



UNIVERSITY *of* WASHINGTON

## DEPARTMENT OF ATMOSPHERIC SCIENCES

### A message from the Chair



Although I only started as chair this past summer, the past six months have been a continuous reminder of the energy and productivity of this department. I want to start by thanking Cecilia Bitz, who led the department as chair for the past three years.

Cecilia's selfless dedication to the department and leadership helped navigate us through that extraordinary time. While effects of the pandemic remain, the department has adapted well, and the excellence in research and education for which we are known is apparent every day.

At the start of my chairship, we learned that the department was ranked as the top Atmospheric Sciences department in the world by the Shanghai Ranking of World Universities. Of course, many of you know that our department has been internationally renowned for 75 years. Being chair has only reinforced what I knew intuitively, that our reputation is due to the dedication and hard work of our students, faculty, postdocs, and staff, and to the support we receive from alumni, partners, and friends.

Going forward as chair, I plan to build on our reputation as a global leader in atmospheric sciences, with an aim to catalyze new opportunities for our faculty and students to advance our foundational understanding of the atmosphere and its interactions with the other components of the Earth system, and to leverage that understanding towards addressing society's needs.

The atmosphere is at the center of many of our most pressing environmental problems, and our faculty and students are continually making advances toward addressing them, such as improving the forecasting of severe weather or weather that will happen weeks away, creating new models to determine the full impacts of climate change on biodiversity and food security, and improving our understanding of both the sources and intensity of air pollution.

Achieving these goals and making the most of our department's scientific advances requires increasing the diversity of our community, expanding the reach of our educational and research opportunities, and collaborations within and beyond the university to engage with experts in global health, computer science, and engineering. I am looking forward to creating and supporting initiatives in these areas.

I hope you enjoy reviewing just some of the many honors and accomplishments achieved by our faculty and students over the past year. I will conclude by highlighting three of our faculty. First, a warm



welcome to our newest faculty member, but certainly no stranger to our department, Dr. Peter Blossey. He is an expert in atmospheric convection and cloud-climate interactions and was hired as a Research Associate Professor this past year. We were also honored to award Professors Alex Turner and Alexander Anderson-Frey the *Calvin Professorships in Atmospheric Sciences*. Created with a generous gift to the department, these term professorships will provide financial support for their research into climate forcings and extreme weather, respectively.

I wish you a happy new year and look forward to hearing from you or even catching up in person at one of our public lectures or social gatherings.



Joel Thornton  
Professor and Chair

---

## Atmospheric Sciences Leads International Research Program Bermuda boundary Layer Experiment on the Atmospheric Chemistry of Halogens (BLEACH)

---

*By Professors Becky Alexander and Joel Thornton*

In late May 2022, scientists from the University of Washington, University of California at Los Angeles, the University of York (UK), and the National Oceanic and Atmospheric Administration (NOAA) traveled to Bermuda to begin the installation of a new 30-foot (10 meter) sampling tower and accompanying suite of state-of-the-art research instruments at the Tudor Hill Marine Atmospheric Observatory (THMAO) operated by the Bermuda Institute of Ocean Sciences (BIOS). The location on a remote island in the middle of the North Atlantic Ocean provides a valuable opportunity to study long-range transport of materials across entire ocean basins.



*The BLEACH project leverages the BIOS-operated Tudor Hill Marine Atmospheric Observatory, which has operated since 1988 to collect year-round data on the chemical and physical properties of the atmosphere.*

The project, called the Bermuda Boundary Layer Experiment on the Atmospheric Chemistry of Halogens (BLEACH), aims to study the impacts of bromine, chlorine, and iodine—elemental gases known as halogens—on the marine atmosphere. The team will visit the site twice for a period of five weeks each, once already during summer 2022 and again during winter 2023. During these visits, they are deploying scientific instruments on the new sampling tower and at an offshore navigation beacon, located approximately 5.5 miles (10 km) off Bermuda's southern coast.

In the early 1980s, scientists discovered that drastic depletions in the ozone layer in the stratosphere (6 to 31 miles, or 10 to 50 kilometers above Earth's surface) above Antarctica coincided with high levels of the halogen chlorine. Ozone in the stratosphere absorbs harmful ultraviolet (UV) radiation, protecting life on Earth. The near-destruction of the stratospheric

ozone layer in the springtime over the Antarctic prompted the development and ratification of the Montreal Protocol to phase out ozone-depleting chlorofluorocarbons (CFCs)—a man-made source of halogens—worldwide by 2008.



*UW's Phil Rund and Dr. Ben Lee and other members of the BLEACH team taking a break from carrying the UW's Chemical Ionization Mass Spectrometer (CIMS) up the stairs to the top of the 10-m tower. The CIMS gives online 1 Hz measurements of a suite of gas-phase compounds including reactive halogens targeted for this campaign.*

In the troposphere, halogens originating mainly from sea salt aerosol and the surface ocean, act to deplete surface ozone and cleanse the atmosphere. The chemical reactions that generate reactive halogens in the troposphere are not well understood, but when current understanding is implemented in our computer models of atmospheric composition, the resulting halogen induced chemistry has profound effects on important trace gases such as ozone and methane. These issues motivate the BLEACH field campaign to better understand halogen chemistry.

With funding from the US National Science Foundation's (NSF) Atmospheric Chemistry Program and the UK Natural Environment Research Council, the BLEACH team is measuring halogen species (bromine, chlorine, iodine), ozone, nitrogen oxides, and other environmental parameters in the troposphere, such as wind speed and direction. During each of the five-week research periods, the team will also conduct sampling of the inshore seawater to better assess the cycling and fluxes of some of these chemicals between the ocean and the atmosphere.

A variety of specialized instruments and measurement techniques are being employed by the BLEACH team

to quantify both reactive gases and particulate halogens (also known as aerosols). Combined, a total of eight scientific instruments from four institutions will be utilized during the project, each designed to measure different halogen species and abundances.

The observational data will be interpreted using numerical models run at the UW and the U. York to provide a quantitative understanding of the sources and sinks of halogens in the marine atmosphere. The combined observational and modeling approach will result in a more accurate assessment of the impact of halogen chemistry on the atmosphere and an improved capacity to predict the impact of climate change on the composition of marine air.



*A high-volume aerosol sampler on top of a 23-m (65 ft) tall sampling tower at the Tudor Hill Marine Atmospheric Observatory. Filter samples are sent back to the UW to measure the chemical composition of the aerosol, including iodine, chloride, bromide, and sodium.*

---

## **Training the next generation: UW students take innovative instruments course at Pacific Northwest National Laboratory**

---

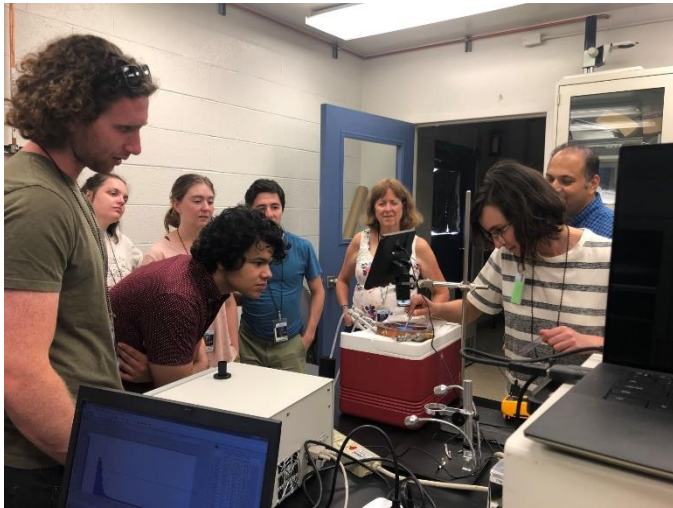
*By: Prof. Lynn McMurdie (UW) and Kristina Palmer (PNNL)*

This September, nine UW atmospheric sciences graduate students traveled to the Pacific Northwest



National Laboratory (PNNL) in Richland, WA, to partake in a special two-week class taught by PNNL scientists and engineers in conjunction with the UW's Department of Atmospheric Sciences.

This unique and creative course on atmospheric instrumentation was made possible by donors who generously support various fellowship funds in the Department of Atmospheric Sciences, including the Joost A. Businger Endowed Fellowship. These funds covered the lodging and transportation expenses,



*Graduate student, Emily Tansey performs an experiment on super-cooled water as other UW students watch. PNNL scientist, Gourihar Kulkarni, watches from behind Tansey*

enabling the students to travel and study at PNNL. Students learned about atmospheric instrumentation, calibration and accuracy, and data analysis techniques from world-renowned experts in the field. These instructors reinforced their lectures through experiments, demonstrations, computer activities, and in-depth tours of labs at PNNL. The participating students came from a wide range of research interests and expertise, but they all shared a desire to learn more about state-of-the-art, research-quality instrumentation that they may potentially use in their own research or future careers.

“I think it was a really unique experience to not only see the instrumentation and learn about how it operates, but to see many of them demonstrated in person, taking real-time measurements,” said graduate student, Andrew DeLaFrance.

The course also opened the eyes of the students to the breadth and depth of available data from the Department of Energy Atmospheric Radiation

Measurement (ARM) data sites. Graduate student Jacqueline Nugent had used some ARM data early in her studies, but said “I’ll likely incorporate some [additional ARM] data into my research moving forward to make new comparisons between observations and model output”.

This course, originally envisioned by Professor Emeritus Robert Houze, a former Joint Appointee with UW and PNNL, and Laura Riihimaki of PNNL, was first held in 2017. The intent was to offer the class every two or three years, but the global pandemic made it difficult to host the in-person course prior to this fall. This year the course was cooperatively organized by Lexie Goldberger, a former UW graduate and current earth scientist at PNNL, and Lynn McMurdie, a research associate professor in the UW's Department of Atmospheric Sciences.

Goldberger coordinated and hosted the students at the Lab. She enlisted the support of 16 PNNL scientists and researchers to lecture and demonstrate instrumentation to the students. Her labor was rewarded throughout the course. She said, “It was fun and exciting to see my fellow co-workers talk about what they are passionate about.” The passion of the PNNL scientists was keenly apparent to the students. “Every scientist we heard from was enthusiastic to spend time sharing their work with us,” DeLaFrance said. “I really liked how researchers with various expertise came to give us lectures and tours in the labs every day and how they were passionate about their work,” said fellow graduate student, Celeste Tong.



*Travis Aerenson, Andrew DeLaFrance, Piero Rivas, Raghu Krishnamurthy (PNNL scientist). Front row: Lexie Goldberger (PNNL scientist), Emily Tansey, Celeste Tong, Clayton Sasaki, Jacqueline Nugent, Piero Rivas, Bree Tatum, Lynn McMurdie (UW instructor). Photo courtesy of Andrea Starr, PNNL*

“This course taught at PNNL by PNNL scientists opened the eyes and minds of the students about complex research-quality instrumentation. All the students gained a greater appreciation for what scientists and engineers do with instrumentation, how they calibrate an instrument, and how to interpret the data correctly to gain scientific insight into earth system science problems,” said McMurdie. “It also exposed them to what it is like to have a career in a government lab like PNNL, a career path many of them had not known about or considered before.”

This course provided practical experience and theoretical foundations in how observations are made. The students will receive credit for the course and each student is currently completing a project under the guidance of a PNNL scientist on one of the topics of study using research data available from PNNL.

Goldberger’s enthusiasm for inspiring students is plain to see. “They are students today, but they are scientists tomorrow,” said Goldberger. “This cooperative venture with UW is a forward-looking project. We are investing in these future scientists. They will remember the Lab and its facilities with good memories.” The success of the 2017 and the current 2022 PNNL-UW instruments courses has convinced McMurdie that this cooperative venture should be offered every two or three years.

*For information on how to support educational and research opportunities like these, please contact the Department of Atmospheric Sciences’ Advancement liaison, James Anderson, at [jamesa7@uw.edu](mailto:jamesa7@uw.edu).*

---

## Convective Process Experiment- Aerosol and Wind (CPEX-AW): Tropical field campaigns in the age of Covid

---

*By Edoardo Mazza and Ariel Jacobs, Graduate students of Atmospheric Sciences*

Deep, thunderous clouds over the remote tropical oceans hold the key to many fundamental processes

within the Earth’s system. They control the hydroclimate of the Tropics, dominate the vertical transport of moisture, and influence the global atmospheric circulation. The historical lack of in-situ observations, however, has hampered our understanding of tropical convection initiation, growth, organization, and decay.

How do you break down such a maze of physical processes? You assemble a state-of-the-art instrument payload, you build a diverse team of scientists, and you head for the tropics. Over the past five years, Professor Shuyi Chen (UW) and Professor Ed Zipser (Utah) led the development of the NASA Convective Processes Experiment (CPEX) field campaigns. The last two deployments, CPEX-Aerosols and Winds (CPEX-AW) and CPEX-Cabo Verde (CPEX-CV), took place on the island of St. Croix in 2021 and in Cabo Verde in 2022. CPEX-AW and CPEX-CV aimed to: investigate the interaction of convective cloud systems, tropospheric winds, and aerosols as part of the joint NASA-ESA Aeolus Cal/Val Tropical Atlantic Campaign, observe the properties of the marine boundary layer in relation to tropical convection, and improve the model representation of convective and boundary layer processes over tropical oceans. Fulfilling the science objectives required a multifaceted approach to exploit the NASA DC-8 payload, which included the DAWN doppler wind lidar, the High Altitude Lidar Observatory (HALO), dropsondes, a 3-band doppler precipitation radar (APR-3), the HAMSR microwave radiometer, and the CAPS spectrometer. Aircraft measurements were also complemented with 6-hourly radiosonde launches from the islands.

The COVID global pandemic brought numerous personal and logistical challenges along the way. CPEX-AW, initially planned for the summer 2020, had to be postponed to 2021 and relocated to St. Croix. The team quickly adapted to the unprecedented time by performing three week-long practice dry runs to fully mimic in-field deployment: a forecast session in the early morning, followed by flight planning and a virtual flight through offline sampling of high-resolution numerical simulations in the afternoon. These comprehensive dry runs led by UW and held with international partners from JATAC made CPEX-AW and CPEX-CV the best prepared field campaigns during COVID-19. More than 120 researchers, including graduate students and postdocs, participated in CPEX-AW in St. Croix, Puerto Rico, and

remotely. On the DC-8 and in the operations center, strict health measures were followed and daily health screenings were put in place for contact tracing.

Ajda Savarin and Edoardo Mazza, UW graduate students, coordinated the 20-member CPEX-AW forecasting team, which included 1st-year UW graduate student Ariel Jacobs. In her first field campaign experience, Ariel was responsible for daily forecasting, assisting radiosonde launches from St. Croix, and supporting airborne dropsonde launches. In the process, she gained an appreciation for the challenges involved in collecting in-situ observations and the collaborative nature of field campaigns. In 2022, Ariel added to her forecasting and radiosonde duties by quality controlling real-time dropsonde data and shadowing the HIWC radar operator. Throughout the campaigns, UW research scientist Brandon Kerns provided real-time daily high-resolution fully-coupled atmosphere-wave-ocean numerical simulations to support forecasting and flight planning.

CPEX-CV provided Edoardo with the unique opportunity to serve as a lead flight scientist in two missions, and as Spider-Man would say, “with great power comes great responsibility.” The daily routine would open with the mission science weather brief, followed by a go/no go decision and the eventual pre-flight brief with the aircraft crew. On the DC-8, the main tasks included monitoring the weather evolution to prepare for in-flight adjustments, periodic check-ins with the instrument teams, and dictating the dropsonde launches. As he is still processing what this hectic experience has taught him, he now truly appreciates all it takes to lead a successful airborne science mission, from careful flight planning, to effective communication and decisive leadership, all while maintaining the flexibility to adapt to ever-changing atmospheric conditions. And he would argue this holds true well beyond the limits of science.

Both CPEX-AW and CPEX-CV were highly-successful endeavors, and we sampled a wide range of targets, including ITCZ convection and nearby Saharan Air Layer outbreaks, Tropical Storm Kate and Hurricane Ida, as well as a number of easterly waves. Among the biggest achievements of CPEX-AW and CPEX-CV were the calibration/validation of AEOLUS satellite wind retrievals, with a total under-flight distance of 5,836 km, and the coordination of co-located dropsonde-saildrone observations at the air-sea interface in collaboration with the NOAA field campaign. Learn

more about CPEX-AW at:  
<https://cpex.jpl.nasa.gov/cpex-aw/>

We would also like to pay tribute to Dr. Gail Skofronick-Jackson, who tragically passed away during the CPEX-AW field campaign. She was instrumental in planning the CPEX-AW field campaign as program manager and advocated for continued operations when faced with the challenges of the global pandemic. She worked closely with Prof. Shuyi Chen throughout the preparations for the CPEX field campaigns. Gail contributed greatly to the field of microwave remote sensing and was a champion for women in STEM and an inspiration to young scientists.

---

## Recent Department Lectures

---

### **Peter V. Hobbs Memorial Endowed Lecture in Experimental Meteorology**

In April 2022, the Department of Atmospheric Sciences hosted Dr. Emily Fischer, Associate Professor of Atmospheric Science, at Colorado State University. Dr. Fischer’s lecture, “Staring into the Wildfire: Using observations to understand wildfires and smoke,” discussed the impacts of the recent increases in



*Dr. Emily Fischer, PhD UW Atmospheric Sciences, is an Associate Professor in the Department of Atmospheric Science at Colorado State University.*

western US wildfire activity that have made wildland



fires and the associated smoke a significant challenge for society.

## Graduate Students' Distinguished Visiting Lecture

In May 2022, the Graduate Students' Distinguished Visiting Lecture was given by Dr. Allison Steiner, Professor of Atmospheric Sciences at the University of Michigan. Dr. Steiner's lecture was titled "*The atmospheric life cycle of pollen.*" Her lecture discussed how atmospheric aerosol particles continue to be a research focus in both atmospheric chemistry and climate, as they can influence climate, alter the formation of clouds and precipitation, and drive air quality. Dr. Steiner spoke of the reasons why the atmospheric processing of pollen is important to atmospheric chemistry, climate, and health.



*Dr. Allison Steiner is a professor of Atmospheric Science in the Department of Climate and Space Sciences & Engineering at the University of Michigan.*

---

## Staff Spotlight

---

### Shana Ava: Atmospheric Sciences' new Administrator

This fall, the department welcomed its newest staff member, Shana Ava. Shana comes to us from the UW's Department of Linguistics. A native speaker of Farsi, Shana grew up in a multilingual household. As a child, Shana's family moved from Iran to Germany as her

father pursued a Masters in German Literature, later moving back to Iran during the 1979 revolution and the war between Iran and Iraq. As a young adult, she moved to the Netherlands, graduating from Hoge Economische School Rotterdam with a BA in International Business Administration. She later married an Angolan-Dutch man (who is also multilingual) and moved to the United States over twenty years ago.



*Shana Ava, Atmospheric Sciences' new Administrator*

Shana has been described as a "proactive and pragmatic problem solver" who is "skilled at bridging diverse communication styles." We look forward to having Shana's experience and skills guiding operations in our department.

---

## Congratulations to our Faculty

---

**Professor Dennis Hartmann** received the American Geophysical Union's Roger Revelle Medal. The Roger Revelle Medal is awarded annually to one honoree in recognition of outstanding contributions in atmospheric sciences, atmosphere-ocean coupling, atmosphere-land coupling, biogeochemical cycles, climate or related aspects of the Earth system.

**Professor Alex Turner** won the UW's 2021-2022 Atmospheric Sciences Teaching Award. This award, coordinated by the graduate students, is given to a faculty member based on student nominations received over an academic year.

**Professors Alexandra Anderson-Frey and Alex Turner** have each been named the inaugural

holders of the Calvin Professorships in Atmospheric Sciences. These professorships will support their research activities into extreme weather and climate forcings, respectively.

**Professor Dale Durran** won the AISIS 2021 prize for outstanding contribution of relevance to society for his lecture “*Can deep learning replace current numerical weather prediction models?*” Professor Durran was also selected for the Jules G. Charney Medal from the AMS. The award is granted to individuals for recognition of highly significant research or development achievements in the atmospheric or hydrologic sciences.

---

## Welcome to our new Postdoctoral Scholars

---

Olga Garmash, Ph.D., *University of Helsinki* (Thornton)

John D'Alessandro, Ph.D., *University of Oklahoma* (Wood)

Tai-Long He, Ph.D., *University of Toronto* (Turner)

Christopher Kenseth, Ph.D., *California Institute of Technology* (Thornton)

Tyler Kukla, Ph.D., *Stanford University* (Swann)

Lucas McMichael, Ph.D., *University of Kansas* (Wood)

Jihong Moon, Ph.D., *Ulsan National Institute of Science & Technology* (Kim)

---

## Welcome to our new Graduate Student Cohort for 2022-2023

---

Alton Daley

Valeria Garcia

Anna D. Hall

Katherine Mifsud

Raul Moreno

Satveer Sandhu

Chad Small

James Yoon

Lily Zhang

---

## Congratulations to our Graduates

---

### ***Bachelor of Science***

Daisy Aguilar-Gonzalez

Noah Solomon Asch

Malcolm Bishop Detering

Nicole Lauren Ferrie

Rachael L Fewkes

Alexander Devereaux

Kamran Nicholas Kazemi

Yu-Chi Kuo

Runjing Li

Jonathan Mingyao Liu

Tyler Qi Liu

Zihui Liu

Emma Sophie Nylund

Connor Jason Oman

Luke Ian Ransom

Rose Lin Yong Schoenfeld

Jacob Townley

Mika Vogt

Alanna Wedum

### ***Master of Science***

**Pedro Angulo-Umana**, The Enhancement of Precipitation due to Mesoscale Convective Organization

**Anna Black**, A Reconstruction of Top-of-the-Atmosphere Radiation Fields During the Instrumental Era

**Mu-Ting Chien**, Representation of the Convectively Coupled Kelvin Waves in Modern Reanalysis Products



**Kaitlyn Confer**, Impact of changing Arctic sea ice extent, sea ice age, and snow depth on sea salt aerosol from blowing snow and the open ocean for 1980-2017

**Vincent Cooper**, Wind waves in sea ice of the western Arctic and a global coupled wave-ice model

**Ursula Jongebloed**, Preindustrial volcanic sulfate aerosol is underestimated in the Arctic: implications for radiative forcing

**Victoria McDonald**, Measuring Kinematic Forcing on Snowbands in Midlatitude Winter Cyclones

**Patrick Murphy**, The Regional Meteorology of California Wildfire Emissions

**Alyssa Poletti**, Diagnosing Stalled Warming in CMIP6 Models

**Molly Wieringa**, The Promise of Sea Ice Thickness: A Data Assimilation Application for Modern Arctic Climate

**Joseph C Robinson**, The role of midlatitude cyclones in the emission, transport, production, and removal of aerosols in the Northern Hemisphere

**Aodhan John Sweeney**, Diurnal Cycles of Synthetic Microwave Sounding Lower-Stratospheric Temperatures from Radio Occultation Observations, Reanalysis, and Model Simulations

**Hua Zhanxiang**, Self-Organizing Maps for the Classification of Spatial and Temporal Variability of Tornado-Favorable Parameters

## ***Doctor of Philosophy***

**Rachel Atlas**, In-Situ Observations and Large Eddy Simulations of Southern Ocean Boundary Layer Clouds (Bretherton)

**Mary Brennan**, Reconstructing Arctic Sea Ice in the Instrumental Era (Hakim)

**Robin Clancy**, Asymmetric Patterns in the Atmosphere and Sea-Ice During Polar Cyclones and their Changes Under Global Warming (Bitz)

**Yue Dong**, Historical pattern effect and its implications for climate sensitivity (Fu)

**Hamid Alizadeh Pahlavan**, The QBO Dynamics and Gravity Waves Characteristics as Seen in ERA5 Reanalysis (Fu)

**Qiaoyun Peng**, Emissions and Chemistry of Reactive Nitrogen in Wildfire Plumes (Thornton)

**Lucas Zeppetello**, A Theory for Summertime Temperature Variability (Battisti)

---

## **Undergraduate Fellowships & Awards**

---

Atmospheric Sciences Undergraduate Student Support Fund:

**John Cramblitt** and **Vlad Munteanu**

Bruce Caldwell Memorial Scholarship Fund:

**Abigail King** and **Linh Vu**

Genevieve and Drew Hamilton Atmospheric Sciences Endowed Student Support Fund:

**John Cramblitt**

Michael and Rebecca McGoodwin Endowed Scholarship in Environmental Conservation, Atmospheric, and Earth Sciences:

**Vlad Munteanu**

Richard and Joan Reed Undergraduate Endowed Scholarship:

**Zhuorui He**

Sally Schoenberg and Randy Poteet Endowed Fund for Student Support:

**John Cramblitt**

---

## **Graduate Fellowships & Awards**

---

James Holton Endowed Graduate Support Fund:

**Alton Daley** and **James Yoon**

Joost A. Businger Endowed Fellowship in Atmospheric Sciences:  
**Satveer Sandhu**

Lorraine and Dennis Hartmann Endowed Fellowship in Atmospheric Sciences:  
**Anna Hall**

Stephen G. Warren Endowed Graduate Student Support Fund:  
**Katherine Mifsud**

William and Carol Lau Term Fellowship in Atmospheric Sciences:  
**Lily Zhang**

Peter B. Wagner Memorial Award for Women in Atmospheric Sciences:  
**Lily Hahn**

Integral Environmental Big Data Research Fund Award:  
**Nikhil Dadheech** and **Molly Wieringa**

National Science Foundation Graduate Research Fellowship:  
**G. Nejlou (Nelly) Emlaw**

National Defense Science and Engineering Graduate (NDSEG) Fellowships:  
**Nathaniel Creswell-Clay**

Provost's Fellowship Award:  
**James Yoon** and **Alyssa Poletti**

CICOES Scholarships:  
**Piero Rivas**, **Shuting Zhai**, and **Ellen Koukel**

CICOES Graduate Student Fellowship:  
**Piero Rivas**

Taiwanese Ministry of Education: Study Abroad Scholarship: **Mu-Ting Chien**

---

## Upcoming Alumni and Friends Event

---

### Reception at AMS 2023, Denver, CO (January 10)

We will be hosting an Alumni and Friends Reception for our department at the 2023 Annual Meeting of the American Meteorological Society in Denver, CO, on Tuesday, January 10 from 7pm-9pm in Centennial Ballroom C. To ensure you receive an email invitation and reminder, please update your contact information by going to <http://atmos.uw.edu/alumni> or by contacting [atmos@uw.edu](mailto:atmos@uw.edu).



*The 2022 UW Atmosphericers performed science and academia themed songs at the recent departmental winter social.*



*The department's current ARCS Foundation Scholars attended the annual luncheon. L to R, Zac Espinosa, Clayton Sasaki, Carley Fredrickson, Nelly Emlaw, Chad Small, and Chair Joel Thornton*



---

## Our Gratitude to our Donors

---

*We are deeply grateful for our community of donors who generously give to the Department of Atmospheric Sciences each year. Philanthropy plays a key role in strengthening the department, which through its excellence in teaching and research, strives to understand and address pressing climate, weather, and air quality issues, and provide communities with valuable, timely observations and forecasts for decision-making.*

*The generosity of our donors also enhances our ability to recruit world-class faculty and students, which in turn, develops the next generation of scientific leaders.*

### ***Making a Gift***

Gifts of all sizes are vital in empowering our community and accelerating their research and scholarship, and we hope you will consider making a gift to a fund or cause that is meaningful to you.

Your gift can be directed to support students, faculty, or programs across the Department of Atmospheric Sciences. To learn more about opportunities to make an impact, we invite you to explore our featured funds at the link below, or contact James Anderson, Director for Advancement for the Department of Atmospheric Sciences at [jamesa7@uw.edu](mailto:jamesa7@uw.edu). The Department's current priority funds are:

- Friends of Atmospheric Sciences Fund
- Atmospheric Sciences Graduate Education Fund
- Atmospheric Sciences Undergraduate Student Support Fund

Additional gift funds can be found at: <https://atmos.uw.edu/alumni-and-community/giving>

To make your gift by phone, please call James Anderson at 206-685-4423, or send a check to the address listed on this page.

Please indicate if your gift is a joint gift so we may recognize your generosity accordingly. Your gift to the

Department of Atmospheric Sciences is also tax-deductible. The University of Washington Foundation is registered as a charitable organization, and its Federal Tax ID number is: 94-3079432

### **Contact Us**

Department of Atmospheric Sciences  
University of Washington  
Box 351640  
Seattle, WA 98195-1640

**Phone:** (206) 543-4250

**Fax:** (206) 543-0308

**Web:** [www.atmos.uw.edu](http://www.atmos.uw.edu)

***The Atmospheric Sciences newsletter is published annually for alumni, friends, and members of the UW's Department of Atmospheric Sciences.***

**Please send alumni news and comments to:**  
[chair@atmos.uw.edu](mailto:chair@atmos.uw.edu)

**Contributors:** Shannon Millican, Anthony Edwards, James Anderson



**Photo Credit: August Mikkelsen,  
UW Atmospheric Sciences graduate**