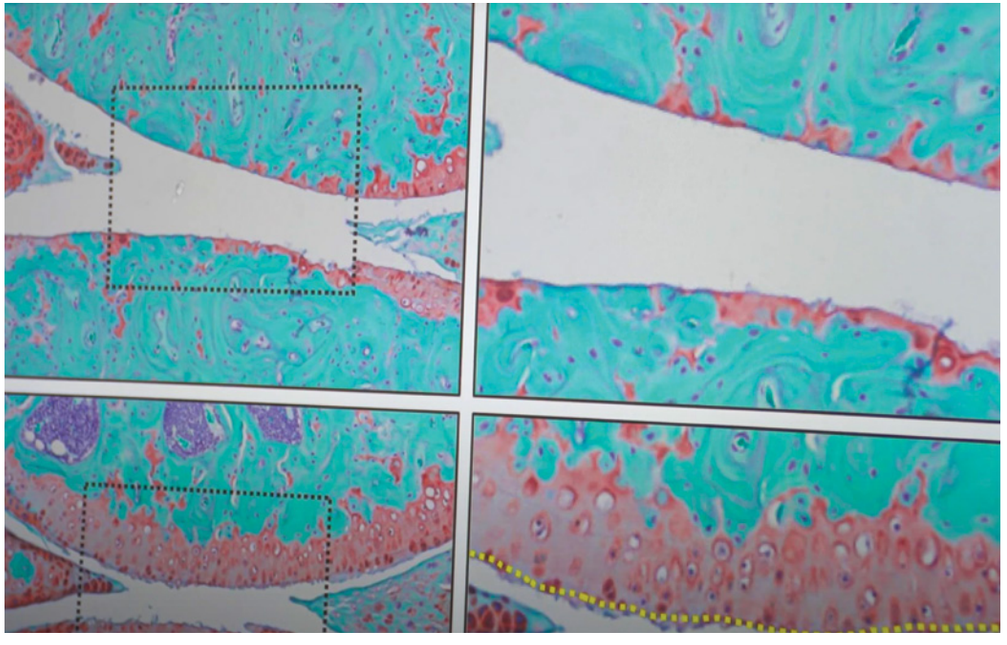


Image: Nicholas Goda, CU Boulder

Stephanie Bryant (right) in the lab.

Photo: Casey Cass, CU Boulder

MAJOR FUNDING FUELS OSTEOARTHRITIS TREATMENT COLLABORATION

CU Boulder and partners secure up to $39M ARPA-H contract to develop revolutionary joint-healing solutions for millions

In a huge win for osteoarthritis sufferers and multidisciplinary collaborations, a CU Boulder-led team of scientists was awarded up to $39 million from the Advanced Research Projects Agency for Health (ARPA-H) to develop new therapies to treat the painful, degenerative disease affecting 32 million Americans.

The grant, part of ARPA-H's Novel Innovations for Tissue Regeneration in Osteoarthritis (NITRO) program, will support team efforts—including University of Colorado Anschutz and Colorado State University researchers—to create minimally-invasive therapies that bring relief for a condition affecting millions of people worldwide. It is CU Boulder's first award from the new agency within the U.S. Department of Health and Human Services that supports transformative health and biomedical breakthroughs.

Osteoarthritis, the third most common disability in the U.S., causes cartilage and bone damage, often leading to increased pain and decreased mobility. The only interventions currently available either treat the pain or replace the joint—all measures that are largely insufficient, invasive or costly. Project leader and principal investigator Stephanie Bryant (chemical and biological engineering, materials science and engineering, BioFrontiers Institute) and colleagues want to change that with a therapy that regenerates cartilage and bone cells.

For over 25 years, Bryant's work has focused on developing three-dimensional gel-like biomaterials that can provide scaffolding to support new cells. She joined forces with co-PIs Karin Payne and Michael Zuscik (both CU Anschutz; School of Medicine, Orthopedics). Payne loaned her cell expertise and Zuscik his knowledge of biologics to a process that will essentially allow a joint to repair itself.

"Within five years, our goal is to develop a suite of non-invasive therapies that can end osteoarthritis," Bryant said recently. "It could be an absolute game-changer for patients."

The dream team coalesced around AB Nexus, an initiative aimed at supporting partnerships between CU Boulder and CU Anschutz researchers with seed funding and other resources. The project is a great example of how combining forces can amplify effect and lead to innovative solutions to the most challenging health issues facing society, said Lisa Nanstad, a research development strategist at CU Boulder. She and colleagues worked first with Bryant on securing AB Nexus funding in 2020 (the catalyst for a $1.5 million grant from the National Science Foundation in 2021), and more recently on the ARPA-H funding opportunity.

"This ambitious project has the potential to profoundly impact the lives of people suffering with osteoarthritis, and it is also an inspiration to researchers across the University of Colorado," Nanstad said. "The success of this team demonstrates the value of institutional investment in seed grant funding programs like AB Nexus."

Illustration: iStock.com/ArtRoseStudio

A key part of landing the ARPA-H grant was the team's approach to bringing their innovation to the marketplace in a practical way. Hannah Nelson, associate director of licensing (biosciences) for Venture Partners at CU Boulder worked with the PI team to chart a path for successful commercialization and a detailed intellectual property strategy. "ARPA-H not only wants to see transformative research, but a strong commercialization and intellectual property plan to ensure that the innovations being developed can move beyond the universities to impact patients," she said.

By Heather Hansen

Principal Investigators
Stephanie Bryant; Karin Payne; Michael Zuscik

Funding
Advanced Research Projects Agency for Health (ARPA-H) Novel Innovations for Tissue Regeneration in Osteoarthritis (NITRO) program

Collaboration + support
CU Boulder's BioFrontiers Institute, Department of Chemical and Biological Engineering, Materials Science and Engineering Program and Venture Partners at CU Boulder; Colorado State University; University of Colorado Anschutz Medical Campus

Early childhood health interventions have ‘big, multi-generation impacts’

By Daniel Long

In the late ‘90s, Tania Barham, who is now an associate professor of economics at CU Boulder, was in Yemen working as an economist for the World Bank, which had teamed up with UNICEF to improve that country’s health, education and water.

But something was missing: evidence.

“There was little data to understand if a project was successful or not,” she recalled.

That realization persuaded Barham to go back to school, earn a PhD and research how to bring people out of poverty over the long term.

Much of Barham’s work now draws upon data from the Maternal and Child Health and Family Planning Programme in Bangladesh, which tracks key metrics. Barham’s recent research found that the program improves people’s height, cognition and test scores.

But the most important finding, says Barham, was that these effects spanned generations. The second generation benefitted as much as the first. The takeaway: even modest health program can have “big, multi-generation impacts.”

Principal Investigators Tania Barham (CU Boulder); Brachel Champion (U.S. Air Force Academy); Gisella Kagy (University of Wisconsin–Madison); Jena Hamadani (icddr,b)

Funding CU Population Center; Institute of Behavioral Science (IBS); International Initiative for Impact Evaluation; National Institutes of Health (NIH)

Collaboration + support icddr,b, an international health research institute based in Dhaka, Bangladesh; University of Wisconsin–Madison; U.S. Air Force Academy

Students participate in school activities at the Sahabatpur Daspara Ananda school in Sahabatpur village, Bangladesh. Photo: Dominic Chavez, World Bank

Photo: iStock.com/Renata Angerami

Social distancing plus vaccines prevented 800,000 COVID deaths

By Lisa Marshall

Masking and social distancing until a vaccine could be developed prevented roughly 800,000 COVID-19 deaths in the U.S., according to CU Boulder research.

The authors gathered national mortality data and data from blood samples to estimate how many people had been infected, vaccinated or died at various points from 2020 to 2024.

They found that 68% of Americans got vaccinated before being infected. Had they gotten COVID for the first time without being vaccinated, their risk of dying would have been as much as four times higher.

"Without a behavioral response, vaccines would have come too late to save lives," the authors wrote.

They acknowledged that distancing measures came at "tremendous economic, social and human cost" and called for the U.S. to develop a more centralized system for gathering relevant data to better target behavioral guidance during future pandemics.

Principal investigator Stephen Kissler

Collaboration + support The Brookings Institution; University of California, Los Angeles

Remnants of ancient virus may fuel ALS in people

By Lisa Marshall

Remnants of a virus that infected our primate ancestors 30-50 million years ago may be fueling amyotrophic lateral sclerosis (ALS) in people today, according to CU Boulder research.

Previous studies have shown that about half of the human genome is made up of bits of DNA, including proteins, left behind by ancient viruses.

The latest research found that when one such protein, PEG10, is present at high levels in nerve tissue, it changes cell behavior in ways that contribute to the fatal, neurodegenerative disease.

The researchers are now working to find a way to inhibit the rogue protein.

"It is early days still, but the hope is this could potentially lead to an entirely new class of potential therapeutics to get at the root cause of ALS," said author Alexandra Whiteley, assistant professor of biochemistry.

Principal investigator Alexandra Whiteley

Funding CU Boulder Biological Sciences Initiative; National Cancer Institute; National Institute of General Medical Sciences

Collaboration + support ALS Association; National Institutes of Health (NIH); Venture Partners at CU Boulder

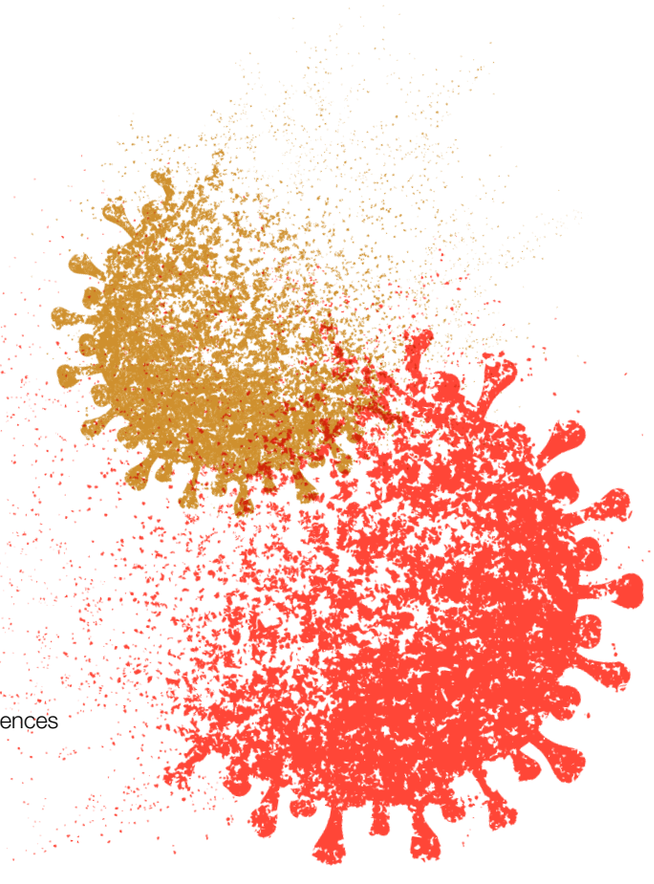


Illustration: iStock.com/goleiro35

TRANSCENDING TRADITIONAL NOTIONS OF NATIVE AMERICAN ART

Whether in a somber National Portrait Gallery performance or in her wry takes on Native humor, Anna Tsouhlarakis follows her heart

By Clint Talbott

Principal
Anna Tsouhlarakis

Funding
Corrina Mehiel Fellowship from S.O.U.R.C.E. Studio; Creative Capital Foundation; Smithsonian Artist Research Fellowship

Collaboration + support
Independent Art Fair, New York; Museum of Contemporary Art Denver; National Portrait Gallery

Anna Tsouhlarakis was a self-described "math and science nerd" in high school, even representing the United States at the International Science and Engineering Fair in her senior year. But while studying at Dartmouth College, she took classes that interested her, particularly studio art and Native American Studies.

"That's where my heart was, and still is," Tsouhlarakis said. Math and science nerds might not be expected to love art, but following her heart—and contravening stereotypes—was a wise choice.

In recent years, Tsouhlarakis' art has appeared as a solo exhibition at the Museum of Contemporary Art Denver (MCA) and New York City's Independent Art Fair, and it has appeared in Switzerland, Greece, Canada and in dozens of other U.S. venues. In 2023, she performed and exhibited her work in the National Portrait Gallery in Washington, D.C.

Just as she broadened the notion of what might interest a budding scientist, she now transcends stereotypes of what constitutes Native American art. Tsouhlarakis, now an assistant professor of art and art history at CU Boulder, works in sculpture, installation, video and performance and is of Navajo, Creek and Greek descent.

At the National Portrait Gallery, her work drew on those strengths and backgrounds. There, she performed "Portrait of an Indigenous Womxn [Removed]," which commemorated murdered and missing Indigenous women and girls.

In 2018, the Urban Indian Health Institute released an extensive study on missing and murdered Indigenous women. As of 2016, there were 5,712 reports of missing American Indian and Alaska Native women, but only 116 were logged into the Department of Justice database, the National Missing and Unidentified Persons System.

"It was shocking to anybody that heard about this, and specifically to Native communities," Tsouhlarakis said. In a gallery full of images of U.S. presidents and cultural icons, she focused her attention on those who are, to society, largely unseen.

"I knew there was nobody more important that I could highlight in terms of their story," Tsouhlarakis observed. Her work featured missing-person posters of Indigenous women. In a video recording of one performance, she carries a sculpture topped with a poster seeking information about Kaysera Stops Pretty Places, who was murdered in 2019 in Montana.

Tsouhlarakis notes that most of her art is not activist, but rather expands upon long-held expectations of Native American art. Her father is a Navajo silversmith, and she grew up going with him to art markets, shows and galleries.

"There was this expectation of Native art to always be beautiful, and for the aesthetic to be very perfect and for it to be very serious," she observed, adding that she rebelled against those expectations.

"I want to make things that question that expectation of Native American art, and for me, humor does that as well." That humor was evident in her 2023 exhibition titled "Indigenous Absurdities," at MCA Denver.

Tsouhlarakis, mother to three young children, described a key moment in which Native humor seemed an obvious way to frame Native art. While at a powwow in Montana, she overheard two Crow women conversing.

"One said, 'You never come by to see me,' and the other responded that she didn't know where she lived," Tsouhlarakis told a New York writer. "Then, one said that the other didn't ever call them, and she said: 'Well, you don't even have a phone.' Then they just burst out laughing—like almost falling off the bench."

Such everyday observations underlie textual work like "HER FRYBREAD ISN'T THAT GOOD" and "HER BRAIDS ARE ALWAYS TOO LOOSE". Humor, Tsouhlarakis noted, is a good coping mechanism in times of hardship, which Native communities know very well.

Tsouhlarakis' art has been recognized and supported by a host of organizations. This year, she won a Corrina Mehiel Fellowship from S.O.U.R.C.E. Studio and a Smithsonian Artist Research Fellowship, and she's also been recognized with more than two dozen other awards and fellowships. She also has artist residencies in New Hampshire and Maine this year.

Performance of Anna Tsouhlarakis's "Portrait of an Indigenous Womxn [Removed]" (2023) at the National Portrait Gallery.

Photo: Matailong Du / Courtesy National Portrait Gallery

Photo: Courtesy of Grace Leslie
Background Illustrations: Andy Gilmore

THE SOUND OF SCIENCE

Grace Leslie's work with ATLAS' Brain Music Lab transforms brain activity into sound, blending art, technology and neuroscience

Grace Leslie stands in front of a crowd, a flute perched at her lips. In many ways, the ingredients of this performance are nothing extraordinary: performer, audience, instrument … other than, perhaps, the odd-looking headband Leslie wears.

When she begins, the sounds of the flute are joined by a wash of vaguely electronic tones. The result is ethereal and strange, moving between atonal and harmonious, unsettling and soothing.

What you're hearing are the brain waves of Leslie, an assistant professor of music technology. During this performance of Vessels, a 30-minute brain-body concert, she wears a special electroencephalogram (EEG) monitoring device that measures electrical activity from her brain. These brain waves are then sonified by means of an algorithm that imprints their spectrum onto a bank of recorded samples of flute and singing.

In other words, Leslie is playing two instruments: the flute and her own brain.

This is the sort of work Leslie does in the Brain Music Lab at the ATLAS Institute, CU Boulder's interdisciplinary institute for radical creativity and invention.

The Brain Music Lab is focused on the nexus between music, technology and neuroscience. "We look at people experiencing music and study their brain waves," said Leslie. "From there, we develop new ways of working with that data and then often transform it back into the performance or a new artistic piece."

Typically, students begin with a broad scientific concept. For example: "What would we learn if we measured the brain waves of jazz performers during an improvisational set?"

At an ordinary lab, measuring that data may be the end result. However, the Brain Music Lab takes it a step further. Once those brain waves are measured and analyzed, the question becomes: "How do we transform what we've learned into a new artistic expression?" The result may be a visual art piece, a composition or even a new form of electronic instrument. The lab works on the continuum of an art-science loop.

"It's super exciting for a student with an electrical engineering background to be able to apply the technical skills that they have to brain waves or a medical question or to a creative pursuit," said Leslie. "I'm constantly astounded by the work that they're doing. They surprise me every day."

Thiago Roque—who is pursuing a triple PhD in creative technology, neuroscience and cognitive sciences—is investigating the phenomenon of neural entrainment in musical settings to better understand social interaction and empathy.

His current research is centered on hyperscanning (a procedure that records activity in two brains at the same time) during a musical performance to better understand the neurological link between performers and audience, as well as between performers themselves. He hopes this research will help inform how we understand empathy—by watching how people interact with each other in nonverbal ways.

Jessie Lausé recently earned a master's degree in music composition and is focusing on creating experimental works using sound from "found objects" rather than traditional instruments. Elements of a piece might include pouring out a bucket of water, ripping up crisp sheets of paper or dropping floor tiles from a height of five feet. A recent piece featured Lausé peeling a butternut squash alongside a saxophone quartet.

Lausé's work centers on accessibility.

"I really like this idea of not needing to know how to play an instrument to engage in music," said Lausé. "I didn't grow up thinking that I was going to be in classical music or in academia. That was never something that was an accessible thought to me growing up."

"ATLAS is a truly, truly unique place," said Leslie. "Experimental work is impossible without the support of others in other disciplines."

By Kelsey Yandura

Principal investigator
Grace Leslie

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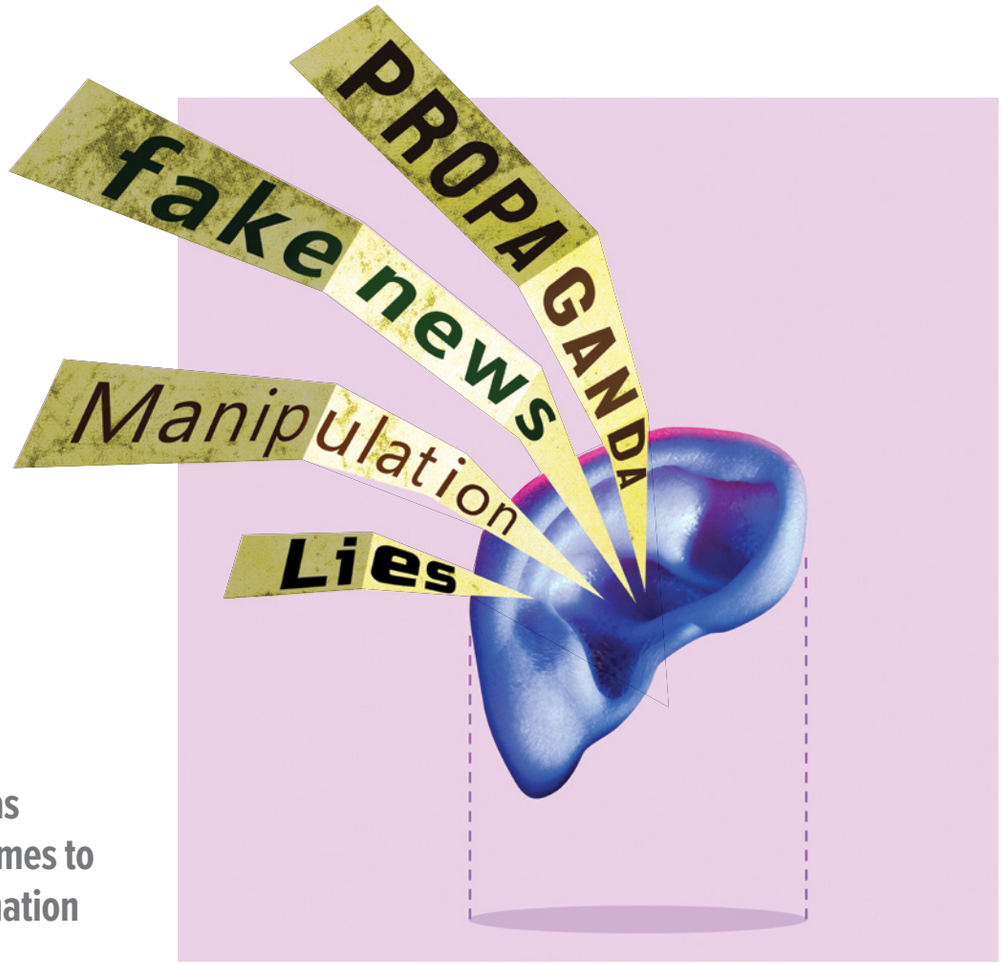

Illustration: iStock.com/SvetaZi

Voters view facts as flexible when it comes to political misinformation

By Katy Hill

Many voters aren't bothered by politicians who misrepresent facts if the statements align with their personal beliefs, recent research suggests.

A study co-authored by Ethan Poskanzer, assistant professor of strategy and entrepreneurship in the Leeds School of Business, found a disconnect between what people believe to be "factual" and what they believe to be "true."

The study, published in July 2024 in the *American Journal of Sociology*, gauged voters' reactions to false statements by politicians including former President Donald Trump, President Joe Biden and Florida Governor Ron DeSantis.

It revealed that many people use moral grounds to justify false statements.

"[It] isn't because they believe those statements per se, but they view that misinformation as supporting political goals that they believe in," said Poskanzer.

Principal investigator Ethan Poskanzer

Collaboration + support Oliver Hahl (Carnegie Mellon University, Tepper School of Business); Minjae Kim (Rice University, Jones Graduate School of Business); Ezra W. Zuckerman Sivan (Massachusetts Institute of Technology, Sloan School of Management)

Photo: iStock.com/Jacob Wackerhausen

Safe2Tell continues to make an impact 20 years on

By Óscar Contreras

Safe2Tell, Colorado's youth-focused harm prevention resource, has seen a record-breaking number of reports in 2024. The 20-year-old program is credited with preventing numerous potential incidents and positively impacting school safety.

After the Columbine massacre in 1999, policymakers called for effective violence prevention strategies. Former director of the Center for the Study and Prevention of Violence (CSPV) at CU Boulder's Institute of Behavioral Science (IBS), Del Elliott, along with former Colorado attorney general, Ken Salazar, visited Colorado communities to gather violence prevention strategies. Safe2Tell was launched in 2004, and now operates under the Colorado Attorney General Office.

Safe2Tell has received over 164,000 reports to date. Currently, CSPV's Violence Prevention Project has helped integrate Safe2Tell beyond its historical K–12 scope at CU Boulder, paving the way for adoption in higher education.

Principals Sarah Goodrum; Beverly Kingston; Del Elliott

Funding The Colorado Trust

Collaboration + support CU Boulder Center for the Study and Prevention of Violence (CSPV), Institute of Behavioral Science (IBS); Susan Payne, Colorado attorney general; Ken Salazar, former Colorado attorney general

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Professor and Director of the Crown Institute Sona Dimidjian led two days of conversation with His Holiness the Dalai Lama.

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Dalai Lama inspires commitment to compassion

By Juan Niño

In March 2024, faculty, staff and students from the Renée Crown Wellness Institute, Leeds School of Business, University of Virginia and Stanford University who are affiliated with the Dalai Lama Fellows (DLF) program, traveled to Dharamsala, India. There, they spoke with His Holiness the Dalai Lama about compassionate leadership and our common humanity.

The DLF program, a one-year fellowship, supports compassionate leaders. By integrating practices of connection and contemplation into research and education, the Crown Institute provides future leaders with skills needed to address pressing global challenges.

Participants gained invaluable insights from His Holiness during the visit, enriching the collective knowledge across their organizations and communities. They returned with a commitment to bring those teachings into action across the world. The CU Boulder DLF program is hosted by the Crown Institute and offered to Leeds students.

Principals Sona Dimidjian; Donna Mejia; Shubham Sapkota; Leah Peña Teeters

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CU Boulder Leeds School of Business, Renée Crown Wellness Institute; Contemplative Sciences Center at the University of Virginia; Stanford University