UC Davis Delivers

THE IMPACT REPORT OF THE COLLEGE OF LETTERS AND SCIENCE AT UC DAVIS

UC DAVIS
COLLEGE OF LETTERS AND SCIENCE

THE ART OF MAKING A DIFFERENCE

Work That Matters

AS WE CELEBRATE the one-year anniversary of *Letters & Science Magazine*, we are mindful of the rapidly changing environment in which we exist. In this time when the role of higher education is being debated in the public sphere, we believe our most responsible course of action is to simply, clearly and confidently communicate the undeniable benefits of our work.

With the significance of our achievements propelling us, we proudly present **UCDavisDelivers: The Impact Report of the College of Letters and Science at UC Davis**.

This compendium, which relays only a small fraction of our achievements, provides a glimpse into our ongoing story. Every day our L&S faculty and students advance discoveries that address real-world challenges, ranging from public health to climate change to cultural understanding to technological innovation. Our work informs local, state and federal policy. It identifies challenges and solves problems. It creates jobs and opportunities for brilliant minds. It yields insights so desperately needed by the whole world and realizes the power of our gifts in ways that benefit us all. Simply put: our work matters.

Every month, we will continue to publish stories that demonstrate our research's global impact. You'll find these stories scattered throughout our **magazine website** or curated in our special **UCDavisDelivers section**.

Please join us as we continue to report the stories that connect you to the arts, humanities and sciences that deepen our understanding of ourselves and our world.

UCDavisDelivers

Contents

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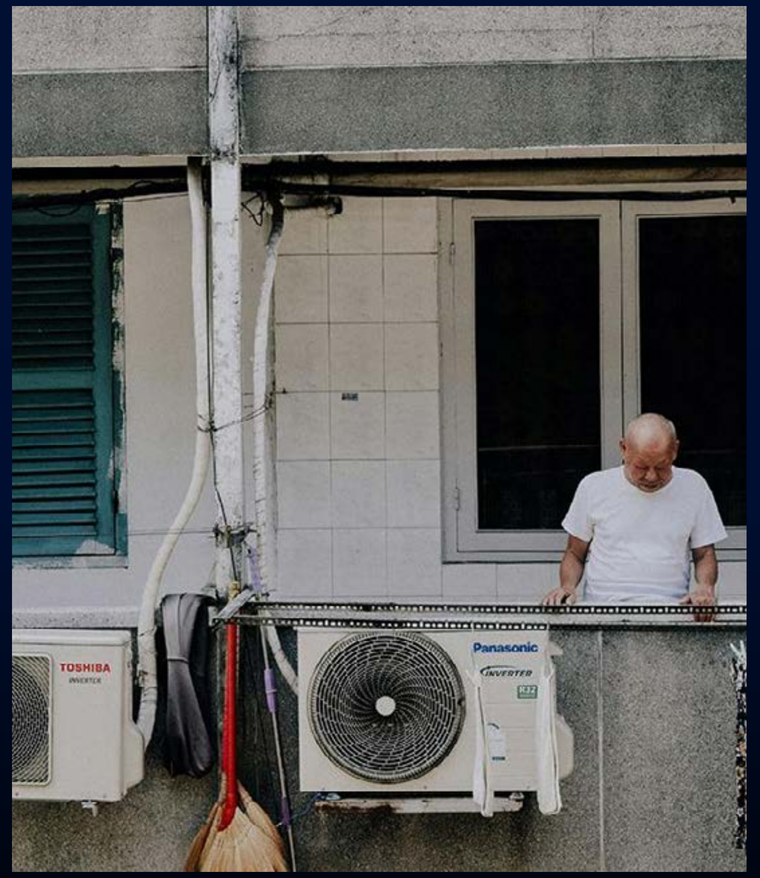
Improving Society Through Technology

HOW CAN LIGHTING, wearable technology and artificial intelligence lead to happier and healthier lives? What are the foundational mechanisms underlying superconductivity and how can we harness those mechanisms to build better technologies for a more resilient future? Researchers across the College of Letters and Science at UC Davis are exploring and answering these questions, among many others, to ensure that technological advancement benefits all.



Designing a Better World

More Than Lighting

LEARN HOW the California Lighting Technology Center is showcasing through research and design the best ways to integrate efficient and human-centric energy systems into new and existing infrastructure.

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‘Air Conditioning’ Book by UC Davis Professor Recontextualizes the Technology

EXPLORE THE origin of air conditioning and U.S. dependence on the technology, as well as the consequences of it on the environment, public health and society.

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Improving Our Lives Through Design

UC DAVIS RESEARCHERS are forging interdisciplinary partnerships to usher in the wearable technology age, from designing a real-time bladder monitoring system to a NASA-funded project for a haptic sleeve interface for a robotic arm.

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Inna Vishik on the Hype and Reality of Superconductivity

IMAGINE CLEAN energy being generated and flowing to the world's population centers without any energy loss. That's the world promised by superconductors. But the path to that world is dappled with far-fetched claims.

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UC Davis Physicist Receives $1.25 Million Grant to Investigate Superconductivity

THE WORLD PROMISED by superconductors is one of clean energy generation for the world's populations centers without energy loss. UC Davis researchers are doing the foundational work to make that dream a reality.

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Electrifying and Automating Aviation

UC DAVIS ALUM Michael Norcia is revolutionizing flights through his company Pyka, which is focused on electrifying and automating aviation.

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Harnessing AI for Public Good

Building an AI Chatbot to Improve Our Health

UC DAVIS RESEARCHERS are developing and testing artificial intelligence (AI) chatbots designed to motivate and persuade us to get in those extra steps for health.

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From Viruses and Materials to Galaxies and Beyond

TO USHER IN breakthroughs, researchers are using the power of machine learning to help protect us from the next pandemic, discover and build new materials, and explore the myriad galaxies in the heavens above.

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Machine Learning Helps Researchers Uncover the Molecular Fingerprints at Ice Surface

THE SURFACE OF ice is a critical catalyst for environmental reactions, including ones that are harmful. Researchers are using the power of machine learning to learn about this critical, and often impenetrable, interface.

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Embracing AI in the Classroom

A COLLABORATIVE PROJECT led by UC Davis, working with four California Community Colleges and three California State University campuses, has won a $1.5 million grant to help address equity gaps in writing support and AI literacy.

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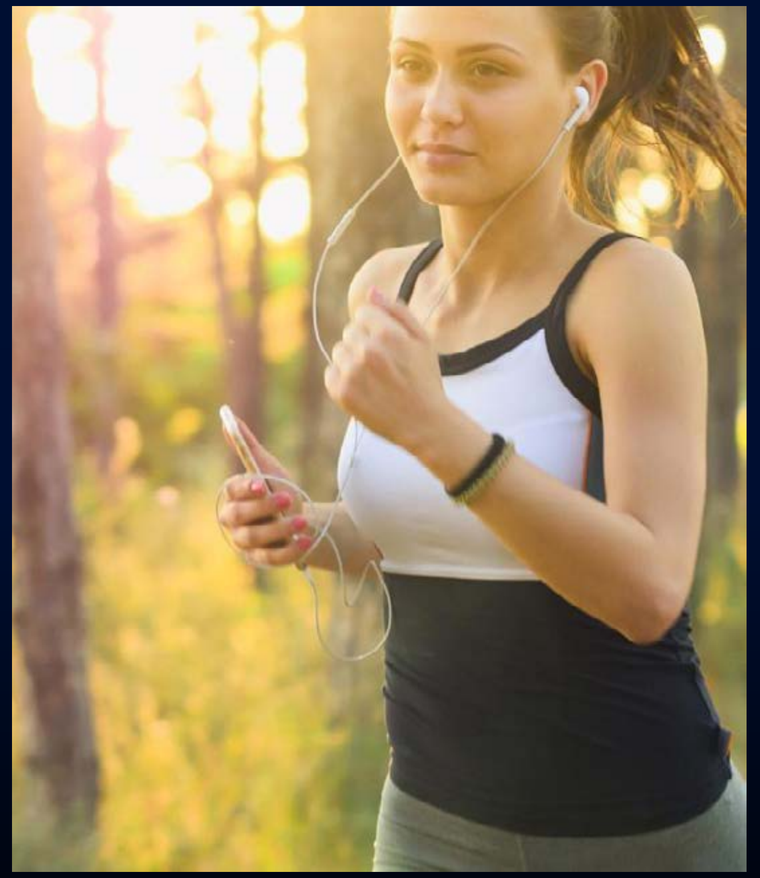

AI to Expand Support for Children and Adults with ADHD

A RESEARCH COLLABORATION between the Center for Mind and Brain and the UC Davis School of Medicine is using virtual reality to understand ADHD better, which could improve its diagnosis and treatment in children and adults.

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Student Film Explores the Ethical Questions of Artificial Intelligence

STUDENTS IN a UC Davis “Experimental Documentary” class were asked to investigate artificial intelligence and consider its ethical impacts.

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UC Davis to Launch Artificial Intelligence Center

L&S LAUNCHES a center focused on developing solutions to complex problems brought on by the rise of Artificial Intelligence (AI) and imagining a future where it is utilized in innovative, ethical and accessible ways. UPDATE: FUNDING FOR THIS INSTITUTE HAS BEEN CANCELED

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Increasing Health and Wellness

RESEARCHERS AT THE College of Letters and Science at UC Davis take an interdisciplinary and comprehensive approach to addressing the most long-standing issues in health and wellness. From revealing previously undetected links between asthma and memory to transforming the landscape of brain health through psychedelics to uncovering how food influences health and culture, L&S researchers are tackling the world's most pressing global health issues.

Shifting the Landscape of Brain Health

UC Davis Develops Tool to Track Psychedelic Effect of Neurons in Minutes

UC DAVIS RESEARCHERS have developed a rapid, noninvasive tool to track the neurons and biomolecules activated in the brain by psychedelic drugs, opening the door to better understanding how these drugs promote neuronal growth.

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Exploring the Psychedelics Within Us

IN TANDEM WITH exploring psychedelic drugs, Instituite for Psychedelics and Neurotherapeutics (IPN) researchers are exploring the psychedelics naturally produced by the body and are building a massive library of those and other compounds to usher in next-generation therapeutics.

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Anti-Anxiety and Hallucination-Like Effects of Psychedelics Mediated by Distinct Neural Circuits

IN RECENT RESEARCH, IPN researchers revealed that the effects of psychedelics work through distinct neural circuits. The research shows that decoupling the beneficial effects of psychedelics from their hallucinogenic effects isn't just a matter of chemical compound design. It's a matter of targeted neural circuitry.

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UC Davis Researchers Achieve Total Synthesis of Ibogaine, Creating Opportunities to Study Its Therapeutic Properties

IPN RESEARCHERS recently achieved the total synthesis of ibogaine, ibogaine analogues and related compounds from pyridine — a relatively inexpensive and widely available chemical. The psychoactive is known for its anti-addictive and anti-depressant properties.

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Researchers Develop LSD Analogue with potential for Treating Schizophrenia

IPN RESEARCHERS have developed a new, neuroplasticity-promoting drug closely related to LSD that harnesses the psychedelic's therapeutic power with reduced hallucinogenic potential.

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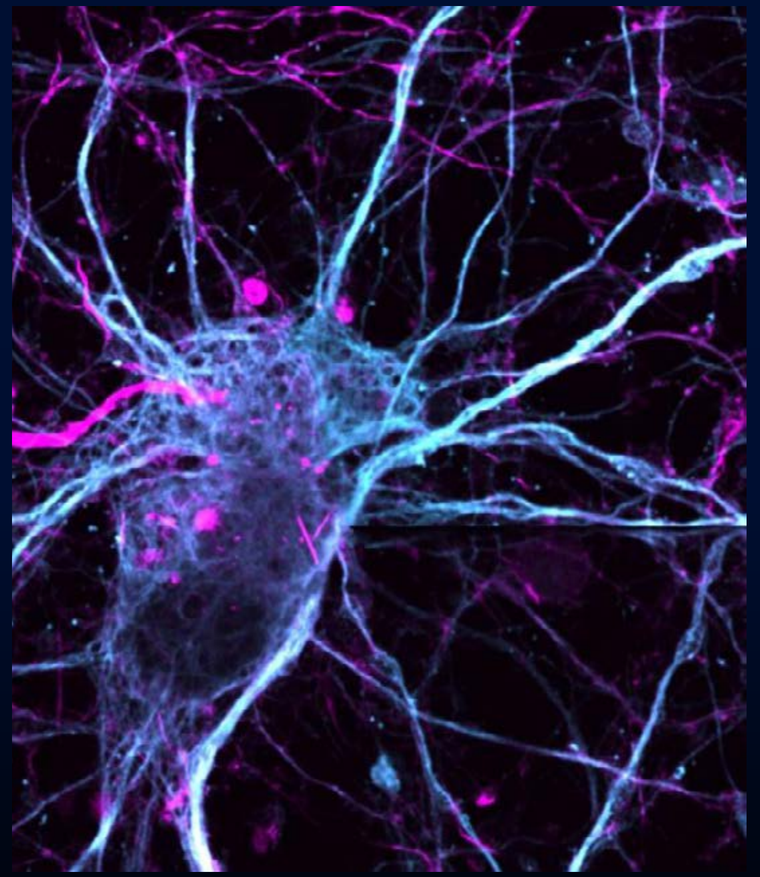

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Exploring New Ways to Combat Disease

Finding that Lower Stress Improves Health and Happiness for a Lifetime

NEW UC DAVIS RESEARCH in psychology has found that older couples have lower levels of the stress hormone when their partners feel positive emotions.

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Harnessing Math to Battle Cancer and Coronavirus

INTERDISCIPLINARY RESEARCHERS at UC Davis are using mathematics, machine learning and computational modeling to investigate how illnesses like coronavirus and breast cancer spread.

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Tuberculosis Trends

TUBERCULOSIS IS the world's top infectious killer. UC Davis researchers are investigating the epidemiological risk factors associated with the disease to more effectively address its mitigation.

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Democratizing Precision Medicine

FOR PRECISION medicine to live up to its name, a more comprehensive understanding of the human genome is required. Funded by the National Institutes of Health, UC Davis researchers are refining genetic prediction algorithms to ensure the benefits of precision medicine can be accessed by all.

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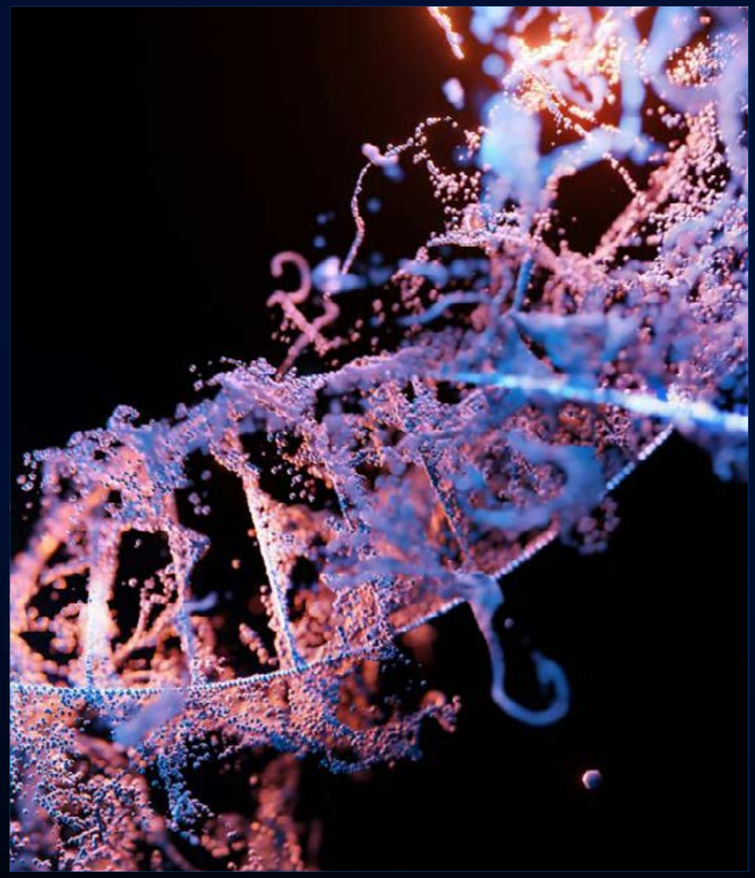

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The Dark Matter of Food: Uncovering the Structures of Carbohydrates

UC DAVIS RESEARCHERS are building a comprehensive understanding of the structural diversity of carbohydrates and how those structures influence digestive health.

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The Roots of Fear: Understanding the Amygdala

UC DAVIS RESEARCHERS have identified clusters of cells with differing patterns of gene expression. The work could lead to more targeted treatments for disorders such as anxiety that affect tens of millions of people.

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Understanding the Harm Asthma May Cause to Children's Memory

ASTHMA IS associated with memory difficulties in children, and early onset of asthma may exacerbate memory deficits. The study is the first of its kind to connect asthma to memory deficits in children.

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Learning How Outdoor Air Pollution Changes Children's Brains

UC DAVIS RESEARCHERS found that outdoor air pollution is associated with differences in children's brains, including volumes of white matter, connections throughout the brain and even early markers for Alzheimer's.

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Using Cannabis as a Launchpad for Next Generation Therapeutics

UC DAVIS RESEARCHERS are exploring the efficacy of "pseudocannabinoids," synthetic molecules that mimic the action of cannabinoids and showcase beneficial therapeutic effects.

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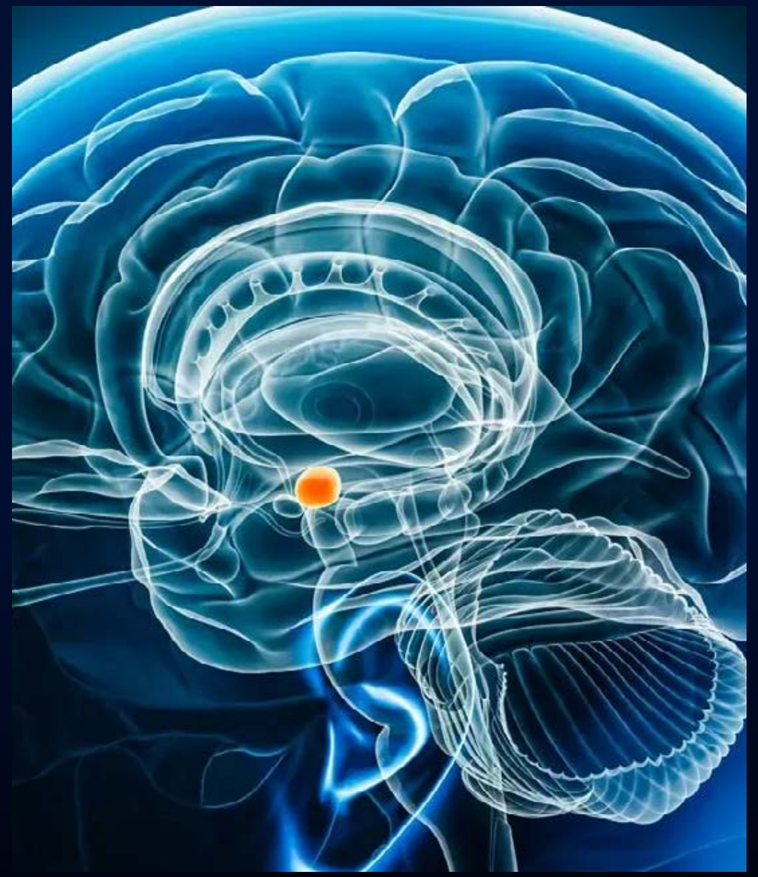

Promoting Food Justice and Public Health

Reimagining the Past Through Food Justice

WITH FLAVOR AND flair, a community of academics, chefs and food justice advocates are sparking conversation at UC Davis and beyond through the new seminar “Thinking Food @ the Intersections: Justice and Critical Food Studies.”

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What is Processed Food? It Depends on Who You Ask

UC DAVIS RESEARCHERS are exploring the friction between the U.S. public and food marketers when it comes to food processing, making the conversations real and accessible to people both in and outside of the food industry.

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UC Davis Scholars Receive $225K for ‘Food Justice’ Seminar

A TEAM OF UC Davis scholars and professors have secured $225,000 in grant funding for “Thinking Food @ the Intersections,” a seminar focused on exploring the narratives and systems that contribute to food inequity in the U.S.

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Avoiding the Next Infant Formula Supply Crisis

UC DAVIS RESEARCHERS contributed to a National Academies of Sciences, Engineering, and Medicine report that identifies the causes of the shortages and detailed recommendations for securing national infant formula supplies.

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Sustaining a Livable World

THE WORLD IS rapidly changing. The increasing prevalence of climate change, natural disasters and sustainability issues are challenging society like never before. Researchers at the College of Letters and Science at UC Davis are creating and exploring research-backed strategies to address these global threats that touch every human life. Uncover how L&S researchers are preparing society to adapt to climate realities, anticipate natural disaster and improve our lives by rethinking sustainability.

Adapting to Climate Realities

A Career Built in Deep Time

A GEOCHEMIST and paleoclimatologist, Isabel Montañez has spent decades developing methods to model Earth's ancient climates. The research has helped scientists refine how we model our climate future and how terrestrial ecosystems respond to climate impacts.

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In the Seagrass Meadows/How Can Seagrasses Help Mitigate Climate Change?

THE OCEANS ARE changing due to human-induced climate change, but a potential solution may reside in the disappearing seagrass beds hugging the California coastline. A nursery habitat for many marine animals, seagrass meadows are vital ecosystems and important agents in the fight against climate change.

> Read More

Research Shows Route to Improving Capture, Conversion of Carbon Dioxide Waste

AS SOCIETY RECKONS with the fallout from this atmospheric chemical change — a warming globe, unpredictable weather and increasing ocean acidity, among other effects — UC researchers are seeking solutions to not only mitigate emissions but to harness carbon dioxide waste.

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Anticipating Natural Disasters

The Black Box of Volcanoes

UC DAVIS RESEARCHERS are analyzing the minerals found in volcanic eruption debris, using them to recreate the interior of volcanic magma chambers and understand the signs preceding potential volcanic eruptions.

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Earthquake Nowcasting

BY COLLECTING DATA from fields like volcanology, geology, geochemistry, geophysics, seismology, geomorphology and many other fields, UC Davis researchers are creating simulations that may one day help predict seismic events, like earthquakes.

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Wildfire Board Game Prepares Community for Evacuations

BY CREATING A board game designed to simulate a wildfire evacuation, UC Davis researchers hope to help communities at-risk for wildfires think through evacuation strategies in a low-stress environment, long before their lives are in danger.

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Innovating Through Biodesign

Designing a Better Future

COMBINING TECHNOLOGIES like 3D-printing with traditional craftsmanship, a UC Davis alum is rethinking fashion through the lens of material sustainability.

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Slowing Down Fast Fashion: Alum Uses Mushrooms to Change Clothing Industry

A UC DAVIS ALUM is using mushrooms to turn fast-fashion waste into reusable, eco-friendly materials that ensure a responsible future for the clothing production industry.

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Unraveling the Secrets of the Universe

FROM THE QUANTUM realm to the universe at large, researchers at the College of Letters and Science at UC Davis are probing the cosmos to uncover the hidden mechanisms of reality. How did the universe arise? What is the nature of dark matter? What can the tiniest particles tell us about existence? By studying the fundamental building blocks of nature, L&S researchers are illuminating the mechanisms that make the world tick.

Exploring the Cosmos

Sifting Through the Cosmic Noise

EQUIPPED WITH the largest digital camera ever built, the Vera C. Rubin Observatory will continuously scan the night sky to create “the largest astronomical movie of all time” with the hope of unraveling cosmic mysteries like dark matter and dark energy. UC Davis researchers are integral to this effort, with one of them acting as the observatory’s chief scientist.

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Polarization Signals from Universe’s First Light Emphasize Hubble Tension

UC DAVIS RESEARCHERS and their colleagues in the South Pole Telescope (SPT) collaboration used observational data of this first light to explore the theoretical underpinnings of the standard cosmological model of the Big Bang.

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Forged by Aggie Hands

A RECENTLY INSTALLED prototype detector at CERN was forged by Aggie hands, fabricated and installed by UC Davis undergraduate and graduate students in Matthew Citron's research group. The detector is meant to assist in the search for dark matter particle candidates.

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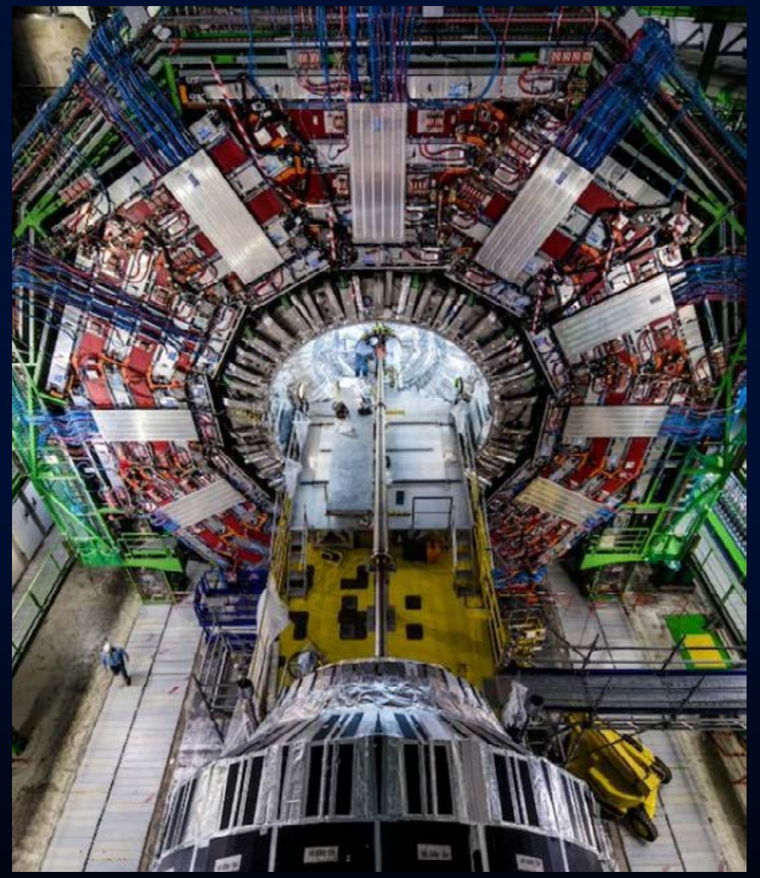

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Analyzing the Past to Preserve Our Future

THE PAST DICTATES the future. But in a rapidly changing world in which even the latest headline is already old news, it's easy for the past, and the lessons from it, to be buried. Researchers at the College of Letters and Science at UC Davis are uncovering history and preserving cultures to ensure that we learn from the past, remember it, and use it to create a better future.

Preserving Cultures

Christina Thomas Works to Preserve Her Native Culture and Language

FROM A FIRST-GENERATION college student to a doctoral candidate and Fulbright Graduate Scholar, Christina Dawa Kutsmana Thomas has become a role model for other "little rez kids." She's working to save her Indigenous language as well as pass on her family's culture to younger generations.

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Heghnar Watenpaugh Talks Cultural Heritage Destruction Ahead of Colloquium

AHEAD OF THE 2025 Templeton Colloquium in Art History at UC Davis, "Cultural Heritage at Stake: Between Conservation and Criminality," Professor of Art History Heghnar Watenpaugh has been speaking about the visual cultures of the Middle East, including issues of architectural preservation, museums and cultural heritage.

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Safeguarding Human Rights Archives in Peru

WITH $100,000 in grants, UC Davis researchers are working to digitize archives from three major human rights organizations in Peru. The project will preserve documents that chart a history of human rights in the country.

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Connecting India's Past and Present with the Kumbh Mela

THE KUMBH MELA pulls together multiple strands of India's deep cultural past with its status today as the second-most populous nation in the world with international influence and ambition to reach for the stars.

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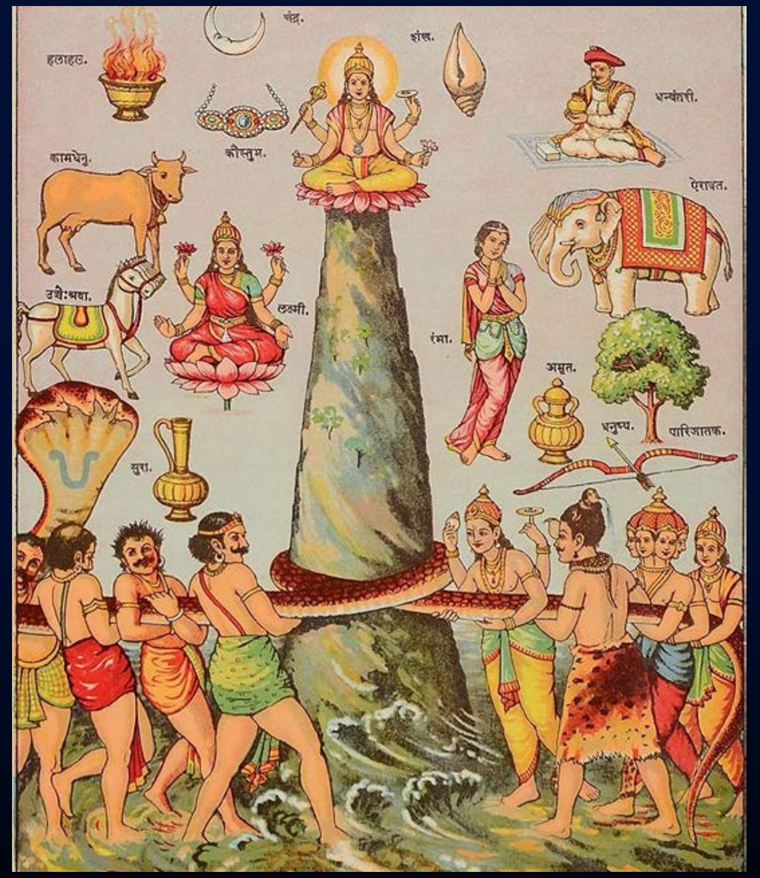

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Bringing History to Light

History Doesn't Sleep Forever

A UC DAVIS biographer, poet and creative writing instructor is shedding light on previously underappreciated women in literature in two books as well as a weekly online newsletter.

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Globalizing the Middle and Early Modern Ages

SCHOLARS IN THE Medieval and Early Modern Studies (MEMS) program are working to dispel the caricatures of this era by de-centering European history from the discourse and showing how, in fact, much of the world was experiencing acculturalization, or borrowing, adapting and mixing traits from various cultures.

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New Research in the Humanities to Document Diverse Histories in California

THE UNIVERSITY OF California Humanities Research Institute (UCHRI) has recently funded two projects led by UC Davis faculty that document the lives of marginalized people, both in the past and present.

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Mapping the Past to Preserve the Future: Native American Studies Project Awarded $1.6 million to Address Climate Change on Tribal Lands

A $1.6 MILLION Climate Action Seed Grant is funding a project to survey the landscape and plan climate resilience projects on Indian allotment lands. The UC Davis-led project will utilize landscape surveys, climate modeling, and the expertise of allottees to understand what is on their land and how it has changed over the past 20 years.

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African Literature Scholar Uncovers Forgotten Poem by Influential Senegalese Author and Feminist Mariama Bâ

LEARN HOW serendipity played a role in uncovering a forgotten poem written by foundational Senegalese author and feminist Mariama Bâ, who's most famous for her novels *So Long a Letter* and *Scarlet Song*.

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Uncovering the Origins of Human Behavior and Society

IN THE INTEGRATIVE Anthropology Lab at UC Davis, Manvir Singh combines evolutionary, cognitive and sociocultural methods and theory to tease apart the origins of human behavior and societies.

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Telling the Story of an Unlikely Ally in the Movement for Puerto Rico Independence

A NEW BOOK documents the history of an unlikely activist and radical pacifist from South Dakota who followed her conscience to Puerto Rico in the 1940s and remained steadfast in her support even when her allies took up arms in fighting for independence.

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How Coretta Scott King Fought for a Fulfilling Life

A HISTORIAN explains how Coretta Scott King's thought and accomplishment as an activist in the Civil Rights Movement helped to shape the work and legacy of her husband Martin Luther King, Jr.

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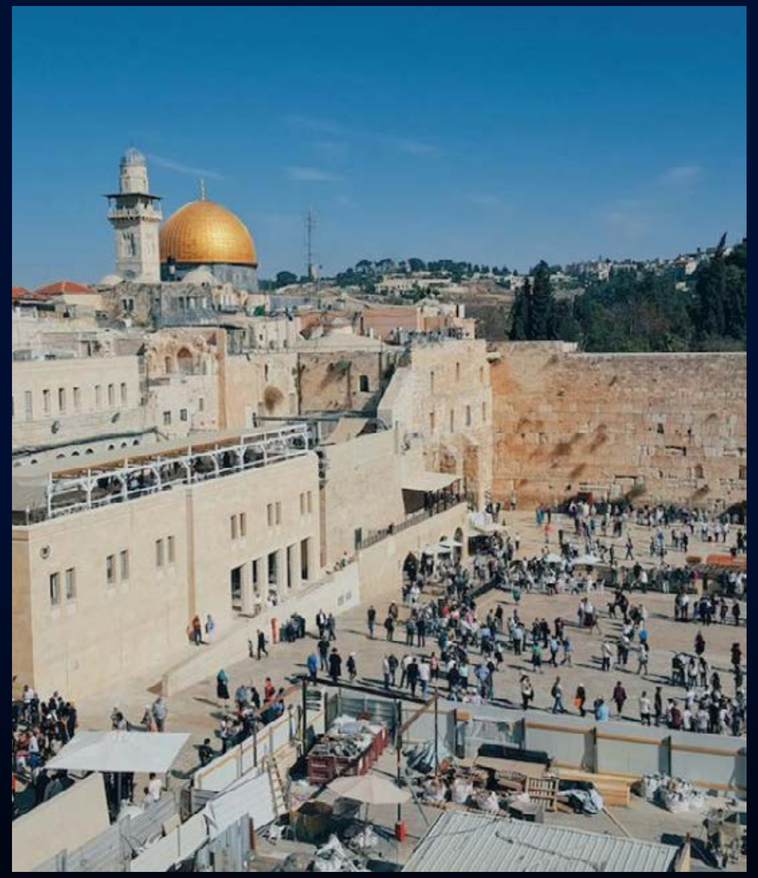
Fostering an Educated Public

FACULTY AT THE College of Letters and Science at UC Davis aren't just ushering in transformative research discoveries. They're teachers too, communicating the relevance and impact of their work, and disseminating knowledge in the classroom and beyond. From contextualizing global conflicts and revealing the causes of political polarization to hosting monthly science cafes at local hotspots, L&S faculty and students are doing the critical work to foster an educated and informed public, and opening the opportunities in academia to all.



Our Shared Existence

UC Davis Scholars Tackle Antisemitism and Islamophobia

WHEN THE most recent war broke out between Israel and Palestine's leaders in the Gaza Strip, UC Davis Associate Professors Sven-Erik Rose and Mairaj Syed decided to confront the controversial topic head on, facilitating talks on campus and teaching a class on antisemitism and Islamophobia.

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Global Tea Institute Brings Communities Together

WHAT STARTED AS a group of 12 like-minded scholars gathering together has turned into a hub for the study of tea across disciplines. Every year, the Global Tea Institute's annual colloquium brings between 400 and 800 people from all over the world to UC Davis.

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Davis Science Café Creates Conversations Between Community and Researchers

A MODERN-DAY version of the intellectual salons of the past, the Davis Science Café, hosted by Professor of Chemistry Jared Shaw, is a space where science and the community meet face-to-face for a conversation.

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$4M More for Professor's Open Education Platform

A $4 MILLION award from the state-funded California Education Learning Lab is helping expand LibreTexts, an innovative, open education project founded by Delmar Larsen, chemistry professor at UC Davis.

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Manuel Calderón de la Barca Sánchez Returns to Alma Mater to Host 'Secrets of the Universe' Screenings

IN THE FILM *Secrets of the Universe*, Manuel Calderón de la Barca Sánchez explores the formation of the universe through the eyes of Aggie researchers. A prolific science communicator, Calderón de la Barca Sánchez consistently travels, both nationally and internationally, to bring the film to audiences.

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CalTeach/MAST Connects UC Davis Students to Teaching Opportunities Abroad

THE U.S. HAS a teacher shortage. More than 85% of K-12 public schools faced hiring challenges last year, according to the National Center for Education Statistics. The STEM fields have been hit particularly hard. UC Davis is training the teachers of tomorrow through the university's CalTeach/Mathematics and Science Teaching Program.

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Understanding Fear to Rob it of its Strength

PSYCHOLOGY PH.D. student Zachary Oakland, a military veteran, is developing a new understanding of social anxiety. What drives him, he said, is a need to understand post-traumatic stress disorder (PTSD), a debilitating condition that many veterans bring home.

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How Tariffs Affect Consumers, Business and the Economy

TARIFFS HAVE a long and complicated history in the U.S. that stretches back to before the nation's founding. Two UC Davis economists discuss what tariffs are, how they can be used and how they might impact the U.S. economy.

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Making Sense of Political Polarization in the U.S.

HOSTILITY FOR people in opposing political parties in the U.S. has been increasing for decades. UC Davis research in political science is at the frontier of more detailed measures of polarization that show what drives those feelings.

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Taking History from the Porch to the Streets

THROUGH HIS public scholarship, Greg Downs, professor and chair in the Department of History, is conducting community engaged research to bring under-told Black histories to light.

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How Statistics Informs Social Science Research

FROM THE SMARTPHONE and satellites to city demographics and global banking transactions, data production is a constant fount. Assistant Professor of Statistics Xiao Hui Tai's research uncovers patterns underlying conflict in the developing world.

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Opening the World Beneath the Waves

SCUBA DIVING opens a portal to the aquatic realm, but it also allows researchers to access a whole new world of scientific questions. Very few, however, get that access. Alyssa Griffin is working to diversify the space.

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A Brief History of Citizenship in the United States

A HISTORIAN explains the complicated history of laws that undermined equal protections guaranteed by the 14th Amendment, as well as the court case affirming the birthright citizenship we take for granted today.

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Charting Barriers to an Elite University Education to All

A NEW study in economics finds that neither free tuition nor the introduction of standardized testing had any impact on the backgrounds of students attending elite institutions for the last 100 years.

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Explaining the Implications of How Nations Negotiate

A POLITICAL scientist explains the costs and benefits of cooperative and non-cooperative negotiating strategies between nations.

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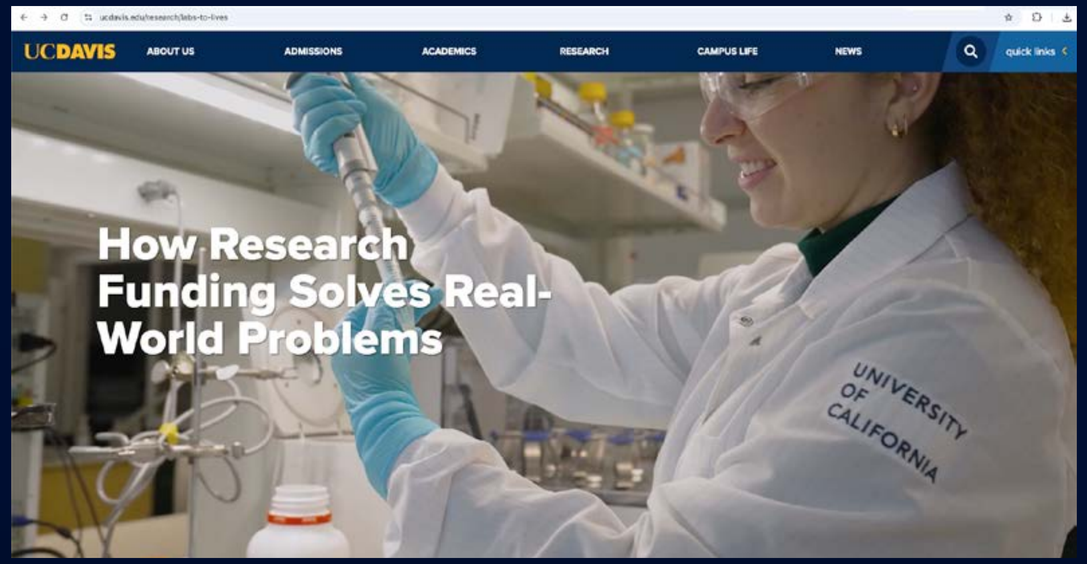

For More About UC Davis' Impact on the World, Visit Labs to Lives

UC DAVIS is a powerhouse for breakthroughs and impact. Our interdisciplinary research plays a vital role in building the region's economy. Our research contributes to our nation's global leadership in technology and innovation. Through collaboration between our top-ranked hospital and veterinary school, as well as our science and engineering discoveries, our research directly improves American lives.

Here, our researchers describe the impact of their work, and the consequences if federal support for this cutting-edge research were reduced or eliminated.

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