AEROCOM

JOHN D. ODEGARD SCHOOL OF AEROSPACE SCIENCES

SUMMER 2023

UND
UNIVERSITY OF NORTH DAKOTA

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COVER PHOTO **2023 UND Air Race Classic Team**

(left to right) pilot Grace Heron, a senior from Tampa, Fla., majoring in aviation safety, commercial aviation, and sociology; ground coordinator Ashley Almquist, a sophomore from Bay Village, Ohio, majoring in commercial aviation and aviation safety; copilot Sadie Blace, a junior from Mankato, Minn., majoring in commercial aviation and aviation management; navigator Tracy Mitchell, a junior from Billings, Mont., majoring in commercial aviation and unmanned aircraft systems.

Dear alumni, family, and friends,

Summer is upon us and we have a lot to celebrate after the Spring semester. We awarded 130 bachelor's degrees, 17 masters degrees, and 3 PhD's and also had three students commission into the US Army, in the US Air Force, and one headed to the US Marine Corps. Thanks to generous donations from alumni, family, and friends of UND Aerospace, we awarded more than nearly $900,000 in scholarships to our very deserving students. Your continued support is appreciated by all and continues to open doors for their future success.

We expanded our connections and research into the upper atmosphere by hosting the first annual Stratospheric Operations and Research Symposium bringing a number of high-altitude long-endurance aircraft and balloon operators together to showcase and discuss their programs. Since then, we've been contacted by NASA and several other companies who want to participate in our next edition.

At the time of writing, we just celebrated our NIFA Flying Team with another podium finish at the National Championships. This makes the 33rd year that our students have been in the top two since their first championship in 1985 and won the Judges Trophy again. We are also preparing to host the official start weekend of the Air Race Classic, welcoming 44 teams of women from 16 years old to 94 before sending them off on June 20th.

The Grand Forks Airport has entered a multi-year period of construction, expanding and replacing runways. We have been working all summer to complete the renovations to the briefing rooms, offices, and classrooms in the extension of Hangar 256 that we call the "Crookston Wing". It will be open and ready this fall and will have the same style and furniture of the planned Flight Operations Building. We are still raising funds for the new building and have made a website where you can get more information and track our progress. A number of people have joined us to sponsor briefing rooms or offices and we have more spaces available if anyone is interested.

We're also seeing more changes across campus. In addition to new dormitories and the start of renovations of Merrifield and Twamley Halls, the College of Engineering and Mines will be introducing a new degree program in Aerospace Engineering. With our expertise in Aviation and Space Studies education, our faculty will be teaching several courses in their curriculum.

Speaking of that faculty and staff expertise, we've had several news outlets reach out for experts including CNN, the Washington Post, the New York Times, and NPR on everything from runway incursions and aircraft turbulence to airline strikes. We also had several people serve on FAA or NTSB committees and panels.

Some dates to remember: The UND Aerospace Hall of Fame luncheon will be on October 6 and we look forward to welcoming the new inductees to our wall of honor. The annual UAS Summit will be October 10-11 at the Alerus Center followed by an additional day for a Space Summit at the Chester Fritz Auditorium on October 12th. And on April 6, 2024, we'll host the next Aerospace Community Day. If you can't come on any of these dates, we would love to hear from you or show you around when you have the chance to visit.

ROBERT KRAUS | DEAN, JOHN D. ODEGARD SCHOOL OF AEROSPACE SCIENCES

UPCOMING EVENTS

JULY

24-30 EAA AirVenture - Oshkosh, WI

AUGUST

4 UND Summer Commencent - Grand Forks, ND

9-11 OBAP Annual Conference - New Orleans, LA

SEPTEMBER

14-16 LPA Expo - Kissemmee, FL

18-19 UND Career Fair

30 View UND Aerospace - Grand Forks, ND

OCTOBER

5 Fly ND Career Expo - Minot, ND

6 UND Aerospace Hall of Fame - Grand Forks, ND

10-11 UAS Summit & Expo - Grand Forks, ND

17 Faces of the Industry - Grand Forks, ND

17 NBAA Alumni & Industry Reception - Las Vegas, NV

NOVEMBER

1-2 Aviation Mental Health Symposium - Murfreesboro, TN

16 Alumni & Industry Reception - Seattle, WA

DECEMBER

15 UND Commencement - Grand Forks, ND

2023 AIR RACE CLASSIC START

at UND

Start events hosted

JUNE 16-20, 2023

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We'd like to thank the following sponsors for their generous support:

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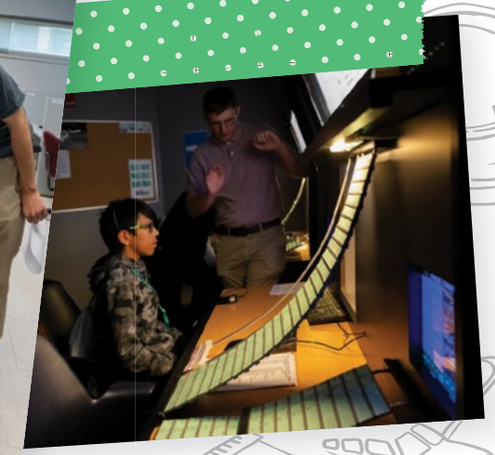
NORTH DAKOTA AERONAUTICS COMMISSION

UND TODAY

Scan the QR code or visit blogs.UND.edu/und-today to read all about the Air Race Classic 2023 start in Grand Forks, ND.

LET'S EXPLORE AEROSPACE!

YOUTH EVENT



North Dakota
WELCOMES 'YA!

ARC 2023

Takeoff Banquet

FLORENCE KLINGENSMITH

START Breakfast

I sausage,
I ham, eg
3 donuts
2 coff black
I c
2
2
I c
I c
I s

GOOD LUCK, RACERS!

midwestern GIOD BYE!

midwestern GIOD BYE!

IN 9 STEPS

LET'S GO UND!

WOOOO

AIR RACE CLASSIC

TAKEOFF!

LET'S GO!

UND STORM CHASERS

Associate Professor Matt Gilmore recently returned from his 8th Annual Storm Experience Field Trip on which he was accompanied by students from his Atmospheric Sciences class. Gilmore was aided by meteorologist Kevin Mahoney, and driver Hugo “Kyo" Lee. The group spent 10 days in the Texas Panhandle and eastern New Mexico. Atmospheric conditions provided excellent class material - the group was able to track severe thunderstorms along with funnel clouds and tornadic activity for most of their trip. Student participants gained real-world experiences to bring back to their studies at UND.

Pictured Left to Right:

Audrey Bestland, Sonja Karner, Theo Chesmorwalling, Devin Graves, Matt Gilmore (Assoc. Prof), Cassie Taggart, Benjamin Clark, Kevin Mahoney (teaching assistant), Connor Heaton, Jacob Walz, and Jackson Page.


DAILY
BREAD

ATMOSPHERIC SCIENCES

INSTRUMENT ON THE ROOF

Several collaborations came to fruition this summer as guest instruments were installed on top of Clifford Hall. The first instrument, known as Pandora, is a spectrometer that tracks the Sun and Moon to detect minute changes in ultra-violet and visible light. This information is then used to identify the amount of trace gases in the atmosphere such as ozone, nitrogen dioxide, formaldehyde, and sulfur dioxide. This effort led by NASA and the EPA will improve long-term monitoring of these gases in the region. An additional Pandora was installed at Sitting Bull College in Fort Yates, ND.

The second instrument is known as a Waggle node and is part of the larger SAGE software-Defined Sensor network. SAGE was funded by the National Science Foundation to design and build national-scale reusable cyberinfrastructure to enable AI computing on the edge. The project is led by Northwestern University and leverages open-source hardware and software developed by Argonne National Laboratory. The Waggle node includes multiple camera systems and weather instruments that are controlled by a computer. Users can program the computer to do machine learning tasks on the instrument itself. For example, other Waggle nodes have been used to track clouds, detect traffic, and even identify hazards such as floods and wildfires.

Aaron Kennedy, Associate Professor and Graduate Program Director for Atmospheric Sciences. Also an expert in weather, climate, remote sensing, and extreme events.

ATMOSPHERIC SCIENCE'S AWARD BANQUET

The 2023 Atmospheric Science Award Banquet was a success with over 20 awards and scholarships being presented to students, staff and faculty. While the faculty recognized outstanding students in the program, student leaders of the UND Chapter of the American Meteorological Society (AMS) presented numerous awards to the faculty and staff of the department. UND alum Steve Stock, '87, a retired Delta Air Lines Senior Meteorologist was the evening's keynote speaker.

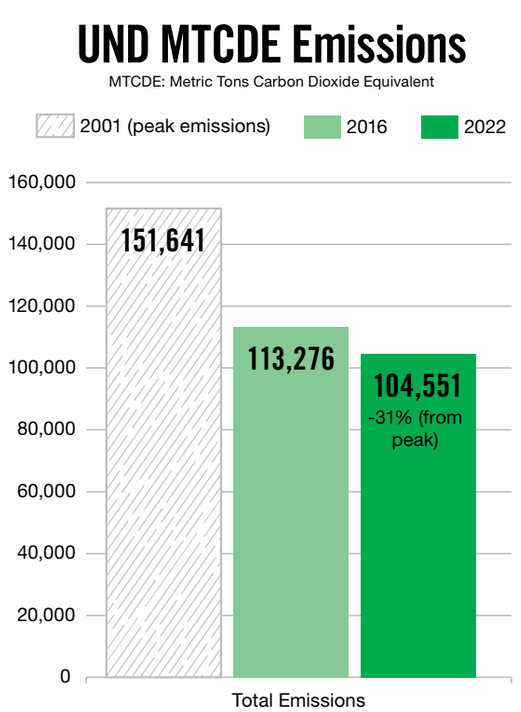
90
students, faculty, & staff

23
awards & scholarships given

ABOUT THE AUTHOR

Soizik Laguette, Associate Professor and Chair in the University of North Dakota Department of Earth System Science and Policy, has worked passionately to move UND toward becoming a greener campus with informed and involved individuals. Laguette has conducted extensive research regarding the current effect UND operations have on the environment and how the school can implement changes to reduce negative impacts. Her work would not have been possible without her continued collaboration with the UND Department of Facilities Management, another ardent overseer of a sustainable UND, and the crucial and true foreman in designing and implementing a greener campus. In the article to follow, Laguette discusses her past research and how she, and many of her colleagues and students would like to use their knowledge of the past and present to continue researching and directing the school towards a more positive environmental stance.

Additional contributors to this article include Moones Alamooti, Ph.D. student in Geophysics, from the UND School of Engineering and Mines and Ethan Pieczykolan, M.E.M. student in Earth System Science and Policy, from the John D. Odegard School of Aerospace Sciences.



WORKING TOWARDS A GREENER TOMORROW

The first Greenhouse Gas Emissions (GHG) inventory of the University of North Dakota (UND) was conducted in 2008 after former UND President Charles Kupchella signed the American Colleges and University Presidents` Climate Commitment (ACUPCC), displaying UND's commitment to understanding and addressing the Campus impact on climate change and the environment. A greenhouse gas inventory is to estimate UND's carbon footprint by measuring, tracking, and assessing the greenhouse gases emitted from the campus' activities and their sources.

By signing the Climate Commitment, UND joined a network of educational institutions dedicated to tackling global climate disruption and promoting sustainability actions. UND set ambitious goals for emission reduction, targeting a 7% decrease from 1990 levels by 2020 and a significant 51% reduction by 2050. Acting already as "Leaders in Action", UND was the first and only institution in North Dakota to have signed the commitment.

The withdrawal of UND from ACUPCC in 2017, marked a shift in the university's stance on sustainability and resulted in the abandonment of its previously established Climate Action Plan. The decision to withdraw from ACUPCC not only ended UND's commitment to carbon neutrality but also left North Dakota without any colleges or universities actively participating in the Climate Leadership Network.

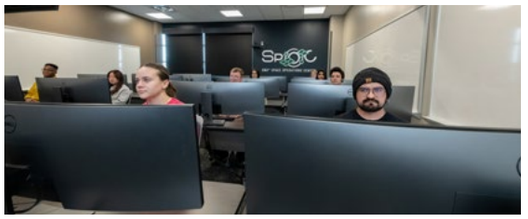
Following the withdrawal of UND from ACUPCC in 2017, no additional GHG inventory has been completed. However, in the meantime, UND has been experiencing significant changes with multiple new buildings being constructed as well as substantial re-models and teardowns.

Which leads to the bigger picture: How are all these changes affecting UND's carbon footprint? Is UND still on track with the emission reduction trend projected in 2010 and the UND pledge, or has the University fallen short? This question could be answered by updating the 2016 GHG inventory and running a new GHG inventory with 2022 data.

The data comparison between the previous publications and the current inventory suggests that UND is still moving in the right direction towards achieving net-zero emissions. In 2022 UND emitted about 104,550.97 MTCDE (Metric Tone Carbon Dioxide Equivalent). This is an 8% emissions decrease compared to 2016, and a 31% decrease compared to the University's peak emissions in 2001.

The 2022 emissions from the steam plant are down 13,710 MTCDE compared to the one of 2016. This is a 24.3% emissions reduction over a one-year period, and the direct outcome of the old coal steam plant being replaced with a new modern and highly efficient natural gas steam plant. However, like in previous years, the Steam Plant and the purchased energy stay the biggest sources of UND emissions. Continuing to address energy efficiency measures, transitioning to cleaner energy sources, and implementing renewable energy projects could help reduce these emissions even more.

The UND Climate Action Plan was a living document generating cost saving and strategic investment in new technologies. It was the roadmap driving and leading the UND ambition of becoming green, sustainable, and carbon neutral. UND can still reinforce net-zero commitment, and should consider implementing more comprehensive strategies. By taking actions, UND can proactively address its identified emission sources and further align efforts with the broader sustainability goals.

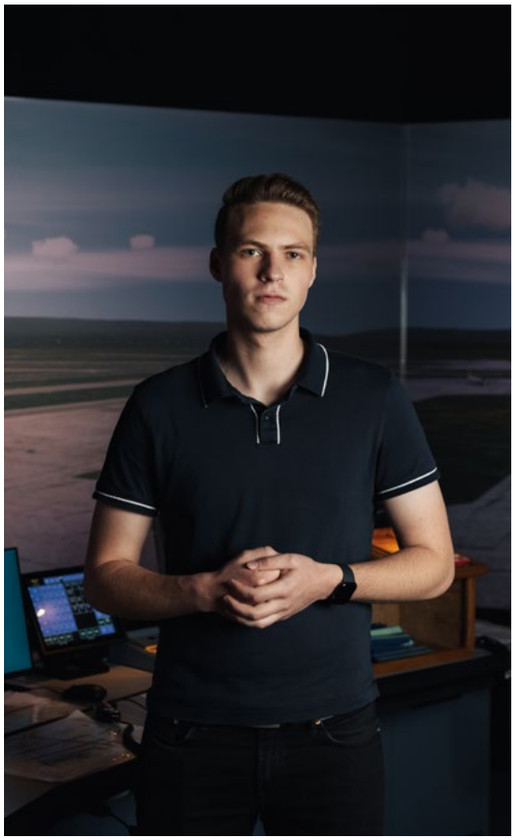


SPACE OPERATIONS CENTER

The Space Operations Center (SpOC) contains state-of-the-art instructional hardware that will accommodate orbital mechanics, space situational awareness, and other space operations courses. With its modern workstations and large format monitors, it is ideal for other types of training as well, such as geospatial data analysis.

UND SOARS SYMPOSIUM'S FLIGHT PLAN: MAKE MOST OF STRATOSPHERE

UND brought together academics, government officials, and aerospace industry manufacturers all facing the same desire: developing the technology needed to harness the potential of long-term aerial operations in the stratosphere.



SAMUEL DYRUD

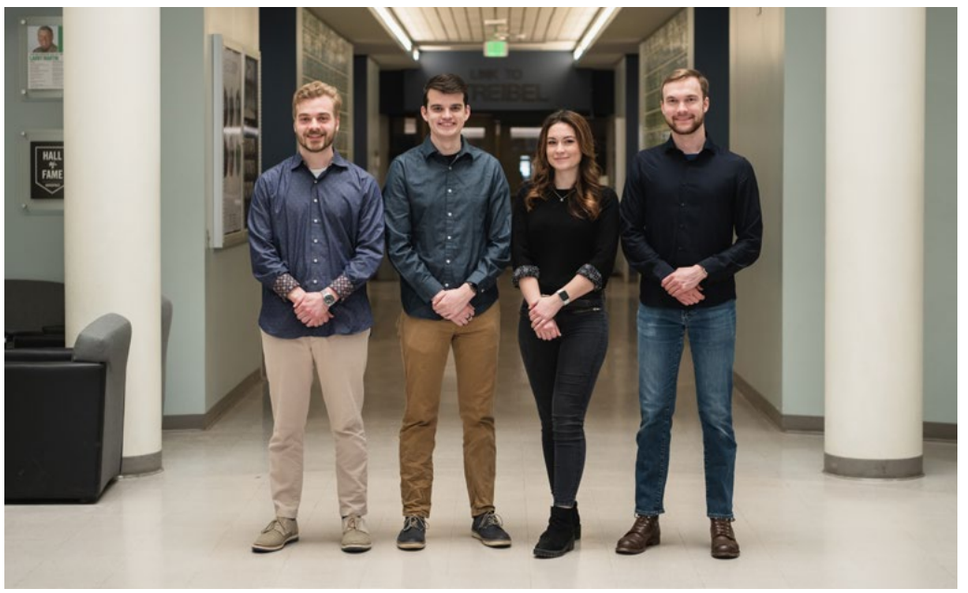
ATCA Gabe Hartl Scholarship Recipient

Hometown: Thief River Falls, Minnesota

Major: Air Traffic Management

Goals: "Right now, my main goal for the future is to become a certified air traffic controller. Someday it is my goal to invest in real estate and build passive income so I can spend my time doing volunteer work."

"For me, receiving this scholarship is extremely impactful. Not only is it a recognition and affirmation of all the hard work I've invested into my education, but it will also play a major role in relieving the financial burden of college as I enter into my senior year. Receiving the scholarship will allow me to spend more of my time studying instead of working, which will ultimately make me better prepared for a potential career as an air traffic controller. Thank you, ATCA and UND."



UND FAA DATA CHALLENGE FINALIST

A team of UND Aerospace students were finalists in the FAA's first-ever Data Challenge competition.

The team of students traveled to Washington D.C. in June to present their final project at FAA Headquarters. They represented the university in high regard and recieved positive comments on their solution statin, "our solution could be a real game-changer for making general aviation safer."

Left to right: Zachary Hoff, Ryan Peene, Jocelyn Ledin-Bruening, and John Dulski.

UND TODAY | CONNOR MURPHY

FLYING TEAM SOARS AT SAFECON

The University of North Dakota Flying Team has once again found success on the national stage, taking second place overall and winning several individual events at the 2023 National Safety and Flight Evaluation Conference contest, hosted this year in Oshkosh, Wisc., May 8-13.

In similar results to last year's SAFECON competition, UND took home the Judges Trophy and first place overall in ground events. UND pilots also earned top marks in four separate events of the 12 total comprising the competition.

UND's team of 12 students also earned the Safety Award, recognizing the group's attention to details and processes crucial to aviation safety throughout the week-long event.

"We would like to thank the UND Flying Team for all the hours spent studying, simulating and flying in preparation for this competition," said Dr. Robert Kraus, dean of the John D. Odegard School of Aerospace Sciences. "We would also like to congratulate them on another outstanding performance, beating out 28 other teams.

"They continue the longstanding tradition of finishing first or second for the 33rd time since 1985, when UND won its first national title."

Indeed, UND has maintained excellence in the annual competition established by the National Intercollegiate Flying Association. SAFECON represents a comprehensive test for pilots' skills and draws hundreds of collegiate pilots from across the country.

UND's top marks came in the following events: Aircraft Preflight, Ground Trainer, Crew Resource Management/Line Oriented Flight Training (CRM/LOFT) and Traditional Navigation.

In the Aircraft Preflight and Ground Trainer events, the UND Flying Team "swept the podium" with the amount of competitors it was allowed to enter, taking first and second and first through third, respectively.

Among other events, UND had several top-ten finishes. The team's point total left them only short of the repeat champion, Embry-Riddle Aeronautical University – Prescott. Full results are available on the NIFA website.

Lewis Liang, associate professor of aviation and head coach, said this year's team was firing on all cylinders after many members attended their first national competition the year prior.

"We at one point nicknamed ourselves the 'Green Machine' because we were running so smoothly," Liang said. "Their diligence and discipline stood out to the judges, and it's why we won the Safety Award this year.

"Though we didn't come out on top this time, I'm really excited about the depth we have moving forward, as well as the work ethic that has been part of our recipe for many years."

"This team worked extremely hard all year," said Ryan Guthridge, assistant professor of aviation and assistant coach. "The Judges Trophy shows that pound-for-pound we were the strongest team at the competition. It's a testament to our hard work and high performance throughout the year."

Members of the UND Flying Team for SAFECON 2023 are Co-Captains Jebadiah Sussenbach (Edina, Minn.) and Carson Wells (Bristol, Ind.), Caroline Kelley (Lakeville, Minn.), Mikayla Weiss (Grand Forks, N.D.), Cole Yokoyama (Kanehoe, Hawaii), Nathaniel Dietz (Chatfield, Minn.), Matthew Cleveland (Sycamore Ill.), Andreas Testerman, Max Langerud (Worthington, Minn.), Blake Nahin (Los Angeles, Calif.), Taylon Haecker and Aaron Schwartz (Buffalo Gove, Minn.).

AVIATION FAMILY WEEKEND

April 20-23, 2023

BY THE NUMBERS

4 days
of student org-lead events

100+
family flights

39
companies at the career fair

5
conference speakers

150
scholarship recipients

$508K
awarded in scholarships

SAVE THE DATE

SAMA & Aviation Family Weekend 2024

April 25-28

SAMA Career Fair

SAMA Conference

Aviation Scholarship Ceremony

WAI Pancake Breakfast

Family Weekend Barbecue (OBAP, PAPA, LPA)

COLLABORATION WITH GE DIGITAL OPENS DOORS FOR UND AEROSPACE STUDENTS

Through new scholarship and industry-first mentorship program, UND students analyze data to solve real-world aviation problems

UND's Brandon Wild (left), associate professor of aviation, and Ryan Guthridge, assistant professor of aviation, stand in front of a banner representing UND's collaboration with GE Digital for data-analytics technology and training. The banner is located in the Annette Klosterman Safety & Data Analytics Lab in Odegard Hall.

Picture this entry on the resume of a newly graduated aviation data analyst: "Led a team that used data and advanced analytics – in partnership with airline engineers – to predict required maintenance, evaluate safety risks, and improve sustainable practices in commercial airline operations."

That's the kind of experience Odegard School of Aerospace Sciences students are garnering, thanks in part to an ongoing collaboration between the school and GE Digital.

UND's Aviation Safety degree offers a major program in Aviation Safety and Operations. Key classes in both programs take place in the Annette Klosterman Safety and Data Analytics Lab, where students use data provided by airline partners to solve real-world safety, maintenance, and other problems.

And those classes, in turn, stand on the foundation of UND's partnership with GE Digital. A subsidiary of General Electric, GE Digital provides software and Industrial Internet of Things services to companies, "helping industry work better," as the company's LinkedIn page says.

At UND, "our relationship with GE Digital provides us with our capability to provide a world-class education," said Ryan Guthridge, assistant professor of aviation at the University. "That means the software, the expertise, the industry connections that have really allowed this program to thrive.

"In other words, we've set up the degree program, but this collaboration has unlocked possibilities for students far beyond what we would have been able to do without GE Digital."

For example, UND and GE Digital now have established America's first university mentorship program for aviation data analysis students. Through the program, UND has hired two Aviation Safety and Operations students as data analytic associates, Guthridge said. The students will work not only as assistants in UND's advanced data-analysis classes, but also in tandem with GE Digital and other industry partners, including Delta Air Lines.

"In other words, the associates are the bridge between our partners' programs and ours," Guthridge said. "The students are matched or paired with a data engineer at GE Digital, who works with them to boost their skills in data analytics. In turn, the students provide GE Digital with their own expertise regarding how university fleets operate and how our students are using the software.

“So these students are really getting a front-row seat as to what’s going on in the industry.”

“Safety is a key component of the future of flight — and software is a key component of achieving it,” said Andrew Coleman, General Manager for GE Digital’s Aviation Software business. “But it’s not enough to just have the software. You have to have people that actually know how to use it. That’s why programs like this one are so important. Giving rising students the opportunity to get hands-on experience while they’re still in school is not only invaluable to them, it’s invaluable to the aviation industry, too.”

High demand

The exceptional usefulness of modern data analytics to the aviation industry means skilled data analysts are in high demand. That’s reflected in the growth of the Aviation Safety and Operations program at UND. In the fall of 2021, for example, the program totaled 50 students (44 majors and six double-majors), while the fall of 2022 saw 112 students (70 majors and 42 double-majors).

In other words, enrollment had more than doubled in only a year.

“We used to offer AVIT 412, Aviation Safety Analysis, once a year and only in the spring,” Guthridge said. “More recently, we’re offering three sections per semester, so six sections a year. That reflects both the growth of the program and the demand students are expressing to take the class.”

With that in mind, UND Aerospace has created a Future of Flight Safety Scholarship and will offer it starting this year. The school describes the scholarship as follows:

“This scholarship will be given to an Undergraduate student who is currently enrolled in the Aviation Safety and Operations degree program. Through research or in-class experiential learning, the student will have familiarity in using GE Digital’s Flight Analytics software for the purposes of Aviation Safety and Operational data analysis.

“The student must be a Junior or Senior and pursuing a career in aviation safety, operations, or data analytics.”

The first scholarship will be awarded during UND Aerospace’s Aviation Family Weekend (April 20-23), and will be for the fall semester of 2023, said Jonathan Gehrke, senior director of development for the School of Aerospace at the UND Alumni Association & Foundation.

“This scholarship basically is a thank-you for and a recognition of our collaboration with GE Digital,” Gehrke said. “With the relationship in place, UND is leading the way among universities, not only in our use of robust data analytics to improve our own flight operations but also in our relationships with industry.”

Thanks to those relationships, UND students actually are using commercial airlines’ own data streams to solve real-word safety, maintenance and other problems for those airlines, Gehrke stressed.

“We are doing cutting-edge research here as well as performing analytics for one of our primary markets, which is the commercial airline industry. So our students not only learn how to analyze data, they also make connections with industry and analyze real aircraft data to make an impact on aviation safety. It’s just a fantastic opportunity.”

FUTURE OF FLIGHT SAFETY RECIPIENT

MIKAILA GILLIS

"I am grateful to be the first recipient of the Future of Flight Safety Scholarship!

Thanks to GE Digital, my peers and I have the opportunity to develop our skills with Flight Data Analysis and learn more about an important area in Aviation Safety.

This past year I began working for UND Aerospace as a Flight Data Analyst Assistant, where I work with GE Digitals’ EMS Software to actively play a role in safety assurance in UND’s flight operations. This is only the start of my career and with the support of the GE Digital scholarship, I am able to continue learning and improving my skills for a successful Future in Flight Safety."

Hometown: **Phoenix, AZ**

Majors: **Commercial Aviation & Aviation Safety and Operations**

LEADER IN AEROSPACE

HONOREE FOR THE INAUGURAL HALL OF FAME FOR

Women in Emerging Aviation Technology

The global awards are organized by Women and Drones, and presented at CES

Erin Roesler, '12, '19

Looking for UAS expertise? Look no further. As the Director of Operations for the Northern Plains UAS Test Site, Erin oversees all UAS operations.

Erin plays an influential role in the operationalization of Vantis, North Dakota's beyond visual line of sight (BVLOS) initiative. Additionally, she participated in the UAS BVLOS Aviation Rulemaking Committee. In addition to her Bachelor of Science in Aeronautics and Master of Science in Instructional Design and Technology, Erin holds a Commercial Pilot Certificate, CFI, CFII, and MEI certificates, and a Remote Pilot Certificate. She is a former Assistant Chief Pilot – UAS and adjunct lecturer for the University of North Dakota Department of Aerospace. Erin wrote the book on UAS operations – literally.

2023 HAI EXPO

Pictured Left to Right:

Thomas Zeidlik, Director of Aerospace Physiology, **Julia Vitale, '23**, **Wes Van Dell, '06,** UND Chief Flight Instructor - Rotorcraft, **Sonja Karner**, **Michael Humble**, Assistant Professor for Aviation, and **Dr. Swee Weng**, Senior Flight Surgeon Pilot, ETC Aircrew

AEROSPACEPHYSIOLOGY.COM

IS YOUR TEAM PREPARED FOR A PHYSIOLOGICAL EVENT?

The University of North Dakota's Aerospace Physiology Division has been providing flight physiology, altitude chamber, and spatial disorientation training to professional aviators for over 30 years.

BENEFITS OF TRAINING

- RECOGNIZE AND REACT TO HAZARDOUS SITUATIONS
- EXPERIENCE SPATIAL DISORIENTATION IN A SAFE ENVIRONMENT
- UNDERSTAND YOUR LIMITS AS A PILOT

UND AEROSPACE
UNIVERSITY OF NORTH DAKOTA

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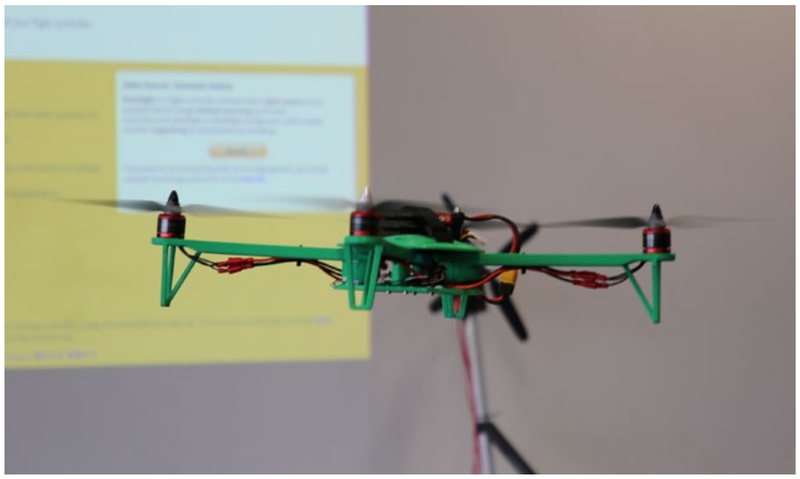

HIGH SCHOOLS VISIT UND FOR A UAV GRAND PRIX

For Drone Safety Day, UND introduces educators and students to the growing sport of drone racing

There's a good chance if you've seen a nature documentary or action film in the past 15 years, you've seen a drone at work. Sweeping shots of natural vistas and dynamic views of car chases have been captured by drones for years. But, unmanned aerial vehicles also have found practical applications in a range of other industries, including the recent launch of drone delivery programs by Amazon and UPS. Now, UAVs are entering the realm of sports, with drone racing becoming a popular after-school activity for middle and high school students.

Capitalizing on the burgeoning sport and recognizing the necessity of training capable drone pilots to support the aircraft's utility in a number of industries, the John D. Odegard School of Aerospace Sciences hosted a workshop for educators and students from the region on FAA's Drone Safety Day on April 29.

Aimed at strengthening the field of UAVs, UND capitalized on their FAA Workforce Development Grant to introduce drone recreation and education to middle and high school students, offering a two-day crash course in drone racing and its benefits as a fun, STEM-centric activity for students.

Robbie Lunnie, assistant professor of Aviation at UND and a UAS enthusiast, said that these events are important to expanding interest in UAS education.

"I like events like this because it really helps to share that excitement for UAS and aviation," Lunnie said. "Aerospace and aviation educators and professionals are a very passionate community, when you get everyone together to share and talk about that passion, it really helps to grow interest in these fields."

Paul Snyder and Leslie Martin, two UND faculty members working on the FAA Workforce Development Grant that made the event possible, developed a comprehensive program for visiting educators.

"We're hoping to give these teachers the resources to get programs off the ground at their schools," Martin said. "We're giving them textbooks, drone kits, and trying to point them in the right direction so they can learn more about this and bring it back to their schools."

Snyder agrees that drones are an excellent way to introduce people to the mechanical and technical aspects of aviation and UAVs, while remaining accessible to those who are not aviation professionals. Recreational drone flying also could serve as a gateway to explore various industries such as agriculture, which already has begun to adopt drone technology for tasks such as spraying crops and collecting data.

Along with offering their expertise, Martin and Snyder invited guest speakers to the event. Several organizations, including Fenworks, a Grand Forks-based esports company, were present to share the resources and information available to schools to get their students involved.

Kaleb Dschaak, Fenworks CEO and an alumnus of the University, said the company has just launched its drone racing program for North Dakota schools, with 13 schools already on board. Along with getting young people involved in after-school programs that engage them and introduce them to STEM topics, Dschaak also pointed toward the academic benefits of drone racing.

"One of our goals is to connect schools to higher ed facilities so that their drone students can be identified by universities and then hopefully one day offered scholarships by universities to pursue data science, UAS and other types of degrees at these institutions," Dschaak said.

Educators also were taken on a tour of the aerospace department's facilities, ending with a demonstration of a drone designed and fully 3D-printed by UND students in one of the department's UAV classes. One of the students who helped with the project, Lukas Jorgensen, demonstrated its functionality to the guests by flying it in the classroom it was built.

Jorgensen, president of the UND UAS/RC Club and senior in the high-altitude UAS program said he first got into drones through recreational flying.

Lukas Jorgensen, UND student and president of the RC Club, holds one of the small drones used for the race.

Robbie Lunnie, assistant professor of Aviation, shows off one of UND's drones.

"I started out in commercial aviation, but then I got into the RC Club a couple of years ago and pretty much fell in love with it," Jorgensen said.

Jorgensen is also one of the students working on the FAA Workforce Grant, which he finds vital to growing interest in UAS among younger students. Jorgensen has found great success already, with his recreational interest in drones blossoming into many job opportunities and a potential career.

"Right now, I've got four jobs and most of them are because of my interest in the RC Club," he said. "A lot of employers look at the RC Club for prospects because they know we're dedicated and have a lot of hands-on experience. It's been really great, and I don't know of any other school that offers as many resources in this as UND does."

The visiting students engaged in a full-day course taught by representatives from Youth Drone Sports Championships, a Minneapolis-based organization specializing in educating students of all ages on the ins and outs of drone racing.

Drone racing has been a competitive sport for nearly a decade, with a professional league being formally established in 2015. It's also become quite popular among university-level students, with more than 28 schools affiliated with the College Drone Racing Association.

It's no surprise then that high schools are getting more interested in incorporating it into their programs. Drone racing, while complicated due to the technological and mechanical knowledge required to operate and repair drones, is a fun way to incorporate STEM fields into an esports-like experience.

The comprehensive course gave students hands-on experience with everything from drone components to sim training through the Velocidrone simulator. Students spent hours flying virtual drones in the program, getting a feel for how the sometimes-unruly drones handle and how to adjust on the fly.

The training culminated in a race between two teams, the Flippy Floppies and the Weird Unicorns, with students rotating in and out between heats. The goal was to hit 20 points by successfully finishing two laps before the other team, and it went right down to the wire.

The racing drones were small enough to fit in the palm of your hand, but they were fast. As the students raced them around the small indoor track, the drones looked like erratic hummingbirds, crashing into the net housing the track and obstacles.

Drone racing isn't easy and typically takes many hours of training to master. These students were still very new, but as the race continued, they got a handle on the pocket-sized aircraft and managed to maneuver them expertly, leading to several tight heats and an exciting race.

Ultimately, the Weird Unicorns came out on top with a 20-19 final score. The students then had the chance to watch their coaches, experienced pilots who helped YDSC instruct the students throughout the weekend, compete in their own race.

Brenden Marto, a UND commercial aviation student who goes by the name Vapid when racing, was one of the coaches who worked with the students for the weekend. He's been racing drones with YDSC since 2019.

"This weekend was good," Marto said, "I wasn't sure what to expect, but the students did a lot better than I would've expected."

Leslie Martin agreed, saying that watching the students so engrossed in the activity was a pleasure.

"To me, it's all about seeing those students excited and cheering each other on," Martin said. "It's been great to see them so engaged, working together to solve problems while they're having fun. I think it's great for students and teachers to see how great these programs can be and learn how to grow them at their own schools."

BY FLYING INTO SNOWSTORMS, UND GRAD STUDENTS MAKE IMPACT FOR NASA

Students' flight-data analyses should improve weather forecasting models and safety

Christian Nairy wasn't sure he had the time to tackle another research project at UND. He had plenty to do in completing a Ph.D. in atmospheric sciences. He changed his mind when he was offered the chance to fly directly into snowstorms to gather atmospheric data for NASA.

Nairy was asked to join the project by David Delene, research professor of Atmospheric Sciences, who was awarded more than $600,000 to participate in the NASA IMPACTS Project (Investigation of Microphysics & Precipitation for Atlantic Coast-Threatening Snowstorms). Data gathered from the project will be used to help update forecasting models of winter storms on the East Coast. The project is undertaken only once every few decades and involves data collection by airplane and weather balloons, two of which were launched in mid-February: one on campus and the other in Bemidji, Minn.

Nairy already had a field project flying into cirrus anvil clouds over Florida, but he's glad he said yes to the IMPACTS project — a project that would take him and graduate student Jennifer Moore through some of the roughest turbulence of their lives.

"I said yes because of the experience that I would gain, and the fact that I'd be flying on an aircraft doing real-world research in the field," Nairy said. "I'm thankful every day that I said yes. It was a great opportunity."

Delene, Nairy and Moore didn't do the work alone, however. The research project had help from people across the academic strata of the UND Atmospheric Sciences Department.

Project members included Marwa Majdi, postdoctoral fellow, who is doing post-processing, image assessment and who wrote software for the project; Michael Willette, a graduate student doing field support, data processing and acted as a backup flight engineer; Nicholas Camp, an undergrad who did data processing and acted as the lead balloon launch engineer and Blake Raffery, an undergrad who assisted with balloon launches. Nairy and Moore operated sensor equipment aboard a NASA P-3 aircraft.

Why fly into a snowstorm?

Not to state the obvious, but that's where the snow is, or rather, that is where the atmospheric conditions exist that can cause a snowstorm that gets school called off. Such storms, Moore said, have a significant economic impact on businesses that end up having to close for a period. Then there are safety concerns for people who need to travel in an area with a high population density.

"Look at where we're studying," Moore said. "The northeast has a lot of people, and we have a lot of big cities that get impacted by snowstorms."

Nairy said they are specifically interested in the microphysics of what is happening in the front, so forecasting models can be updated to improve safety, and limit losses from business closings.

Like Nairy, Willette said the project is meaningful because of the nature of the research, but it also brings the added benefits of hands-on experience and doing actual scientific work. Willette acted as backup and flew on a few NASA flights either in place of Nairy or Moore. As backup, he had to be familiar with calibrating and operating the wing-mounted sensors, as well as the onboard equipment, or "racks," that operate them.

"Extremely bumpy at times"

Nairy and Moore said they experienced turbulence that ranged from mild to extreme. They've flown about 30 research flights since joining the program, with another 10 flights just to prep and calibrate the material, so they've gotten used

From left, undergrad student Nicholas Camp, graduate students Michael Willette, Jennifer Moore, Christian Nairy and postdoctoral fellow Marwa Majdi stand with equipment used to collect weather data for the NASA IMPACTS program. The team worked with David Delene, Atmospheric Sciences Professor, in collecting and processing data for the project.

to jostling and bumping up and down. The flights took place mostly near the East Coast and ranged up into Canada. The farthest east they flew was in Minnesota, in mid-February (that flight took 10 hours, as they followed a snow storm east).

Most off the time Nairy said flying into a storm is "unnervingly smooth," while Moore said the standard bumps and dips of turbulence are "kind of calming." But that is because they are on a mission and are monitoring equipment—and they have the benefit of knowing how the research may ultimately benefit eastern cities that get hit by snowstorms.

Nonscientists on the flights don't always have that security. A flight over the Atlantic near Boston illustrates:

"We must have hit an updraft, our plane felt like it went vertical," Nairy said. "You could feel your cheeks and your skin, and all your blood rushing down on your feet. Then on the other side of that we must have hit the downdraft because then our plane felt like it was floating. I had to catch my laptop. It was floating up in the air."

When asked if she would fly in such conditions again, Moore simply responded: "Oh yeah."

"I said yes because of the experience that I would gain, and the fact that I'd be flying on an aircraft doing real-world research in the field," Nairy said. "I'm thankful every day that I said yes. It was a great opportunity."

But now those flights have been completed. Majdi processes the data after each flight (and at about eight hours a flight there is a lot of data to process), and it's time to do an in-depth analysis of the microphysics data from the cloud. That data includes the amount of water and ice crystals found in the clouds the NASA plane flew through, as well as when and how frequently icing occurs on the plane. The wing-mounted probes capture this data, as well as striking images of the droplets and ice crystals that form in the air.

That whole process, sort of like doing quality assurance on the data, will take about six months Delene said. From there, it will be sent to NASA, for any atmospheric researcher to use. The UND team will also use the data in their own research projects.

Data from the science flights will be combined with the UND weather balloon data, computer models and ground-based radar data to help make sense of the snowstorms.

Delene said it was great to work with the UND group. He said they put in long hours not only on training, calibration and flights, but also on making any needed repairs to the sensitive equipment.

"It's that kind of North Dakota spirit of 'get it done,'" Delene said.

SPACE GRANT CONSORTIUM MAKES SPACE FOR EVERYONE

North Dakota NASA Space Grant Consortium invites students with visual impairments to explore space in new ways

The NASA Space Grant Consortium, a nationwide effort started by NASA to increase interest and engagement in STEM and space studies in K-12 and university students, invited students with visual impairment from the North Dakota Vision Services/School for the Blind for a tour of the University's comprehensive Space Studies facilities on May 1.

The North Dakota Space Grant Consortium, a part of NASA's consortia, is housed in UND's Clifford Hall and seeks to connect Space Studies students and faculty with NASA expertise and research.

Amanda Higginbotham, '23, and NASA STEM ambassador with the consortium, said their primary interest is to get students involved with Space Studies.

"Our main goal here is to excite people about space," Higginbotham said. "We're trying to reach people from a variety of backgrounds, interests, and education levels through after-school programs, campus visits and activities. The tours like we're doing here today are definitely one of my favorite parts of what we do."

Grace Heron, also an aviation student and NASA STEM ambassador, said the consortium places a lot of emphasis on expanding accessibility in Space Studies.

"The important thing for us with NASA is to promote diversity and accessibility for everyone in the field. There isn't just one type of person who can get into Space Studies; we're really trying to promote the idea that it's for everyone."

The visiting students were participating in a NDVS/SB's Short-Term Program's five-day training session for elementary schools. The focus of the program is the Expanded Core Curriculum, a comprehensive plan to educate students in nine vision-related areas, including accessibility, technology, social interaction and career education.

UND alumna and NDVS/SB's Student Program Coordinator Cindy Williams said that the organization's programs offer students access to experiences tailored to them in a way their schools may not be able to provide.

"A lot of times in their home school or their local education agency, they're the only ones with a visual impairment or blindness. The social aspect of it is really great for them, along with learning how to do things with vision loss that they may not have access to in their local school," Williams said. "So, it's important for them to get out in the community, and UND provided a really excellent opportunity for them to do that here."

The consortium's tour complimented the NDVS/SB's mission by offering a wide range of interactive and exploratory activities and walking them through the intricate details of Space Studies.

For their part, the students seemed to enjoy the tour, as they were presented with various experiences ranging from an exploration of UND's space shuttle simulators to time with braille workbooks that taught them about our solar system.

The space suit lab was a big hit with students; UND personnel in the space lab walked the students through the different components of space suits, showing them the different materials used and explaining how they're designed specifically to keep astronauts safe.

The students were able to touch and hold the helmets and protective gloves of the suits for an up-close look at the materials and construction. Several students also got to try on the helmet, giving them a feel for what suiting up for space travel is really like.

Higginbotham, Heron, and Cassandra Taggart took great care in setting up a tour that catered to the students' needs to provide them with a fulfilling experience and foster their interest in space.

The consortium and students developed a tour that was equally enjoyable and educational, coordinating with aerospace labs and creating 3D constellation models so that students could get a truly holistic view of Space Studies.

Pipe cleaner constellations and solar eclipse models made out of construction paper and art supplies were passed around for students to study with their hands, all made by the Space Grant's STEM ambassadors.

“We make lesson plans for things like today in-house,” Higginbotham said. “Most of the learning materials we’re using today were made by STEM ambassadors. I’ve done one other tour with NDVS/SB where I observed and made a cheat sheet of different things that would work. The rest was just making sure that we prepared everything so that the tour could be safe and successful.”

The tour’s sensory experiences offered something for every student. Some eagerly hopped into the shuttle simulation to get a taste of cramped space travel and investigate the feel of the simulator control panel’s switches and buttons, while others preferred the quiet inspection of textured pictures of planets in our solar system, complete with braille labeling.

No matter what the students gravitated toward, the experience surely left a lasting impression and planted the seeds of the world of space exploration in their young minds. Williams concurred that experiences like these are an important avenue to get these students interested in STEM.

“We have collaborated with the North Dakota Space Grant Consortium in the past as well, and they always do an excellent job of explaining things and giving the students hands-on and tactile experiences. It’s important for the students to have that firsthand experience, and UND always offers it in an accessible way,” Williams said.

The efforts made by the consortium and UND’s faculty and students to improve accessibility are an excellent stride toward capturing the imagination of students with diverse needs. By introducing them to the realm of space exploration, the consortium not only engages students in STEM-related activities but also fosters future leaders in the field. After all, space is for everyone.


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1. An NDVS/SB student testing out a UND space helmet on the tour.
2. An NDVS/SB student tests out the control panel located in UND’s shuttle simulator.
3. NASA STEM ambassador Amanda Higginbotham, '23, talks with a student during the tour.

IN THE MEDIA

CNN | MARCH 16, 2023

Flight Risk — Turbulent Times For Air Travel

"We went all the way to the University of North Dakota, one of the best schools in the country for this," Jimenez told Bolduan to kick off the segment. "(UND) brought us into their air traffic control simulator – not just to show us how they train students, but also to give us insight on what these air traffic controllers might have been seeing during some of the more significant recent incursions at U.S. airports."

NEW YORK TIMES | MARCH 17, 2023

Banned From Russian Airspace, U.S. Airlines Look to Restrict Competitors

New York Times interview with UND Aviation Professor Jim Higgins, a former airline pilot, about the impacts to airlines after Russia closed off its airspace to overflights.

WEATHER CHANNEL | MARCH 22, 2023

Aaron Kennedy was interviewed about his research on ground blizzards in the Red River Valley region of North Dakota and Minnesota — perhaps one of the best areas on earth for studying this meteorological phenomenon. The Skycams that Kennedy operates for UND's Department of Atmospheric Sciences are to show a live view of weather conditions are frequently featured on the Weather Channel.

WASHINGTON POST | MAY 20, 2023

Can non-pilots land a plane in an emergency?

We tested the flying capabilities of non-pilots and a former pilot in a flight simulator to see who could land a plane in an emergency.

UND TODAY | MAY 23, 2023

Confessions of a flight simulator pilot

UND Today writer Patrick Miller at the controls of the ALSIM flight simulator in Ryan Hall. He was one of four people with no flying experience who attempted to land a jet airliner as part of an exercise for a Washington Post article.

blogs.und.edu

UND AEROSPACE
ALUMNI ADVISORY BOARD

On behalf of the UND Aerospace Alumni Advisory Board (AAAB), I'd like to offer my personal greeting to all fellow Aerospace alumni and update you on our latest happenings. Our board meets twice per year with our spring meeting coinciding with SAMA's Conference & Career Fair, when many board members are back on campus as featured guest conference speakers or representing their respective companies at the large career fair. In addition to holding meetings and remaining visible on campus, the board appreciates the opportunity to fund and award several scholarships to deserving students.

This past year, UND Aerospace successfully completed its thorough academic accreditation process, and the board was able to assist by interacting with a review panel at our fall meeting and remained available for follow-up questions. In their final report, it was mentioned that one of the many strengths of UND Aerospace was having a very diverse, strong, and active alumni board.

Recently, we launched a new website for our growing mentor program. Partnering with the Student Aerospace Advisory Council (SAAC), we hope to engage and provide mentorship opportunities for students from alumni volunteers who are spread throughout the industry. So far, over forty mentors have applied to volunteer, and we hope to launch a large recruitment campaign this Fall for interested students. We appreciate UND's continued support and hope this program can continue to grow to be a critical tool for students evaluating career options.

The AAAB is open to all alumni who have an interest in serving in an advisory role to support the Odegard school. We welcome and encourage all Aerospace disciplines to join our ranks. If you have an interest in joining the board, please send an email and include a brief description of your career experience since leaving UND.

Looking forward to the remainder of 2023, we will continue to work to find ways to better support the Odegard school. I encourage faculty, students, and alum to contact the board and take advantage of the tremendous depth of experience that resides in our board members.

As always, the entire UND Aerospace Alumni Advisory Board would like to thank you for the opportunity to serve the students, faculty, and alumni of UND Aerospace. This is a very exciting time for all of us, and for our industry.

Best Regards,

John Klinger, '90
President, AAAB
johnrklinger@gmail.com

INDUSTRY
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AEROSPACE CONNECTIONS

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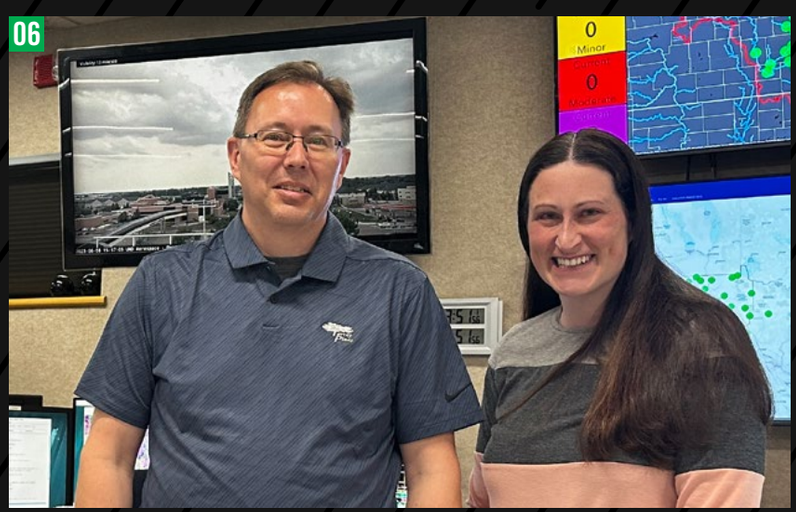

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1. Captain **George S. Connelly III, ‘82**, First Officer **George S. Connelly IV, ‘06,** flying American Airlines from Miami to Basseterre, Saint Kitts.

2. Captain **Sean Lau, '05,** and First Officer **Michelle Leland, '04** on Hawaiian Airlines Flight 89, Boston to Honolulu.

3. Captain **Bernadette Running, '16,** and First Officer **Ally Olson, '19,** flying for Endeavor Air.

4. Chief Pilot **John Klinger, '90,** and son, First Officer **Patrick Klinger, '18,** had the opportunity to share the flight deck from Minneapolis to Nashville.

5. **Lisa Nydahl, '85**, Airbus A350 Captain for Delta Air Lines pictured with **Leigh Meyers, '93**. The flight was Incheon, Korea to Minneapolis - St. Paul, March 5, 2023.

6. **Vince Godon, '91,** and **Amanda (Homann) Lee, '07 & '09,** at the Grand Forks National Weather Service (GF NWS).

7. **Jared Herndon, '08**, First Officer for Delta Air Lines pictured with **Trevor Mullen, '08**, Flying New York to Dakar, Senegal in May 2023.

8. **Wes Van Dell, '06**, UND Chief Flight Instructor - Rotorcraft, flying with **Austyn Schluter, '18,** currently at Black Hills Aerial Adventures in Custer, SD.

9. **Sheldon Tension Martin, '17,** presented United Airlines wings to his former student **Jake Spellacy, '20**.

SEND US YOUR ALUMNI PHOTOS!

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Join our **UND Aerospace Alumni** Facebook group!

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