

Issue 10

FALL 2022

Wanda Seyler, Editor

Letter from the Interim Chair, Matt Gilmore



Welcome to the Fall 2022 edition of our yearly newsletter. This has continued to be a positive year of changes with the addition of new faculty members; development of new courses and revamping old favorites; obtaining research grants; and providing experiential learning opportunities to students in both the classroom and research realms.

First, we would like to welcome our new tenure-track faculty member in Atmospheric Sciences: Dr. Jake Mulholland. Please read more about Dr. Mulholland, and the classes he will be teaching, on page 3. We would also like to say thanks for your many years of service to Al Borho (see page 2) and Dr. Mark Askelson (see page 9).

This is Dr. Jared Marquis' second successful year as assistant professor, teaching several graduate-level courses (e.g., Hydrometeorology) and upper-level undergraduate courses (Intro to Synoptic and Intro to Forecasting). In Spring 2023, we are excited that Dr. Marquis will teach an entirely new yearly course called "Advanced Forecasting (ATSC-420)", in collaboration with forecaster guest lecturers from the local National Weather Service office in Grand Forks.

This is also Dr. Montana Etten-Bohm's (or Dr. E-B, for short) second successful year teaching with us. Last year, she taught a couple of sections of ATSC-110 Meteorology 1 online while she was finishing her Ph.D., and this year we are pleased she has joined us in person as an instructional assistant professor! We are already hearing great things about Dr. E-B's classes, which is not surprising given her attention and research expertise in teaching pedagogy.

Several faculty have received new grant funding over the past school year that I would like to highlight. The information can be found on page 12.

Last but not least, I would like to highlight a new and fun opportunity for alumni to contribute to both our education and research efforts. This can also be found on page 12.

In closing, we thank the generous contributions of our friends, alumni, and industry partners who have continued to fund our student scholarships, including the Leon F. Osborne Science in Society Award, the Carlton Bjerkaas scholarship, Frank Bavendick Meteorology Scholarship, and the Science Engineering Associates Scholarship.

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Retirement News

Al Borho retires after teaching Intro to Meteorology for 19 years at UND

Fred Remer presented this at the Department Awards Banquet last April.

Alan Borho started at UND before we offered degrees in Meteorology or Atmospheric Sciences. He lived in Walsh Hall his freshman year and is proud to tell his freshman that he lived in the same dorm (and possible the same room) as they currently do. He earned a degree in geography in 1982 from UND. While an undergrad he worked at Squires Cafeteria and learned skills that would become handy after he was asked to run the cafeteria at Lake Region State College during the flood of 1997.

Al had a varied and distinguished career as UND. He worked as a student teaching assistant from 1981 to 1984 which prepared him to manage the 36 lab sections a year of ATSC 110. In 1984 he was hired as a Doppler Radar Operator and in 1987 became a Research Associate and manager of the Doppler Radar. In 1993 Al added the title of lab coordinator.

Al was Leon Osborne's trusted employee and friend. He worked in the Regional Weather Information Cen-

ter on various projects and was instrumental in forecasting the 1997 flood in Grand Forks.

Al left UND in 1999 to become lead forecaster at Meridian Environmental Technology where he worked shifts for 4 years. He remained there until a position opened on the Atmospheric Sciences faculty with the retirement of Pat Hurley. Al started teaching ATSC 110 classes and coordinating the labs in 2003 and has been going strong ever since.

*During the period 2003 to 2022, Al has taught 38 semester and over 10,000 students (including re-takes!). Al has been the face of the Atmospheric Science department to these students. Tonight the Atmospheric Science department would like to become the **FACE** of Al Borho in recognition of your dedication and achievement.*

Thank you Al for leaving your mark on all of the students you have had over the years! Al will be missed by the students, faculty and staff of Atmospheric Sciences.

Enjoy your retirement, Al!



These 'masks' were handed out at the awards banquet to hold up when Fred said "tonight the Atmospheric Science department would like to become the **FACE** of Al Borho in recognition of your dedication and achievement.

New Faculty Hires

Assistant Professor --Jake Mulholland

Dr. Jake P. Mulholland has joined our department as an Assistant Professor starting July 2022! Jake was recently a Research Faculty Associate in the Department of Meteorology at the Naval Postgraduate School in Monterey, CA.



Jake will be teaching the following courses: ATSC-220: "Extreme Weather and Climate", ATSC-530: "Numerical Weather Prediction", and ATSC-405: "Numerical Methods".

His research includes leveraging observations and running numerical model simulations to better understand environmental influences on deep convective draft properties (width, entrainment, and intensity), along with how these environmental and draft property variations affect deep convective upscale growth.

Jake's interests outside of work include freight train photography/videography, storm chasing, sports, hiking, walks, family time, and hanging with friends. We are excited to have Jake join our dedicated team of professors in Atmospheric Sciences!



If you received a copy of this newsletter in the mail and would prefer to receive it via email, please drop Wanda an email at wanda.seyler@und.edu and she will get you added to the email list.

Atmospheric Sciences Alumni Reception - AMS Denver - January 2023

In Boston 2020 at the 100th Annual Meeting of AMS the Atmospheric Sciences department held an alumni reception with an awesome turnout. It's time to hold another Alumni Reception. So this one will be held in Denver at the January 2023 AMS Annual Meeting.

It is set for Tuesday, January 10, 2023 from 7 - 9 p.m. at the Hyatt Regency Denver Convention Center in the Centennial Ballroom F.

If you wish to be notified about the reception or have any questions, please contact Wanda Seyler at wanda.seyler@und.edu.

I look forward to seeing many of you in Denver and again we will plan to take a group picture that evening!



"A Lifetime of Impact: Leon Osborne"

The Atmospheric Sciences Graduate Student Association have put together a hard copy version of the book titled "A Lifetime of Impact: Leon Osborne". To view this product follow the link to Shutterfly and set up an account. From Shutterfly you will be able to purchase a copy of this book.

[https://share.shutterfly.com/action/welcome?
sid=sAbOWrhy2as2Lyw&cid=SM-
PBAPP](https://share.shutterfly.com/action/welcome?sid=sAbOWrhy2as2Lyw&cid=SM-PBAPP)

33rd Annual Awards & Scholarship Banquet

The 33rd Annual Atmospheric Sciences Awards & Scholarship Banquet was held on Friday, April 22, 2022. The speaker was Melinda Beerends, Meteorologist-in-Charge, National Weather Service, Grand Forks, who started there February 1, 2022.

The following awards were given by the Atmospheric Sciences Faculty, the ASGSA and the UND Student Chapter of the American Meteorological Society.

The following awards were presented to the following undergraduates:

Outstanding Freshman – Abby Wyss; Outstanding Student Broadcaster – Dillon Vogt; Outstanding Undergraduate Teaching Assistant – Austin Krause; Outstanding Undergraduate Student Researcher – David Singewald; Outstanding Sophomore – Payton Braun and Blake Rafferty; Outstanding Junior – Trece Hopp; Bruce A. Smith Aerospace Scholarship – Nathan Dahlseng; John D. Odegard Aerospace Sciences Scholarship – Blake Rafferty and Payton Braun; Outstanding Graduating Senior – Casey Toavs; Outstanding Service to the Department – Cassidy Holth; Science Engineering Associates Scholarship— Lucas Castro; Carlton Bjerkaas Atmospheric Sciences Scholarship –Cassidy Holth, Nicholas Camp, Sara Hall and Samuel Halvorson; Frank Bavendick Meteorology Scholarship - Kassidy Kjos; Leon F. Osborne Scholarship - Trece Hopp

The “Faculty Award” to the Outstanding Undergraduate was presented to B.S. seniors **Dillon Vogt** and **David Singewald** in December 2021. This included a scholarship to be used for their last undergraduate semester at UND.

The UND AMS Student Chapter voted to give the following faculty awards: *Best Freshman & Sophomore Professor – Aaron Scott; Best Junior & Senior Professor – Jared Marquis; Best Academic Advisor – Fred Remer; Golden Reamer Award – Aaron Kennedy & David Delene; 7-Eleven / Most Available Professor – Fred Remer; Night Owl Award—Fred Remer; Best Graduate TA—Ben Remington; Department Powerhouse Award – Sue McWilliams and Wanda Seyler.*

The UND Weather Update Group gave out some fun awards: **Payton Braun**, BS Undergrad Student—*Most Takes*; **Lucas Castro**, BS Undergrad Student—*Longest Caption*; **Shelby Ebertowski**, BS Undergrad Student—*Most Improved*; **Lauren Larsen**, BS Undergrad Student—*Most likely to cancel a show for weather update* and **Blake Rafferty**, BS Undergrad Student—*Best Forecaster*.

The UND AMS Student Chapter held Photo Contests and the Award Winners were: *October 2021—Fall Colors—Kaela Lucke Rosencrans*, MS Grad Student; *Pumpkin Carving Contest—Devin Bissell*, MS Grad Student; *November 2021—Turkeys—Cassidy Holth*, BS Undergrad Student; *February 2022—Optical Illusions—Dillon Vogt*—BS Undergrad Student; *April 2022—Spring on Campus—Julia McGee*, BS Undergrad Student.

Congratulations to all!

UND-AMS Officers 2022-2023

President - Lauren Larsen
Vice President - Cassidy Holth
Secretary - David Brannon
Treasurer - Blake Rafferty
Historians - Keely McLean & Julia McGee
Student Liaison to Undergraduate Curriculum Committee - Trece Hopp
New Advisor—Dr. Jared Marquis



Standing: Keely, Cassidy, Dr. Marquis, Lauren, Trece
Kneeling: Julia, Blake, David

Recent AtSc Graduates

December 2021 B.S. Graduates

Bobby Fleming
Sam Peterson

December 2021 M.S. Graduate

J. Braxton Aldridge
Logan Lee
Sankha Subhra Maitra
Kyle Pederson
Alec Sczepanski
Elizabeth Sims
Greg Sova

May 2022 B.S. Graduates

Joshua Kern
Joshua Nielsen
Aanan Schlieff
David Singewald
Casey Toavs
Dillon Vogt

August 2022 B.S. Graduates

Isaiah Nault

August 2022 M.S. Graduate

Christian Nairy
Logan Twohey



Incoming Graduate Students

The Fall of 2022 we will have four new graduate students working on their Master's. One graduating student will continue on for his Ph.D.

They are: **Taylor McHone**, Evansville, Wisconsin, a 2021 B.S. graduate of the University of Wisconsin, Madison; **Lynnlee Rosolino**, Port Orange, Florida, a 2022 graduate of Embry-Riddle Aeronautical University, Daytona Beach, Florida; **Aanan Schlieff**, Lowry, Minnesota, is a 2022 UND Atmospheric Sciences B.S. graduate; and **Ethan Weisberger**, Randolph, New Jersey, a 2022 graduate of SUNY-Oswego.

Christian Nairy, Webster, New York, received his M.S. in August 2022 from UND AtSc and his B.S. from SUNY-Oswego. He is continuing on for his Ph.D.

Joshua Kern and **Joshua Nielsen**, May 2022 UND B.S. graduates are enrolled in the AtSc Combined Degree program.

Welcome Students!

Interesting Tidbit!

During the summer of 2022 the Atmospheric Sciences department had two current AtSc students and three alum working on the four local network channels (NBC, CBS, ABS, FOX) doing weather broadcasts out of the Fargo studios.



*Our AtSc
students are
Awesome!*

Department News

Dr. **Bruce Lee** presented a virtual talk “*Insights on Tornado Evolution Associated with Supercell Outflow Changes*” at the National Storm Chaser Summit conference held January 21-22, 2022, in Oklahoma City, OK.

Presentations at the National Weather Association 2022 Severe Storms and Doppler Radar Conference held March 31 – April 2, 2022 in Ankeny, Iowa were “*Impact of Storm-Generated Storm Relative Helicity on Low-Level Mesocyclone Development and Intensification in Simulated Supercells*” by **Dr. Cathy Finley**; “*Tornado Heading and Speed Changes Associated with Major Rear-Flank Internal Surges in Supercells*” by **Dr. Bruce D. Lee**. A poster presentation titled “*Storm-Induced Changes in Low-Level Wind Shear in WRF-Based CAMs*” was given by **Ben Remington**, M.S. grad student.

Master’s Graduate Student, **Michael Willette**, traveled to Corpus Christi, TX to attend the 2022 Annual Weather Modification Association Meeting held April 26-29. Michael was a student volunteer to help presenters and ensure remote attendees are able to view presentations.

Postdoctoral Researcher **Marwa Majdi** and Research Professor **Dr. David Delene** concluded a National Science Foundation sponsored project entitled, RAPID: North Dakota Field Measurement Campaign to Improve Understanding of Fog Processes, during May 2022. Improved understanding of fog formation and dissipation has broad societal impacts that enable a more reliable and efficient transportation system. Such improvements are especially critical for routine utilization of Unmanned Aircraft Systems (UAS) in transportation since flights need to be near the ground and out of sight of the operator. The project used observations from the Meteorological Observations Trailer (MetTrailer), which are available from linked on the MetTrailer Website, see <http://mettrailer.atmos.und.edu/>.

Natalie Midzak, Ph.D. student, recently participated in the **National Aeronautics and Space Administration (NASA)** and the **National Science Foundation's National Center for Atmospheric Research (NCAR)** jointly funded two-



month campaign in Summer 2022 in the Republic of Korea: the **Asian Summer Monsoon Chemical & Climate Impact Project (ACCLIP)**. Two aircraft (the NASA WB-57 and the NCAR G-V), outfitted with state-of-the-art sensors completed over a dozen science flights throughout the duration of ACCLIP with the goal of sampling trace gases in the upper troposphere and lower stratosphere (UTLS) associated with the Asian Summer Monsoon. An accurate representation of the transport, microphysical and chemical processes associated with the Asian Summer Monsoon is necessary for chemistry-climate models to predict its future impact in a changing climate.

Ms. Midzak worked in support of the Roscoe lidar, a new, more compact version of the NASA Goddard Space Flight Center (GSFC) Cloud Physics Lidar that has flown on multiple NASA high altitude aircraft over the past two decades. While building on the heritage of the Cloud Physics Lidar, Roscoe is designed to simultaneously observe both upwards and downwards from the aircraft, to enable studies of stratospheric aerosols above flight altitude as well as below. The lidar operates at only 1064 and 355 nm (not 532 nm) to satisfy eye-safety considerations for airborne operation. Roscoe measures depolarization at both wavelengths to characterize the phase of the cloud and aerosol particles detected.

ALUMNI NEWS WANTED

We are looking for news about you to share with other alumni in our upcoming newsletters (information about your current position, significant achievements, family activities, etc.). Also if you could please send us your current e-mail address and address changes it would be appreciated. If you have any ideas or comments about the newsletter, please send them to Wanda at: wanda.seyler@und.edu.

American Geophysical Union (AGU) Annual Meeting

The American Geophysical Union Fall Meeting 2021 was held December 1 – 17 in New Orleans Hybrid style. The following graduate students gave presentations: “*Observations of Chain Aggregates in Florida Cirrus Cloud Anvils during the CapeEx19 Field Campaign*” virtually by **Christian Nairy**, M.S. student and “*An Investigation of Smoke Particle Sphericity Using CATS Data*” in person by **Natalie Midzak**, Ph.D. student.

102ND AMERICAN METEOROLOGICAL SOCIETY ANNUAL MEETING, STUDENT CONFERENCE AND CAREER FAIR

The 102nd Annual Meeting and Career Fair for the American Meteorological Society (AMS) was held virtually January 23-27, in Houston, Texas. **Dr. Aaron Kennedy** traveled to Houston and covered the UND Atmospheric Sciences table at the Career Fair during the hybrid Student Conference visiting with prospective graduate students from all over the U.S. and Canada. Student Conference posters were presented by the following students: “*Verification of High-Resolution Rapid Refresh Forecasts in Support of a Small Unmanned Aircraft Systems Weather Application*” (virtually) by **Brian Horan**, M.S. Student; “*Meteorological Drivers of Blowing Snow Events at the ARM North Slope Alaska Site*” (virtually) by **Talia Kurtz**, M.S. Student; “*A Comparison of Two In Situ Aircraft Probes for Cloud Droplet Measurements*” presented by **Trece Hopp**, a B.S. student.

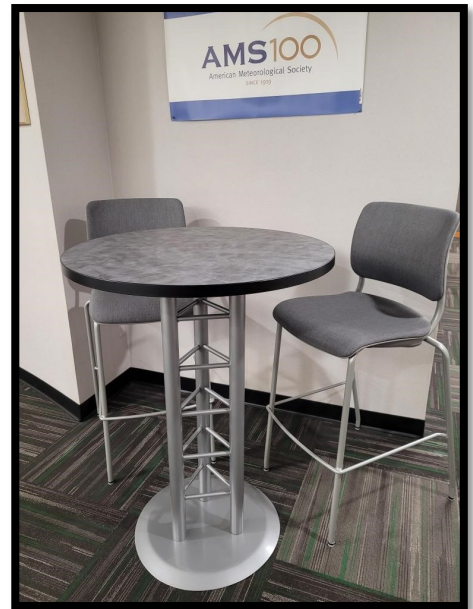
Oral presentations were given virtually by the following: “*A Multi-Instrument Algorithm for Detecting Blowing Snow: Results from the AWARE and MOSAIC Campaigns*” by Ph.D. Student **Alec Szczepanski**; “*Estimating the Impact of Assimilating Cirrus Cloud Contaminated Hyperspectral Infrared Radiances for Numerical Weather Prediction*” by **Dr. Jared Marquis**; “*A Python Port of the PIEKTUK Column Blowing*

Snow Model” by Ph.D. Student **Aaron Scott**; “*Hydrometeor Imager and Ceilometer Observations for Monitoring and Forecasting Blizzards*” and “*A Summer of Smoke: Ceilometer Observations of 2021 Wildfire Smoke Plumes over the Northern Great Plains*” by **Dr. Aaron Kennedy**; “*Comparing Sentinel-6 Altimeter Wind and Wave Measurements to NDBC Buoy Data*” and “*A Climatology of Blowing Snow Events at Alaskan ARM Sites*” by M.S. Student **Lauren Vocke**; “*The Role of ENSO and PDO on Atmospheric Patterns in the Great Plains of the United States in the CESM2 Large Ensemble*” by M.S. Student **Taylor Dolan**; “*Validation of HRRR Convective Detrainment Heights Using Radar and Observations from DCOTSS*” by M.S. Student **Devin Bissell** and “*Development of a Quality-Controlled Arctic OMI Aerosol Index Dataset for Arctic Aerosol Analysis and Modeling Applications*” by Ph.D. Student **Blake Sorenson**.

Those from the UND Atmospheric Sciences department who attended the Student Conference were: M.S. Student **Devin Bissell**; B.S. Students **Trece Hopp**, **Lauren Larsen**, **Cassidy Holth**, **David Singewald**, **Blake Rafferty**, **Shelby Ebertowski**, **Addison Espy** and **Dillon Vogt**, UND Student Chapter of AMS President.

Department News

After installing new carpet last summer in the lobby area and both hallways on 4th floor, we were able to update the lobby area this past spring. The three cutouts on the west wall were painted green and we received three comfy chairs with desks attached for doing homework and on the east side a high-top table with two tall chairs to visit and do homework. Such nice additions to the AtSc lobby area.



The spring of 2020 we purchased four comfy chairs and a low table for the Leon F. Osborne Weather Center (formerly RWIC) for students to relax, visit and study.

Mark Askelson Appointed to top UND National-Security Research Post



Mark Askelson, professor of Atmospheric Sciences at UND and a longtime leader and coordinator of multiple research projects on campus, has been named the University's first associate vice president for national security research.

As such, he will lead one of UND's strongest and most focused initiatives of recent years: the National Security Initiative, an effort to expand the University's capacity to secure and carry out national-security-related projects with federal agencies, including the Department of Defense and Department of Homeland Security.

Askelson was hired as the result of a national search, and his appointment is effective immediately. The new position is located in UND's Division of Research & Economic Development.

The National Security Initiative builds on UND's proven strengths, and will generate extensive opportunities in research, training, and education for a broad range of University colleges, faculty members and students, said UND President Andy Armacost.

And Askelson's experience, coupled with his love for collaborative projects that bring together researchers from across different fields, make him the right leader for the job

"Mark Askelson's selection as UND's first associate vice president for national security research confirms the University's dedication and commitment to meeting our nation's critical security needs through technology innovation and workforce development," Armacost said.

"With more than 20 years of R&D experience in aerospace, autonomous systems and atmospheric science, Mark has a proven record of building and leading high-performing research teams. He is the ideal person to lead our University's national security initiatives and build enduring partnerships with the military, industry and universities."

A new Grand Challenge

John Mihelich, UND's interim vice president for research and economic development, agreed. "Mark has a strong history of leading research opportunities, building teams for collaborative research and seeing future research possibilities," Mihelich said.

Moreover, "the National Security Initiative — which also involves a cohort of new faculty researchers hired across three colleges — provides the basis for a new Grand Challenge," he continued.

"The AVP-NS is a bold new position, one in which Mark will work with others across campus to expand UND research in national security across a range of areas, including autonomous systems, space, health and energy."

Askelson earned his undergraduate degree at UND and his master's degree and doctorate in meteorology at the University of Oklahoma. He came to UND as an assistant professor in 2001, rose through the faculty ranks and was serving as both the executive director of UND's Research Institute for Autonomous Systems and associate dean of research for the John D. Odegard School of Aerospace Sciences at the time of his new appointment.

"In America today, there's a need for innovative solutions to national security problems," Askelson said. "And these go well beyond problems on the battlefield. There are challenges with supply, technology, health care, policy, and a great number of other areas."

Meanwhile, UND not only has key strengths in many of those areas, but also a proven ability by its researchers to work together across disciplines to solve problems. "I don't know if it's the weather or something in the water up here," Askelson said with a laugh, "but that collaborative spirit is real."

"So, the National Security Initiative is truly an alignment of our capabilities with opportunities, as well as with our country's needs. I'm so excited and am very, very grateful to have been given this role."

From the U-Letter July 2022

Congratulations Mark!!!

Internships & Other Activities

We had quite a number of AtSc students working on internships this past summer and also some of our Ph.D. students have been teaching classes.

Chuck Richie II, MS Student, was selected for the National Weather Service Pathways program this past summer. He spent his summer at the Weather Forecast Office in Billings, MT, learning the daily flow inside a NWS office. It was a very active summer filled with record flooding, severe storms, fire weather, and heat. Not only did he get to learn from the active weather, but was also able to help out, ranging from quality control of climate observations, interacting with emergency managers, helping with the social media accounts, and interacting with the public on the phone. The experience was amazing, and one he would highly recommend to anyone considering operational meteorology for a career."

Blake Sorenson, Ph.D. Student, is teaching the introductory meteorology course (ATSC 110) remotely at Sitting Bull College in Fort Yates, ND. He has six students in the class, and it has been fun to watch the students get more and more excited about meteorology over the course of the semester. Teaching the class remotely has been a challenge, especially for a course with a lab section, so it's taken a bit of creativity to figure out ways to get the students involved over Zoom. But with some relatively simple at-home weather experiments that relate to the topics in class, it allows the students to see the class topics first-hand. It's been a great experience so far, and he is excited for the rest of the semester!

BS Undergrad **Mathew McLaughlin** was selected for the National Weather Service Pathways program this past summer. He spent this past summer in Boulder, Colorado. He is currently a senior and is continuing his Pathways Program with the Grand Forks Weather Forecast Office during the school year.

This summer **Taylor Dolan**, MS Student, had an internship at the National Center for Atmospheric Research in Boulder, Colorado. The internship she was a part of was the ASP Graduate Visitor Program. The internship is fully funded by NCAR, with a stipend over the summer and a travel allowance. At her internship, she worked with the Climate and Global Dynamics section with Dr. Maria Molina. Taylor was able to work more on her Master's thesis with the help of many scientists at NCAR and make connections with many scientists.

PhD student **Aaron Scott** taught ATSC 565 Air Quality which is a graduate level course at Sitting Bull College in Fort Yates, North Dakota. Aaron delivered lectures and interacted with his students remotely. The class was based around learning how air quality is measured, modeled, and how pollutants interact with our atmosphere. The class also covered policy and how some policy decisions have unequally impacted some tribal lands. Aaron says it was a great learning experience to work with students outside of the standard classroom at UND.

During the summer of 2021 (June to August), MS Student **Lauren Vocke** was part of the William M. Lapenta Internship program through NOAA. She was placed within the Center for Satellite Applications and Research (STAR), part of the National Environmental Satellite, Data, and Information Service (NESDIS). Specifically, she worked with a team of scientists in the Satellite Oceanography and Climatology Division (SOCD), working with a newly launched satellite altimeter system onboard the Sentinel-6 satellite. Her work mostly consisted of validating the altimeter's wind speed and wave height measurements with those of marine buoys when close-range overpasses were detected. These verifications are important, as wind and wave data from these satellites can aid in high wave/wind warnings for shipping and oil platforms as well as provide additional data for hurricane forecasting. While the internship was fully remote due to the pandemic, it offered an amazing opportunity to meet and work with a variety of NOAA scientists, including several members of NOAA leadership, learn about several of the NOAA offices, and interact with other interns within both NOAA and NASA. Lauren even had the opportunity to present her work to several NOAA officials at the conclusion of the internship and at the AMS annual meeting in January 2022.

Through the North Dakota Space Grant Consortium (NDSGC) MS Student **Kaela Lucke Rosencrans** has been able to work directly with the NASA GISS Climate Impacts team through an Internship, Fellowship and Mini-Grant. She has amazing mentors she meets with weekly as well as multiple NASA groups that she meets with. Through this opportunity, Kaela has been able to be a part of multiple projects, outreach events and have been able to work on her own research project. Kaela's research examines extreme frost and heat limits over three emission scenarios, five climate models, three time periods from 1985-2100, and four crops across the world and in ND. Results from this project will be published in a journal and will be integrated into crop and economic models within NASA Climate Impacts (AgMIP) models to identify vulnerabilities in food systems for the future policy's, risk management, and adaption. Over the last couple of years, she has been able to also be a part of the NASA Science & Art in the Time of Coronavirus project. This project will be featured at the NASA GISS museum and will feature a section on her research, her photography of ND weather and climate, an interview with Kaela and a paint pour piece of artwork that she created. This project made her think creatively for climate communication and was her favorite project to be a part of. Other fun aspects of her time with NASA have been to be able to give talks and presentations to scientists, stakeholders, farmers, and kids. She has given talks to various Astro-camps, NASA events, high schools, and seminar series events. Kaela has presented to NASA headquarters, NASA Climate Impacts, NASA model e, Earth to Sky, multiple AGUs, and AMS. This NASA opportunity has been a once in a lifetime dream where she has made new lifelong connections and has learned how to be more confident in her research and abilities. A huge thank you goes to NDSGC and to Cynthia Rosenzweig for creating this opportunity for her.

Air Race Classic

Students from the John D. Odegard School of Aerospace Sciences provided weather support this past summer for a team representing UND in the Air Race Classic. The race is a cross-country air race for women pilots during the third week of June. A UND team consisting of a pilot, co-pilot and navigator flew a Piper Archer supplied by UND Aerospace in the race. The UND Atmospheric Sciences Department has been forecasting for the UND team, known as 'The Frozen Force', since 2012.

The race is a handicapped race based upon the airplane's true airspeed. This year's race started in Lakeland, FL and ended in Terre Haute, IN following a circuitous route that included nine stops en route. Any advantage that the team can gain from a tailwind improves their ranking at the finish line.

Seventeen graduate and undergraduate students from the UND Atmospheric Sciences and Aviation programs supported the UND race team with weather briefings and updates. The forecasters determined the most favorable altitudes for tailwinds and also helped them avoid thunderstorms and hazardous weather.

UND will host the start of the 2023 Air Race Classic at the Grand Forks International Airport on June 20.

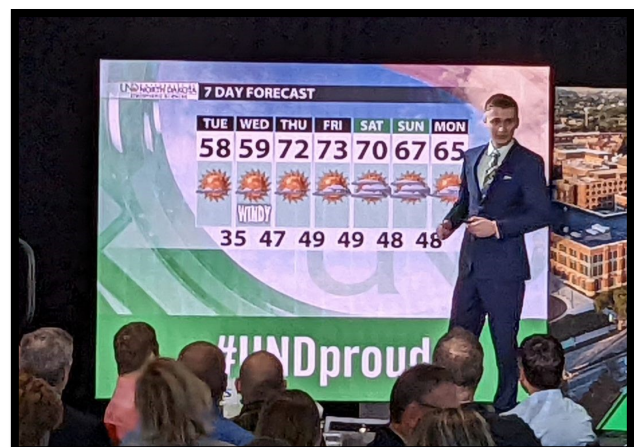


"Wake Up to UND" breakfast

In front of a sold-out banquet hall of more than 400 attendees at UND's Memorial Union, university administrators outlined major developments for the upcoming academic year.

Thousands more joined in for a video broadcast of the Tuesday morning **Wake Up to UND** breakfast, which is a joint production of UND and the chamber, and business sponsors.

The event's format followed a typical television news broadcast, right down to a weather broadcast from **Blake Rafferty**, a UND Atmospheric Sciences student and intern at KVRN News Fargo.



ATMOSPHERIC SCIENCES GRANTS RECEIVED

Several faculty have received new grant funding over the past school year.

- Drs. Dave Delene and Andy Detwiler received a National Science Foundation grant entitled, “*Comparison between In-situ & Polarimetric Radar Hail Observations in Convective Storms*”.
- Another example is the “*WxScout*” Small Business Technology Transfer grant obtained in conjunction with D. H. Wagner and Associates, by Drs. Aaron Kennedy and Dave Delene.
- Among many others Dr. Mark Askelson received a grant entitled, “*Evaluation of UAS Safety and Security Technologies*” from the Federal Aviation Administration.
- In the modeling realm, Dr. Jake Mulholland received a collaborative Department of Energy grant to study downdrafts in high resolution convective storm simulations
- Dr. Marwa Madji, a post-doc researcher, received a North Dakota Atmospheric Research Board grant to forecast storms in western North Dakota.

These are just a handful of the numerous grants received by professors within the department over the past year. Thank you and congratulations to these hard-working individuals!

SPONSOR A ATMOSPHERIC SCIENCES WEATHER BALLOON

We would like to highlight a new and fun opportunity for alumni to contribute to both our education and research efforts.

Through the Alumni Center, you may sponsor a weather balloon for \$250, which is about what it costs for the materials to release a single/standard-sized weather balloon: parachute, balloon, instrument package, not including helium.

For each \$250 that you contribute, you will receive a group photograph of faculty and students releasing the weather balloon. In the photo below, you can see one of the many launches conducted over this past year. Here is the link for the weather balloon donations:

<https://undalumni.org/weather-balloon>



Atmospheric Sciences Skycams



September 17, 2021 marked the three-year anniversary of the UND Department of Atmospheric Sciences Skycam. The current camera, facing west, has provided students, the department, UND and numerous others with great views of the Grand Forks skyline and weather phenomena. It has been featured nationally on the Weather Channel and WeatherNation.

A second camera facing east was added to the Clifford Hall roof in September 2021. youtube.com/undatmosphericsscience

East: <https://www.youtube.com/watch?v=Jq6C162vNkg>

West: <https://www.youtube.com/watch?v=mpcvRHLGBRw>