

DEPARTMENT OF

ATMOSPHERIC SCIENCES

Welcome to the Department of Atmospheric Sciences newsletter

FIRST MIDWEST STUDENT CONFERENCE ON ATMOSPHERIC RESEARCH (MSCAR)

Based on comments in a graduate student survey, then department head **Bob Rauber** agreed it was time for DAS to pursue the ambitious endeavor of launching a conference led by and for students in the Midwest. DAS graduate students Joe Finlon, Holly Mallinson, and Jeff Thayer led the planning efforts with assistance from numerous students, staff, and faculty to create the First Midwest Student Conference on Atmospheric Research (MSCAR) held in October 2017. This conference served as an opportunity for both graduate and undergraduate students to present their research, gain feedback, and network in a small conference setting before attending larger meetings typically held in the winter.

The 12-month planning process led to a successful conference attended by 91 researchers from 11 different schools across the Midwest. During the one and a half day conference, oral and poster presentations were given on a wide range of topics, most of

which specifically focused on the Midwestern U.S. Keynote speakers, Louis Uccellini (NWS Director) and Tom Skilling (chief meteorologist at WGN-Chicago) discussed the importance of communicating and disseminating information about natural disasters to the public. Due to the overwhelmingly positive feedback from the inaugural conference, planning for MSCAR 2018 is underway. ♦



Attendees of MSCAR 2017 in the Illini Union Ballroom after the Keynote Dinner address by Louis Uccellini (center)

FACULTY SPOTLIGHT: Deanna Hence, Assistant Professor

Professor **Deanna Hence** and PhD student Jeff Thayer are using observations collected from one of the most remote places on our globe to better understand the tropical atmosphere. The observations, which Hence helped collect, are from the Dynamics of the Madden-Julian Oscillation (DYNAMO) field campaign of 2011. Hence and Thayer have been using a large-scale initiation of convective storm systems, known as the active phase of the MJO, as a natural laboratory to study tropical convection. They are using high-resolution research radars, atmospheric soundings, and satellite imagery to understand how these large evolving patterns influence the development of convective storm systems within the MJO.

Their work provides new understanding about the evolution of convective storm organization and precipitation processes within

the MJO and how tropical oceanic convection responds to changing environmental conditions more generally. These results are critical for understanding the evolution of the types and behavior of convection within the MJO, which governs how this convection pumps energy into the atmosphere and generates precipitation. For these research efforts, Thayer won an Outstanding Student Poster Award at the 2018 American Meteorological Society Hurricane and Tropical Meteorology Conference. The paper on this research has been conditionally accepted at *Monthly Weather Review*; be on the lookout for the publication later this year. ♦



From Bob Rauber, the outgoing department head and new SESE director



Time flies. It seems like yesterday that Don Wuebbles passed the helm of department leadership to me. Yesterday, in fact, was 2006 and today is 2018. Time indeed flies. It has been an honor, and truly a humbling experience to serve the faculty, students, staff, and alumni of the Department of Atmospheric Science as your department head. As I look back, we have come a long way. In 2006, we were just ramping up our new undergraduate major. Now we have one of the highest ranked undergraduate programs in the country. Our graduate program has grown substantially, and our faculty, with their students, have led the way in their respective research areas. Our department is known worldwide for its excellence in research. I attribute all of our success during my years as department head to the incredible efforts of our superb faculty, and especially our students, who, frankly, are the best anywhere!

Back in 2006, when I became department head, we were housed in our little building on South Gregory Street. We didn't have enough space for our students and staff, so the University had us occupy two little, white dilapidated houses, one on the corner of Goodwin and Green and the other in the parking lot behind the ATMOS building. We were struggling trying to find a home for our expanding computing infrastructure. WHAT A CHANGE IN 2018! The department is now in the Natural History Building. The building, completely renovated, is a 21st century structure with a beautiful 19th century façade. We now have state-of-the-art classrooms, an instrument lab, a synoptic weather laboratory, and a data visualization laboratory. Our graduate student spaces are twice as large as in the old building. We have space for everyone, and we are right on the Quad, in the heart of campus. Our ever-growing computer cluster is now housed in the Advanced Computing Building in an environment designed for computer systems. Please stop by and see our new home! You can count on a personal tour from me!

So as I pass the helm to our next leader, Jeff Trapp, and take on my new role as director of the School of Earth, Society, and Environment, I can assure all of you reading this that the department's future is in good hands. Jeff has great ideas and the dynamic energy required to move our department into the future, and I can't wait to be part of all of the new exciting adventures ahead. ♦

Thank you, everyone, for the honor and pleasure of serving the department.

Bob Rauber

Director, SESE

From Jeff Trapp, the incoming department head



I'm honored to be given the opportunity to help guide the department through its next phase, and build on Bob's countless accomplishments as head. I've already had the pleasure of welcoming our ten new graduate students to campus, and enjoyed meeting many of our 22 new undergraduates during the annual cookout.

I feel so fortunate to be affiliated with such a vibrant group of students, and such an active and engaged faculty! Check out the articles on Professor Deanna Hence and her group (p. 1), as well as the reports by the SOCRATES team (p. 3), and then follow us on Facebook (@dasuiuc) and Twitter (@DAS_Illinois) for more highlights on the exciting work by our faculty and students. This will be a busy year for DAS, complete with two major field campaigns, the Second Midwest

Student Conference on Atmospheric Research, and more high-profile research activities. In addition, we are making plans to deploy our SCAMP instrumentation suite (see the Summer 2016 Newsletter) to the roof of NHB, and even add a 915 MHZ wind profiler to this suite, all of which will enhance our teaching and research infrastructure. We are developing the capacity for online instruction at the graduate level, and ultimately the possibility of an online degree program, to better serve our students locally and worldwide. Finally, we will soon begin the process of forming an Alumni Advisory Board to help us gain from your experiences and better ensure the success of our graduates in their careers. Indeed, we value your input, so please don't hesitate to send us a note or keep us posted on your careers and accomplishments. And echoing Bob: Please plan to stop by if you're ever back in Campaign-Urbana! ♦

Jeff Trapp

Head DAS

ANNOUNCEMENTS

- Professor **Ryan Sriver** has been promoted to associate professor with tenure. Congratulations, Ryan!
- Professor **Jeff Frame** received the LAS Award for Excellence in Undergraduate Teaching by Instructional Staff. Congratulations, Jeff!

SOCRATES: The Southern Ocean Clouds, Radiation, Aerosol, Transport Experimental Study



Image from the NCAR/NSF G-V aircraft, flying at the top of a stratocumulus deck over the Southern Ocean. Photos courtesy of Professor Sonia Lasher-Trapp.

Imagine flying from the land of koalas and Tasmanian devils towards Antarctica, sampling clouds in a G-V aircraft for six to seven hours over the turbulent Southern Ocean. Sometimes the clouds contain supercooled water that freezes on the aircraft and its probes, and the aircraft has to exit the cloud to burn it off safely. Such was the experience of a group of

DAS faculty and graduate students in January and February 2018 during the SOCRATES field campaign. This international effort was designed to collect new observations of aerosol and clouds over the Southern Ocean, down to 62°S, which were heretofore rare. Clouds in this region are critical to understanding and predicting the global climate, yet satellite observations and global modeling results often conflict regarding cloud frequency, longevity, and phase (liquid versus ice).

Professors **Bob Rauber** and **Sonia Lasher-Trapp**; former DAS faculty member Greg McFarquhar; research scientist Brian Jewett; and graduate students Joe Finlon, Dan Stechman, and Emma Scott participated. The DAS team is evaluating and understanding the tendency of these clouds to remain supercooled liquid rather than ice at temperatures below freezing. Airborne radar, aerosol, and microphysical probe observations,

as well as numerical modeling, are being used to study supercooled stratiform clouds, cumulus clouds, and even atmospheric rivers, over the Southern Ocean. ♦



A subset of SOCRATES participants, including DAS members Dan Stechman (back, far left), Professor Bob Rauber (back, far right), Emma Scott (front, second from left) and Joe Finlon (front, center). Missing from photo is Professor Sonia Lasher-Trapp.

My SOCRATES Experience, by Joe Finlon



Joe Finlon as flight scientist for SOCRATES research flight 09.

During January and February 2018, I had the opportunity to participate in a portion of the six-week SOCRATES field project stationed in Hobart, Tasmania. I assisted in the collection and processing of microphysical data from instruments aboard the National Center for Atmospheric Research G-V aircraft. I attended daily forecast briefings led by the Australian Bureau of Meteorology that involved lively discussion about the timing and logistics of flight operations over the Southern Ocean. I was given the opportunity to construct a flight plan and serve as flight scientist for a

mission. Collecting data from the air gave me a really unique perspective on the degree of heterogeneity within some of these clouds. My participation during SOCRATES was an invaluable experience as an early career scientist, and I'm looking forward to continuing collaborations with project participants as we learn more about meteorology in an understudied region of our planet. ♦



Students pose in front of a supercell thunderstorm south of Goodland, Kansas, on May 25, 2017. From left to right: Lauryn Such, Alex Erwin, Ben Bleiman, Tyler Young, Adam Springer, Jason Maska, Kait Neibarger, Antonio Elizondo, Lauren McGinnity-Boswell, Anthony Grande, Marley Majetic, Devin Chehak, and Lydia Jaja.

ATMS 324: Field Studies of Convection

While most storm observers would likely describe the 2017 spring storm season on the Great Plains as mediocre, the University of Illinois Field Studies of Convection courses still enjoyed great successes, with both trips witnessing tornadoes and numerous supercells, mesocyclones, and shelf clouds. Highlights of the trips include a tornado near Great Bend, Kansas, on a Storm Prediction Center High Risk day on May 18; a striated supercell near Goodland, Kansas, on May 25; a long-lived supercell in North Dakota on June 9; and four tornadoes on the High Plains on June 12. ♦

DAS graduates pursue careers in risk analysis

Risk analysis in weather and climate has transformed the educational landscape in atmospheric science. Our students have the opportunity to develop the skills necessary to compete for careers in this area and many of our recent graduates are working in insurance, reinsurance, and agribusiness. Kevin Van Leer (MS, '13) is now working as a manager of client solutions at Cape Analytics Inc., an AI technology company serving the insurance industry with underwriting property intelligence. He was previously a catastrophe-model product manager for Risk Management Solutions, Inc. Spencer Guererro (MS, '15), who as a master's student developed a predictive model to purchase natural gas on the futures market based upon weather forecasts, was hired by AXIS Reinsurance where he is developing software that manages their complex financial investments and assess profits and loss. Five of our former students, Bill Turner (BS, '13), Adam Burns (BS, '14; MS, '16), Matthew

Reardon (BS, '16), Emily Hogan (PhD, '18), and Andrew Huang (MS, '18) have worked for Agrible, Inc, a predictive analytics company in agriculture founded by Eric Snodgrass (Director of Undergraduate Studies). Their work is crucial to the development of products and tools that aid farmers, retailers, seed companies, and large corporations like ABInBev, Kellogg's, and ADM in their decision making. Each of these students left our program trained in advanced computing techniques that specialized in data analysis and dynamical/statistical modeling, and their early careers have been fruitful and full of opportunity. Given this success, we are routinely teaching courses in advanced computing, risk analysis, and dynamical modeling, and our research programs are incorporating more private sector applications. We are excited to see this area grow in our program as we train the next generation of atmospheric scientists. ♦

SOARS satellite...

Professor **Deanna Henc**e uses any opportunity she can to not only discuss her scientific research, but also the need for broadening pathways into learning and participating in geosciences. An alumna of the University Corporation for Atmospheric Research (UCAR) Significant Opportunities in Atmospheric Research and Sciences (SOARS) program, she credits being involved in her first field campaign, doing her first real and meaningful research, and opening her eyes to the possibilities in the atmospheric sciences to that experience. Determined to help as many students have transformational opportunities like that as possible, she is now a co-PI with SOARS to develop a UIISOARS satellite program.

The key is to adapt the program from a federal lab to a university environment. Being on a large university campus, she sees an immense opportunity to partner with fellow faculty, students in the department, our wide array of support resources across the university, and our two-year colleges in the state of Illinois. Using the SOARS program as a model, she is developing a network of mentorship, professional development and early research experience whose goal is to not only smooth the transition of transfer students into the program, but also support all students within the department. These efforts have the potential to revolutionize the support of students, especially underrepresented students, in the atmospheric sciences. ♦



Deanna with UIISOARS's first student in summer 2017. (Photo credit: Jeff Thayer)

Annual Ogura Lecture Series 2017 and 2018



Katharine Hayhoe (Photo Credit: Chris Soldt, Boston College)

The 2017 Ogura Lecturer was **Katharine Hayhoe**. She is a professor in the Department of Political Science and director of the Climate Science Center at Texas Tech University. Hayhoe holds a master's and PhD from the Department of Atmospheric Sciences at the University of Illinois at Urbana-Champaign. Her research currently focuses on establishing a scientific basis for assessing the regional to local-scale impacts of climate change on human systems and the natural environment. She is also the founder and CEO of ATMOS Research, a company which bridges the gap between scientists and stakeholders to provide relevant, state-of-the-art information on how climate change will affect our lives to a broad range of non-profit, industry and government clients. She has received numerous awards and recognitions, including the American Geophysical Union's Climate Communication Prize, the President's Mid-Career Faculty Award at Texas Tech University, and the Chancellor's Council Distinguished Research Award from Texas Tech University. In 2014, she was named one of TIME's 100 Most Influential People. In 2015, she was named one of the Huffington Post's 20 Climate Champions. And in 2017 she was named one of FORTUNE's world's greatest leaders.

Hayhoe is a scientific advisor to Citizen's Climate Lobby, the EcoAmerica Moment US project, the Energy and Enterprise Initiative, the Evangelical Environmental Network, and the International Women's Earth and Climate Initiative, and also serves on national advisory boards of several institutions. The second edition of her book, "A Climate For Change: Global Warming Facts for Faith-Based Decisions," is now available. ♦



Edward Zipser

The 2018 Ogura Lecturer was Professor **Edward Zipser**. Zipser has been on the faculty of the Department of Atmospheric Sciences at the University of Utah since 1999. He received his PhD in 1965 from Florida State University. He then spent 24 years at the National Center for Atmospheric Research, serving in many roles including director of the NCAR Convective Storms Division. He left NCAR in 1990 for academia, joining the Department of Meteorology at Texas A&M, where he served as department head from 1990-1995. In 1999, he moved to the University of Utah, where he served as chair of their department between 1999 and 2005.

Zipser is a world expert in hazardous weather events such as thunderstorms, squall lines, flash floods and hurricanes, particularly through pioneering studies using aircraft and satellites. A consummate field scientist, he has over 50 years of experience in field campaigns, including groundbreaking projects such as GATE, BOMEX, Pre-STORM, and TOGA-COARE. His 1977 paper discussed, for the first time, aircraft-observed airflows within the stratiform and convective regions of organized convective systems in the tropics (back when research aircraft could fly through convection), which in a later 1982 paper he coined for the first time, the term "mesoscale convective systems." Zipser served on the Science Team for the highly successful TRMM satellite that first mapped global precipitation across the tropics. He and his students led important studies using TRMM data to map tropical precipitation systems and led the team of scientists that conducted TRMM "ground validation" field campaigns in Texas, Florida, Brazil, and the Marshall Islands. He was instrumental in the mission formulation and validation campaigns for the currently flying follow-on mission, the GPM mission.

Zipser is a fellow of the American Meteorological Society, and received the Society's highest research award, the Carl-Gustav Rossby Research Medal in 2016. The Society also honored him as the Walter Orr Roberts Lecturer in 2010. ♦

Ogura Awards for 2017

- Outstanding Senior: **Rachel Gutierrez**
- Outstanding Research Paper: **Gan Zhang**
- Outstanding Teaching Assistant: **Andrew Huang**
- Outstanding Undergraduate Research: **Amy Chen, Mekensie E. Schell, Vince C. Schaper, Benjamin O. Bleiman, Eli J. Turasky, Rachel Gutierrez**
- Mankin Mak Scholarship: **Dong Wan Kim**

Ogura Awards for 2018

- Outstanding Senior: **Dong Wan Kim**
- Outstanding Research Paper: **Jeff Curtis**
- Outstanding Teaching Assistant: **Kevin Gray**
- Outstanding Undergraduate Research: **Devin Chehak, Alexander Erwin, Dong Wan Kim, Angelica Marchi, Lauryn Such, Sarah Szymborski, Javier Villegas Bravo, Brittany Welch, and Troy Zaremba**
- Mankin Mak Scholarship: **William Smith**

Alumni in the spotlight

Jessie Choate, BS, '14; MS, '16



What have you been up to since your time at DAS?

After finishing my master's I moved to Norman, Oklahoma, and began working for the Cooperative Institute for Mesoscale Meteorological Studies (CIMMS) and the National Severe Storms Laboratory (NSSL) as a member of the Warn on Forecast (WoF) team. I work with the WoF prototype, the NSSL Experimental Warn-on-Forecast

System for ensembles (NEWS-e). My job allows me to explore many aspects of this ensemble system but the majority of my work includes post-processing, verification, web development, and working within the Hazardous Weather Testbed. In my free time I am usually with my two Australian cattle dogs, baking cakes, or doing home DIY projects.

How have you benefitted from your degree in atmospheric sciences from the University of Illinois?

Getting both my BS and MS from U of I allowed me to be extremely well-rounded in the different aspects of atmospheric sciences. While many schools focus their courses on one subject, Illinois's diversity in course topics and the quality of professors teaching those subjects allowed me to get bits of knowledge in a variety of areas which I have found extremely useful in the research environment. Also, during my time at U of I, I was allowed to work at the television station part-time. The people skills and communication skills I obtained during that time has been extremely valuable.

What's next for you?

I am currently working within the Hazardous Weather Testbed for the Spring Forecasting Experiment and I hope to take the data I collect and get deeper insights into how operational forecasters view different probability graphics and use a web interface during severe weather in hopes of applying this knowledge to NEWS-e. I am also halfway through my master's of business administration from the University of Oklahoma, where I take several courses a week at night. I am getting a specialization in the energy industry and hope to continue to apply my meteorological knowledge across different platforms. ♦

Junshik Um, MS, '04; PhD, '09



What have you been up to since your time at DAS?

After receiving MS and PhD degrees in 2004 and 2009, respectively, from DAS, I stayed at DAS for as a post-doc and then as a research scientist. In August 2017 I moved to Oklahoma and joined the Cooperative Institute for Mesoscale Meteorological Studies (CIMMS) as a research scientist. And then after seven

months at CIMMS, I accepted a faculty position offer from the Department of Atmospheric and Environmental Sciences at Pusan National University, Busan, Republic of Korea, on March 2018. My research interests are the microphysical and radiative properties of clouds using in-situ aircraft measurements and theoretical calculations.

How have you benefitted from your degree in atmospheric sciences from the University of Illinois?

Although I did not completely realize it at the time, I had very high-level training from professors and colleagues at DAS. The classes, seminars, and advice I got at DAS became part of me and motivated me to keep doing research.

What's next for you?

I will keep working on my research and teaching. A goal for the next several years is to set up my research group: receiving graduate students and research funding, building computing clusters, and proposing in-situ research flights. ♦

Other alumni updates

Zach Wienhoff (BS, '13) is now engaged to Jessie Choate (BS, '14; MS, '16); see above!

Jason Keeler (MS, '10; PhD, '15) is a new assistant professor in the Department of Earth and Atmospheric Sciences at Central Michigan University.

Bobby Jackson (PhD, '15) is now a postdoctoral research associate at Argonne National Laboratory in Lemont, Illinois.

Wendi Flynn (MS, '10; PhD, '12) has been granted tenure and is now an associate professor of Earth Sciences at the University of Northern Colorado.

Don't forget to keep us posted on your updates! ♦

In Memoriam

Michael E. Schlesinger

1943–2018

(The following is an excerpt of a tribute to the late Professor Michael Schlesinger, courtesy of Professor Don Wuebbles. This appeared in the Bulletin of the American Meteorological Society)

Michael E. Schlesinger, an atmospheric scientist and a professor at the University of Illinois, died on April 11, 2018, at the age of 74. Michael's scientific research was especially distinguished by his fundamental and applied studies of the Earth's climate system and the studies he did of the potential policy implications of climate change. He was an expert in the modeling, simulation, and analysis of climate and climate change, with interests in simulating and understanding past, present, and possible future climates, climate impacts, and climate policy.

Michael had been researching climate and climatic change since 1973 when he worked at the Rand Corporation while also completing his PhD at the University of California, Los Angeles (UCLA). Among the many highlights of his career, Michael carried out the first detailed comparison of climate and climate changes simulated by different atmospheric general circulation models (GCMs). In a series of papers, Michael, in coordination with Larry Gates while they were at Rand Corporation and later at Oregon State University, had developed and applied an atmosphere–ocean GCM based on the UCLA model. He continued to further develop this model at the University of Illinois, including developing one of the first climate models with interactive chemistry with his then wife, Natalia Andronova. He also developed and worked with simpler models of the climate system in his research.

In the 1980s, Michael was chosen by the U.S. government to be a member of the science team that exchanged science on climate and the environment with USSR scientists in a series of meetings. These meetings led to a jointly published 1990 book, "Prospects for Future Climate: A Special US/USSR Report on Climate and Climate Change," that Michael coauthored.

Michael was a contributing author on the first international assessment of climate change led by the Intergovernmental Panel on Climate Change (IPCC) and on several later assessments; as a result Michael was a contributor to IPCC being awarded the Nobel Peace Prize in 2007. In 1994 he discovered a 65–70-year temperature oscillation in observed surface temperatures for the North Atlantic Ocean and its bordering continental regions, a finding that was reported in *Discover Magazine* as one of "The Top 75 Science Stories" of 1994. In 1996 he published the first simulation of the onset of the last ice age using a coupled atmospheric general circulation/mixed-layer ocean—ice-sheet/

asthenosphere model. Over the years, he also published a number of papers on climate-change impacts and policy, including a series of studies for developing a robust adaptive decision strategy relative to climate change policy. Recent studies had particularly focused on developing a "fair" international climate policy strategy.

Michael received his BS and MS in engineering, and his PhD in meteorology, all from the University of California, Los Angeles. He was a professor at the University of Illinois for 29 years in the Department of Atmospheric Science, and was previously a professor at Oregon State University for 14 years.

Schlesinger is survived by his first wife, Barbara Chesbrough; his children, Mylynda (Mordechai) Massart, Michelle (John) Simpson, Savva Korolev, and Sam Schlesinger; grandchildren, Louren, Noah, Emmit, Elyara, Chloe, and Chayim; sister, Jacqueline Cohan; numerous nieces and nephews; and his beloved dog, Sadie. He was preceded in death by his parents, his second wife, Natalia Andronova; and his brother, Jeffrey Schlesinger.

—Donald Wuebbles. ♦

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