ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY

2025 Newsletter

Department land-atmosphere research takes off

Assistant Professor Dien Wu

Assistant Professor Dien Wu has visited 31 of the 63 national parks in the United States. Her appreciation for nature fuels her research and teaching.

"As an atmospheric scientist, I have always been intrigued by complex land-atmosphere interactions," said Wu. "Our generation faces two key challenges related to the carbon and water budgets: mitigating anthropogenic and pyrogenic emissions while enhancing carbon sequestration and ensuring food security while coping with water scarcity."

Wu investigates human impacts on carbon, pollution, water and energy fluxes — the rates at which energy moves across boundaries within the Earth system. She also brings teaching expertise to the department. Wu was previously a scientist in the Division of Geological and Planetary Sciences at California Institute of Technology and received her doctorate in atmospheric sciences from the University of Utah in 2020.

Wu's first CSU PI proposal to NASA's TEMPO mission was selected. This project focuses on soil NOx emissions from agricultural land. The team includes Stephen Ogle, Ram Gurung, and Anping Chen. TEMPO is NASA's first Earth Venture Instrument mission to measure key gases and aerosols impacting air quality across North America on an hourly basis and with high spatial resolution.

Wu's NASA TEMPO mission work will address two questions: 1) How much NOx are emitted from different productive croplands in the US and Mexico? 2.) How do NOx from cropland soils respond to meteorological, biophysical, or management factors from hourly to annual scales?

Learn More about Dien Wu

Read the full story at **https://col.st/1znft**

National Park photos by Dien Wu

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Your support of the Department of Atmospheric Science enhances recruitment and retention of world-class faculty and students, while ensuring critical contributions to weather, climate, and air quality research. Thank you for considering how you can make a contribution for our shared success.

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The *Atmospheric Science Newsletter* is published annually for alumni, friends and members of the department.

Editors: Theresa Barosh, Eric Maloney, Sarah Tisdale

Follow Us

Thriving in the Face of Adversity: a message from our Department Head, Eric Maloney

Greetings from the Department of Atmospheric Science. This year has seen unprecedented challenges to science, federal funding headwinds, a rapid changing higher education landscape, and great stress and uncertainty for our students and international scholars. Through it all, our department has remained resilient, leading the field in cutting edge research and graduate education. Our research programs had a banner year, posting record research expenditures even in the face of these substantial headwinds, testament to the hard work and creativity of our people, and our vibrant and inclusive community.

The milestones in our department continued to pile up. Assistant Professor Dien Wu joined our department in January, bringing innovative research in land-atmosphere interactions (pg. 1). We currently have openings for two new faculty members in climate dynamics and artificial intelligence. Congratulations to Professor Emeritus Wayne Schubert, who was awarded the 2026 Carl-Gustav Rossby Research Medal from the American Meteorological Society (pg. 3). It represents the highest award AMS can bestow upon an atmospheric scientist. Congratulations also to Senior Research Scientist Charlotte DeMott, who was named the 2025 ATS Outstanding Alum (pg. 19). Many other students, faculty, and research scientists received important recognitions this year as seen in the newsletter. In bittersweet news, our Department Manager Darby Nabors will be retiring in January 2026. Darby is irreplaceable and has been with our department since 2008 and we will miss her greatly. Thanks, Darby, for all you have done to ensure our department's success!

We clearly cannot rest on our laurels in these challenging times. While we had record research success in the past year, funding and other challenges loom for our field and department. To continue to thrive, we are thinking outside the box and innovatively, including novel curricular offerings at the graduate and undergraduate levels, new funding sources, and more diverse ways to support our students. Please consider giving to our main Atmospheric Science gift fund, which we are using to help support the success of our graduate students in these uncertain times. A link to donate is found on the left side of this page.

I look forward to seeing you in 2026, or whenever our paths may cross next.

FACULTY NEWS

Professor Emeritus Wayne Schubert receives the Carl-Gustav Rossby Research Medal from the AMS

Professor Emeritus Wayne Schubert received the Carl-Gustav Rossby Research Medal from the American Meteorological Society. It represents the highest award the Society can bestow upon an atmospheric scientist. According to AMS, the Carl-Gustaf Rossby Research Medal is presented to individuals on the basis of outstanding contributions to the understanding of the structure or behavior of the atmosphere. Schubert received this award for "fundamental and sustained research on the theoretical understanding of moist atmospheric processes, hurricanes, and geophysical fluid dynamics and their representation in numerical models."

There are other strong CSU connections in the AMS awards list. Professor V. Chandrasekar of the Department of Electrical and Computer Engineering — a close friend of the ATS department — received the David and Lucille Atlas Remote Sensing Prize for advancing remote-sensing measurements of precipitation and applications of weather radar. Former Prof. Elizabeth Barnes was named Fellow of the American Meteorological Society, as was alum Dr. Gerald Mulvey. Alum Dr. Gus Alaka is part of a group awarded the Banner I. Miller award for developing a high-wind boundary-layer parameterization scheme that advances the intensity, including rapid intensification, and forecast skill of NOAA's operational hurricane forecast model. Finally, alum Timothy Hall received the Henry T. Harrison Award for outstanding contributions by a consulting meteorologist. Please join us in congratulating Schubert and all the other awardees on receiving these well-deserved recognitions. We look forward to celebrating with them at the AMS Annual Meeting in Houston in January 2026.

Prof. Christine Chiu named 2025 Fellow, Meteorological Society of the Republic of China (Taiwan)

Chiu receives the honor in recognition for being an expert in her field. Christine Chiu's research interests lie in remote sensing, radiative transfer, and cloud-aerosol-precipitation-radiation interactions. Congratulations Professor Chiu!

Prof. Eric Maloney named AGU Fellow

Our Department Head and Prof. Eric Maloney was elected as an AGU Fellow, joining a distinguished group of 52 individuals in the 2025 Class of Fellows. Since the program's inception in 1962, less than 0.1% of AGU members have been selected as Fellows each year. Maloney was selected for his exemplary leadership and outstanding scientific achievements, which have significantly advanced our understanding of tropical meteorology, hurricanes, ocean-atmosphere interactions and climate dynamics, as well as, climate modeling.

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https://col.st/zhbk7

"During my graduate school days studying tropical meteorology, it was inconceivable to me that I would one day receive such a humbling honor," said Maloney. "I could not have done this without the students and other collaborators I've worked with. I've also had outstanding mentors at the University of Washington, NCAR, Oregon State University, and Colorado State University. Without them, this would not have been possible."

FACULTY NEWS

Prof. Maria Rugenstein awarded AMS 2025 Outstanding Early Career Award

Professor Maria Rugenstein was awarded the 2025 Outstanding Early Career Award by the American Meteorological Society Committee on Climate Variability and Change. This is one of the prestigious Scientific and Technological Activities Commission awards granted by AMS. Maria was cited "for contributions to understanding of climate sensitivity and community leadership through LongRunMIP, Green's Function MIP, and the U.S. CLIVAR Pattern Effect Workshop."

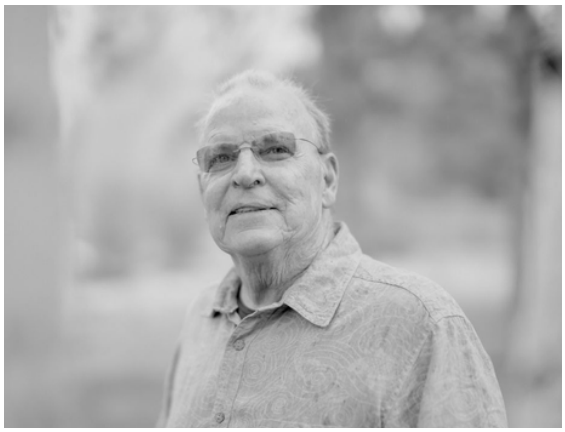
Congratulations Professor Rugenstein on this well-deserved honor!

Prof. Russ Schumacher named President-Elect of the American Association of State Climatologists

Along with his faculty position in the department, Schumacher serves as the Colorado State Climatologist and Director of the Colorado Climate Center. His recent election to serve as the president of the AASC reflects his dedication and expertise.

The AASC is committed to advancing the development and delivery of science-based climate services on local and state levels.

University Distinguished Professor David Randall selected for AMS symposium



The David Randall Symposium will occur at the 107th Annual AMS Meeting in Denver, January 10–14, 2027. According to AMS guidelines, the symposium is "an honor reserved for only the most outstanding of our colleagues. It should be awarded only to those individuals who are completing a career of significant achievements in their field and whose contributions would make them worthy of consideration for Honorary Member of AMS."

Congratulations Dave! Our department looks forward to celebrating your ongoing distinguished career next year in Denver.

FACULTY NEWS

Prof. Emily Fischer receives Inclusive Excellence Award

CSU Vice President for Inclusive Excellence Kauline Cipriani announced that our Associate Department Head and Professor Emily Fischer was awarded the 2025 CSU Inclusive Excellence Award for faculty. This award recognizes faculty and staff who support a culture of inclusive excellence and exemplify Colorado State University's Principles of Community. Fischer's selection reflects that she goes above and beyond the standard expectations for employees with similar responsibilities in this space.

Cipriani noted many areas where Fischer's work excels and makes her deserving of this honor. She is doing important and groundbreaking work through her research to monitor air pollution in underserved areas. She has led research identifying and testing strategies to disrupt the lack of diversity and bias in STEM at all academic levels. Fischer has increased the diversity of our graduate student body through fostering holistic review practices and improving mentoring for our students through evidence-based practices. She also led implementation of a code of conduct for our department, as well as many other initiatives.

"I couldn't be more proud to work with Emily in her role as Associate Department head over the last few years as she has advanced this essential work for our field and department," said Department Head Eric Maloney, "Please join me in congratulating Emily on this honor."

Jeffrey Collett receives 2025 Frank A. Chambers Excellence in Air Pollution Control Award

Frank A. Chambers (1885–1951) was a founder of the Smoke Prevention Association of America, a forerunner of the Air & Waste Management Association, and was instrumental in building the foundation for A&WMA. His pioneering ideas for smoke control were employed by many cities across the United States. The Frank A. Chambers Excellence in Air Pollution Control Award is presented annually by the Association for outstanding achievement in the science and art of air pollution control. It requires technical accomplishments considered to be major contributions, the merits of which have been widely recognized by persons in the field. The coverage is intentionally broad, since it recognizes achievement in any line of technical endeavor in air pollution control, from pure research to applied science.

A&WMA presents the 2025 Frank A. Chambers Excellence in Air Pollution Control Award to Jeffrey L. Collett, Jr.

Jeff Collett grew up on the Oregon coast where he developed a deep appreciation of the natural environment. He earned the rank of Eagle Scout, was a state debate champion, and graduated as valedictorian from Neahkahnie High School in Rockaway, Oregon, before heading to MIT for his undergraduate studies. At MIT, he majored in chemical engineering and received the department's Roger de Friez Hunneman Prize in recognition of outstanding academic performance. After graduating from MIT ('84), Jeff earned an M.S. ('85) and PhD ('89) at Caltech in Environmental Engineering Science. The focus of his graduate research was precipitation and cloud chemistry. Jeff completed a postdoc at the Swiss Federal Institute of Technology (ETH-Zurich, 1989-91), where he studied aerosol-cloud-precipitation interactions in the Swiss Alps.

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Read more on the **Air andWaste Management Association website**

FACULTY NEWS

Susan van den Heever named 2025 ATS Outstanding Professor of the Year

The winner of the department's annual Outstanding Professor of the Year award, selected by Department of Atmospheric Science graduate students, is honored for exceptional instruction. Student Rachael Auth presented the award.

"I'm deeply honored to receive this teaching award and truly touched to have been nominated by our students. Teaching and mentoring are at the heart of what we as faculty do, and to be recognized for work that brings me so much joy is an incredible gift," said University Distinguished Professor Susan van den Heever. "This award is especially meaningful because it celebrates the very strong connection between our students and faculty here at ATS —something I value immensely. The opportunity to help students grow, to share in their curiosity, and to support them in their academic and professional journeys is a privilege I never take for granted."

The students noted that van den Heever's passion for atmospheric science is infectious in the classroom. She is a phenomenal lecturer who keeps students engaged through facilitating questions and discussion. Others noted that van den Heever's cloud physics class was one of the best, if not the best, class they had ever taken, and she actively modified the course to optimally suit the learning styles and curiosity of her students. She inspires students to be curious and think critically.

This is the fourth time van den Heever has received the award with previous selection in 2009, 2013 and 2015.

Department staff, faculty honored with college awards

Award winners from the Walter Scott, Jr. College of Engineering are recognized for outstanding achievements and overall excellence throughout the college. Nominations are accepted through faculty and staff, and each award highlights achievements made throughout the previous year. From Atmospheric Science:

- Christine Chiu - Art Corey Award for Outstanding International Contributions
- Peter Jan van Leeuwen - George T. Abell Outstanding Faculty Research Award
- Brenda Dolan - Outstanding Researcher Award

Please also join us in congratulating Kelley Branson, an outstanding colleague in both the department and college, for the Outstanding Staff Award.

Welcome to new 2025 student rams

Photo of the 2025 incoming class and new community members, from left to right: Jinhui Ju, Jack Tobin, Peng-Xiang Lai, Ming-Han Chung, Brendan Eckerman, Emma Benedict, Megan Marra, Deztynee Bryan, Mayumi "Yumi" de Andrade Miyazato, Justin Hassel, Andrew Muehr and Miles Harmala

We celebrated the start of the semester with a picnic and introductions to our new community members, including eleven new graduate students. When asked why they chose Colorado State University, students shared a variety of motivations. Most of them mentioned the opportunity to work with one of the foremost experts in their field of interest, specifying their faculty advisors.

Hassel and Muehr are enthusiastic to work on the INCUS project in University Distinguished Professor van den Heever's group. Others mentioned being excited to dig into tropical cyclones, radar and fire weather.

"CSU appealed to me as a place where atmospheric scientists are born," said Carr.

Students are also enthusiastic to enjoy the benefits of Fort Collins. Benedict looks forward to fun outdoor activities, and Tobin looks forward to skiing. Lyons is happy to be back in Colorado. Miyazoto "wanted to know the west for a while."

Our new #RamGrads got to enjoy some Colorado weather on the day of the picnic. At the beginning of the picnic, a rainbow appeared, and new community members posed with the rainbow showing off their new ram spirit.

Levi Carr

STUDENT NEWS

Congratulations, graduates!

Charlotte "Charlie" Connolly
PhD - Libby Barnes

Kelsey Ennis
MS - Libby Barnes, Eric Maloney

Jacob Landsberg - MS - Libby Barnes

Ashley Dwyer - MS - Libby Barnes, Jim Hurrell

Daniel Hueholt
PhD - Libby Barnes, Jim Hurrell

Sabrina Cohen - MS - Jim Hurrell

Kat Humphreys - MS - Pat Keys

Nicole June - PhD - Jeff Pierce

Mitchell Gregg - MS - Kristen Rasmussen

Yiyu Zheng - PhD - Maria Rugenstein

Allie Mazurek - PhD - Russ Schumacher

Casey Zoellick - PhD - Russ Schumacher

Leif Fredericks
MS - Dave Thompson, Maria Rugenstein

Charles Davis - MS - Sue van den Heever

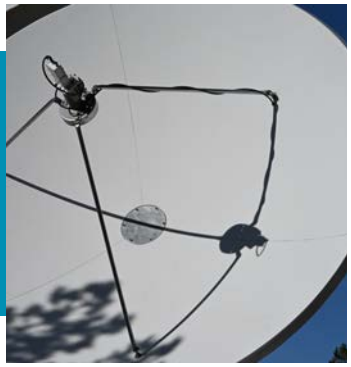
Nick Falk - PhD - Sue van den Heever

Gabrielle "Bee" Leung
PhD - Sue van den Heever

Ryan Gonzalez - PhD - Chris Kummerow

Attention, Alumni!

If you are interested in having a profile on the Alumni Network page, visit the page and complete the linked form to create your profile. CAMP plans to host virtual events that will allow current students to meet members of CAMP's Alumni Network.



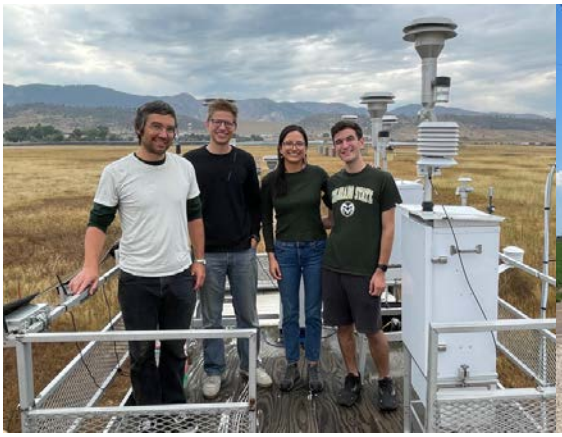
Jared Stickney shares field experience

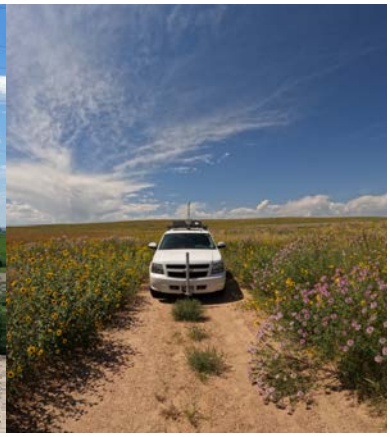
Do you know what is in the air you breathe?

This past summer, Professors Emily Fischer and Jeffrey Collett's research groups at CSU collaborated with the University of Montana, the Colorado Department of Public Health and Environment (CDPHE), and the Regional Air Quality Council in a field campaign designed to answer that exact question.

Aundrey Marsavin and Jared Stickney

Ozone in excess concentrations where people breathe is harmful for human health, and this study's mission was to investigate ways to mitigate these effects.





The Front Range Ozone Éxperiment, also known as FROZÉ, utilized both stationary and mobile measurements across the Colorado Front Range to gain insight into the distribution of ozone precursors along the Front Range. These measurements were performed because the Colorado Denver Metro and North Front Range area has been designated as nonattainment for ozone by the Environmental Protection Agency, as this region frequently exceeds the National Ambient Air Quality Standard for ozone in the summer.

A first-hand experience from one of the students involved in FROZÉ

My name is Jared Stickney, and I am a Master's student in Professor Collett's research group. My role in FROZÉ was to drive the CSU Plume Tracker, a Chevy Tahoe outfitted with instruments to measure air quality parameters. The goal of driving the Plume Tracker was threefold: to gain information about the where and when ozone and its precursors occur, to collect whole air canisters for detailed volatile organic compound (VOC) speciation, and to visit disproportionately impacted communities to assess criteria pollutant and air toxics exposure in communities with little or no prior monitoring.

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Read more & watch the vlog on https://col.st/xzori

Department ASCENT award supports research in Germany

Student Delián Colón-Burgos recently returned from a visit to the Max-Plank-Institute for Meteorology in Hamburg, Germany hosted by scientist Daniel Klocke and working with Professor Michael Bell.

Klocke, Bell and Colón-Burgos

She attended the ORCESTRA (Organized Convection and EarthCARE Studies over the Tropical Atlantic) workshop, where scientists and students from various sub-campaigns within ORCESTRA shared first results using data collected during the project. Colón-Burgos works on a component of ORCESTRA called PICCOLO (Process Investigation of Clouds and Convective Organization over the atLantic Ocean), which deployed the CSU SEA-POL radar on the R/V Meteor, collecting polarimetric retrievals of tropical precipitation across the Atlantic Ocean last August and September.

While abroad, Colón-Burgos worked on a research project relating CSU SEA-POL radar observations collected during the PICCOLO field campaign to satellite brightness temperatures from the Geostationary Operational Environmental Satellite (GOES-16). As part of her doctoral research, Colón-Burgos plans to train a machine learning model on the PICCOLO dataset using the gridded volume scans to retrieve echo top height and rain rates from the observed brightness temperatures from satellites across the Atlantic Ocean.

In support of this international experience, CSU's Department of Atmospheric Science provided an ASCENT award.

SCAN ME

Read the full story at
https://col.st/co72eE

Two Atmospheric Science graduate students receive competitive NASA FINESST awards

Two top atmospheric science graduate students have received NASA grants to improve research into cloud effects and precipitation. Fewer than 10% of applicants are selected for the competitive NASA award, called FINESST or Future Investigators in NASA Earth and Space Science and Technology. FINESST awards support graduate student research projects relevant to NASA's Science Mission Directorate, totaling up to $150K over three years. Award-winners shared about their work.

Olivia Pierpaoli

I study tiny particles in the air called aerosols, which interact with sunlight and clouds and play a key role in Earth's climate. Satellites help us observe aerosols by measuring sunlight reflected to space. By examining how bright that reflected sunlight is, and how it changes across different colors of light, we can identify aerosol types (e.g., smoke, dust, or pollution) and estimate their abundance and particle sizes.

However, this has only worked in areas far from clouds. Near clouds, the strong reflection from clouds obscures the weaker signal from aerosols, leaving a blind spot in our ability to study aerosols. My research addresses this challenge by developing a new approach that accounts for cloud effects, making it possible to study aerosols even in near-cloud regions. This advancement will improve estimates of aerosol impacts on climate and open new opportunities to study aerosol–cloud interactions in areas previously considered inaccessible.

Spencer Jones

The satellites we use to observe precipitation use highly specialized sensors that measure Earth's naturally emitted microwave radiation, and these sensors have limited resolution due to antenna size. We use algorithms that use principles of physics to estimate what atmospheric conditions produced these measurements. My research involves blending physics and AI to improve the resolution of microwave sensors by allowing the AI to "learn" the natural spatial patterns of precipitation to help find the physical solution.

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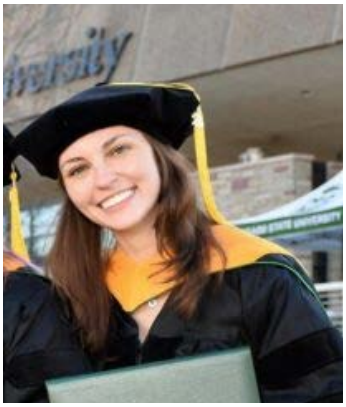
Find the full Q&A at https://col.st/2xa48



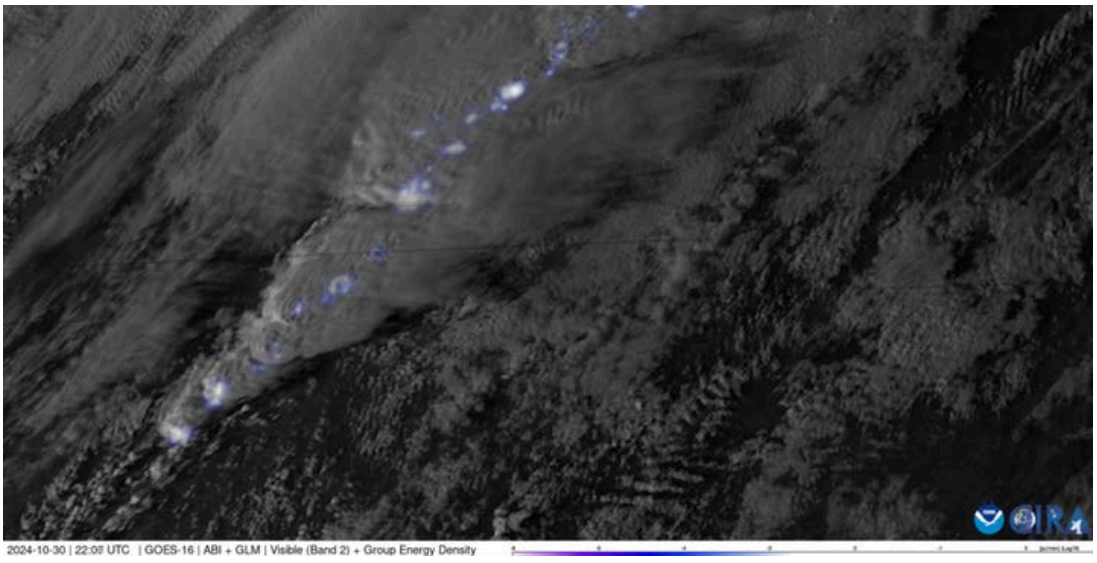
Ask the Experts: What does the future of AI weather forecasting look like?

Colorado State University researchers are working collaboratively to evaluate emerging AI weather forecast models and provide resources to help other researchers investigate their usefulness. CIRA's real-time visualizations for purely AI-based weather models, developed by Jacob Radford, can be found online.

With CIRA funding and support from CIRA researchers Ryan Lagerquist and Imme Ebert-Uphoff, recent graduate Allie Mazurek used the output for part of her doctoral graduate research advised by Atmospheric Science Professor Russ Schumacher. Mazurek explored parameters that are relevant to predicting severe convective weather, such as thunderstorms.

"We're not predicting those parameters directly from the models. We're just taking the model output and then making some calculations to compute these parameters. Ryan was super helpful – he was the one responsible for making all those calculations," said Mazurek. "My role has been analyzing those data and seeing what they look like: do they make sense physically and how do they compare to our current numerical weather prediction models?"

Numerical weather prediction models represent conventional weather-prediction methods and use physical equations making predictions on the basis of an understanding of physics. In contrast, generative AI models forecast weather patterns that are plausible given past measurements, or statistical likelihoods. Specifically, the models use machine learning, one method of training an AI by using past data.



Mazurek found that the moisture in the AI models tended to be too low throughout most of the atmosphere, while the temperature tended to be slightly too cool in the mid-levels of the atmosphere. Warm, moist air must rise and run into cool air to form thunderstorms as far as real-world physics are concerned.

Both Mazurek and Radford said it isn't time to retire traditional forecasting methods. For one thing, AI weather forecast models are often trained on datasets from traditional forecasting models. Additionally, AI models can have a low resolution compared to traditional forecasting methods.

Mazurek looks forward to the future of AI weather models. "It would be super helpful for these developers to explicitly predict more complex atmospheric variables."

Mazurek is now an Engagement Climatologist at our Colorado Climate Center.

SCAN ME

Read more
https://col.st/f27Ic

Future set of GeoXO environmental satellites promise new societal benefits

A new set of weather satellites set for launch in the 2030s has Colorado State University researchers excited for the future of weather research and forecasting. Watching over the Western Hemisphere, GeoXO satellites will support short-term forecasting, extreme weather warnings and long-term planning.

Atmospheric Science graduate student Katurah Zahler conducts quantitative analysis of satellite imagery using the new near-infrared satellite band and is advised by CIRA researchers Miller and John Haynes.

Zahler with a GeoXO predecessor GOES-U weather satellite solar array in the high bay at Lockheed Martin (May 2023)

Zahler was thrilled to check out a geostationary satellite, GOES-U, through a class field trip and subsequently watch the satellite launch.

"Since my research is satellite focused, I don't get many opportunities to participate in field campaigns. But these trips fulfilled that desire for 'field' experience as well as a lifelong dream of seeing a launch," said Zahler. "It was a full-circle moment for me getting to see GOES-U, now GOES-19, being assembled here in Colorado and then a year later getting to see its launch in Florida."

In her free time, Zahler also chases storms on the ground. She might be found chasing a tornado in Nebraska, viewing the northern lights near Horsetooth Reservoir or photographing lightning on an impromptu detour from a grocery store trip.

"A lot of tornado reports to the National Weather Service come from chasers," said Zahler, recalling the first tornado she ever reported to the NWS. In places with the most tornadoes like Texas and Oklahoma, storm chasers can make a big difference by providing reports. "The goal is to preserve life."

Zahler plans her storm chasing trips days in advance, using satellite information to determine where to go down to specifics such as which cornfield in eastern Colorado. "I can't imagine [weather] forecasting, and even chasing, before satellites," said Zahler. "It's really exciting — all of the improvements that the GeoXO program is going to bring — as someone who loves satellites and satellite imagery, getting to use all of those new products. It helps us stay on the forefront of technology compared to other countries."

Zahler's research stems from the partnership between Atmospheric Science and CIRA. Multiple students in the department work with CIRA researchers.

"Connecting the brightest young minds of our field to the state-of-the-art in satellite technology is one important and effective way that the CIRA-Atmospheric Science partnership at CSU helps to fulfill NOAA's societal benefit mission," said Miller. "Thanks in part to Katurah's research, National Weather Service forecasters will be able to 'hit the ground running' on day one and turn the new flavors of information from GeoXO into time-critical guidance to the public, keeping us all one step ahead of the ever-changing weather."

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Read more and find more photos at https://col.st/jmj30

STUDENT NEWS

Kelsey Ennis, Bee Leung and Daniela Guevara

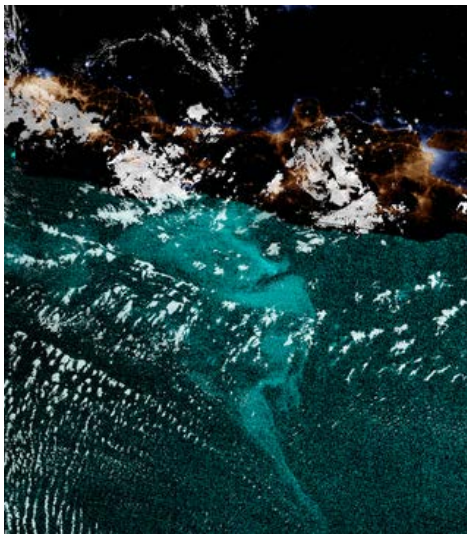
SCAN ME

Find AGU 2024 and AMS 2025 award details at https://col.st/svr33

Congratulations to student presenters

Our students present at scientific meetings and conferences all year round. Though, members of our community especially travel around the turn of the year for annual conferences. We celebrate all the student presenters year-round for sharing your work with the rest of the scientific community.

Students received an impressive eleven awards at AGU 2024 and AMS 2025, including Ivy Glade, Daniela Guevara, Kelsey Ennis, Jacob Escobedo, Sarah Gryskewicz (REU student), Miles Harmala (REU student, now grad student), Tom Juliano, Michelle Kanipe, Bee Leung, Jyong-En Miao, Madison Shogrin and Anastasia Tomanek.



With new database, researchers may be able to predict rare milky seas bioluminescent event[s]

To better predict when and where milky seas will occur, researchers at Colorado State University and the Cooperative Institute for Research in the Atmosphere have compiled a database of sightings over the last 400 years. Described in the journal Earth and Space Science, the archive includes eyewitness reports from sailors, individual accounts submitted to the Marine Observer Journal over an 80-year period, and contemporary satellite data. This is the first such collection of data on milky seas in 30 years. Together, it shows that sightings usually happen around the Arabian Sea and Southeast Asian waters and are statistically related to the Indian Ocean Dipole and the El Niño Southern Oscillation.

Both of those climate phenomena are known to impact global weather patterns, prompting researchers to wonder how the dazzling phenomenon may be connected to those processes.

Justin Hudson, a Ph.D. student in the Department of Atmospheric Science and the paper's first author, said the database will help researchers better anticipate when and where a milky sea will occur. The goal, he said, is to get a research vessel out to the site in time to collect information about the biology and chemistry within a milky sea. Information about those variables could be helpful to connecting the event to broader Earth systems activity.

SCAN ME

Find the full story by Josh Rhoten at https://col.st/0u5fd

STUDENT NEWS

Under the Arctic Ice

When researcher Jessie Creamean first sent her GoPro down the five-foot hole through Arctic ice, she didn't know if it would make it back up.

At the beginning of the seven-week expedition, the water was blue and clear, and the GoPro returned intact from its trip . Creamean kept sending the GoPro down holes left from collecting ice cores throughout the expedition. At the end as the summertime settled in, the edges of the sea ice were often brown and the water was cloudy-green; the algae and phytoplankton had started waking up and releasing into the ocean.

Creamean and graduate student researcher Camille Mavis were part of an Arctic expedition aboard the ship Oden, a Swedish icebreaker specialized to move through ice-covered water. When Creamean and Mavis returned from the field, they worked in the lab of University Distinguished Professor Sonia Kreidenweis to analyze samples at the Atmospheric Science department.

Biological material in the Arctic Ocean wakes up from winter hibernation through spring into summer peak. When algae and phytoplankton release and bloom in the ocean, floating particles are visible and measurable. That material moves from the ocean into the atmosphere as particles, becoming airborne after experiencing ocean turmoil. The biological particles impact cloud formation, as ice forms around these small specs within a cloud.

Mavis enjoys the interdisciplinary nature of the work is extremely satisfying. She conducts research bringing together knowledge from biology, ecology, oceanography and atmospheric science.

"It's truly an interdisciplinary field. If you want to get at the sources of these particles, you have to look at the earth's surface, whether that's the upper levels of the ocean or sea ice," said Mavis. "When people hear that I study atmospheric science, they always ask me what kind of cloud is that or what's the weather going to be like. I know more about sea water and sea ice dynamics."

SCAN ME

Watch the GoPro video at https://col.st/4g7y0

Celebrating Black History Month: Student highlight

Ph.D. candidate Erin Alexys (Lexi) Sherman is part of Associate Professor Kristen Rasmussen's research group. Having researched changes in the snowpack of the upper Colorado River Basin for her master's research, Sherman is currently working on thunderstorms. "I study how anthropogenic climate change will impact severe convective storms, the hazards they produce, and the potential risk these future storms will pose to society."

Sherman also serves as the president of the Graduate Students of Color group under the CSU Graduate School. The group's goal is to make finding community easier for graduate students with marginalized and underrepresented racial identities across the university.

SCAN ME

Read the full story and learn about African American milestones in meteorology at https://col.st/byhu3

STUDENT NEWS

Deztynee Bryan awarded American Meteorological Society Graduate Fellowship

Advised by Professor Michael Bell, Bryan's research focuses on tropical cyclones: on understanding the microphysical and kinematic processes that influence their intensity and predictability, with an emphasis on utilizing airborne radar observations.

Ivy Glade honored with CSU Vice President for Research Graduate Fellowship

Glade is advised by James Hurrell, Professor and Scott Presidential Chair in Environmental Science and Engineering.

Justin Hassel recognized with NSF Graduate Research Fellowship Program Honorable Mention

Advised by Associate Professor Kristen Rasmussen, Hassel works on the INCUS satellite mission and studies convective updrafts and machine learning.

Brandon McGuire receives Climate Adaptation Partnership Fellow

McGuire is advised by Professors Jeffrey Pierce and Emily Fischer and conducts research on air quality.

Jennifer McGinnis receives GESTAR Fellowship to intern at Goddard Space Flight Center

McGinnis is advised by Professors Jeffrey Pierce and Emily Fischer.

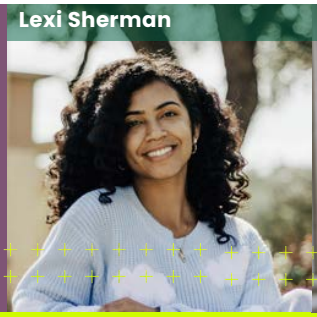
Lilly Naimie wins AGU 2025 Michael H. Freilich Student Visualization Competition Grand Prize

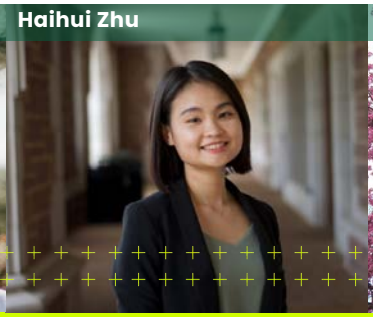
Naimie was advised by Professor Jeff Collett and completed her Ph.D. recently. She has worked on numerous air quality research projects, addressing air quality issues in National Parks.

Yu-Cian Tsai receives CSU Atmospheric Science Department ASCENT award

Tsai is advised by Professor Eric Maloney and plans to use the award to visit Dr. Matthew Wheeler in the Australia Bureau of Meteorology, located in Melbourne in April.

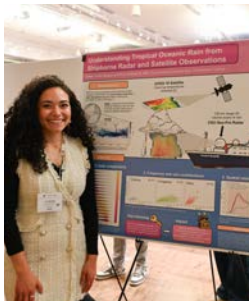
Three community members selected as Diana Wall Sustainability Leadership Fellows





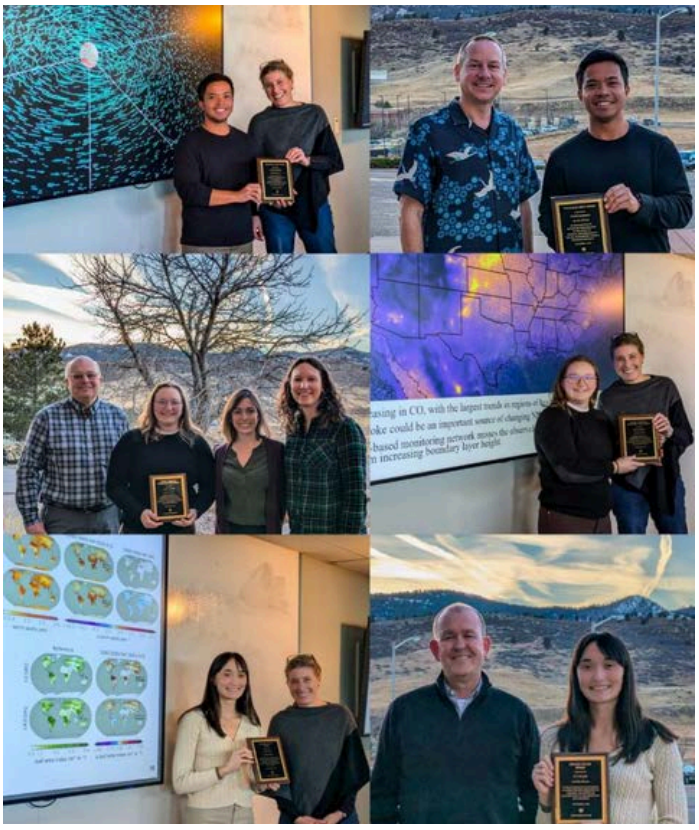
STUDENT NEWS

CSU Graduate Student Showcase



CSU graduate students shared innovative research, creative artistry and entrepreneurial projects while competing for $24,300 in scholarships at the 10th annual GradShow. The Nov. 19 event connected 295 presenters from all eight colleges and special academic units, including solid representation from the atmospheric sciences.

- **Delián Colón-Burgos** presented "Understanding Tropical Oceanic Rain from Shipborne Radar and Satellite Observations," receiving an honorable mention award of $100 in the category of ***Great Minds in Research***, presented by the Graduate School and OVPR.
- **Lauren Beard** presented "Seeing Inside Storms with Radar: How Air Motion Shapes Rainfall."
- **Hannah Grace Marti** presented "Following the Air to Understand Urban New Particle Formation."
- **Olivia Lee** presented "Contextualizing SWUS Precipitation In Future Mean Climates With Marine Heatwaves."
- **Megan Franke** presented "Taller, Fiercer, and Faster: How Climate Change Reshapes Thunderstorms."
- **Nicholas Mesa** presented "Global Analysis of Environmental Factors Underlying Tropical Cyclone Rapid Intensification."
- **Daniel Veloso Aguila** presented "Modulation of Storm Features in South America by the MJO."
- **James Larson** presented "Climate Variability Introduces Uncertainty into Future Emissions Pathways."
- **Jesse Robinett** presented "Southeast Pacific Radiative Feedbacks Not Modulated by ENSO."
- **Kristina Moen** presented research on the "Texture analysis of satellite imagery." Based out of the Department of Mathematics, Moen works with CIRA researchers.



Fall 2024 student awards

Tyler Barbero was granted the William M. Gray award for the best technical manuscript submitted for publication during the previous 18-month period on research advancing understanding of the physics and dynamics of the tropical atmosphere and ocean, including hurricanes.

Lilly Naimie was awarded the Dietrich Scholarship, funded each year by Fort Collins-based Air Resource Specialists, Inc. (ARS) to recognize an Atmospheric Science graduate student who has excelled in the study and research of air quality.

Ivy Glade received the 2024 Shrake-Culler award, given annually to a senior PhD student who has demonstrated excellence in their graduate program, including a strong work ethic and enthusiasm for higher education.

Spring 2025 student awards

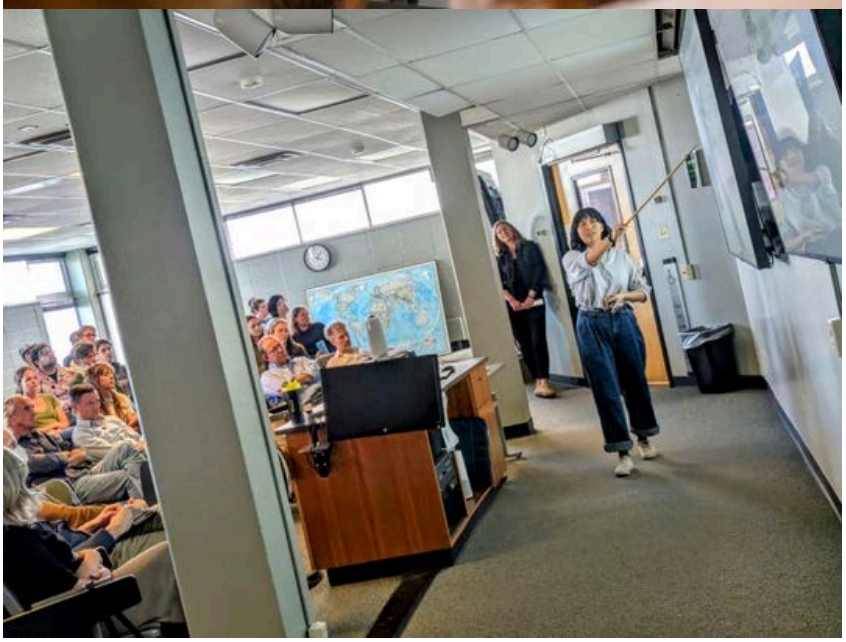
Each spring, our department awards the Herbert Riehl Memorial Award and the Maria Silva Dias Award to — typically two — students nominated by their advisers for outstanding research. This year, three students received awards because the nominees were so strong.

Congratulations to **Camille Mavis**, who won the Riehl Award for an outstanding technical manuscript by a student. The award is named in honor of department founder Herbert Riehl. Mavis researched ice nuclei generation in Arctic melt ponds. Mavis' paper, with twenty coauthors, "Investing meltwater as a local source of ice nucleating particles in the central Arctic summer" is under review for Environmental Science & Technology. Mavis was co-advised and co-nominated by University Distinguished Professor Sonia Kreidenweis and Research Scientist Jessie Creamean.

Nicole June and **Gabrielle Leung** both won the Silva Dias award for outstanding research by a Ph.D student. The Silva Dias Award is given in recognition of outstanding research. Previously known as the Alumni Award, through a student-led initiative it was re-named for alumna Maria Silva Dias to honor the department's first woman Ph.D. graduate.

June, advised by Professor Jeffrey Pierce, worked on the effects of wildfire smoke injection height on climate with seventeen collaborators. Her manuscript, "Look Within: Intraplume differences on smoke aeorosol aging driven by concentration gradients," was published in Feb. 2025 in JGR Atmospheres.

Leung shared an insightful analysis of how tropical deforestation affects cloudiness. She published "Deforestation-driven increases in shallow clouds are greatest in drier, low-aerosol regions of Southeast Asia" in Geophysical Research Letters in May 2024 with University Distinguished Professor Susan van den Heever and Research Scientist Leah Grant.



Charlotte DeMott named 2025 Outstanding Alum

Charlotte DeMott received her M.S. from the department in 1990 on a project entitled "Radar-Derived Latent Heating Rates in a Convective Storm", studying with Prof. Tom Vonder Haar. She then received her Ph.D from the department in 1996, studying with Prof. Steve Rutledge. Her dissertation was entitled "The Vertical Structure and Modulation of TOGA COARE Convection: A Radar Perspective." Subsequent to graduation, DeMott was a postdoctoral fellow in our department before becoming a Research Scientist in 1998. DeMott achieved the rank of Senior Research Scientist in 2020. During her time at CSU, she has advised and mentored multiple undergraduate students, graduate students, and postdoctoral fellows.

Throughout her career, DeMott has conducted breakthrough research on tropical convection, ocean-atmosphere interactions, and tropical dynamics. In addition to gaining scientific inspiration by participating in the TOGA-COARE field experiment in the early 1990s, DeMott published important work on the vertical structure of convection that was observed during the field program (DeMott and Rutledge 1998 a,b). While keeping firmly rooted in the study of tropical convection, DeMott's research interests soon expanded to encompass larger timescale tropical dynamics, including use of general circulation models such as the superparameterized CCSM to understand the dynamics of monsoons and tropical convectively coupled disturbances (e.g. DeMott et al. 2013; 2014).

She also now leads the field in the study of ocean-atmosphere interactions on timescales ranging from diurnal through inter-annual, including seminal work on the role of ocean feedbacks to the Madden-Julian oscillation (DeMott et al. 2015). DeMott has published important reviews on such topics, in addition to fundamental research. She has done increasing work on the role of intraseasonal ocean-atmosphere interactions for Pacific warm pool expansion and the initiation of ENSO warm events. DeMott's interest and passion for field observations has come full circle since the start of her career, and she is helping to spearhead planning for a proposed tropical Pacific Ocean field experiment called TEPEX to study ocean-atmosphere interaction processes associated with Pacific warm pool expansion.

DeMott's stature in the field is reflected in her prestigious leadership positions. Among other distinguished positions, she has been co-chair of the WMO WGNE Madden-Julian oscillation task force, member of Global Precipitation Experiment, a cross-WCRP initiative to accelerate advances in precipitation knowledge and prediction at different scales, co-chair of the US CLIVAR Process Study and Model Improvement Panel, co-chair of the S2S Prediction Ocean Subproject, and co-chair of the Air-Sea Transition Zone Study Group. DeMott has also had a large impact on education within our department. In addition to the mentoring and advising roles mentioned above, DeMott served as the Assistant Director for our NSF Research Experiences for Undergraduates Program, and has been a member of the department's Diversity, Equity, and Inclusion committee. Department alum Dr. Brandon Wolding nominated her for the ATS Outstanding Alum award.

Congratulations to DeMott on this richly deserved recognition!

ALUMNI NEWS

Jakob Lindaas (M.S., '18; Ph.D., '20) has moved back to Fort Collins from Washington DC and is now Director of Climate Action for The Nature Conservancy in Colorado, focused on state and local policy related to climate and clean energy.

Aryeh Jacob Drager (M.S., '16; Ph.D., '20) completed a postdoctoral position at Brookhaven National Laboratory and joined SUNY Oswego's meteorology program in August 2025 as an assistant professor.

Anna Hodshire (M.S. '16; Ph.D. '19) has become an assistant professor in CSU's Systems Engineering department. She still works closely on methane emissions with the CSU Methane Emissions Technology Evaluation Center (METEC).


Anna Hodshire


Geoff Krall

Rachel McCrary (Ph.D., '12) was promoted to Scientist VI (formerly Project Scientist III) at NSF-NCAR. She is currently the lead of the Regional Integrated Science Collective (RISC), a group that focuses on climate downscaling and actionable climate science.

In January 2025, **Geoff Krall** (M.S. '10 from CSU; Ph.D. from UWyoming) rejoined CSU, accepting a faculty position in the Department of Mathematics. He is a full time assistant professor and currently teaching and course coordinatinting 100- and 200-level Calculus courses.


Sarah Tessendorf

Sarah Tessendorf (M.S. '03, Ph.D. '06) was promoted to Senior Scientist at NSF NCAR in February 2025 and is now also the Director of the newly-formed Environmental Resilience Applications Program (ERAP) in the Research Applications Laboratory (RAL) of NSF NCAR as of October 2025. She also won the 2024 UCAR Outstanding Publication Award with her coauthors (Tessendorf et al. 2019) in November 2024.


Walt Petersen

Walt Petersen (Ph.D. 1997) retired from NASA at the end of July 2025. For several years prior to his retirement he served as the Chief of the Science Research and Projects Division at NASA Marshall Space Flight Center. During his career he worked in university settings at CSU Atmospheric Science in the Radar Meteorology group, and at the University of Alabama Huntsville in the lightning remote sensing group.

As a NASA civil servant, Petersen worked in Earth Sciences at NASA Marshall and Goddard (Wallops) Space Flight Centers with research foci in lightning, precipitation science and radar remote sensing. Petersen is a Fellow of the AMS, NASA Exceptional Science Achievement Medal awardee, and a CSU Outstanding Atmos Alumni awardee. In his retirement, Petersen is enjoying more free time with family, travel, and relaxation with his wife of 43 years, Kara.

ALUMNI NEWS

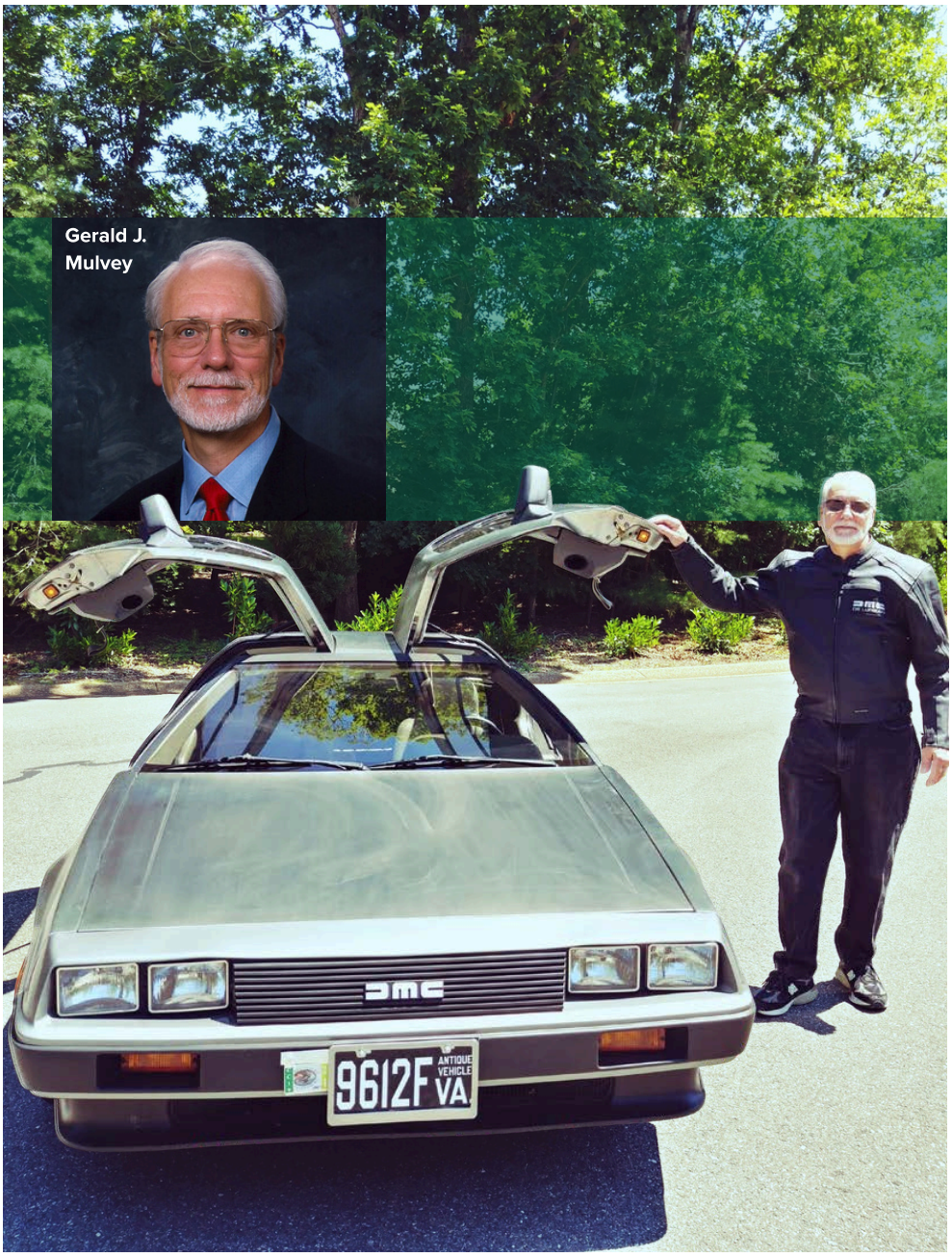
Bill Gallus (M.S., ‘89; Ph.D., ’93) was awarded the title Distinguished Professor at Iowa State University where he has been a faculty member in the Department of Earth, Atmosphere, and Climate for 30 years. In addition, he was selected to have his portrait painted and added to the Faces of Iowa State art exhibit, which honors people with strong ties to the university.

Xubin Zeng (Ph.D., ‘92) received the AGU Bert Bolin Global Environmental Change Award and Lecture, during the Fall Meeting in December 2024.

Rob O'Neal (M.S.; ‘87) retired in June 2025 after 38 years of environmental engineering and consulting. His most recent stint was as Managing Principal at Epsilon Associates in Maynard, MA where he worked for over 25 years. The focus of the job was on impacts from wind energy facilities across the U.S.

“As a self-described baseball nut, I've recently completed visits to all 30 major league baseball stadiums,” said O’Neal, “The quality of hot dogs varies wildly from park to park!”

Gerald J. Mulvey (Ph.D., ‘77) was elected a Fellow of the American Meteorological Society and will recognized at the 2026 annual AMS meeting. He has also resumed his teaching career that was suspended in 2020. Dr. Mulvey is currently teaching at the OSHER Institute at William & Mary, Williamsburg, VA. In his spare time he enjoys working on his 1981 DeLorean.



CLIMATE CENTER UPDATE

Update from Colorado Climate Center Director, Russ Schumacher

Droughts, floods, mountain snowpack (or lack thereof), hailstorms. These are all key components of Colorado's climate, and the kinds of things that we are always keeping a close eye on at the Colorado Climate Center.

You can read about all of these and more in our summary of Water Year 2025. Overall, the water year was warmer and drier than average across the state. Western Colorado saw exceptional drought return in 2025, after a disappointing snow season and a long stretch of hot, dry weather in the summer. This led to several fast-growing and destructive wildfires in that part of the state. But then, shortly after the start of Water Year 2026, a huge rainstorm with major flooding hit southwestern Colorado. You can read about that in our blog – and if you want to follow along with what's happening in Colorado's climate make sure you're subscribed to get both blog posts and monthly statewide climate summaries in your inbox.

If you liked the new format of the water year summary, send your appreciation to Allie Mazurek. Allie finished her PhD in the department in December 2024, and joined the CCC team in January 2025 in a new Engagement Climatologist position. She is working on a range of projects within the office, and is bringing her creativity, knowledge, and skills to the position.

Allie Mazurek showing hailpad to visiting third graders

One initiative that the CCC has been involved with in the past year is the development and launch of the CSU Climate Hub at Spur. The Hub, based at CSU's Spur campus in Denver, will be a "front door" for CSU's interdisciplinary climate-related expertise. The CCC will be offering training and climate services as part of this initiative. One of the Hub's first activities was "Colorado Crossroads," a training for state legislative staff and agency officials on topics at the interface of climate, water, and agriculture. This event was organized in conjunction with the National Academy of Science and the Denver Museum of Nature and Science.

The Colorado Agricultural Meteorological Network (CoAgMET), also known as Colorado's Mesonet, was honored this year for over 30 years of data collection [next page]. And the network continues to expand: two new stations were added in western Colorado, and a new station technician for the western slope, Ty Blacklock, joined the team. We look forward to celebrating the addition of the 100th station to CoAgMET in 2026.

CoCoRaHS (the Community, Collaborative Rain, Hail, and Snow network) also continues to thrive, with now over 27,500 active volunteer precipitation observers. A major new feature added in 2025 is the ability for observers to add photos along with reports of hail and on-the-ground conditions. This was made possible through research grants involving collaborations with researchers studying hailstorms, drought, and soil moisture conditions. And speaking of soil moisture, assistant state climatologist Peter Goble co-organized and hosted the National Soil Moisture Workshop at CSU in June.

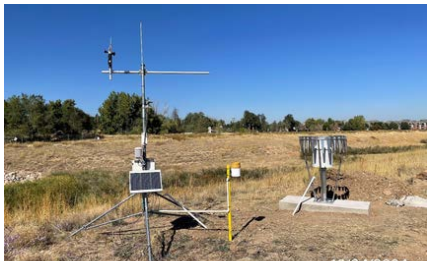
We have been proud to serve the state for over 50 years with our threefold program of climate monitoring, climate research, and climate services for Colorado, and we look forward to keeping tabs on whatever 2026 may bring.

SCAN ME

Subscribe to our blog at https://climate.colostate.edu/blog/

CSU Colorado Mesonet recognized by American Association of State Climatologists for over thirty years of service

The Colorado Agricultural and Meteorological Network, known as CoAgMET, was recognized with the American Association of State Climatologists 30 Year Mesonet Award for contributing more than 30 years of quality weather records of Colorado.



CoAgMET provides useful weather details for Colorado's agricultural industry through quick data and long-term record-keeping.

CoAgMET is a network of 96 weather stations managed by Lane Simmons and operated out of the Colorado Climate Center. The center is part of the Department of Atmospheric Science in the Walter Scott Jr., College of Engineering. "As someone who has seen firsthand the impact of Colorado's CoAgMET network, I can say this is a groundbreaking group of scientists and staff," said Gene Kelly, Professor and Director of Colorado Agricultural Experiment Station. "They see and deliver real value—not just with world-class climatological monitoring, but through a commitment to accurate, accessible reporting that benefits every facet of our agricultural community and all citizens of Colorado."

Beginning with a collaboration between CSU's plant pathology extension specialists and USDA's Agricultural Research Service Water Management Unit, CoAgMET was established in 1992 to improve the density and timeliness of quality weather data in Colorado. State Climatologist Emeritus Nolan Doesken led a major expansion of the network in the early 2000s, adding stations in all corners of the state.

"Many people have contributed to CoAgMET over the last thirty-plus years, laying a foundation for the network to mature into a true mesonet," said Simmons.

What is a Mesonet? Pronounced "meh-zoh-net"

A mesonet captures what meteorologists call "mesoscale" weather – behavior that is too small in scale or too dynamic for typical weather networks. A network of closely spaced weather stations reporting multiple times an hour makes up a mesonet. The ability of mesonets to quickly report weather conditions and fill coverage gaps makes them vital for forecasters.

CoAgMET – also referred to as Colorado's Mesonet – collects and reports data to a wide range of data users every five minutes, including temperature, relative humidity, wind speed, wind direction, solar radiation, soil temperature and liquid precipitation. Data is free and available to the public.

"A major initiative this year has been to add or upgrade soil moisture measurements at 39 stations that met specific criteria," said Lane. The soil moisture sensor installations were done by staff from the College of Agricultural Sciences.

"At select stations we are constructing towers, allowing us to measure wind at 10 meters (32 feet) in addition to our standard two meter or three-meter height (about six and a half to 10 feet)," said Simmons. "We are also hoping to add hardware to these towers that would allow us measure temperature inversions (when air temperature increases with height)."

SCAN ME

Read the full story at
https://col.st/id6ex

RESEARCH

Amy Sullivan celebrated for work as American Association for Aerosol Research President

Story by Theresa Barosh

INCUS scientific team celebrates upcoming mission, launch

Story by Emily Wilmsen

INCUS, the CSU-led NASA earth science satellite mission scheduled to be deployed in 2026, is under budget and ahead of schedule, lead scientist Sue van den Heever happily told her team on Tuesday.

That accomplishment comes despite the past year's layoffs at partner JPL, the Eaton fire that destroyed JPL colleagues' homes, and the federal shutdown.

"This was a really, really rough year, but there was no griping," van den Heever, a University Distinguished Professor, proudly told attendees in Fort Collins for the annual INCUS science meeting. "We came together as a team and made things happen. The fact that this is moving forward and we're here today is remarkable."

Antarctic clouds and pristine air hold clues to climate model blind spots

ABC News *Story by Tyne Logan*

RESEARCH

University Distinguished Professor A.R. Ravinshankara retires

Story by Hannah Gluckstern

Science Moms feature Drs. Melissa Burt, Emily Fischer

Multiple podcasts
https://sciencemoms.com/climate-change-podcasts/

Successful data assimilation training marks milestone in $6.6M project

Story by Theresa Barosh

NSF workshop on educational experiences in atmospheric science field campaigns

Story by Theresa Barosh

RESEARCH

INCUS Mission successfully passes system integration review, another major milestone

Story by Theresa Barosh

The Art of Research: David Randall

Story by Christopher Outcalt

New study identifies health risks during unconventional oil and gas production for those living near wells

Story by Meagan Weisner, PhD, Senior Scientist, Healthy Communities and Paige Varner, PhD, Scientist, Healthy Communities

CSU art exhibition uses air pollution to create art

Story by Madeleine Boyson

RESEARCH

Researchers predicting above-average Atlantic hurricane season for 2025

Story by Josh Rhoten, published April

2024 AMS Climate Policy Colloquium: CSU researchers participate in inaugural year

Story by Theresa Barosh

Women shaping CSU history

Stories by CSU Communications Team

For Women's History Month, CSU SOURCE created a collection of stories and images to celebrate the array of research activity led by women across CSU and highlighted two faculty from our community.

Kristen Rasmussen has quickly become a leader in research and education at Colorado State University since joining the Department of Atmospheric Science in 2016.

Rasmussen earned her M.S. (2011) and Ph.D. (2014) from the University of Washington, where her research centered on the cloud and mesoscale processes of high-impact weather events in South America, as well as flooding in India and Pakistan. She continued that work as a postdoctoral fellow at the National Center for Atmospheric Research (NCAR) before building her own lab at CSU centered on the weather-climate interface to further study the dynamics of convective storms – intense weather events characterized by strong up and down drafts and how they may change in a future climate.

Elizabeth Barnes [now a department affiliate] did not set out to be an engineer. That was something her parents did and, as such, was something to avoid if possible. Growing up with a talent for science, she instead wanted to be an astrophysicist like Jodie Foster's character in the 1997 movie "Contact."

Today, her team based at Boston University focuses on improving climate prediction abilities beyond the short-term, traditional weather forecasting windows by developing new AI powered data analysis tools.