



# ATMOSPHERIC SCIENCE

## COLORADO STATE UNIVERSITY

2018 Newsletter

### WE-CAN seeks to crack chemistry of wildfire smoke

A team of Colorado State University scientists led by Assistant Professor Emily Fischer spent the summer flying into wildfire smoke to analyze its composition in the largest, most comprehensive campaign of its kind to date. Five universities and the National Center for Atmospheric Research collaborated on the [Western Wildfire Experiment for Cloud Chemistry, Aerosol Absorption, and Nitrogen](#), or WE-CAN, which involved a C-130 research aircraft loaded with scientific instruments and 15 scientists per flight.

Based in Boise, Idaho, the flight crew flew 16 six-hour missions to collect smoke samples and data.

Boise was chosen because almost every August there is a wildfire burning within a two-hour flight of the city. The WE-CAN team included around 100 scientists and engineers, with many of them stationed on the ground, monitoring fires, smoke, and weather to guide the plane.

Fischer directed the campaign from the cockpit.

“The visibility was so poor that we had to use a completely different flight planning strategy than I anticipated,” she said. “Decisions in the cockpit were essential.”

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**James Hurrell joins faculty as Walter Scott, Jr. Presidential Chair**

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**ATS team wins top prize in North American forecasting competition**

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## AMS Alumni Reception

Please join us for the American Meteorological Society Alumni and Friends Reception at the 99th Annual Meeting in Phoenix, Ariz.

**Tuesday, Jan. 8**

6:30-8:30 p.m.

Paradise Valley Room of the Sheraton Grand Phoenix Hotel

### Donate

Please consider supporting the Department of Atmospheric Science. Your gift strengthens CSU through the recruitment and retention of world-class students and faculty. It also ensures that our department will continue to be a leader in weather, climate, and air quality research.

To contribute, please visit: [advancing.colostate.edu/ATMOS](http://advancing.colostate.edu/ATMOS) or call (970) 491-8682.

## An exciting year and changes in the works

It's hard to believe that 2018 has come and nearly gone. This was an especially busy year here at CSU ATS. In the pages of this newsletter, you can read about some of the many activities and accomplishments of our exceptional faculty, staff, students, and alumni.

2018 was a very active year for fieldwork, including three very large experiments. WE-CAN (wildfires in the Western U.S.), PISTON (tropical meteorology in the western Pacific), and RELAMPAGO (thunderstorms in Argentina) all involved multiple ATS research groups.

We added two new faculty this year. Professor Peter Jan van Leeuwen, an expert in data assimilation and causality inference, joins us from the University of Reading. Professor Jim Hurrell, an expert in climate, climate variability, and climate change, joins us from a distinguished career at NCAR, including serving the past five years as NCAR director. Jim is the holder of the new Walter Scott, Jr. Presidential Chair in Environmental Science and Engineering.

This fall we welcomed an exciting class of 17 new ATS graduate students. We continue to receive nearly 10 times that many applications to our program each year, allowing us to



Department Head  
Jeff Collett

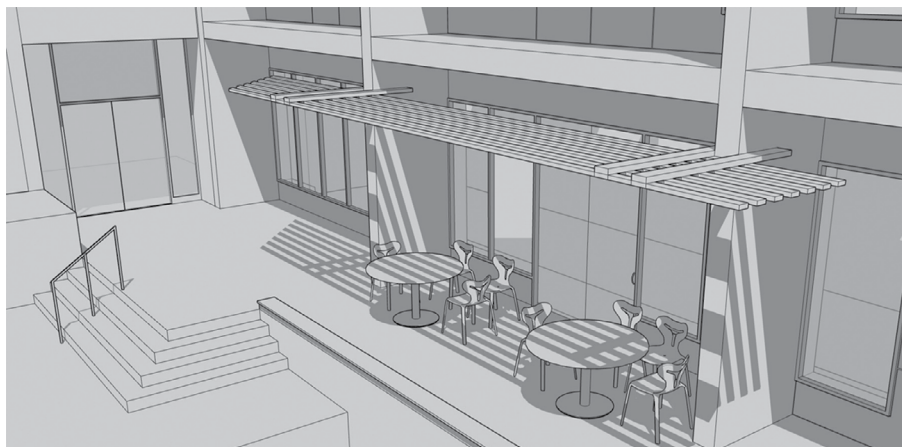
recruit the very best students.

Our outstanding students and alumni contribute greatly to the reputation of our program. This fall we are pleased to celebrate the accomplishments of Dr. Xubin Zeng of the University of Arizona, the 2018 CSU ATS Outstanding Alum.

With department growth over the years, we now occupy five buildings on "the hill." While new space has

been critical to the success of our research and educational programs, our separation into distinct structures hampers the informal interactions that can spark new research ideas. To help remedy this challenge, I am pleased to announce plans to construct a new indoor/outdoor common space on the west side of the original Atmospheric Science Building. Everyone at ATS is excited to create a space that will enhance interaction and collaboration across the department. We are contemplating a fundraiser to support this effort. If you are interested in participating, please reach out through the donation link on this page or send me an email directly ([collett@colostate.edu](mailto:collett@colostate.edu)).

I wish you all a happy conclusion to 2018 and a great new year. We look forward to seeing you at our AMS reception in Phoenix or on a future visit to Fort Collins.



This artist's rendering shows the proposed Atmospheric Science Building facade, complete with indoor/outdoor seating and a pergola.

# FACULTY NEWS

## Climate scientist James Hurrell named first Walter Scott, Jr. Presidential Chair

James Hurrell joined the department in September as a professor and the Walter Scott, Jr. Presidential Chair in Environmental Science and Engineering. Hurrell has filled the first of four presidential chairs in the Walter Scott, Jr. College of Engineering, endowed by a gift from college alumnus Walter Scott, Jr. The four chairs represent the college's areas of excellence in water, health, energy, and the environment.

Hurrell most recently served as director of the National Center for Atmospheric Research in Boulder, where he was also a senior scientist in the Climate and Global Dynamics Laboratory. He received his Ph.D. in atmospheric science from Purdue University.

Hurrell's research centers on empirical and modeling studies and diagnostic analyses to better understand climate, climate variability, and climate change. As presidential chair, Hurrell will continue his research on climate dynamics and develop collaborations across campus to examine climate impacts on a range

of human and natural systems.

"Climate variability and climate change pose risks to many sectors, including agriculture, water, human health, infrastructure, national security, transportation, energy, forests, and ecosystems," said Hurrell. "I am eager to collaborate with CSU researchers working in these areas."

Hurrell has received numerous awards for his work, including the American Meteorological Society Meisinger Award; the Nansen Memorial Lecture and Medal from the Norwegian Academy of Science and Letters; and the Distinguished Alumnus Award from the Purdue College of Science. He is an elected fellow of the American Meteorological Society, American Geophysical Union, and the Royal Meteorological Society.



## Department welcomes Peter Jan van Leeuwen

Peter Jan van Leeuwen joined the department in September as a professor. His research focuses on the use of data assimilation and causality inference for better understanding geophysical fluids, with emphasis on the atmosphere and ocean.



Van Leeuwen earned his Ph.D. in fluid dynamics from Delft University of Technology in the Netherlands. Most recently he was a professor in data assimilation at the University of Reading. He was head of the Data Assimilation Research Centre, the largest academic data-assimilation center in the world; interim director of the National Centre for Earth Observation; and later director of Data Assimilation Research at NCEO.

## Wayne Schubert won't retire 'halo of wisdom' any time soon

Colleagues, friends, family, and former students of Professor Emeritus Wayne Schubert gathered July 27 to honor the scientist's "retirement," or lack of it. After 45 years with the department, Schubert has no intention of leaving research or the department.

"It's been a great pleasure for me to watch the department grow," said Schubert as he addressed the audience assembled to pay tribute to him. The department has grown significantly since Schubert joined the faculty in 1973. Since then Schubert has authored 105 publications and advised 32 M.S. and 27 Ph.D. students. Several of them were present to recognize the influence he has had on

their lives.

Associate Professor Michael Bell, who has been both Schubert's student and colleague, described the "Wayne Schubert halo effect," or the sphere of understanding that Schubert emanates and the knowledge gained in his presence.

Though Schubert has retired from teaching, he continues to be a mentor and respected colleague. He recently completed a research proposal to advance his group's studies in atmospheric dynamics, numerical weather prediction, and tropical meteorology.



# FACULTY NEWS

## Jeff Pierce awarded Monfort Professorship

Associate Professor Jeff Pierce was named a Monfort Professor at the *Celebrate!* CSU Awards ceremony on April 11. The Monfort Professorship is CSU's premier award, recognizing research accomplishments and potential of mid-career faculty. The program is sponsored by the Monfort Family Foundation to help CSU recruit and retain talented faculty members.

Two CSU faculty members are selected as Monfort Professors each year. They retain this designation for two years and receive \$75,000 per year to further their teaching and research. Pierce plans to use his Monfort award to investigate the effectiveness of pollution emission control strategies in China.

Pierce is the fourth Department of Atmospheric Science faculty member to be named a Monfort Professor since the program began in 2002. Past recipients were Scott Denning, David Thompson, and Sue van den Heever.



**Monfort Professor Jeff Pierce also was chosen as the 2017-18 Outstanding Professor of the Year by Department of Atmospheric Science graduate student representatives, based on evaluations submitted by students.**

## Elizabeth Barnes receives NSF CAREER award

Assistant Professor Elizabeth (Libby) Barnes was selected for a CAREER award from the National Science Foundation. The Faculty Early Career Development Program offers the NSF's most prestigious grants in support of early-career faculty who have the potential to serve as academic role models in research and education.



offers five years of funding to explore both passions of mine: science and education."

Integrating education and research is central to the program's goal. With CAREER, the NSF

boosts promising and talented junior faculty toward lifelong leadership and scientific advances in their fields. The awards are granted annually, and the selection process is one of the most competitive within the NSF.

Barnes will use her grant to

study causal connections between the Arctic and mid-latitudes.

"I'm particularly excited because I am being funded to work on applying exciting statistical techniques to address questions of causality in climate science – that is – 'who caused whom?' Or, which came first, the chicken or the egg? I'm specifically going to be studying the links between the tropics-midlatitudes-Arctic and how they communicate with each other and who communicates first."

Barnes' project also will create an online database for scientists to utilize and expand.

## Faculty & Staff Milestones (Years of Service)

### 5 years

Elizabeth Barnes  
Emily (Qi-jing) Bian  
Emily Fischer  
Tom Hill  
Jeff Pierce  
Samantha Reynolds  
Emily Riley Dellaripa  
Weixin Xu

### 10 years

Katie Benedict  
Bonne Hotmann Ford  
Eric Maloney  
Ammon Redman

### 15 years

Joon-Hee Jung  
Celal Konor  
Julian Turner

### 25 years

Mostafa Elkady

### 30 years

Kelley Branson  
Donald Dazlich  
Charlotte DeMott  
Scott Denning  
David Randall  
Steven Rutledge

### 45 years

Wayne Schubert

# FACULTY NEWS



**Assistant Professor Emily Fischer** was selected as one of three recipients of this year's Graduate Advising and Mentorship Award from the CSU Graduate Student Council. Winners are selected based on nominations by CSU graduate students across all disciplines. In its fourth year, the award was created to acknowledge outstanding advisers who exceptionally dedicate their time, energy, and wisdom to graduate students. Thirty-one advisers were nominated, including ATS Assistant Professor Kristen Rasmussen.



**Professor James Hurrell** was selected to serve on the Joint Scientific Committee of the World Climate Research Programme. Hurrell will be one of two members on the committee from the U.S. The JSC provides scientific guidance for WCRP and its primary goals of determining the predictability of climate and the effect of human activities on climate. The international organization plans initiatives, workshops, and conferences to coordinate and facilitate climate research. Hurrell also will serve as president of the Atmospheric Sciences section of the American Geophysical Union in 2019-20. He was president-elect in 2018.



**Professor Emeritus Richard H. Johnson** was named a fellow of the American Association for the Advancement of Science. He was presented with the honor during the 2018 AAAS Annual Meeting in Austin, Texas, in February. Johnson was recognized by the Section on Atmospheric and Hydrospheric Science for his "creative design, execution, and analysis of field experiments that have given insight into the interaction of convective clouds with large-scale atmospheric circulation."



**Professor Eric Maloney** received the George T. Abell Outstanding Research Faculty Award at the Walter Scott, Jr. College of Engineering All-College Meeting on Nov. 8. Maloney was recognized "for groundbreaking work in the prediction of weather extremes weeks in advance." This year's award winners were selected by a committee composed of last year's winners. Nominations were submitted by colleagues and staff of the college's eight departments and programs.



**University Distinguished Professor A.R. Ravishankara**, a professor of both atmospheric science and chemistry, received an international Scientific Leadership award from the United Nations Environment Programme, the agency that coordinates the U.N.'s environmental activities. The award recognized Ravishankara's lifelong work studying and finding solutions to climate change and ozone layer depletion. The honor was presented at a ceremony in Montreal on the 30th anniversary of the Montreal Protocol, the international treaty that phased out ozone-harming chlorofluorocarbons, or CFCs.



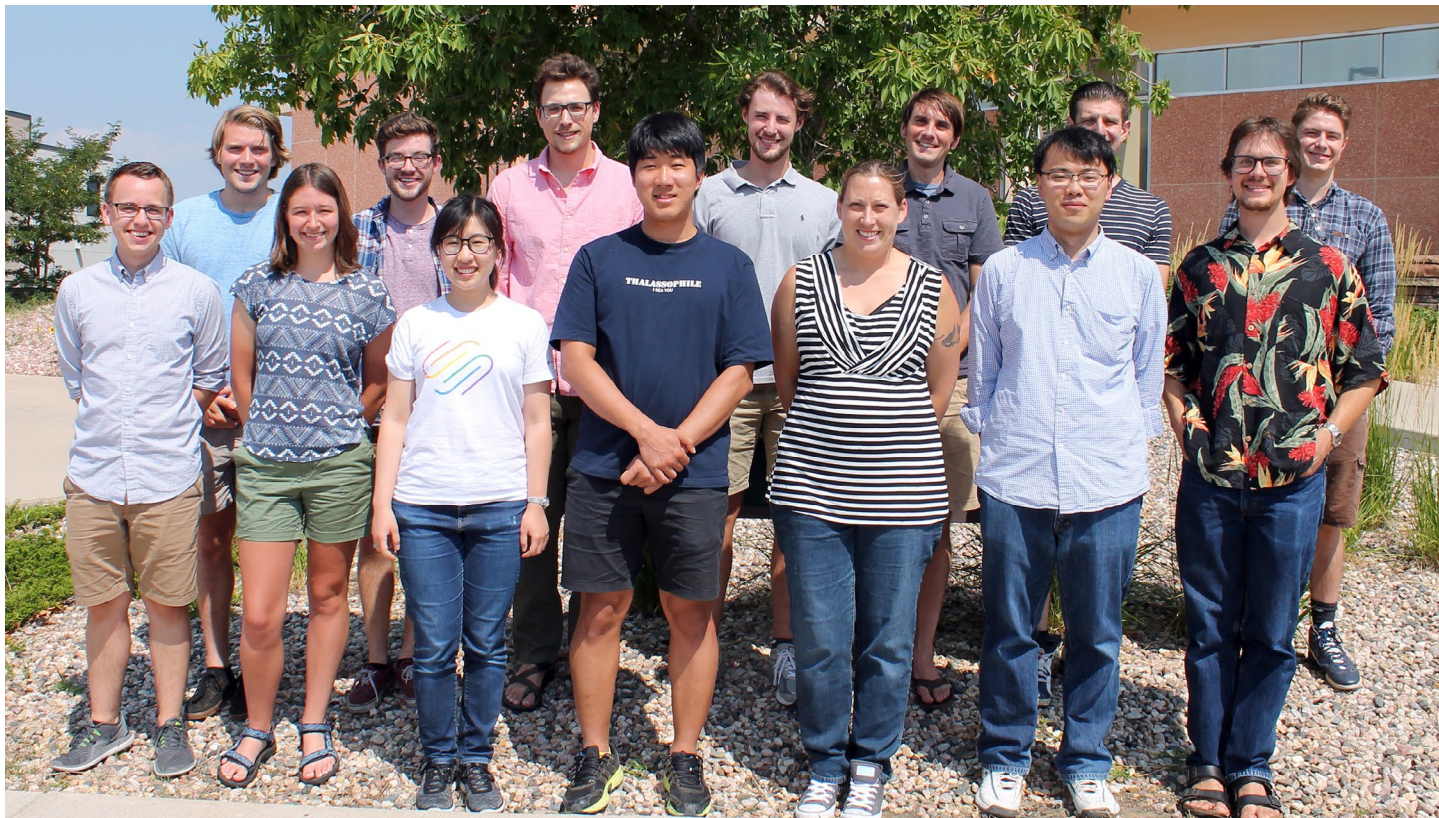
**University Distinguished Professor Emeritus Graeme Stephens** was elected as a fellow of the Royal Society for his exceptional contributions to science. Founded in 1660, the Royal Society is the oldest scientific academy in continuous existence. It is a fellowship of many of the world's most eminent scientists. This year Stephens also received the 2017 Mason Gold Medal from the Royal Meteorological Society.



**Professor Sue van den Heever** was selected as the 2018 recipient of the Edward N. Lorenz Teaching Excellence Award from the American Meteorological Society. One person is chosen annually for this highly competitive national teaching award. She also was appointed co-chair of NASA's Science Advisory Group for its study of aerosol and clouds, convection, and precipitation. In addition, van den Heever was elected secretary of physics, dynamics, and climate for the Atmospheric Sciences section of the American Geophysical Union for the 2019-20 term.

# STUDENT AND STAFF NEWS

## Welcome, new students!



Fall 2018 incoming students, front row, from left: Drew Koeritzer (Texas A&M University), Marqi Rocque (State University of New York at Albany), Rung Panasawatwong (Massachusetts Institute of Technology), Simchan Yook (Seoul National University), Chandra Pasillas (Naval Postgraduate School), Yasutaka Murakami (University of Tokyo), and Michael DeCaria (Millersville University of Pennsylvania). Back row, left to right: Alex DesRosiers (University of Florida), Michael Needham (Loyola University of Chicago), Nicholas Kedzuf (University of Miami), Adam Clayton (University of Alabama in Huntsville), Eric James (Colorado State University), Alex Sokolowsky (Pennsylvania State University), and Matthew Lang (Pennsylvania State University). Not pictured: Julieta Juncosa Calahorrano (Universidad San Francisco de Quito), Jeremiah Piersante (Hobart & William Smith College), and Greg Zwicke (Texas A&M University).

## Ilana Pollack recognized with Outstanding Researcher Award

Scientist Ilana Pollack received the Outstanding Researcher Award at the Walter Scott, Jr. College of Engineering All-College Meeting on Nov. 8. Assistant Professor Emily Fischer nominated Pollack for the award. Her nomination letter spoke of Pollack's integral, first-of-its-kind work on the multimillion dollar

NSF project WE-CAN, and her dedication to teamwork and mentoring.

"Ilana's mix of talent and expertise is rare. She is a meticulous atmospheric chemist, and she is also a master of logistics. She is a true team player, and that is why she is so deserving of this award."



Walter Scott, Jr. College of Engineering Dean David McLean presents the Outstanding Researcher Award to Ilana Pollack.

# STUDENT AND STAFF NEWS

## Congratulations, Atmospheric Science graduates!



From left to right, front to back, Zitely Tzompa Sosa, Kira Shonkwiler, Chris Slocum, and Jack Kodros. Photo by Jeff Collett

### 2018 Graduates

Emily Bell – M.S. – Kummerow/O’Dell  
Julie Barnum – M.S. – Rutledge  
Trent Davis – M.S. – Rutledge  
Leah Grant – Ph.D. – van den Heever  
Nathan Kelly – M.S. – Schumacher  
Jack Kodros – Ph.D. – Pierce  
Jakob Lindaas – M.S. – Fischer  
Naufal Razin – M.S. – Bell  
Rick Schulte – M.S. – Kummerow  
Yixing Shao – M.S. – Collett  
Kira Shonkwiler – Ph.D. – Collett  
Chris Slocum – Ph.D. – Schubert  
Ben Trabling – M.S. – Bell  
Zitely Tzompa Sosa – Ph.D. – Fischer  
Derek Weber – M.S. – Collett  
Justin Whitaker – M.S. – Maloney  
Ellie (Delap) Casas – M.S. – Bell  
Ting-Yu Cha – M.S. – Bell  
Kyle Nardi – M.S. – Barnes  
Emily Ramnarine – M.S. – Pierce  
Michael Cheeseman – M.S. – Denning/O’Dell  
Stacey Hitchcock – Ph.D. – Schumacher  
Kate O’Dell – M.S. – Pierce  
Sean Freeman – M.S. – van den Heever  
Greg Herman – Ph.D. – Schumacher

## Sam Childs and Jack Kodros receive department honors

Sam Childs and Jack Kodros were honored in May for outstanding student publications. Childs, advised by Associate Professor Russ Schumacher, received the Riehl Memorial Award for an outstanding paper based on M.S. thesis research. Childs was nominated for two papers and was selected for “Cold-season Tornadoes: Climatological and Meteorological Insights.”

Kodros, advised by Associate Professor Jeff Pierce, received the Alumni Award for an outstanding paper based on Ph.D. research. He was chosen for his paper “Quantifying the Contribution to Uncertainty in Mortality Attributed to Household, Ambient, and Joint Exposure to PM2.5 from Residential Solid-Fuel Use.” Kodros is one of a handful of students who have received both the Riehl and Alumni awards.



Sam Childs (left) and Jack Kodros with their Riehl and Alumni awards, respectively.

# STUDENT AND STAFF NEWS

## Student Fellowships, Awards, and Recognition

Alumni Award	Jack Kodros
American Meteorological Society Graduate Fellowship	Alex DesRosiers
AMS presentation awards from the Aerosol-Cloud-Climate Symposium student competition at the AMS Annual Meeting	Peter Marinescu, Minnie Park
AMS poster award (third place) at the AMS Annual Meeting	Stacey Hitchcock
Best Student Poster Presentation award at the AMS 29th Conference on Weather Analysis and Forecasting/25th Conference on Numerical Weather Prediction	Erik Nielsen
Chateaubriand Fellowship	Will Lassman
Colorado Science and Engineering Policy Fellow	Zitely Tzompa Sosa
David L. Dietrich Award	Anna Hodshire
Department of Energy Computational Science Graduate Fellowship	Ben Toms
Engineering Graduate Teaching Fellowship	Sam Atwood
Fulbright Scholarship	Jhordanne Jones, Julieta Juncosa Calahorrano
Herbert Riehl Memorial Award	Sam Childs
NASA Earth and Space Science Fellowship	Katelyn O'Dell, Casey Patrizio, Naufal Razin
National Science Foundation Graduate Research Fellowship	Kathryn Moore, Kate O'Dell
Outstanding Poster Presentation Award at the AMS 33rd Conference on Hurricanes and Tropical Meteorology	Ben Toms
Program of Research and Scholarly Excellence	Michael DeCaria, Simchan Yook
Shrake-Culler Scholarship	Kai-Chih Tseng
SoGES Global Sustainability Leadership	Erin Dougherty
Walter Scott, Jr. Fellowship	Drew Koeritzer, Jeremiah Piersante, Marqi Rocque
Walter Scott, Jr. Graduate Fellowship and Dean's Graduate Research Assistantship	Julieta Juncosa Calahorrano, Matthew Lang

# STUDENT AND STAFF NEWS

## ATS wins top prize in North American forecasting competition

Graduate students, researchers, and faculty in CSU's Department of Atmospheric Science took home the team trophy for the top combined weather forecast score for the 2017-18 season of the WxChallenge, the North American collegiate weather forecasting competition including 1,800 participants from 62 meteorology programs.

During the 20-week contest season, participants apply their knowledge of atmospheric processes and interpretation of numerical weather guidance to predict the daily maximum and minimum temperatures, accumulated precipitation, and maximum sustained wind speeds for designated cities across the U.S. The CSU team managed to out-forecast 40 other teams for the season team trophy, placed first in the two-week 12-team play-off round, had eight members qualify for the individual tournament, and won five individual forecaster trophies.

While this is the first season for CSU to take home the top prize, the team has historically done well in the competition. They placed second overall in 2016-17, with eight individual forecaster trophies.



CSU WxChallenge team, front row, left to right: Cory Baggett, Russ Schumacher, and Faith Groff. Back row, left to right: Erik Nielsen, Kyle Nardi, Sam Childs, Greg Herman, Chris Slocum, and Zach Bruick. Not pictured: Joe Messina.

### Individual forecaster trophy winners

- Second place graduate student for the season – Zach Bruick
- First place faculty/staff/postdoc forecaster for Washington, D.C. – Chris Slocum
- First place graduate student forecaster for Cleveland, Ohio – Zach Bruick
- Runner-up graduate student forecaster for Cleveland, Ohio – Greg Herman
- Runner-up graduate student forecaster for Binghamton, N.Y. – Zach Bruick

## Melissa Burt named assistant dean for diversity and inclusion

The Walter Scott, Jr. College of Engineering recently welcomed its most diverse incoming class of students to date, with a 34 percent increase in the number of women and 25 percent increase in students of color. While celebrating these gains, the college aims to enhance them further through the appointment of an assistant dean for diversity and inclusion. Filling this new role is Melissa Burt, who has been developing

diversity and inclusion initiatives for a decade as education and diversity manager, first for CMMAP, ESMEI, and the department, and more recently for the college.

In her expanded position, Burt will continue to foster a welcoming and inclusive environment in the college and focus efforts for recruiting and retaining diverse faculty, staff, and students. She will lead strategic

planning and implementation of diversity, inclusion, and equity goals, and play an active role in Universitywide diversity and inclusion initiatives.

Burt will continue to serve as director for the Research Experience for Undergraduates program, based in the department, and support other department diversity and inclusion efforts, including student recruiting.



Melissa Burt also was elected to the American Meteorological Society Council for 2018.

## Xubin Zeng selected as 2018 ATS Outstanding Alum

Professor Xubin Zeng will receive the 2018 CSU Department of Atmospheric Science Outstanding Alum Award in a ceremony Dec. 7. Zeng received his Ph.D. from the department in 1992, advised by Roger Pielke.

Through more than 170 peer-reviewed papers, Zeng is well known for his research on land-atmosphere-ocean interface processes, weather and climate modeling, hydrometeorology, remote sensing, and nonlinear dynamics. His model parameterizations and value-added observation-based datasets have been widely used in weather and climate models.

In 1994 Zeng joined the University of Arizona, where he is the Agnese N. Haury Chair in Environment, a professor of hydrology and atmospheric sciences, founding director of the Climate Dynamics and Hydrometeorology Center, co-chair of the University Strategic Planning and Budget Advisory Committee, and member of the University President's Cabinet. Zeng co-founded the University of Arizona's Hydrometeorology M.S. and Ph.D. program, the first such program in the U.S.

Zeng's work on chaos has advanced our understanding of this important field and is widely referenced, even beyond atmospheric science. Zeng is deputy PI of a newly selected \$30 million NASA project on the understanding of aerosol-cloud-weather interactions through measurements using two aircraft in formation over the western North Atlantic. Among other recognitions, Zeng is a fellow of the American Meteorological Society and recipient of a 2014 Special Creativity Award from the National Science Foundation.

Zeng currently co-chairs the international GEWEX Global Atmospheric System Study Panel and co-chairs the 2019 AMS Annual Meeting Overall Planning Committee (with approximately 4,000 attendees expected). He also serves on the NOAA Science Advisory Board Environmental Information Services Working Group, Science Advisory Board of DOE PNNL Earth & Biological Sciences Directorate, and NCAR Earth Observing Laboratory External Advisory Committee. In the past decade, he was elected to the AMS Council and its Executive Committee, co-chaired the Community Workshop and White Paper on NSF lower-atmosphere observing facilities for climate studies, and served on the National Academies BASC Board and NASA/NOAA/USGS Decadal Survey Weather and Air Quality Panel.



### A note from Zeng:

I am honored by this recognition from ATS – a top program in our field with many distinguished alumni throughout the years. I thank the ATS faculty for inspiring me and raising me up to stand on their shoulders.

My wife (Qingqiu) and I both received our Ph.D.s from ATS with wonderful memories of the department, the University, and Fort Collins, and with long-lasting friendship with many fellow students and ATS faculty. Our son, David, was also born during that period.

Here I would like to share a few points (with revisions) from a newsletter interview a few years ago:

**Q:** How did you decide to study atmospheric science?

**A:** For my generation, math, physics, and chemistry were emphasized in the late 1970s and 1980s in China, and I love both physics and math. I was accepted into the Atmospheric Physics Program of Nanjing University, and my passion for atmospheric science was developed through the undergraduate thesis research.

**Q:** Which accomplishments are you most proud of in your professional life?

**A:** The wide use of our research products in the world, including the implementation of model parameterizations and value-added global datasets over land and ocean in the NCEP and ECMWF operational models for weather forecasting, in the NCAR CESM and DOE E3SM for climate studies, in WRF for regional studies, and in other regional and global models.

**Q:** Who influenced you most in your professional life?

**A:** I am grateful to so many mentors at different stages of my career, including ATS faculty (particularly Professors Roger Pielke and David Randall).

**Q:** What are your perspectives for future direction in our field?

**A:** Besides traditional scientists in a particular subfield of atmospheric science, we will need more scientists who can

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## Updates from Alumni

**Dave Bader** (M.S., '81; Ph.D., '85), **Chris Golaz** (M.S., '98; Ph.D., 2002), **Jim Hack** (M.S., '77; Ph.D., '80) and **Luke van Roekel** (M.S., 2006; Ph.D., 2010) all had major roles in the development of the [Energy Exascale Earth System Model](#) at the DOE National Laboratory. After four years of development, E3SM was released in May to the broader scientific community.

**Julie Barnum** (M.S., 2018) is a software developer at the Laboratory for Atmospheric and Space Physics at the University of Colorado Boulder, where she is helping to manage a science data center for the [Magnetospheric Multiscale Mission](#) and developing a visualization package for the [Mars Atmosphere and Volatile Evolution Mission](#).

**Lori Olsen Bator** (M.S., '96) is instrument operations system lead for the Multi-Angle Imager for Aerosols instrument at the Jet Propulsion Laboratory in Pasadena, Calif. She recently moved back to the U.S. after living in Germany for six years.

**Katie Boyd** (M.S., 2011; Ph.D., 2017) has a new position with CIRES at the University of Colorado Boulder. She is an education and outreach project lead in their education and outreach group.

**Pat Fitzpatrick** (Ph.D., '95) continues his 17th year at Mississippi State University as a part-time associate research professor with NOAA-funded tropical cyclone research. He is also a forensic meteorologist; software developer for commercial storm surge, ocean, and weather products; and an online adjunct instructor for Jackson State University.

**Stephanie Henderson** (Ph.D., 2017) is an NSF Atmospheric and Geospace Sciences Postdoctoral Research Fellow in the Center for Climatic Research at the University of Wisconsin-Madison. In June 2019, she will begin a position as assistant professor in the Atmospheric and Oceanic Sciences department at the University of Wisconsin-Madison.

**John F. Henz** (M.S., '74) was awarded the AMS Henry T. Harrison Award for Outstanding Contributions by a Consulting Meteorologist "for an exemplary career dedicated to providing innovative, cross-disciplinary consulting services with great integrity to a diverse clientele while advancing the societal applications of hydrometeorology."

**Don Hillger** (Ph.D., '83) was selected as permanent Chief of the Regional and Mesoscale Meteorology Branch within the Center for Satellite Applications and Research / Cooperative Research Program Division. He and the branch are co-located with the NOAA Cooperative Institute for Research in the Atmosphere at CSU.

**Jim Jones** (M.S., 2013) has been appointed as a Technical Fellow at Northrop Grumman. He is a research and development scientist in Bellevue, Neb., where his work is focused on the environmental effects on Department of Defense systems, in particular the upper atmospheric effects on radio wave propagation.

**Steve LaDochy** (M.S., '69) has retired after 47 years of teaching, with 17 years at the University of Winnipeg and 30 years at California State University, Los Angeles.

**Chris Landsea** (M.S., '91; Ph.D., '94) has been promoted to chief of the Tropical Analysis and Forecast Branch at NOAA's National Hurricane Center in Miami. The branch generates wind and wave forecasts for the Caribbean Sea, Gulf of Mexico, tropical North Atlantic Ocean, and tropical northeastern Pacific Ocean.

## Updates from Alumni

**Tristan L'Ecuyer** (Ph.D., 2001), associate professor at the University of Wisconsin-Madison, will lead one of two new NASA CubeSat missions. Projected to launch in 2021, the **Polar Radiant Energy in the Far-Infrared Experiment** will systematically measure, for the first time, spectra of far-infrared radiation that makes up nearly 60 percent of emitted radiation in the polar regions.

**Patrick Minnis** (M.S., '78) received the AMS 2019 Verner E. Suomi Technology Medal for "numerous innovative advances in remote sensing techniques to understand clouds and radiative processes." After nearly 40 years of service, he retired from NASA Langley Research Center in 2017 and continues to study clouds from his home in Raleigh, N.C., as a consulting scientist for SSAI. His main foci are development of climate data records and application of satellite-derived cloud property data for numerical weather prediction and air safety.

**Gerald J. Mulvey** (Ph.D., '77) was elected chair of the Atmospheric Science, Environmental Science, and Physics Department at the University of the Incarnate Word in San Antonio, Texas. He authored or co-authored eight presentations this year and presented "An Introduction to Ethics in Forensic Meteorology" during the AMS short course, The Art & Science of Forensic Meteorology. To date, six students have benefited from Allison and Gerald Mulvey's Saint Patrick of Ireland STEM Scholarship for incoming Choctaw undergraduate students. Mulvey also received an Internal Faculty Research Award to study the structural behavior and thermal properties of modern stabilized adobe brick.

**Walt Petersen** (M.S., '92; Ph.D., '97) of NASA-Marshall Space Flight Center has been awarded the NASA Exceptional Scientific Achievement Medal. This prestigious NASA medal is reserved for exceptional scientific contributions toward achievement of the NASA mission. It is given for individual efforts that have resulted in a key scientific discovery or resulted in contribution of fundamental importance in this field or significantly enhanced understanding of the field.

**Michael Smith** (M.S., 2007) was awarded the Outstanding Contribution to Emergency Management Award by the Canadian federal government. He is chief meteorologist for Yukon Wildland Fire Management in Whitehorse, Yukon Territory.

**Brandon Wolding** (M.S., 2014; Ph.D., 2017) and his wife recently returned to Colorado after a yearlong road trip from Canada to southern Chile. He received a NOAA Climate and Global Change Fellowship (2018-20) and is studying the role moisture plays in the energetics of convectively coupled tropical phenomena at the NOAA laboratory in Boulder.

## Note from Outstanding Alum Xubin Zeng, continued

*Continued from Page 10*

do interdisciplinary research (e.g., combining science with technology). We will also need more scientists who can work with social scientists to translate our results for societal benefits.

**Q:** What is your major advice to graduate students and young scientists in our field?

**A:** You have to be passionate about your research so that you are willing to spend long working hours usually required for making important progress. Besides your expertise in one area,

it is better to develop interests in different areas to ensure a more stable support of your diverse research.

**Q:** What are your suggestions on professional service?

**A:** It is an honor to serve, because the selection of candidates for most positions is very competitive, and because you learn as much from fellow committee members as you contribute. You also need to get prepared to become an effective and efficient committee member by having broad views, being unselfish, understanding the working mechanism of the committee, and seeking first to understand and then to be understood.

## Climate Center continues monitoring, research, services

*Update from Colorado Climate Center Director Russ Schumacher.*

The Colorado Climate Center continues its mission of serving the state by providing climate monitoring, climate research, and climate services. We continue to monitor the climate of our state through maintaining the historic Fort Collins weather station on CSU's main campus, analyzing data from other weather stations throughout the state, and by leading the operation of two important observing networks.

The first you have likely heard of: CoCoRaHS, the Community Collaborative Rain, Hail, and Snow network, which was founded by former State Climatologist Nolan Doesken after the 1997 Fort Collins flash flood. CoCoRaHS continues to collect precipitation observations — an average of about 10,000 per day! — from volunteer observers across the U.S., Canada, and the Bahamas. You can view the data, or become an observer yourself, by visiting [cocorahs.org](http://cocorahs.org).

The second you may not have heard of: CoAgMET, the Colorado Agricultural Meteorological network. The network has now expanded to 85 stations across the state, most of which have data at five-minute time resolution. We are beginning to incorporate the name “Colorado’s Mesonet” to highlight additional uses of the data for weather forecasting and other applications. Visit [coagmet.colostate.edu](http://coagmet.colostate.edu) for a number of ways to find the data, including new mapping features!

Our climate research includes analyzing high-impact weather and climate events in Colorado, including the ongoing exceptional drought in western Colorado, and the unusual



**From left to right, front row: Dani Talmadge, Becky Bolinger, and Noah Newman. Back row: Zach Schwalbe, Peter Goble, Julian Turner, Russ Schumacher, and Henry Reges.**

string of severe hailstorms in eastern Colorado in the summer of 2018. We are also working with the Colorado Wine Industry Development Board to identify new regions that have microclimate conditions that could support growing wine grapes in Colorado.

And we continue to lead significant efforts in climate services, especially related to drought monitoring and early warning in the Intermountain West. Through support from the National Integrated Drought Information System, we produce detailed weekly summaries of current conditions in the Intermountain West to inform the U.S. Drought Monitor, and we are conducting applied research to better understand and depict the precursors and indicators of drought. You can find the weekly drought updates on our website at [climate.colostate.edu](http://climate.colostate.edu), and even sign up for regular drought webinars.

### **The CCC staff is now up to eight members!**

- Russ Schumacher, director and Colorado state climatologist
- Becky Bolinger, assistant state climatologist
- Peter Goble, climatologist and drought specialist
- Noah Newman, CoCoRaHS education coordinator
- Henry Reges, CoCoRaHS national coordinator
- Zach Schwalbe, CoAgMET manager
- Dani Talmadge, CoCoRaHS data quality coordinator
- Julian Turner, CoCoRaHS Web developer and IT coordinator

## PISTON's goal shifts, yielding new typhoon observations

As field researchers know, sometimes the science you set out to do is not what you end up doing. But the drive for knowledge is unwavering, and scientists find a way to get the job done, even if it means changing course, maneuvering bureaucratic hurdles, and waiting out setbacks. Flexibility is key to field campaigns, and sometimes the reward is in the unexpected discoveries.

One team of CSU scientists can attest to this recent experience. Department of Atmospheric Science researchers set sail on U.S. research vessel the R/V Thomas G. Thompson in August and September to study precipitation in the tropical west Pacific. Their project, the **Propagation of Intra-Seasonal Tropical OscillatioNs**, or PISTON, seeks a better understanding of precipitation processes in this area, in order to better understand weather across the Maritime Continent, in southeastern continental Asia, and even in the U.S.

"PISTON had lots of challenges because it was a complex, international experiment. But many of the challenges we faced come with the business of doing this type of science," said Professor Steven Rutledge, lead principal investigator for PISTON's atmospheric component. "In the end, it all worked out."

A complex set of factors contribute to tropical weather, requiring PISTON to be an extensive field campaign involving intensive numerical modeling and observation. Fourteen universities and several national and international organizations collaborated on the project, with funding for the U.S. portion provided by the Office of Naval Research.

As with any job so large and complicated, PISTON encountered some challenges along the way. PISTON was rerouted to international waters far east of the Philippines after the Philippines denied the collaboration permission to conduct research in the South China Sea west of Luzon.

"The change in location allowed us to do different science, to examine the atmosphere and ocean before, during, and after the passage of typhoons," Rutledge said.

Rutledge's research group deployed PISTON's two main instruments for measuring atmospheric properties, the new **SEA-POL C-band polarimetric radar** – on its second assignment since it was designed and built at CSU – and a CSU radiosonde system. The team conducted continuous radar and atmospheric sounding observations on two 30-day cruises, gathering a



The R/V Thompson docked in Kaohsiung, Taiwan. Photo by Professor Eric Maloney

wealth of data that will take at least two years to analyze. Some of the typhoon observations were the first of their kind.

"Going east of Luzon into international waters allowed us to collect some unique, first-time observations where a ship-based polarimetric radar, SEA-POL, documented the precipitation patterns of spiral and outer bands associated with several typhoons."

Before the CSU researchers were able to collect any data, however, they dealt with another setback. One of the R/V Thompson's main engines overheated while sailing from the Bay of Bengal to pick up the PISTON crew in southern Taiwan. It took a full week to replace all the cylinder heads on the engine, while the CSU team waited in Kaohsiung, Taiwan.

Once underway, researchers tracked large rainbands and their interactions with the daily cycle of rainfall, typhoons, and atmospheric waves, using a variety of tools and sophisticated regional models, including the **RAMS model** developed and maintained by Professor Sue van den Heever's research group at CSU. Professor Eric Maloney led development of the science plan for PISTON, and he and scientist Emily Riley Dellaripa headed a major modeling component. Associate Professor Michael Bell and his group led forecasting, providing daily forecast summaries to researchers on the R/V Thompson, and van den Heever and her group were involved in PISTON's numerical modeling activities. More than 20 other graduate students and researchers from the Maloney, Bell, Rutledge, and van den Heever research groups contributed to field observations, forecasting, data processing, and modeling.

# RESEARCH

## RELAMPAGO studies strongest storms on Earth in Argentina

Several Department of Atmospheric Science researchers traveled to Argentina in late October to study the strongest thunderstorms in the world. Assistant Professor Kristen Rasmussen was a key contributor to the campaign called RELAMPAGO (Remote sensing of Electrification, Lightning, And Mesoscale/microscale Processes with Adaptive Ground Observations), which translates to “lightning” in Spanish and Portuguese.

The \$30 million, National Science Foundation-funded field campaign aims to unravel why thunderstorms in Argentina’s Andean foothills are among the most extreme in the world. The scientists will help improve the knowledge and prediction of violent storms in this part of the world, as well as for severe weather in general.

## WE-CAN, continued from cover

The campaign’s objectives were to determine what the smoke is made of, how it changes over time and as it travels, how it affects clouds, how the type of fuel affects smoke composition, and how the fire’s temperature affects the smoke’s chemistry. The results will bring insights on air quality, health impacts, weather, and climate.

Fischer will share preliminary WE-CAN results in a session at the AMS Annual Meeting in January. She was pleased with all the data collected during the campaign.

“We have a beautiful dataset that will answer many of the questions we posed.”

The campaign was primarily supported by the National Science Foundation, with additional support from the National Oceanic and Atmospheric Administration and NASA. The C-130 aircraft is owned by the NSF and maintained and operated by the NCAR Earth Observing Laboratory.

In Fischer’s original WE-CAN proposal, she requested extra flight hours from the NSF to conduct an aircraft observations class following the campaign.

“I thought, ‘What would I like to do if I was a student?’”

Students from several universities, including CSU, the University of Wyoming, North Carolina Agricultural and Technical State University, and the University of Montana,

The project involved about 160 researchers and students from five universities, as well as the Department of Energy, the National Center for Atmospheric Research, and international partners. It was also funded by the National Oceanic and Atmospheric Administration, NASA, and other federal and provincial agencies in South America.

Rasmussen and her graduate students worked primarily with a network of C-Band and X-Band radars, using real-time algorithms to process data as storms developed. They decided where and how the radars should scan, sampling as many storms as possible. Associate Professor Russ Schumacher also led a group in Argentina. His team launched about 100 mobile radiosondes to track the progression of storms. They also contributed to the forecasting for RELAMPAGO.



**WE-CAN scientists Frank Flocke, Emily Fischer, and others on the NSF/NCAR C-130. Photo and cover photo by Bill Cotton Jr.**

learned about aircraft-based atmospheric science in a hands-on format by calling the shots during three educational flights. They learned how to plan and execute flights, analyze the data they collected, and communicate science through short videos. Fischer arranged for the National Public Radio Science Desk to review the students’ videos for real-world feedback.

Mechanical engineering student Ali Akherati found the course rewarding and beneficial to his Ph.D. work. Framing a research question, considering all the factors involved in flying, and communicating research information all were valuable lessons he took away from the class.

“It pushes the boundary of thinking critically in a short amount of time, and you have to have a precise plan,” he said. “I learned how to communicate the science in a simple way with other people.”



**Colorado State University**

**Department of Atmospheric Science  
1371 Campus Delivery  
Fort Collins, Colorado 80523-1371**

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Permit Number 19

## Contact Us

Department of Atmospheric Science  
1371 Campus Delivery  
Colorado State University  
Fort Collins, CO 80523-1371  
Phone (970) 491-8682  
[www.atmos.colostate.edu](http://www.atmos.colostate.edu)

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## CSU Atmospheric Cyclists win Bike to Work Challenge

The CSU Atmospheric Cyclists, a team of Department of Atmospheric Science and Cooperative Institute for Research in the Atmosphere members, won this year's Bike to Work Challenge, held April 30 until Bike to Work Day on June 27 and sponsored by the city of Loveland.

The team of 41 Atmospheric Cyclists, organized by CIRA researcher Kyle Hilburn, logged 7,367 miles and 809 commute days, which was estimated to have saved 295 gallons of gas. The team included Kyle Hilburn, Rob Nelson, Andrea Jenney, Ezra Levin, Yann Blanchard, Russell Perkins, Tommy Taylor, Leah Grant, Peter Marinescu, Jaime Joseph, Wesley Berg, Chris Kummerow, Paul Ciesielski, Wayne Schubert, Anna Hodshire, Emily Fischer, Nichols Geyer, Bryn Ronalds, Steven Brey, Stacey



Kawecki, John Knaff, Will Lassman, Jakob Lindaas, Michael Natoli, Jennie Bukowski, Kyle Chudler, Zitely Tzompa Sosa, Paul DeMott, Mark Branson, Kelley Branson, Marie McGraw, Rick Schulte, Jared Brewer, Jun Uetake, Ya-Chien Feng, Eric Maloney, Joe Messina, Phil Partain, Ryan Gonzalez, Annette Foster, and Samantha Gillette.