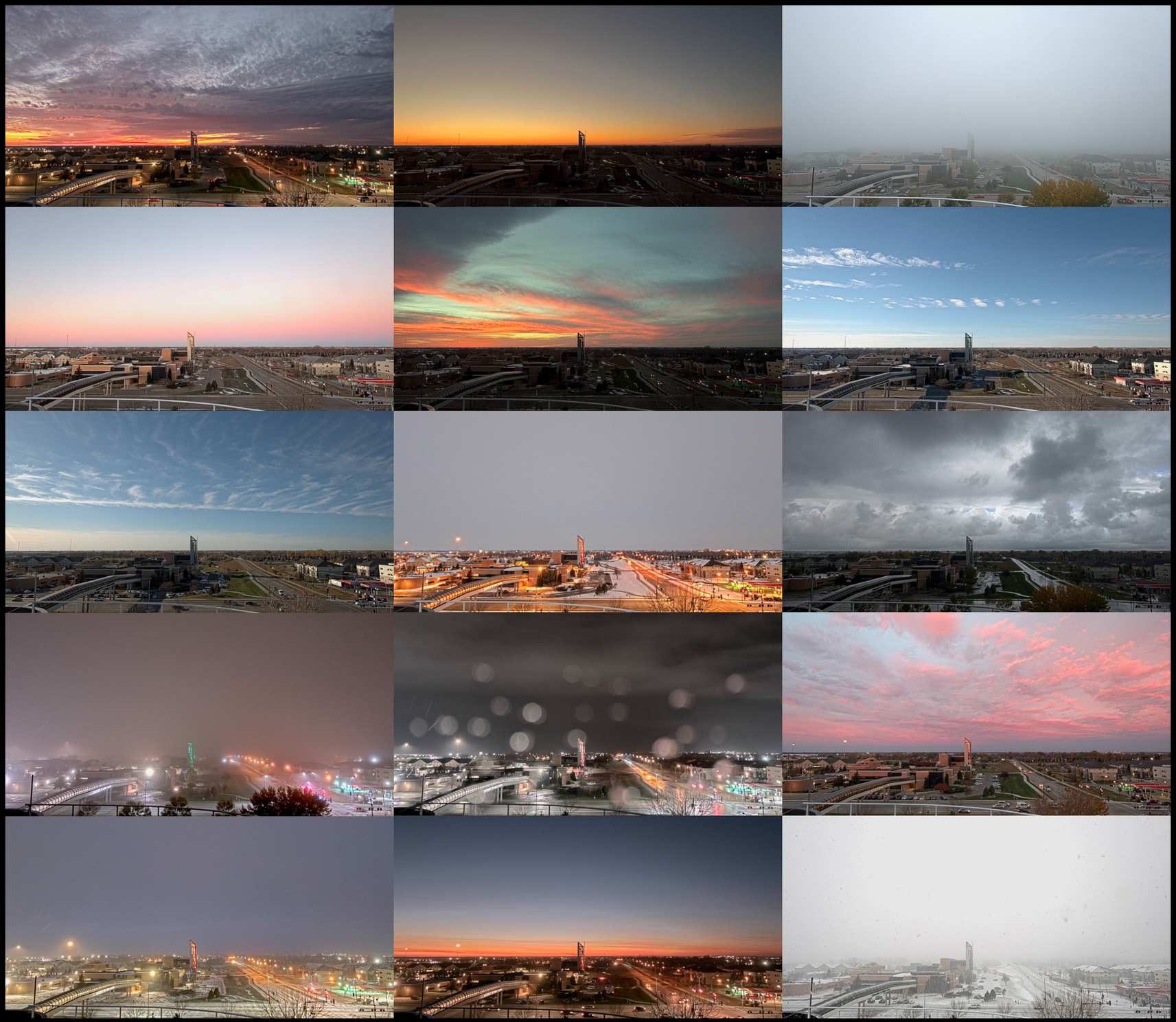

# AEROCOM

JOHN D. ODEGARD SCHOOL OF AEROSPACE SCIENCES

**WINTER 2022**

UND
UNIVERSITY OF NORTH DAKOTA

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It's hard to believe I've been here a year—and what a year it's been. At our recent December graduation, we awarded 69 Bachelor's Degrees, 9 Masters Degrees, and 1 PhD. We continue to see more interest in hiring our graduates—across all disciplines and are hearing great things as our graduates move into their careers.

Additionally, over the past year, we had three members of our Aviation Faculty earn their PhDs: Congratulations to Shayne Daku, Nick Wilson, and Zach Waller. We are currently advertising for several faculty to start next summer in Aviation, Space Studies, and Atmospheric Sciences.

In August, we had the honor of hosting General John Raymond, the Chief of Space Operations for the U.S. Space Force, for the signing of the first University Partnership Program agreement. With the support of the North Dakota legislature and strategic investments from the university, we will see eight additional faculty positions and new space and national security infrastructure added across three colleges on campus. We are leveraging our Unmanned Aerial Systems expertise and extending into the space arena.

The fall semester saw another record class of freshman and brought our total undergraduate majors to 2,406 (with 149 in our minors) and with increased interest in our Space Studies graduate programs we now have 223 total graduate students. We also broke a flying hour record for last year, exceeding 126,000 total hours and are on pace to meet or exceed that again at the halfway point this year. That being said, we are at our capacity and are restricting admissions for Commercial Aviation and Aviation Management for the class entering next summer.

We completed the initial design for a new Flight Operations building with plans to start construction in the Summer of 2023. Fundraising has started for this building as well as adding endowed faculty chairs or fellowships for each of our departments. We'll also be completing the ramp renovations that were started a few years ago.

The Aviation department added a new major in Aviation Safety and Operations, both in-residence and online and enrollment is already growing. We'll also be adding a helicopter spatial disorientation trainer next summer, expanding our aerospace physiology training capabilities for students as well as more capacity and capability for corporate customers. Our Earth Systems Science and Policy department added a Masters of Environmental Management degree program and is now offering online versions of its MS and PhD programs.

We were able to reconvene during Homecoming week for our Aerospace Hall of Fame Induction Ceremony and recognize the seven new members from 2020 and 2021. It was great to see everyone again and hear about the wonderful careers they've had and contributions they've made to the aerospace industry.

As many of you know, in October we lost one of our aviation students, John Hauser, in a tragic aircraft accident. The college and campus community really came together to mourn and to support John's family, friends, and each other. We hosted the first Collegiate Aviation Mental Health Summit with the FAA, multiple airlines and union representatives, other collegiate aviation programs, and mental health researchers after which we will be providing more resources for all of our students.

We hope to see you at one of our on-campus or outreach events in 2022 so we can share more great stories of the successes of our students, faculty, and staff and hearing about yours.

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


# SEVEN ALUMNI INDUCTED INTO UND AEROSPACE HALL OF FAME

## Inductees recognized during Homecoming Week represent 2020, 2021 selections

On Oct. 22, the John D. Odegard School of Aerospace Sciences recognized seven distinguished alumni as the latest inductees in the UND Aerospace Hall of Fame.

The group represented both the 2020 and 2021 classes of inductees, the third and fourth classes since the UND Aerospace Hall of Fame's establishment in 2018.

Robert Kraus, dean of UND Aerospace, said the Hall of Fame is the College's way of recognizing the significant accomplishments and contributions of UND's outstanding aerospace alumni.

"This year, we were happy to induct the Hall of Fame classes of 2020 and 2021," Kraus said. "Reading through the nomination packages was a true pleasure. They highlighted the foundation that the University of North Dakota, the John D. Odegard School of Aerospace Sciences and its predecessors laid for lifetime success."

# DONALD DUBUQUE ‘81

From 1979 through 2018, Dubuque’s roles at the University of North Dakota included Chief Flight Instructor, Assistant Director of Flight Operations and Director of Extension Programs. He helped establish eight extension sites on behalf of the UND Aerospace Foundation to provide flight training, which included partnerships with the U.S. Space and Rocket Center, as well as Cirrus Aircraft. Currently, the Phoenix extension site flies more than 45,000 flight hours annually.

Dubuque is also credited with buying and selling more than 300 aircraft for the University, and his strategy of owning rather than leasing aircraft saved millions of dollars for UND.

# LARRY MARTIN ‘71

Serving as Chairman of the Board for the UND Aerospace Foundation since 2008, Martin spent many years of his career in airline leadership positions. In 1980, he joined the team that founded People Express Airlines, where he served as Managing Officer and helped lead the airline to $1 billion in revenue, 5,000 employees and 130 aircraft in just five years.

After merging with Continental Airlines and acquiring Frontier Airlines in 1986, Martin would go on to serve as President for Frontier and later as Regional Vice-President for Continental. He is also credited with establishing the first university pilot bridge program between an airline and UND in the early 1980s.

While at UND, Martin was the first student president of the Student Aviation Advisory Council in 1969, and was on the first UND Flying Team to compete in the annual NIFA SAFECON competition.

# LAMAR HAUGAARD ‘85

Since his graduation in 1985, Haugaard has served as a Captain, Director of Pilot Hiring and System Chief Pilot for Horizon Air. Before finishing at UND, Haugaard also worked as a flight instructor and as a charter pilot for Northern Airway.

UND Aerospace recognized Haugaard for his role in bringing more than 500 UND alumni to fly for Horizon Air via a university partnership valuing academic experiences for aspiring pilots. He’s credited with mentoring many professionals in the industry, as well as serving as an Industry Trustee on the Board of Directors of the Aviation Accreditation Board International for 12 years.

# JEFF BOERBOON ‘92

Boerboon is perhaps best known as an air show performer, having flown in more than 100 events and creating the one-of-a-kind Yak 110 – a combination of two Yak 55 aircraft with an additional jet engine. But since 1999, Boerboon has flown for Delta Air Lines as an Airbus 320 Captain.

Before joining Delta, he flew for Grand Canyon Air Tours and American Eagle Airlines between 1992 and 1999. Boerboon won the US National Aerobatic Championship in 2003 and 2007 in the Advanced category, as well as in 2010 in the Unlimited category. He’s a member of both U.S. Advanced and Unlimited Aerobatic teams, having flown in multiple World Aerobatic Championships with numerous awards and accolades.

While at UND, Boerboon was an aerobatic flight instructor and a member of the 1989 and 1990 NIFA National Championship teams.

# JEFFREY D. HART '79

Since graduating in 1979, Hart has more than 42 years of airline operations experience. Until 2009, Hart held a variety of directing roles at Northwest Airlines, Inc. with expertise in operations control, passenger service, aircraft servicing, international operations, government and airport relations, facilities and flight dispatch.

Since 2009, Hart has worked for Delta Air Lines as General Manager for Airman Certification Standards at Minneapolis-St. Paul International Airport. Hart has also served as the team leader of the Frozen Flyers since 2008 for the Minnesota Polar Bear Plunge, which benefits the Special Olympics.

In 2020, his team raised more than $270,000, and has raised more than $1 million since joining the Frozen Flyers.

# JAMES KOSLOSKY '76

Starting his career in the United States Air Force, attaining the rank of Staff Sergeant as an Air Traffic Control Specialist, Koslosky went on to serve as a Planning Supervisor, Operations Manager and Executive Director for multiple airports in Wisconsin and Michigan.

From 1986 to 1991, he was Executive Director of the Fort Wayne-Allen County Airport Authority before being named Executive Director of Gerald R. Ford International Airport, located in Grand Rapids, Mich., a position he held until 2012.

Koslosky was directly involved in the creation of two degree programs at UND: the Airport Administration degree granted through the Nistler College of Business & Public Administration and the Aeronautical Studies degree granted through the College of Arts & Sciences.

# HAL E. ADAMS '75

Adams has more than 40 years of civil and military aerospace experience, specializing in business development and strategies support with emphasis in avionics. He served the United States Air Force as a B-52 combat flight crew member during the Vietnam conflict, where he was awarded the USAF Air Medal with three oak leaf clusters.

Adams would go on to co-found Accord Technology, where, during his tenure as COO, he achieved FAA approval for the industry's first advanced GPS sensors used in ADS-B technologies.

In 2015, Adams co-founded Aerospace Business Development, where he has since served as Managing Director. Four years later, in 2019, he co-founded AviaGlobal Group, another aerospace business development venture.

HALL of FAME
AEROSPACE

# DO YOU KNOW AN OUTSTANDING UND ALUM?

Nominations are open for the 2022 UND Aerospace Hall of Fame!

Recipients will be announced in July & inducted the week of UND Homecoming.

**Nominate someone today!**

aero.UND.edu/alumni


Photo by Mike Hess/UND Today.

# AVIATION MENTAL HEALTH SUMMIT

## In Chicago, UND Aerospace brought together industry, government and academic interests to address pilot mental health

The University of North Dakota brought all sides of the aviation industry to the table on Wednesday, Dec. 15, to discuss mental health and wellbeing among the industry's student body and workforce.

At the Aviation Mental Health Summit in Chicago, UND hosted members of the Federal Aviation Administration (FAA), U.S. Air Force, Aviation Medicine Advisory Service, several airlines and the Air Line Pilots Association (ALPA).

The event took place at United Airlines' ALPA headquarters. Researchers and faculty members from eight flight schools and universities, including UND, also joined industry stakeholders throughout the day's proceedings.

And on UND's campus, in the Memorial Union, more than 60 students and faculty tuned in for presentations and panels via Zoom. Robert Kraus, dean of the John D. Odegard School of Aerospace Sciences, led the campus co-event.

According to Elizabeth Bjerke, associate dean, the conference brought together aviation programs, industry leaders, mental health experts and the FAA to share knowledge, explore ideas and promote mental health in the aviation community, especially among students and other aspiring aviators.

"This direct dialogue with the industry and with medical experts is crucial," Bjerke said. "This topic of mental health hasn't been as widely discussed on the collegiate aviation side as it has been within most major airlines, whose pilots have stood up peer support groups and training efforts in recent years.

"Through this multidisciplinary group of industry professionals, academics and medical experts, we're hoping to establish a collaborative network, one that addresses the needs of our students and prepares them for careers as professional pilots," she said.

Kraus agreed. "It was heartening to hear the efforts and emphasis regarding safety, security and wellbeing from the FAA, aviation medical and mental health professionals, airline and union representatives, and how collegiate aviation programs can benefit from what the airlines have implemented," he said. "Growing our peer support programs and providing training to key individuals will help with our goal of normalizing discussions of brain health and mental wellness."

The John A. Hauser Mental Health in Aviation Initiative Endowment, established by Anne Suh and Alan Hauser, parents of UND Aerospace student John Hauser, supported the day's events. Hauser died in October in what is believed to have been a suicide. We are appreciative of the support of Drs. Suh and Hauser for developing a fund that will support our department in addressing the ongoing mental health needs of student pilots. Students who are experiencing distress or want to talk to someone about mental health are encouraged to reach out to the University Counseling Center (701-777-2127).

*—Connor Murphy / UND Today*

**Aviation Mental Health Summit 2021**
Head over to our YouTube Channel: **UND Aerospace** to view recordings from the summit.

**The Aviation Mental Health Summit**
was supported by the John A. Hauser Mental Health in Aviation Initiative Fund. Scan with your camera app to give!

# REMEMBERING AL PALMER

UND Aerospace community pays tribute to longtime colleague and friend Brig. Gen. Al Palmer

Photo from UND Archive.

In 2017, following his retirement as director of UND's UAS Center for Education, Research and Training, Brig. Gen. Alan Palmer told UND Today, "I've been blessed with a great career. I did everything I wanted to do in aviation, except go into space."

With Palmer having flown close to 10,000 hours since first learning to fly at UND in 1976, earning licenses and certifications for multiple aircraft, and attaining flag officer rank in the North Dakota Air National Guard, it's easy to believe he meant it.

On November 16, 2021, Palmer died at the age of 69 in Grand Forks.

Through more than 30 years of service to UND Aerospace, Palmer managed one of the nation's largest flight training programs and later helped lead the country in UAS education and research. His military career saw him rise through the enlisted ranks all the way to retiring as brigadier general. Palmer's contributions and legacy – on both fronts – will resonate for years to come, according to his peers.

"His legacy is the number of students who benefited from his decades of leadership and service," said Robert Kraus, dean of the John D. Odegard School of Aerospace Sciences. "I had the pleasure of meeting Al shortly after my arrival at UND, and I could clearly see the positive impact his dedication had on our flight training and UAS programs."

Dick Schultz, UND's director of flight operations, said he was fortunate enough to work with Palmer for many years in managing the University's flight training.

"Al was a tremendous individual and a great mentor," Schultz said. "What I remember most about him was that nothing was impossible, in his eyes. There was always a way, and he wouldn't quit trying until he found it.

"Al continued John Odegard's spirit at UND Aerospace, which continued to push us to be better, as well as unafraid to venture into the unknown. He will be truly missed."

## One of the original UND 'young guns'

Palmer's time at UND began when he took night classes under the tutelage of John Odegard, working to finish the college degree he left behind when he was drafted into the U.S. Air Force during the Vietnam War. Palmer was enlisted as a B-52 electronics warfare specialist and was stationed at Grand Forks Air Force Base in 1975, following an assignment at the U-Tapao air base in Thailand, according to the Grand Forks Herald.

Palmer's work on his degree blossomed into a career at UND following his active duty service in 1978. In 1981, he joined the North Dakota Air National Guard as a maintenance officer.

Palmer flew close to 6,000 hours as an instructor pilot, and later was heavily involved in establishing UND's first international training programs. According to Chuck Pineo, CEO of the UND Aerospace Foundation, Palmer is a well-known figure in Taiwan, having given hundreds of China Airlines pilots their FAA practical tests, better known as checkrides.

Pineo referred to Palmer as "one of the original John D. Odegard young guns, flying the jets and living the 'Aviation Dream.'"

"By the time I met Al, he was director of flight operations and was visibly excited to help us rebuild those international programs, but this time with Japan, Saudi Arabia and China," Pineo said. "Al's willingness and enthusiasm to chase new projects and customers was a big part of UND Aerospace's success.

"He always made himself available to help strategize, host and travel."

Hired by UND on the same day as Palmer, Don Dubuque – who went on to direct UND's flight training extension programs until 2018 – maintained a close friendship with Palmer through their nearly 40 years working together. Dubuque regarded Palmer as a great friend with a positive attitude and a willingness to lead by example.

"Among many dedicated people at UND Aerospace, Al was among the most dedicated I worked with," Dubuque said. "He loved what we were doing, and what our mission was, and that showed in our success. As a manager, he was never afraid to get in there and show how it was done, and he was always kind to people."

*—Connor Murphy / UND Today*

Photo by Mike Hess/UND Today.

> "What you come to realize is that the people you meet come from all over the country and the world to fly here, and they all have different perspectives on life."
>
> **ELSPETH THOMAS**
> **COMMERCIAL AVIATION STUDENT**

# FIRST IN FLIGHT FOR WOMEN OF STANDING ROCK

**The first woman from her tribe to pursue commercial aviation at UND, Elspeth Thomas doesn't intend to be the last**

Sitting in the cockpit of an airplane was all it took for her to make up her mind.

With the flight controls at arm's reach, staring at the flat expanse of earth and its horizon below, Thomas sensed at that moment where her ambitions and her UND major belonged.

"I just knew it was exactly what I wanted to do," she said.

And, in making that decision, she likely became the first woman from the Standing Rock Lakota Tribe to pursue a commercial aviation degree at UND.

## Miracles of flight

As Thomas tells the tale, her UND aviation story began in Noren Hall, where she'd lived on campus since coming to UND in 2016. Noren is a residence hall popular with students in the aviation program.

"I was trying a bunch of different classes at the time, and I ended up making a lot of friends in aviation," Thomas said. "And one day, I went flying with one of those friends, and I was in the front seat."

As the small aircraft hummed above UND, Grand Forks and the Red River Valley, she experienced life at the controls, if only for a moment.

That exposure to the miracle of flight likely brought

forth long-forgotten memories, based on her childhood experiences and fascination with flying.

"Both of my parents and a couple other family members were in the Air Force, and I was exposed to aviation at a young age," Thomas told UND Today.

Though she has always called Grand Forks home, her mother was born and raised on the Standing Rock Reservation, and Thomas has been an enrolled member of the tribe since birth.

Her parents, though not on the flight line themselves, were stationed at bases in Cavalier and Grand Forks through much of Thomas' childhood.

She recalled a time in elementary school when the students were asked to dress like people who inspired them. Skipping the standard fare of superheroes and sports stars, Thomas dressed as trailblazing pilot Amelia Earhart.

"So, in a way, flying was always in the back of my mind, but I never thought I could actually go out and do it," she said. "It wasn't until I got to college that I thought this could be something I could pursue as a career."

## First-generation aviation student

Of course, majoring in commercial aviation – especially at the start of one's junior year, as in Thomas' case – is a lot more complicated than just checking a box. But from her experiences and friendships, Thomas understood the gravity of her choice and took time to think it through.

The result was taking a full semester off to do her own research. Thomas spent hours reading things online, talking to advisors and doing what she could to understand the financial and academic implications, she said.

"I really wanted to think about my decision and see what it entailed, which turned out to be a lot," Thomas said with a laugh.

Today, she's certified as a commercial pilot with multi-engine and instrument ratings, and she's working on her certification to become a flight instructor. Thomas estimates that she'll be graduating by summer 2022. In other words, "I'm very close to being done," she said.

Regarding her status of being "first" from Standing Rock, or among the few Native American women to go into aviation at UND, Thomas said she has thought about it, but knows that – despite the challenges she has faced – going into the program would have been a lot more difficult if she had come from a reservation community.

"Having grown up in Grand Forks, going to the schools here, it wasn't a big transition coming to UND," Thomas said. "But I could see how going from life on the reservation to pursuing an aviation degree would be a totally different experience."

"Even for me, being a first-generation aviation student, I don't have parents who are airline pilots, which is the case for many other students," she continued. "That type of background turns out to be a valuable guide in knowing the right people to talk to and finding the right resources. So, in that way, there can be so many challenges and obstacles to overcome."

Also, the fact that Thomas is a woman enrolled in commercial aviation is almost as singular as the fact that she's Native American. Women pilots represent only 6 percent of the total pilot population, according to Women in Aviation International.

At UND's John D. Odegard School of Aerospace Sciences, which trains students for not only the cockpit but also other careers in aviation, women make up about 15 percent of the students, according to enrollment data.

As a result, starting out in the program was difficult, due to sitting in classes with only one or two other women in some cases, Thomas said. But as time went on, she made more friends, and the feelings of difference became more trivial as the litany of aviation "unknowns" went away with experience.

In addition, many of Thomas' female classmates also are first-generation aviation students, and those peers are among her most important resources on campus, she said. She's taken an active role in a number of student organizations, including the UND Indian Association, American Indians in Science & Engineering, Women in Aviation and the Organization of Black Aerospace Professionals.

Thomas notes that while she is not Black, the Organization of Black Aerospace Professionals has rapidly grown and expanded its umbrella to represent other minorities at UND Aerospace. It has become a place for minority students "to come together and have a unified voice," she said.

"What you come to realize is that the people you meet come from all over the country and the world to fly here, and they all have different perspectives on life," Thomas said. "So, even though I'm one of the few Native Americans in the program, I feel as though I'm among a diverse group of women in the field."

## Sharing in success, present and future

Besides building the flight hours she'll need for her career in the clouds, Thomas is determined to do right by her tribal community, she said. That means advocating for Native Americans who are similarly interested in aviation careers.

"In our Lakota culture, and likely other Native nations, the expectation is to give back to your people and your community," Thomas said. "I want to see more Native people in this field, and I'm always going to try to inspire young people in my community – to open that door for them."

With most of her mother's family living on the Standing Rock Reservation, Thomas makes the five-hour journey to visit when she can.

"I wasn't raised in a traditional Lakota home, but my mom always made sure that we are connected to our family, community and culture," Thomas said. "And within that community, certain values such as humility, respect, compassion and generosity have shaped my decisions as a student pilot and as a person in general."

What that means for her career, she said, is that personal success is to be shared with others. The success of one is the success of the community, in other words; and, in return, she will never be short of support.

"People have heard about how I'm pursuing this career, and I'll be approached by people I met a long time ago and they congratulate me and say how proud they are," Thomas said, smiling. "It's talked about as if I'm doing this for all of us, for the entire community.

"That's what I think about and feel when I go in for my exams and my flight tests. Like, 'OK, I have all of these people behind me to do this.' It's a source of strength that I have to overcome challenges and succeed."

*—Connor Murphy / UND Today*

# WE DO EMPOWER THE FUTURE.

As a strategic philanthropic project for the University of North Dakota, the new Flight Operations Center will be a state-of-the-art facility. This building will reflect the quality of education our students receive at the world's premier collegiate aviation program. Located at Grand Forks International Airport, the Flight Operations Center is the heartbeat of flight training at UND. Students and instructors will be offered a technology-driven training experience, industry will be welcomed to an inviting and modern venue for increased collaboration and events, and the wellness of our faculty, staff, and students will be positively impacted by beautiful spaces.

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**You have the opportunity to create the next-generation student experience at UND Aerospace. Help our students soar to new heights at the Flight Operations Center.**

**To learn more, contact:**


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UND ALUMNI ASSOCIATION FOUNDATION

## TAKE FLIGHT

Use your phone's camera to scan this code for a bird's-eye view of the proposed Flight Operations Center.

Photo by Heather Schuler.

# 500TH CORPORATE CLASS

## Clearing 500-course milestone, flight physiologists at UND Aerospace continue life-saving training for students and companies alike

Outside of the military, it's nearly impossible to experience high-altitude conditions on the ground. Ditto with what it's like to suffer from complete visual and physical disorientation from the safety of a simulation.

But at UND, such training is a standard for every student studying aviation. Since 1990, UND Aerospace has been home to one of the few altitude chambers operated by a university, and the program's other specialized flight training devices put UND in rarer company still.

With access to these training environments, students enrolled in their mandatory flight physiology course are able to better understand and respond to the warning signs of depressurization, hypoxia (oxygen deprivation) and spatial disorientation that can befall any pilot, depending on the circumstances.

And for the past 30 years, UND has also played host to Fortune 500 companies and a variety of organizations and flight schools looking for that very same training – albeit in a condensed format, as opposed to a semester-long course.

In recent weeks, the flight physiology department at UND Aerospace completed its 500th corporate course, as they're known. These courses deliver UND's altitude training in a two-day session.

More than 3,000 people have attended, in addition to the more than 9,000 who went through similar training as UND students.

And from the feedback that Director of Flight Physiology Tom Zeidlik receives, UND has been able to offer an experience found in few other places that are accessible by civilians.

"In our corporate classes we have people who have been flying for 20 to 30 years, and they're flying some of the highest-tier business jets and transport aircraft," Ziedlik said. "A majority of them write, 'I wish I would have known this stuff years ago. I wish I would have taken this class a long time ago.'

"Even super-experienced pilots are finding a lot of value in this class."

### Lessons you can feel

Found on the ground floor of Odegard Hall, the gray, hulking altitude chamber with porthole windows is "military grade" in every sense of the term. People seated inside the chamber are able to feel the precise effects of rapid decompression – the sudden depressurization of an enclosed space, such as an airplane cabin – as well as the lack of air when such an event occurs.

Zeidlik credits Steven Martin, a military-trained aerospace physiologist and the manager of the department, with keeping such a unique technology operating as smoothly as it does.

"Teaching pilots in this way has been a military and practical discipline for decades, but, in the civilian world, it's relatively unknown," Martin said. "Even though it's

not a widely available type of training for most pilots, I would say the skills are necessary to learn."

Over the two days of the typical corporate course delivery, Martin spends the first day going over high altitude physiology, meaning how the atmosphere influences human performance. The second day brings lessons on sensory physiology, or human orientation systems and different types of disorientation.

In his words, people can read about the symptoms of hypoxia, or memorize what illusions can cause disorientation while flying. But at UND, those things are felt, not imagined, and experienced as realistically as possible on the ground.

"It's possible to put students in a tent and pump in nitrogen, which can cause hypoxia, but they don't feel their ears pop, or feel the gas expansion and pressure change," Zeidlik said. "Here, we can do a rapid decompression where we go through a 4.4 PSI pressure change, and you end up with the longest exhale you're ever going to have in your life. There isn't another school where you experience that."

### Military training philosophy for professionals

In addition to the altitude chamber, UND Aerospace boasts an impressive fleet of ground-based flight trainers, including a spatial disorientation trainer used by the flight physiology team. The enclosed cockpit replica forces pilots into no-visibility scenarios, for instance, while also using a wide range of motion to cause a realistic distortion between what is seen and felt.

"I've flown airplanes almost all my life, and what you feel in there is real," Zeidlik said. "When I get in, I always laugh and say I don't know whether I'm on foot or horseback."

But spatial disorientation, the marriage between visual and sensory illusions during flight, is no joke. Such impairment causes crashes across the world every year. It caused the death of NBA legend Kobe Bryant in early 2020, Zeidlik said, which led to a surge of corporate pilots seeking specialized training at places such as UND.

"Just to give one example, oxygen equipment is something that civilian pilots don't have a lot of opportunity to work with," Martin said. "It's always there in the cockpit, but a lot of professional pilots are kind of afraid of the oxygen masks, whether because of inexperience or misinformation. We wanted to incorporate the military training philosophy into professional pilot training."

Zeidlik agreed. "At 25,000 feet, the FAA says you have three to five minutes of useful consciousness, where you can still help yourself," he said. "In our experience, which is 9,000 students, we rarely have anybody off oxygen for more than three minutes.

"Actually feeling the real thing is vastly different from anything you can read."

### 'Tip of the spear' for safety

Because of that, UND has been able to develop close relationships with the likes of Raytheon, Phillip Morris International, Abbott Labs, Merck and other large companies that employ multiple aircraft to shuttle executives and conduct global business. Martin said the training at UND is recommended by the Federal Aviation Administration, the National Business Aviation Administration and the International Business Aviation Council.

In addition to the 150 companies that have worked with UND to receive the two-day flight physiology training, multiple federal agencies such as the Drug Enforcement Agency and Customs and Border Protection as well as schools such as Mankato State University and South Dakota State University have made trips to UND for the chance to use what would otherwise be cost-prohibitive equipment.

Recently, the team established a new webpage – aerospacephysiology.com – with information about corporate course pricing and availability, the training facilities used as well as the team members involved.

And next summer, UND is expected to install another spatial disorientation trainer, but the new unit will be fitted for helicopter pilot training. According to Zeidlik, the only other two trainers of this kind are located at the U.S. Army's Fort Rucker, in Alabama. UND Aerospace made the announcement of the acquisition this past month.

Given how the fixed-wing trainers are already hard to come by, this form of helicopter training is as "tip of the spear" as safety training can be, said Martin.

According to Associate Dean Elizabeth Bjerke, UND Aerospace is in a unique position to provide valuable training to the College's industry partners.

"This type of training goes well above the minimum required by the FAA, and has been proven to save lives and reduce accidents," Bjerke said. "It is also great exposure for the University of North Dakota as it gives individuals a reason to visit our beautiful campus! We are looking forward to expanding our physiology offerings for both our students and corporate clients."

*—Connor Murphy / UND Today*

# MIKE POELLOT RETIRES AFTER 45 YEARS

Chester Fritz Distinguished Professor of Atmospheric Sciences led the department as a founding professor in 1986, then as chair for 21 years

For the first time since 1976, the pressure was off for Mike Poellot as he stepped on campus.

All that was left to do, following decades of leadership, teaching and research, was celebrate.

The end of summer marked the end of an illustrious career for Poellot, a Chester Fritz Distinguished Professor of Atmospheric Sciences and longtime chair of the department he helped create some 35 years ago.

And to celebrate such a distinguished career, he did it the only way he'd prefer: with the people he so cherished throughout his career.

"This is 100 percent better than a Zoom party," said Poellot with a laugh, amid a crowd of students, faculty and staff gathered in Odegard Hall to congratulate him on his retirement.

"With all of the precautions we've had to take, it's maybe not the way I thought I'd finish things up here," Poellot continued. "But I've been glad to see people and look back on what's happened over the years, and to see people up-and-coming. I've always enjoyed working with the students, so it's fun to follow them and see what they're doing, or where they're off to."

## Legacy of dedication

As Poellot walked around the room, chatting with old colleagues, students and longtime staffers, some of his peers reflected on his legacy.

Recruited to UND by John D. Odegard and among the first three professors that started the Department of Atmospheric Sciences, alongside Tony Grainger and the late Leon Osborne, Poellot has been influential in a way few other faculty have, said Associate Dean Elizabeth Bjerke.

Through his years of airborne research, spent between piloting the Citation research jet and operating its data-collecting instruments, Poellot bridged the gaps between the academic departments of the John D. Odegard School of Aerospace Sciences.

"He's a pilot, he's a meteorologist and he's spent a lot of time teaching our aviation students about atmospheric sciences," Bjerke said. "He's been able to refine his research expertise through both aircraft research and meteorology research – it's phenomenal. He was as interdisciplinary and all-involved as any faculty member I've worked with."

Poellot's exploits in the field of weather modification, in particular, have drawn tens of millions of dollars in external research funding over the years, working with the likes of NASA, the National Oceanic and Atmospheric Administration and the Federal Aviation Administration. Today, Poellot's contributions to the field are recognized internationally, said Research Professor David Delene.

"That's a legacy we hope to continue far into the future," said Delene, who often worked with Poellot on airborne weather projects. "Everything we've been able to do in that form of weather research, involving graduate students so extensively, is all due to Mike's work. And that's just one part of what he's done in this department."

Photo from UND Archive.

> "You look at the program as a whole and all that it's accomplished over the years, and so much of that could be attributed to Mike either in a leadership role as chair or in a support role working with Leon Osborne to help build everything we have today..."
>
> **DEAN ROBERT KRAUS**

Looking around the reception, Delene said that Poellot – who held the position of department chair for 21 years, until 2020 – was instrumental to the hiring of everyone currently working in the Department of Atmospheric Sciences. Because of that, he remarked, the department is likely on a good trajectory.

To Dean Bob Kraus, continuing Poellot's vision for the department will take Atmospheric Sciences at UND to the next level. Under Poellot, the department developed graduate and doctoral degree programs and now brings in students from across the country.

"You look at the program as a whole and all that it's accomplished over the years, and so much of that could be attributed to Mike either in a leadership role as chair or in a support role working with Leon Osborne to help build everything we have today," Kraus said. "It's great to see the support for Mike from all levels of our College, because this program, as it exists today, is a result of his dedication and support of the College and department."

### Poised to succeed

Thinking about his retirement, Poellot said he's going to miss the daily interactions he had with colleagues. He's been able to make some good friends throughout his career, he said, and he's going to miss the small conversations.

"Some of it was business, some wasn't," remarked Poellot, smiling underneath his Fighting Hawks face mask. "I'll miss those touchpoints, but I can always come back up and visit once in a while."

But his first thought of what he'd miss was the impact of working with students.

"They come through and learn and grow, and then they move on to the work force and have their own careers," Poellot mused. "It's always been an interest of mine to follow that.

"We have good people, and that's really what's important. If we have faculty who are interested in students and interested in research, I see a lot of success from here on forward."

*—Connor Murphy / UND Today*

Photo by Patrick C. Miller/UND Today.

# SKYCAMS GIVE BIRD'S-EYE VIEW OF UND'S WEATHER

## Weather Channel regularly features Atmospheric Sciences camera atop Clifford Hall

Aaron Kennedy's office on the fourth floor of Clifford Hall provides a panoramic view of the western skyline of Grand Forks, a real perk for a UND atmospheric scientist who studies severe weather.

If he wants an even better view, clicking on a web link on his computer takes Kennedy to the Department of Atmospheric Sciences Skycam located on the building's roof. One need not be a weather researcher to take advantage of this resource. The live Skycam view is available 24 hours a day on the department's YouTube channel to anyone with internet access.

"I think it's good for the community to understand that we have a department on campus that works in this area," Kennedy said. "We're here to answer questions. That's part of a university's purpose – to be the center of knowledge. If we can answer people's questions about what they see in the sky and provide some education, that's part of our mission."

### As seen on the Weather Channel

In fact, video from the UND's Skycam is regularly featured on the Weather Channel. Sometimes it's a live view showing the current conditions in Grand Forks and other times it's recorded video of weather phenomena, ranging from meteors to severe weather events to unusual cloud formations.

"Sometimes they show sunny skies in North Dakota," Kennedy said. "I usually find out about it when my dad sends me a screen shot and says, 'Hey look what I saw on the Weather Channel today!'"

There's no formal agreement with the Weather Channel. Kennedy said not long after the Skycam went live three years ago, someone from the Weather Channel contacted him about using the livestream.

"I told them to make sure you put the University of North Dakota on it – preferably

UND Atmospheric Sciences, so prospective students see it," he explained. "They like watching various weather channels. When it shows up on air, you never know who's going to see it."

Recently, the addition of a newer, higher-resolution camera enabled Kennedy to meet requests for an east-facing Skycam showing the view down University Avenue toward East Grand Forks.

"The first day or two, there were a bunch of comments from people saying they were happy we had a Skycam looking east," he noted. "Someone said, 'I can see my house!' Once we put it up, there was a lot of feedback in the chat. People are appreciative of having it."

Livestreaming channels on YouTube have chat rooms where viewers can discuss what they're seeing, a feature over which Kennedy has no control and which he views as something as a mystery. Usually when there are severe weather events in the Grand Forks area, the discussion is about local weather. But at other times, the discussion is in foreign languages about topics unknown.

"I'm just impressed that there are folks across the world seeing what's going on in this random place and using the chat room to talk," Kennedy laughed.

In addition, time-lapsed video of various weather events and cloud formations recorded by the Skycam is frequently used in classrooms throughout the Atmospheric Sciences department.

### Meteorology basics

"One of my classes is physical meteorology, which essentially teaches students how to explain to their parents and grandparents what they just saw in the sky," Kennedy said. "If a weather event happened the previous day, we'll show the Skycam video to them. Seeing the evolution over time is really handy when looking at optical phenomena like sundogs and rainbows. It's a good learning tool.

"I've got a publication in a journal with screenshots from the Skycam," he continued. "It's even scientifically used, which is pretty cool."

> **"We're here to answer questions. That's part of a university's purpose – to be the center of knowledge. If we can answer people's questions about what they see in the sky and provide some education, that's part of our mission."**
>
> **DR. AARON KENNEDY**
> **GRADUATE PROGRAM DIRECTOR & ASSOCIATE PROFESSOR**

Sometimes people contact Kennedy about an event they think the Skycam might have recorded. It could be a meteor falling from the sky or an accident at the intersection of University Avenue and 42nd Street.

"The Skycam provides high-resolution video, but it's focused on the sky," Kennedy noted. "It can't recognize individual people and it can't read license plates. Some people think it's like Big Brother in the sky, but what it can actually see is very limited."

Maintaining the two Skycams isn't difficult, according to Kennedy. Usually all that's required is wiping spots off the lenses after a rain and routinely downloading the video from the flash memory cards.

The inspiration for the Skycam occurred when Kennedy was a graduate student at UND. A landspout, which looks like a tornado but is more similar to a giant dust devil, formed west of Grand Forks.

"Half the building saw it and I was in the half that didn't see it," he recalled. "When I became a member of the faculty, I thought maybe I could try crowd funding the Skycam. It was one of the earlier projects when UND first started using that platform."

Kennedy is hopeful that the Department of Atmospheric Sciences YouTube channel will reach 1 million views before the end of the year. For the future, he'd like to have a more sophisticated Skycam that can be remotely aimed and zoomed in on weather events.

In the meantime, Kennedy encourages UND students and their parents to make use of the Skycam. The west-facing camera now provides live weather observations from the Grand Forks International Airport.

"Parents can see the weather their kids are experiencing," he said. "I tell students to pull up the Skycam on YouTube to see what the weather is like and plan accordingly. You can pretty much make a complete forecast for how to dress when you leave for class that morning."

*—Patrick C. Miller / UND Today*

### Watch Live!

Head over to the **UND Atmospheric Sciences** YouTube Channel to watch live Skycam footage from across campus and watch timelapse videos of past weather events.

**youtube.com/UNDAtmosphericSciences**

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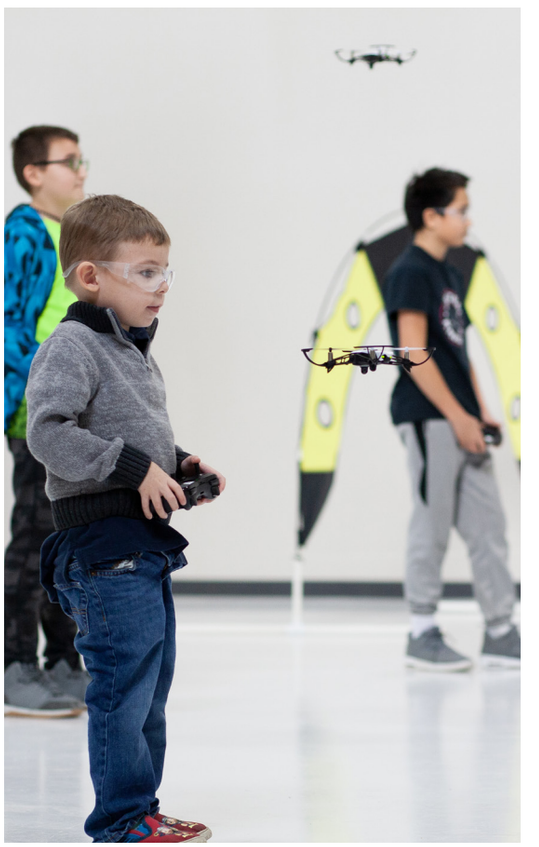

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12 | NGPA Alumni & Industry Reception - Palm Springs

**March**

05 | View UND Saturday (Aerospace) Open House

18 | Women in Aviation Alumni & Industry Reception - Nashville

**April**

02 | UND Aerospace Community Day - Grand Forks

21 | SAMA Conference

22 | SAMA Career Fair

23 | Scholarship Ceremony & Family Weekend Banquet Dinner

26 | AUVSI Alumni & Industry Reception - Orlando

30 | View UND Saturday (Aerospace) Open House

**May**

14 | UND Spring Commencement

**July**

25 | EAA Airventure Alumni & Industry Reception - Oshkosh

**August**

05 | UND Summer Commencement

11 | OBAP Alumni & Industry Reception - Phoenix

**September**

26 | UND Homecoming Week

30 | UND Aerospace Hall of Fame Luncheon

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# UND ASTRONOMERS REACH FOR THE HOT JUPITER EXOPLANETS

## Novel approach to studying exoplanets enables UND team to spot sodium from more than 3.5 quadrillion miles away

This NASA illustration represents transit spectroscopy on a fundamental level. As a planet passes in front of its host star, the observed electromagnetic signature alters. Though not a new way of reading into the structure of distant stars and planets, UND astronomers have worked on a software system that can make accurate readings from ground-based telescopes easier to achieve. Image courtesy of NASA (Christine Daniloff/MIT, Julien de Wit).

Imagine capturing a photo of a fly buzzing past a light bulb, and how delightful that would be for a bug-obsessed entomologist.

The brightness of the bulb would highlight impressive details about the creature – how its translucent wings are structured, or how many tiny hairs surround its legs. Observers would have a fresh new perspective on their subject of study.

Now apply that imagery to a situation occurring more than 600 light years from Earth, where a star much like our own is telling UND astronomers about a planet unlike anything we'd find in our solar system.

Discovered in 2015, KELT-10 is a little younger, slightly hotter and 40 percent brighter than our sun. But KELT-10b, the only planet orbiting the star, is a gas giant like Jupiter that orbits its star ten times closer than Mercury's path around the sun. A year lasts merely four days on KELT-10b.

At UND's Department of Space Studies, observations of this "Hot Jupiter" planet are being used to better understand the formation and characteristics of exoplanets – planets and planetary systems beyond our own.

In turn, their work will help fellow exoplanet experts more efficiently interpret data collected by ground-based telescopes that have to regularly contend with Earth's atmosphere.

Ph.D. student Sean McCloat and Assistant Professor Sherry Fieber-Beyer at the John D. Odegard School of Aerospace Sciences recently published "Atmospheric Transmission Spectroscopy of Hot Jupiter KELT-10b using Synthetic Telluric Correction Software" in The Astronomical Journal. The two collaborated with Assistant Professor Carolina von Essen of Aarhus University, a co-author of the article.

As KELT-10b celebrated "New Year's Eve" by passing in front of its star, relative to Earth, McCloat used novel software techniques to detect elements in KELT-10b's hot, gaseous atmosphere.

McCloat employed the "fly and lightbulb" analogy to explain the nature of transit spectroscopy, the term for observing the electromagnetic signature of a planet passing in front of its star.

"In this project, we were in effect waiting for the light to shine through the fly's wings, so we could figure out what those wings are made of," he said.

### Searching for signs of life

A key reason for studying exoplanets for McCloat and his faculty mentor, Fieber-Beyer, is the search for extraterrestrial life. By studying the elements found in exoplanet atmospheres, astronomers can look for signifiers of life – elements that correlate with what we know as bio-signatures.

KELT-10b, with its extremely close proximity to a star, is obviously out of the running for harboring life as we know it. But the peculiar planet is an excellent proving ground for refining the way scientists observe exoplanets more broadly, according to McCloat and Fieber-Beyer.

Simply put, it's a big, gassy planet that passes in front of its star very often. When the planet passes, what we see on the electromagnetic spectrum changes, and those changes can be further interpreted to identify elements.

By using a 2018 observation of KELT-10b, plus software that adjusted the telescope data for Earth atmosphere conditions at the time, McCloat was able to detect the presence of sodium 614 light years away from UND.

"Getting this type of spectral fingerprint is a very new technique in observing exoplanets," Fieber-Beyer said. "And through what Sean has developed in the correction software, we can potentially observe exoplanets as finely as our own solar system."

"This work shows the important research our students and faculty are doing in atmospheric composition of exoplanets, which is a completely new area," said Pablo de León, professor and chair of the Department of Space Studies. "This knowledge is being developed right here, in North Dakota, and will help us to better understand our universe."

## To get past the noise

To redeploy the "fly and lightbulb" analogy, imagine trying to look through a glass of water at the fly passing the bulb. That's what it can be like to use telescopes on Earth's surface to look at distant objects, according to McCloat. The atmosphere creates extensive noise and interference on the electromagnetic spectrum.

Typically, ground telescopes – such as the Very Large Telescope (VLT) responsible for the 2018 readout used by McCloat in the project – have relied on observing "standard stars" to account for Earth-bound interference when looking at other stars and exoplanets. This meant using precious, expensive telescope time to look at very well known stars for the sake of corrective measurements.

"What we did was use software to create a model of what the atmosphere looked like at that time, and at the location of observation," McCloat said.

In the case of the VLT, McCloat's software used data from the National Oceanic and Atmospheric Administration to approximate conditions high up in the Atacama Desert of Chile, at the Paranal Observatory.

Operated by the European Southern Observatory, the VLT's 2018 data was made available to McCloat by von Essen, who's a fellow astronomer in Denmark and a co-author of the published study.

## Alien worlds abound

Sodium is particularly easy to see, with respect to the way it appears in the electromagnetic spectrum, McCloat said. The first measurement of an exoplanet atmosphere, published in 2002, was of sodium.

"But that was done by the Hubble Space Telescope," McCloat remarked. Now, techniques are advancing to make this work possible on the ground, between a larger variety of telescopes. That's important, because sodium's signature can illustrate broader qualities of the planet in question. A strong sodium signal suggests an extensive atmosphere and larger planet, and so on.

"This type of research will help us understand more about how planets form and how systems of planets change over time," McCloat said. "Until recently, we've only known Jupiter-type planets to exist farther from the star. In a very real sense, KELT-10b is alien to us."

Another implication of the paper – published in one of the world's foremost astronomical journals – is that by learning how to be more efficient in accounting for Earth's atmosphere, it will be easier to start looking at Earth-like planets.

Thus, as astronomers continually eliminate electromagnetic "noise" from our telescopes, the search for life elsewhere can continue in earnest.

## Career highlight

Fieber-Beyer was proud to see McCloat work through the data and earn first billing on the research article. In her words, he put in the work to deserve the authorship.

"He's been really great as a student and instructor in our department, and he came up with phenomenal results," Fieber-Beyer said. "I'm very proud of what he's achieved through his years of research."

McCloat said that the accomplishment of finishing and publishing the paper is a highlight of his career as a graduate student. He's been working on the paper since the original KELT-10b data was obtained in 2018, he said.

"The work I've been doing with Dr. Fieber-Beyer and UND's own telescopes has built my understanding to the point where I could do a project like this," McCloat said. "And it's really a big building block on top of what I've already built at UND.

"It feels very good to have these past few years of work acknowledged with the first author publication."

*—Connor Murphy / UND Today*

The Very Large Telescope, operated by the European Southern Observatory, sits near the top of the Atacama Desert of Chile. The comprehensive facility of eight individual telescopes has made some of the first and biggest discoveries in the recent history of exoplanet observations. Image courtesy of ESO (J.L. Dauvergne & G. Hüdepohl).

# SPACE GRANT CONSORTIUM WANTS TO BOOST STUDENT NUMBERS

## Fellowship Bridge Program offers student researchers out-of-this-world experience

One transfer student to the University of North Dakota studied metformin levels in soybeans. Another put North Dakota on the map by curating its historical connections to the famed Apollo 11 moon landing.

And now a third is researching NASA's next-generation spacesuit to see if it's got the right stuff for top astronaut performance.

All of the research made possible by the Fellowship Bridge Program is impressive, and that's why Marissa Saad says there should be more of it.

The deputy director of the North Dakota Space Grant Consortium says the federal research money offers great support and opportunities for all North Dakota students.

"We're excited to see as many students as possible benefit and grow from it," Saad said. "The whole purpose of the program is to offer them that hands-on, experiential learning. They get to step away from the textbooks and regular classroom to get that authentic research and real-world experience."

Plus, it's a double bonus: Students get the chance to make some fascinating discoveries while faculty researchers get valuable assistance without spending a dime of their departmental budget.

### A little history

The North Dakota Space Grant Consortium, with offices headquartered at UND, is just one of 52 organizations that make up NASA's National Space Grant College and Fellowship Program. Since its inception in 1989, the national network of colleges and universities — along with its affiliates in industry, museums, science centers and state and local agencies — has worked to expand opportunities for Americans to understand and participate in NASA's aeronautics and space projects by supporting science and engineering education, research and public outreach.

A major part of that mission includes scholarships and fellowships to students pursuing research or careers in science, technology, engineering and mathematics.

Saad said the consortium's separate semester-based Student Fellowship is probably more widely known at UND, but the Bridge Fellowship is unique in that it's designed for transfer students or students who've already earned an undergraduate degree and are starting a higher degree program. It has a more flexible timetable and a rolling application deadline on the first day of every month.

Unlike the traditional fellowship, students are not required to do research 15 hours a week. Though the hourly stipend is still $15, there's no maximum or minimum time commitment. Instead, the student and mentor work out a plan together, Saad said.

"The Bridge Fellowship is specifically tailored for the transferring student or a student who's in a new environment," Saad explained. "Research shows that transfer students or students in a brand-new program can be more at risk of dropping out or less likely to seek out research opportunities.

"This program is meant to be super flexible. It allows them to get familiar with a new campus, new laboratories and new faculty. We hope to increase retention by fostering those positive research experiences for students in a new setting."

Photo by Mike Hess/UND Today.

Students are paired with a mentor, but Saad stressed their research project does not need to be directly related to their major. In fact, it's common for students to collaborate across disciplines.

Students come from everywhere, including space studies, engineering, physics and astrophysics, aviation and kinesiology. There are surprisingly few limits, Saad said. The only requirement is that the research support the broad mission of NASA or the North Dakota Space Grant Consortium.

Furthermore, applicants are not expected to come in with a big thesis or research proposal. This is entry-level research, Saad said, and the faculty mentors are key to the program's success.

"It's just awesome. All of these faculty advocates go out of their way to take a student under their wings and give them that real-world experience," she said. "The students learn how to think critically, how to work together, do interdisciplinary collaboration, create reports and present their findings. All of these research projects are practice for the real world, so when they graduate, they're ready to hit the ground running."

### What you need to know

Saad said students with little or no research experience are encouraged to apply. Prospective applicants should go to UND's Fellowship Bridge Program homepage to find an application form, get application guidance and learn more about matching with a mentor.

For questions, Saad can be reached at 701.777.4164 or msaad@space.edu. The main telephone number for the North Dakota Space Grant Consortium is 701.777.6819.

Only U.S. citizens are eligible, and students must have earned an associate degree or higher — with at least a 3.0 GPA — and be starting a new or advanced degree program at a North Dakota Space Grant Consortium-affiliated school.

100% of the Bridge Fellowship funding goes directly to the students, who may spend it however they see fit.

*—Janelle Vonasek / UND Today*

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