

AEROCOM

JOHN D. ODEGARD SCHOOL OF AEROSPACE SCIENCES

SUMMER 2021

UND

R44
Cadet

TABLE OF CONTENTS

- 06 Hub of The Wheel at UND Army ROTC
- 08 Life Imitates Art at UND Aerospace
- 10 UND Flying Team Captures 2nd Place at SAFECON
- 12 Remembering UND's Woman Aviation Pioneer



16 Perlan Project Pushes Envelope of Possibilities

20 Interns

24 The Limit is Beyond The Sky

26 Fly Me To The Near-Earth Objects

AEROCOM | SUMMER 2021

PRESIDENT Andy Armacost

DEAN Dr. Robert Kraus

ASSOCIATE DEAN Dr. Elizabeth Bjerke

EDITOR Kim Higgs

DESIGN & LAYOUT Courtney Olson & Heather Schuler

COVER PHOTO Wes Van Dell

Aerocom is published for alumni and friends of the John D. Odegard School of Aerospace Sciences. Aerocom welcomes your suggestions, story ideas, alumni profile information and photos for use in future publications. Permission to reprint any portion of text or photography may be granted upon request. Visit our website at aero.UND.edu.





Congratulations to the Class of 2021! The Odegard School conferred 119 Bachelor's Degrees, 33 Masters Degrees, and two PhD with the May graduation. At the end of the semester, we started holding in-person events again starting with our Aviation Scholarship ceremony followed a week later by the Atmospheric Sciences awards ceremony. Overall, we awarded more than 120 scholarships totaling more than \$400,000. On behalf of all of the recipients, we want to thank all of those that donated to make these scholarships possible.

We also have reason to celebrate as we achieved possibly the highest annual flying hours total ever at UND. Even with the mask wearing and additional cleaning requirements, flight operations exceeded the 125,000 hour mark over the past 12 months. On top of that, we had several days in March where we were the busiest airport in the nation, beating Atlanta and Chicago. This is a testament to the dedication and professionalism of all of our maintenance, line, and instructional staff and students.

One benefit of the situation was that we were able to fully staff our flight instructor corps and retain quite a bit of experience. Since I get to sign their Restricted-ATP certificates once they reach 1,000 hours, we are starting to see the regional airlines restart their training and have seen an uptick in departures.

At the opposite end of the experience spectrum, we welcomed a new group of Air Force Junior ROTC cadets for a summer Flight Academy, where they will have the opportunity to earn a Private Pilot Certificate. We also continue to work with Army ROTC to provide helicopter training to their cadets prior to commissioning and departure for Fort Rucker. Our NIFA Flying Team earned second place honors in this year's modified National Championship (SAFECON), placing well in all ground events and having the overall top two scoring contestants. The team is looking forward to competing in the flying events again next year.

Farewells: On the faculty and staff, over the summer we are saying farewell to Ken Polovitz, Michael Poellot, Bev Fetter, Kathy Borgen, Paul Drechsel, and a few others. We extend our gratitude for their many years of service to UND and this college.

Hails: We recently selected Jared Marquis to join our Atmospheric Sciences faculty and Dr. Francisco del Canto Viterale will join Space Studies in August. As of this writing we are in the process to hire three more Aviation faculty in time to start in the fall.

We'll have more good news to share in the next issue about Space Studies. We've been working collaboratively with the Colleges of Engineering & Mines and Arts & Sciences to identify what more we can do in the space arena. In addition to a state appropriation for space-related infrastructure, we have met with leadership from the DoD Space Development Agency and Headquarters US Space Force about future partnerships.

We're finally starting to get past pandemic restrictions and looking forward to the fall semester. The University has gone mask-free (for those vaccinated) as of June 1 and we will be back to normal classroom spacing. Additionally, we continue to see enrollment increases and are having capacity discussions to ensure we are able to continue to deliver the best aerospace education and training in the nation. To help with that, we've moved into the formal design stage for a new flight operations building at the airport and look forward to unveiling the plans later this fall.

Speaking of this fall, we look forward to gathering in person to celebrate homecoming and the induction of the 2020 and 2021 groups to our Aerospace Hall of Fame. We hope to see you all there!

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

UPCOMING EVENTS

October 2021

- 09 | View UND Saturday Open House
- 12 | NBAA Alumni & Industry Reception - Las Vegas
- 22 | UND Aerospace Hall of Fame
- 23 | UND Homecoming

January 2022

- 23 | American Meteorological Society
102nd Annual Meeting - Houston

February 2022

- 12 | UND Aerospace Community Day
- 12 | NGPA Alumni & Industry Reception - Palm Springs

March 2022

- 05 | View UND Saturday Open House
- 18 | Women In Aviation Alumni & Industry
Reception - Nashville

April 2022

- 21 | UND SAMA Conference
- 22 | UND SAMA Career Fair
- 23 | Family Weekend & Scholarship Banquet
- 30 | View UND Saturday Open House

CONGRATULATIONS ON YOUR RETIREMENTS!

2020 Retirements

- Stephen Carpenter | 39 years
- Jim Casler | 13 years
- Suzanne Flom | 11 years
- James Hagen | 21 years
- MerriJo Roland | 11 years
- Douglas Sebenaler | 13 years

2021 Retirements

- Michael Brookshire | 12 years
- Kathleen Borgen | 25 years
- Paul Drechsel | 23 years
- Bev Fetter | 31 years
- Robert Kunze | 21 years
- Brian Milling | 40 years
- Michael Poellot | 45 years
- Kenneth Polovitz | 42 years
- Dennis Schultz | 18 years
- Marsha Tonder | 32 years

Thank you for your dedication and years of service. Enjoy your retirement!



HUB OF THE WHEEL AT UND ARMY ROTC

UND Aerospace dedicates newest helicopter to Trudy Soli – Army ROTC admin officer, student advisor and MVP

When Lt. Col. Jason Mathre learned he'd be coming to Grand Forks to lead UND's Army ROTC program, he mentioned the news to a fellow officer.

"He's a full-bird colonel now in the Army," Mathre said. "And when he found out I was going to be the professor of military science here, he said, 'Talk to Trudy Soli! She was there when I was there, and she's a key person who really helps make the ROTC program work.'"

"And he was absolutely right," Mathre said. "She's amazing."

Last week, UND Aerospace got a chance to tell Soli how amazing, when it surprised her with a ceremony dedicating a new helicopter – one that'll be used extensively by ROTC cadets, among other aviation trainees – in her honor.

For more than 30 years, Soli has served as the administrative officer and academic advisor for UND's Army ROTC program. For that service and for Soli herself, the tail number of the new, blue R44 helicopter now stands as a permanent salute. The tail number is N 586TS, with "86" referring to Soli's start at UND in 1986, and "TS" being her initials. ("N" is the standard U.S. registration prefix, and "5" notes that the aircraft is UND's fifth R44.)

The May 26 dedication started with Soli getting a ride in the aircraft, which was piloted by Fred Kitko, assistant chief flight instructor for helicopters. Then after the flight, the aircraft bearing Soli and Kitko approached the James C. Ray Hangar at GFK.

The hangar doors rolled open, revealing a crowd of 40 gathered inside, to Soli's surprise. The crowd burst into applause.

A program mainstay

"I want to welcome all of our friends and family and special guests who are here," said Robert Kraus, dean of the John D. Odegard School of Aerospace Sciences, to the group as Soli joined them, wiping her eyes.

"We've got the Military Affairs Council from Grand Forks, we've got our ROTC commanders, we've got everyone here. It's a great turnout for a special occasion, which is to recognize a very special employee of UND."

Wes Van Dell, chief flight instructor for the Aerospace School's helicopter department, spoke next.

"Trudy is really a mainstay of the Army ROTC department, and has been the main connection between that program and UND Aerospace for the last 35 years, through all the iterations of the Army flight training program," Van Dell told the crowd.

"She's been the rock that all of the cadets have depended on, as has Aerospace management as well in working with her. ... We still get Army aviators coming back, you know, 30 years later, and their first stop is always to go see Trudy.

"It's a testament to the care that she puts into her job, over such a significant portion of time," Van Dell said. "And it's a testament to her character."

Vote was unanimous

When the new R44 helicopter was being acquired, UND Aerospace solicited ideas for its tail number. "Basically, we put it out to the students and the instructors; they could suggest the tail number and what it would mean," Van Dell said. "The only



thing that we said is that it had to have a '5' in it.

“And once somebody suggested ‘86’ for 1986, which is the year Trudy started, and then ‘TS’ for Trudy Soli, it was unanimous,” Van Dell said. “Everybody voted for that, because we all recognize how significant she is in the lives of so many Army cadets and Army aviators.”

The key to understanding Soli’s impact is to recognize how many hats she wears, said Kitko, the pilot of that morning’s flight.

For students, UND has its own requirements, Aerospace has its own requirements, Army ROTC has its own requirements, Army ROTC Flight Training has its own requirements – and Soli is the hub of that wheel, Kitko said.

She’s the one who makes sure students are fulfilling all of those requirements and nudges those students who need to get back on track. She also monitors the scholarship dollars, including the flight-training money that’s available for aviation cadets.

“In a fraternity, you’ve got the ‘house mother,’ right?” Kitko said.

“A lot of the cadets, they see her as the ROTC mother. And we’re at the point now where we’ve got one-star and two-star generals, and as Wes said during the dedication, their first words are ‘How’s Trudy?’ when they come back. So, this recognition was well deserved.”

Lt. Col. Mathre agreed, and noted that Soli’s role also extends to helping the ROTC program’s military staff.

“Remember, we’re here for only two to four years,” he said. “And then we’re leaving again. But she is that continuity, for the students and everyone else.”

You couldn’t ask for a better person to work with, Mathre continued. “She takes care of everything, jumps in whenever there’s something that needs to be done. She’s just an amazing lady.”



Pictures on the alumni board

As for Soli, if you ask her about her job, she’ll say she’s never worked a day in her life.

“I love it,” Soli told UND Today. “I absolutely love everything about UND, ROTC and the Aerospace School. It’s just an awesome job, and it’s so fulfilling, to see the students reaching their potential.”

Asked how many UND alums she still keeps in touch with, Soli said, “Oh, gosh. Maybe two or three hundred? I couldn’t even tell you how many.”

Such contacts aren’t an everyday thing. But the pictures are – the pictures that are sent to Soli from around the world.

“I have a huge alumni board, and students constantly saying, ‘Hey, I ran across this alum.’ And they have a picture of that person or of themselves with the UND flag or the Army flag, and they say, ‘Can you put this on the alumni board?’ Then when they visit, they always look for those pictures, so I always make sure they’re up.”

In early May, Army ROTC relocated to Twamley Hall temporarily while the campus is under construction. “And I didn’t bring my Alumni Board with me, because it’s quite big,” Soli said.

But already, the photos from UND-trained soldiers worldwide are coming in, and Soli is posting them on her office wall. “It’s an awesome place to work, UND,” she said. “There’s no place better.”

— Tom Dennis / UND Today

LIFE IMITATES ART AT UND AEROSPACE

UND student pilot Faiza Ashraf hosts – and relates to – Willow Willpower, a children’s book character inspiring young people to fly high



Faiza Ashraf

A UND junior majoring in Commercial Aviation and Aviation Management, holds Willow Willpower in the offices of the Odegard School of Aerospace Sciences at UND. Willow Willpower is a handcrafted, one-of-a-kind doll which is being hosted by female pilots as she travels around the world. Photo courtesy of Faiza Ashraf.

There’s a little bit of Willow Willpower in all of us, but an awful lot in Faiza Ashraf, a UND Odegard School of Aerospace Studies student and aspiring airline pilot.

Last week, Ashraf held the Willow Willpower doll – there’s only one; she was handcrafted by a dollmaker in Germany, and she has traveled around the world with female pilots, inspiring young people to pursue their dreams – on her lap as she read from “Willow Willpower,” a children’s book about the fictional character. Ashraf’s audience was a group of rapt 5- and 6-year-olds at the University Children’s Learning Center at UND.

“ ‘But Mom, can I really become a pilot and fly to all these wonderful places around the world?’ ” Ashraf read, quoting and pointing to Willow in the picture book. Answers Willow’s mom, “Willow, if you really want to, you can achieve anything with willpower and belief.”

Ashraf put the book down. “Let’s all say it together, boys and girls: With willpower and belief, you can achieve anything.”

Just ask Ashraf, a Bangladesh native who is will-powering and believing herself toward achieving her own pilot’s dream.

Willow’s Flight Challenge

In 2019, the publisher of “Willow Willpower” launched a Flight Challenge around the book and the character of Willow. The challenge asked female pilots to host and fly with the book-based doll for a time. This would both call attention to the dearth of female pilots – in 2018, the proportion of female pilots was only about 5 percent, and the women’s share of new commercial airline licenses was below 3 percent, the BBC reported – and inspire more girls to consider learning to fly, organizers hoped.

Since then, Willow has been in France, Germany, China, the United States and the African countries of Chad, Mali and Niger, among other places.

Now, she’s in North Dakota, where Ashraf had caught wind of the project some months ago and emailed the coordinator – a retired female pilot for the French Navy – to invite Willow to visit.

“And I’m the first student pilot she has flown with,” Ashraf said in an interview, “because everyone before me who flew with her was an actual commercial airline pilot. So I thought that was very cool.”

Elizabeth Bjerke, associate dean and professor at the Odegard School, agreed.

Furthermore, “we have seen significant increases in our female aviation student population by engaging in creative outreach with inspiring role models such as Faiza,” Bjerke said. “So when Faiza told us that she would be hosting Willow at UND, we were all onboard to help her out. We are also thankful that UCLC was open to allowing Faiza and Willow to share their stories with them.”

Willow has been in North Dakota since February. In that time, Ashraf has flown with her in UND aircraft, posed with her by those aircraft and in UND aviation facilities, and brought her to “Willow Willpower” book readings, such as the one at the UCLC.

And when she reads to children about Willow’s determination to learn to fly, Ashraf sees herself. “Personally, I really struggled to come to UND to become a pilot,” Ashraf said.

“So when I heard about Willow and the project’s goal of motivating young people to become pilots, I thought, ‘I’d like to help.’ I could really relate to Willow’s dream of flying.”

Cultural barriers

Ever since she was a girl, Ashraf has loved airplanes, she said. That feeling eventually inspired her to become a pilot.

But “I come from Bangladesh,” Ashraf noted. “And obviously, it’s a developing country, and because of the culture there, it’s really hard for females to go into aviation. There are very, very few woman pilots.”

That meant Ashraf had few role models, and not much support – including, at first, from her parents. “When I told my parents that I want to do something with aviation, they wanted me to be an aerospace engineer,” she said with a laugh. Doctor, yes; engineer, yes; pilot, no. Mom and dad initially said.

But both eventually changed their minds. Since then, “they’ve been extremely supportive throughout all of my time here at UND, and now, they’re very, very proud of me,” Ashraf said.

Speaking of UND, Ashraf first learned about the University online.

“I just searched on ‘best aviation school in the world,’ and UND popped up. That’s how I first heard about it, and why I applied,” she said.

She’s never regretted it: “When I came here, I was a little worried, because North Dakota has a reputation as being in the middle of nowhere, and I’ve lived in the city all of my life,” she said.

“Let’s all say it together, boys and girls: With willpower and belief, you can achieve anything.”

**FAIZA ASHRAF
COMMERCIAL AVIATION STUDENT**

“But once I got here, all of professors and my flight instructors were really great. And they’ve never made me feel like I was any less because I was a female.” Modern aviation is a field where skill matters more than anything else, so the only external or internal pressure Ashraf feels is to excel: “I study before every flight, I do everything I’m supposed to do and then some,” she said, in order to become the best pilot she can be.

Just like Willow

Back to the UCLC for a moment, where “Miss Faiza,” as UCLC Director Gwen Puckett introduced her to the children, talked with the youngsters about flying. Not all of the discussion was on topic — “I’m going to the dentist later,” one young man declared — but for the most part, the Willow doll as well as Ashraf’s tales of flying airplanes at UND were met by wide eyes, big smiles and enthusiastic oohs and ahhs.

“We’ll leave this book about Willow Willpower here at the Center, so you can read it anytime,” Ashraf said.

“And remember, if you really want to, you can become an aviator, too. Just like Willow. And me.”

That hard work has paid off, as Ashraf, a junior, now is only one flight lesson away from getting her commercial pilot certificate. After graduation, she hopes to work as a Certified Flight Instructor for the University to build up her cockpit hours, then as a corporate or regional-airline pilot enroute to her ultimate goal of flying for a major carrier.

— Tom Dennis / UND Today





UND FLYING TEAM CAPTURES 2ND PLACE AT SAFECON

The UND Flying Team captured a second-place overall finish at the 2021 Safety and Flight Evaluation Conference, extending the University's multi-decade record of flight excellence.

For the past 37 years of competition in the National Intercollegiate Flying Association (NIFA) event, better known as SAFECON, UND has placed first or second 31 times.

But flight was notably absent from this year's SAFECON festivities, which was held May 17-21. Most years, SAFECON features a dozen or so events testing students' all-around aircraft knowledge and skills – in the cockpit and on paper. This year marked the first time the competition was held virtually. Thus, ground-based events made up the core of contests in 2021.

Even so, the UND Flying Team performed exceptionally, with several individuals placing high in key events. In fact, UND aviators Garret Turco and Joseph Taylor ranked first and second as top scoring contestants, among hundreds of competitors from across the country.

'Never give up'

Overall, UND's 15-student team came up just short behind Embry-Riddle Aeronautical University, Prescott (Ariz.). The full results for SAFECON 2021 can be found on the NIFA website.

Leading the team were Associate Professor Lewis Liang, head coach, and Assistant Professor Ryan Guthridge, serving as assistant coach. The pair also presided over

UND's 2019 first-place finish – the 17th in UND's long history of championships – before SAFECON 2020 was cancelled due to the COVID-19 pandemic.

Other members of the coaching staff include Assistant Professors Mark "Monty" Johnson and Jered Lease, both of whom are former SAFECON competitors and champions.

Robert Kraus, dean of the John D. Odegard School of Aerospace Sciences, said that despite the cancellation of flying events in 2021, the team stayed motivated and engaged to place well in all categories.

"We are proud of this team's accomplishments and thank them for their dedication and many hours spent preparing for the competition," Kraus said. "I would like to thank the NIFA group that made it possible for most of the competitions to still take place, and we look forward to next year's event, which will be hosted by The Ohio State University."

The team, guided by Liang's coaching mantra of "Never give up, never give up," delivered results during a challenging time. Due to COVID circumstances, the team wasn't able to gather for practice sessions in the ways it had in past years, Liang said. And the format of competition taking place on campus felt more like final exams as opposed to one of the biggest networking opportunities of the year for collegiate aviators.

Gritty efforts

The ground skills tests were all administered in closely proctored settings, with



NIFA judges viewing multiple angles of the testing rooms on Zoom.

In that environment, participants were tested on how well they could recognize and identify a variety of aircraft, how well they could plot and navigate a simulated cross-country flight with a number of variables and their ability to solve mathematical flight planning computations using a manually operated flight computer, among other challenges.

Liang noted that the “carrot” of SAFECON being much more than a competition was missing for the team, but the crew persevered and put forth an exceptional effort. Despite the dampening effects of the pandemic, UND still took second place for the Judges Trophy – an award signifying the depth of participation among the 28 total teams.

“The word I go to is ‘grit,’” Liang remarked. “Our coaching staff worked hard to keep this team motivated, to keep practicing for these events. In working with many new students on the team, our coaches have done an incredible job.

“This team truly never gave up, and they of course get all of the credit for that devotion and diligence.”

Members of the 2020-21 UND Flying Team are Ryan Fitzgerald, Bailey Harris, Alexis Hesse, Caroline Kelley, Max Langerud, Cobi Pimental, Jason Preston, Grace Rames, Aaron Schwartz, Jaspinder Singh, Jedediah Sussenbach, Joseph Taylor, Garret Turco, Mikayla Weiss and Seth Wiebe.

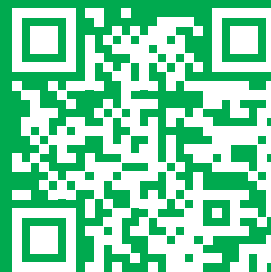
University of North Dakota's official press release archive.

Apparel | Gifts | Accessories | Cockpit posters | and more!



STOP BY THE AEROSTOP

4275 UNIVERSITY AVENUE
ROBIN HALL ROOM 123
OPEN 8:00-4:30 M-F



SCAN TO
SHOP

Can't visit in-person?

Shop for your favorite
UND Aerospace merchandise
from anywhere on the
Aerostop web store!

[AEROSTOP.UNDAEROSPACE.COM](https://aerostop.und.aerospace.com)



Kathryn 'Kay' Lawrence

Kathryn "Kay" Lawrence, a 1941 UND graduate, was the first woman to earn a pilot's license from the University. During World War II, she died in a training accident in Texas while flying for the Women Airforce Service Pilots (WASP). UND archival photo.

REMEMBERING UND'S WOMAN AVIATION PIONEER

University's first woman pilot gave her life for her country in World War II

As World War II raged on, a young woman took off from Avenger Airfield in Texas for a solo flight in a military training aircraft. She never returned.

On Aug. 3, 1943, 23-year-old Grand Forks, N.D., native and University of North Dakota graduate Kathryn "Kay" Lawrence became one of 38 pilots in the Women Airforce Service Pilots (WASP) program to lose their lives. She was less than a month into her training at the airfield near Sweetwater, Texas, when the tragic accident occurred.

Lawrence's single-engine PT-19 airplane apparently went into a deadly spin. She attempted to bail out, but was unable to pull the ripcord to open her parachute, perhaps blacking out because of high G forces. Her body was found not far from the wrecked aircraft.

Lawrence is not only being remembered for her service and sacrifice, but also as the first woman to earn her pilot's license from UND's College of Engineering through the Civil Aeronautics Authority. She graduated with a degree in education in 1942, then went to Seattle, Washington, to work for the Boeing Aircraft Co. before becoming a WASP.

While many of the women pilots in the program cited patriotism and a desire to serve their country during the war, Kay's nephew Mike Lawrence – a former UND employee who still lives in Grand



Forks – remembers the family story about her reason for becoming a WASP.

“If you get to fly the most powerful, up-to-date airplanes for free, then what’s the question?” she is said to have replied when asked about taking a risk she didn’t need to take. Born in 1938, Mike doesn’t remember his aunt, although he knows she had a reputation for being unafraid to try new things. At UND, she belonged to a sorority, was active in athletics and was a cheerleader.

Six members of UND’s Women in Aviation (WIA) chapter were joined by advisor Dr. Elizabeth Bjerke, associate dean and aviation professor at the John D. Odegard School of Aerospace Sciences, and Mike Lawrence to lay flowers and place a flag on Kay Lawrence’s grave. It’s part of a Memorial Day effort by Women in Aviation International to #HonorTheWASP.

Mike was overcome with emotion as he told stories about his Aunt Kay to the six women UND student pilots, some of whom are taking training to fly helicopters for the U.S. Army. He said his aunt never would have imagined so many women having aviation careers as pilots.

Bjerke, who has studied the WASP program, heard panel discussions in which WASP members participated and wrote a paper about the program as an undergraduate aviation student at UND, wants to keep Kay Lawrence’s memory alive. She became interested after a visitor to the WASP museum in Sweetwater, Texas, posted a photo on Facebook showing Kay’s memorial plaque.

“That sparked my interest and I went to the archives at the Chester Fritz Library in Special Collections,” Bjerke recalled. “We found that she was buried in Grand Forks and found her gravesite. We decided to name the Women in Aviation scholarship we’ve been giving out for decades in honor of Kay.”

The WASP program was formed in 1942 to help relieve the shortage of pilots needed to ferry military aircraft around the country and overseas. Originally composed of 28 civilian women volunteer pilots, more than a thousand women were trained for the program before World War II ended. They flew millions of miles in every type of military aircraft. WASP members also served as flight instructors, teaching male pilots how to fly some of the most difficult-to-handle aircraft.

The end of young Kay Lawrence’s life is somewhat symbolic of how the WASP program ended. Never an official part of the military, it took decades before WASP members were recognized as veterans and honored for their valuable contributions during the war.

“Many of these ladies served their country in World War II and, after the war was over, they went back to living their lives as mothers and grandmothers,” Bjerke explained. “It was like, ‘Alright. Thanks for doing that, but there’s no jobs for you in the aviation industry.’”

It wasn’t until 2006 that a military memorial ceremony was held at Lawrence’s gravesite in Grand Forks Memorial Park Cemetery. It featured a U.S. Air Force

honor guard and a flyover.

Mike Lawrence said that after his aunt died during the wartime training accident, the situation was far different. Because she wasn’t in the military, WASP members had to raise money to send Kay’s body back to Grand Forks. All they could afford was a plain wood casket.



“While they were loading the casket on to the train, one of the girls who was a pilot with Kay saw that they handled it roughly, just like a piece of baggage,” he said. “They had no respect. That young lady decided to come with Kay all the way back to Grand Forks to make sure they handled her with respect.”

Kay’s death wouldn’t be the only wartime loss for the Lawrence family. Her brother William joined the U.S. Marine Corps and was killed on Sept. 15, 1944, in combat on Palau Island.

Mike said William wrote a letter to a family member saying, “I have to go into

combat again. Don’t tell Mom.”

It was the last letter they received from him. Kay’s mother, Chrissie, who lived to be 99, would never forget the family’s sacrifice.

Mike Lawrence shared a story about his grandmother with the UND Women in Aviation students who gathered to honor Kay for Memorial Day.

When his grandmother was in her 90s and visited Grand Forks, he drove her past the student union, which was being remodeled. A sign out front said the building was the “University Student Center.” He saw that this upset his grandmother, but he wasn’t sure why.

“About a week later, Grandma told me she had gone to talk with President (Tom) Clifford and told him he couldn’t name the building the Student Center,” Mike explained. “She said, ‘That is the Memorial Union. I lost two children in the war. They were students here, and that building was built as a memorial building.’”

“The next week, I saw a new sign out there saying it was the Memorial Union. If it wouldn’t have been for my grandma, it would have been called the Student Center,” he noted.

Bjerke wants to see the tradition continued by including space in the new Memorial Union to honor Kay Lawrence and other UND students who’ve made the ultimate sacrifice in service to the country.

—Patrick C. Miller / UND Today

2021 AEROSPACE SCHOLARSHIPS



**SOCIOLOGY & AVIATION
MANAGEMENT & COMMERCIAL
AVIATION & MINOR DANCE**
GRACE HERON

Valrico, Florida

Student Involvement

Alpha Eta Rho Delta Chapter (Aviation), Dance Marathon
Aerospace Professionals, Pi Beta Phi, Student Aviation N
Women in Aviation



**BUILDING DREAMS AVIATION SCHOLARSHIP
2021 SCHOLARSHIP RECIPIENT**

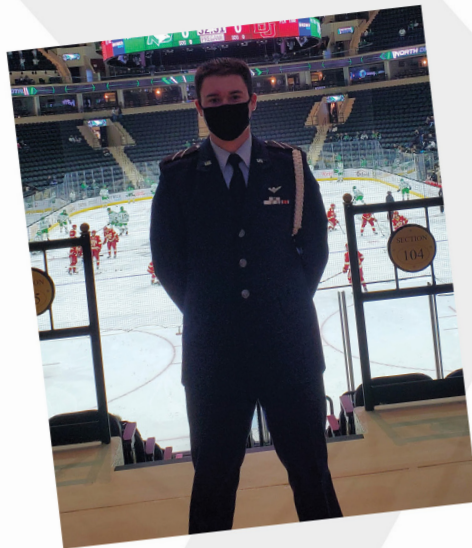


**UNMANNED AIRCRAFT SYSTEMS
& MINOR ENGINEERING SCIENCE**
JAMES ALWIN

Oconto, Wisconsin

Student Involvement

Screaming Eagles, UAS/RC Club, Wilderness Pilots Association
Experimental Aircraft Association Chapter 1342



**MMOPA SAFETY & EDUCATION FOUNDATION SCHOLARSHIP
2021 SCHOLARSHIP RECIPIENT**

\$451,097

FY2021 scholarships

381

unique donors

113

students impacted

Throughout the past year, we've weathered many storms. Some mild, some severe and some even turned our worlds upside down. **But behind the clouds of uncertainty, your compassion and humanity have shone.**

YOU'VE BEEN OUR BREAK IN THE CLOUDS

AND WHILE THIS PAST YEAR HAS CHALLENGED US AS WE'VE NEVER BEEN CHALLENGED BEFORE,

THE JOHN D. ODEGARD SCHOOL OF AEROSPACE SCIENCES SAW A FEW SILVER LININGS.

1

BUSIEST AIRPORT IN NATION SEVERAL DAYS IN JUNE, 2020 & MARCH, 2021

MISSION LAUNCHED IN THE INFLATABLE **MARS/ LUNAR HABITAT**

RANK IN NATION FOR STATE PREPAREDNESS FOR COMMERCIAL DRONE USE

NEW STUDENT ORG: **ORGANIZATION OF BLACK AEROSPACE PROFESSIONALS**

UND COMMUNITY GARDEN PLANTED BY DEPARTMENT OF EARTH SYSTEM SCIENCE & POLICY STUDENTS

Even in the middle of a pandemic, this school gave its students opportunities of a lifetime. You can too.



HELP STUDENTS REACH THE CLOUDS

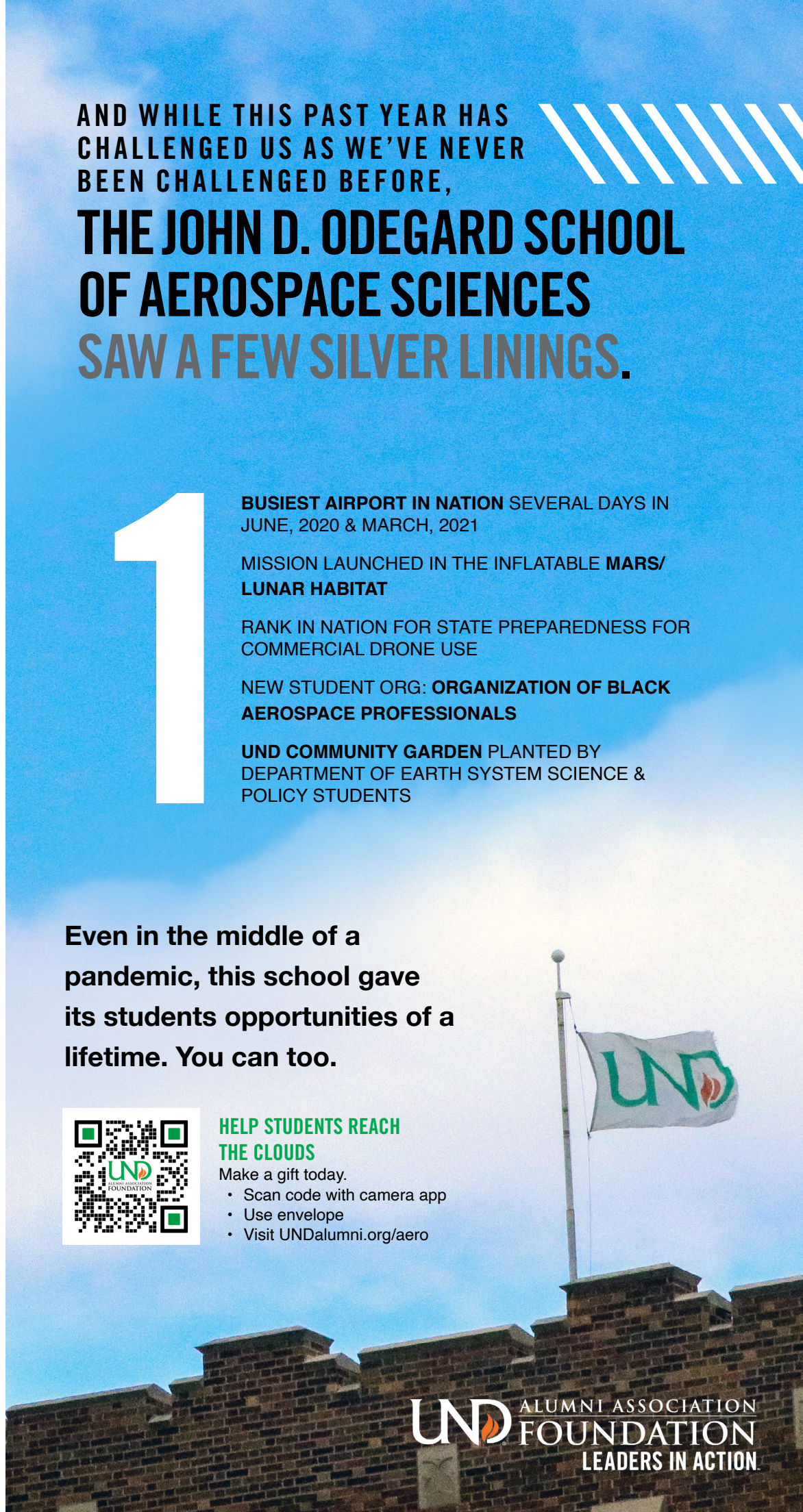
Make a gift today.

- Scan code with camera app
- Use envelope
- Visit UNDalumni.org/aero

Interested in giving to a scholarship, creating your own or funding one through a gift in will or estate? Call or email me to get started!

Jonathan Gehrke, '06, '11
Sr. Director of Development
701.77.2633
jonathang@UNDfoundation.org

UND ALUMNI ASSOCIATION
FOUNDATION
LEADERS IN ACTION





Perlan Project

Sitting next to a green UND Cessna 150, the Perlan Project stored its tow plane as well as an Arcus glider in one of UND's hangars at Grand Forks International Airport. Recent conditions above Grand

Forks were ideal for their data-gathering mission as Perlan II's high-altitude projects in Argentina are on hold due to COVID-19.

Wes Van Dell.

PERLAN PROJECT PUSHES ENVELOPE OF POSSIBILITY

UND Aerospace played host to one of the most exciting projects in aeronautics

Jim Payne is in his element in Argentina, at the foot of the Andes Mountains, close to the picturesque Patagonian peaks and glaciers just miles from a remote airstrip near the town of El Calafate.

The retired U.S. Air Force test pilot also feels at home soaring at 70,000-plus feet above the Andes – where he's closing in on breaking the altitude records previously set by the Lockheed SR-71 Blackbird.

(Did we mention he's trying to break that record in an aircraft that doesn't have an engine?)

So, last week, it was curious to see Payne on the campus of UND, which is famously far from mountains of any kind. But there he was with Robert Kraus, dean of the John D. Odegard School of Aerospace Sciences, talking Polar Vortexes and stratospheric mountain waves and other tricks of the high-altitude gliding trade.

Payne is chief pilot for the Perlan Project, a nonprofit aeronautical research organization that sends engineless aircraft to the edge of space. To do that, Payne

flies the Perlan II, an engineless but pressurized aircraft with 84-foot-long wings.

It can carry two pilots, scientific instruments, life support and two safety parachutes, yet has the same weight as a 1967 Volkswagen Beetle, the Perlan Project's website notes.

Last week, Payne and his team were in Grand Forks to test a different type of glider, though the flights were using the same tow plane as the one that pulls the Perlan II: a Grob 520 Egrett with high-altitude capabilities.

The exact details of their work remain under wraps, but Payne said that the conditions above North Dakota were aligned with data they needed to collect by glider for their client.

Also, UND's hangar space at Grand Forks International Airport was uniquely suited for storing their modified Arcus J glider's daunting 65-foot wingspan.

"I've known Jim since I was a cadet at the U.S. Air Force Academy in his Flight Test

Techniques course,” said Kraus, who came to lead UND Aerospace after a 28-year career in the Air Force. “Several years later, we were both stationed at Edwards Air Force Base for a time.”

During a webinar last Wednesday, where Kraus hosted Payne for a showcase of Payne’s work with the record-smashing Perlan Project, the dean made mention of the distinguished pilot’s influence.

“That was a wonderful flight course that really set me on my Air Force career,” said Kraus in opening remarks to an audience of students, staff and faculty.

Peaks of performance

While Payne flew fighter jets throughout much of his Air Force career, his true love has always been soaring – going aloft with not much more than a pair of wings, a rudder and the wind.

Since the mid-2000s, the Perlan Project has taken the concept of gliding to the most extreme levels of performance. So much so, in fact, that it’s a discredit to call the aircraft “gliders.” Sailplanes are able to truly harness the power of rising air, as opposed to cutting through it on a graceful, slow descent.

“I got inspired to fly gliders by an issue of National Geographic that I read when I was maybe 13,” said Payne with a laugh. “You never know when you might do something that somebody reads about and says, ‘You know what, I’d really like to do that.’”

Perlan II – as the project is in its second phase – aims to beat the Lockheed SR-71 Blackbird’s official altitude record of 85,609 feet above sea level. The Perlan Project bested all other engineless aircrafts’ altitude records years ago. Payne is now going for the limits of Earth’s atmosphere in a world-record attempt: to fly a sailplane higher than any other manned aircraft has ever flown in sustained level flight.

This stunning feat is only achievable because of a relatively recent discovery in the behavior of the Polar Vortex. In the 1990s, project founder Einar Enevoldson proved that in regions close to the poles, in winter, conditions can line up to create giant air waves off of mountain ranges – air waves massive enough to extend above the troposphere, well into the stratosphere miles above Earth.

Enevoldson realized that the forces in those winds could easily assist an aircraft to the edges of survivability, where the air is 3 percent of normal density and temperatures are minus 70 degrees C. It’s like being on the surface of Mars in such conditions, according to the Perlan Project’s website.

The project’s founder, a NASA test pilot, then went on to discover that the Patagonian ranges straddling Chile and Argentina provide optimal conditions for catching the most consistent and impressive forms of mountain waves.

Perlan II was created as Enevoldson and his co-pilot descended from a then-record 50,722 feet above El Calafate in 2006. Since then, with the support of European aerospace giant Airbus, the Perlan Project has produced a completely custom airframe that can not only withstand the forces of harnessing mountain waves, but maintain survivable pressures for two crew members without the need for flight suits akin to those required for piloting the SR-71.

Space capsule with wings

As one can imagine, creating a vessel that can hold two people and all of the

required equipment yet still be light enough to “catch the waves” (while maintaining structural integrity) is a tall order. Payne spent much of his talk going through the engineering that has made it possible, as well as the logistics of getting a state-of-the-art aircraft from Nevada to southern Argentina.

“It’s a space capsule with wings,” Payne remarked, succinctly describing the Perlan II craft. And when you see the porthole-style windows dotting the fuselage and inverted hatch configuration (which uses cabin pressure to its advantage), it looks that way.

In the images and videos Payne shared, the cockpit arrangement looks about as cramped as one might expect. There are a number of displays, including a tablet computer showing the view from a camera that’s mounted on the tail of the



sailplane. Twenty-two Arduino mini-computers spread throughout the slim frame make it by far the most instrumented sailplane in history, Payne said.

And the decked-out nature of the aircraft shines a light on Perlan II’s companion mission of research. All of those computers and accompanying sensors are gathering information not just about the waves Perlan II is riding, but about the nature of the atmosphere that few aircraft experience.

In 2019, Payne reached around 76,000 feet in Perlan II. Since that season, record flights have been on hold due to the coronavirus pandemic and its limiting of international travel.

“With limited visibility, the cameras are useful for us while we’re up there,” Payne said. “And, in addition to further proving that these mountain waves exist, we’re trying to gather as much data as we can – wave location and strength, temperature, radiation, ozone density, particle collection. ... We see temperature data, but the rest is recorded and beamed to the ground team.”

While the conditions in past years have proven viable for flights up to 90,000 feet, safety is a higher priority. Each time Payne and his team push the envelope, they need to test the effects of altitude and wind on the airframe. Record flights take more than five hours to complete, partly on account of such testing.

“Next time we go up, we won’t need to do test points until 76,000 feet, so we’ll get up there quicker,” Payne told UND Today. “Right now we have enough data to be confident, so we just need to find the weather and go for it.”

Different outlook on aviation

Kraus, sitting across from Payne throughout Wednesday’s webinar, said that it was a great event for UND and for students and faculty of UND Aerospace to hear about opportunities in aviation and atmospheric sciences that are different from the traditional warm and cold fronts that are more familiar in North Dakota.

“It was interesting to hear not only about custom-building and testing a new sailplane, but then taking it up as high as 76,000 feet,” Kraus remarked. “While pilots who fly over the Rocky Mountains are familiar with mountain waves, the extreme altitude mountain waves they’ve been investigating have been known about for only a few years.”

Kraus added that the pilot of the tow plane partly responsible for breaking records, Arne Vasenden, is a 1980 graduate of UND. It was Vasenden who suggested that Payne and the team come to North Dakota for the right conditions on their current

assignment.

“Both Arne and Jim are great examples of how to turn a passion for flying into a lifetime career,” Kraus said.

Payne, for his part, has had a great experience in getting to know UND, he said.

“I’ve been extremely impressed. The facilities at the airport are incredibly well-kept,” Payne said. “I’m looking at the airplanes the students are flying, and I’ve been impressed by that too. ... Everyone has gone out of their way to make us feel welcome and help us out, so that has been fantastic.”

He encouraged students to maintain their enthusiasm and well-being throughout their education as well as during their careers in the aviation industry. He doubly encouraged students to involve themselves in aviation outside of their normal jobs. Perhaps unsurprisingly, Payne made a pitch for hopping in a glider from time to time.

“As the airline business becomes more automated, it’s harder to maintain stick-and-rudder skills as time goes on,” he said. “A lot of airline pilots have gone on to be very successful glider pilots, and you can be just as passionate about soaring as you are about flying airliners.”

—Connor Murphy / UND Today



/////// ARNE VASENDEN '80

Arne is a Class of 1980 graduate of the Aerospace program before it was nationally recognized, having known John Odegard personally, and he has done very well with his educational upbringing from UND. His work in the aviation industry spans the gamut of aviation, from being a professional airline pilot with more than 23,000 hours (including earning the #1 seniority slot at one major airline), to business jet pilot (ferrying around the very rich and famous), to research flying (conducting weather modification to start while at UND, now currently flying multiple research aircraft to prototype instrumentation, as well as acting as a test pilot for the world record-setting Perlan Project, which is why he was most recently at UND). Arne is also a certificated A&P aircraft mechanic with Inspection Authorization (IA) so he can maintain, as well as modify, the aircraft he flies.



SCAN TO
LEARN MORE

EARN YOUR AVIATION SAFETY DEGREE ONLINE



Gain the knowledge and expertise to keep air and ground personnel and aviation support systems safe and secure.

With the aviation safety degree, you can expect career opportunities in several areas related to aviation safety and operations, including: Safety Manager, Accident Investigator, Safety Analyst, and Safety Inspector.

[UND.EDU/PROGRAMS/AVIATION-SAFETY-OPERATIONS](https://und.edu/programs/aviation-safety-operations)

INTERNS



IZZY ADAMS | DENVER, CO

BSA Commercial Aviation & Unmanned Aircraft Systems

North Dakota Cloud Modification Project

Co-Pilot Intern

"The internship involves meteorologists and pilots working together to seed summer storms in western North Dakota. The goal of the project is to increase rainfall or decrease hail damage to help our farmers out. As an intern pilot, I get to fly with my PIC next to stop where we seed the clouds with silver iodide. We are oncall 24 hours a day and are often flying into the late hours of the night!"



HANNA ANDERSON | STILLWATER, MN

BSA Commercial Aviation with a Specialization in Safety & Minor in Atmospheric Sciences

North Dakota Cloud Modification Project

Co-Pilot Intern

"Working alongside meteorologists, I will be flying a Cessna 340 to enhance rainfall and suppress hail. This project helps reduce crop loss for the local farmers."



KYLE FINSETH | ST. PAUL, MN

BBA Airport Management with Safety Specialization

Waukesha County Airport, Waukesha, Wisconsin

Airport Operations Assistant

"I am responsible for the day-to-day operations of the airport to include inspections and maintenance. I work with several different county departments and outside contractors for minor (under one month time frame) airport improvement projects. I manage the airfield inspection program, wildlife hazard mitigation program, storm water pollution prevention program and the snow and ice control plan. I work with tenants to create and present a monthly operations report to the Airport Board of Commissioners (which includes a UND alumni)."



MERIDATH JACKSON | ROSEMOUNT, MN

BSA Commercial Aviation & Minor in Nonprofit Leadership

Minneapolis, MN Endeavor Air Headquarters/ Flight Ops

Virtual Pilot Training Classroom Host and Flight Ops Intern

"I facilitate the operation of the Endeavor Flight Operations training for the virtual pilot classes such as new-hire and recurrent training. I support the instructor through operating the virtual platform and assisting with classroom and pilot training tasks. I also work with Endeavor Flight Ops on projects around headquarters associated with pilot resource allocation, aircraft emergency training simulations, and more!"



RYAN KRAM | LANGDON ND

BSA Commercial Aviation & Minor in Atmospheric Sciences

North Dakota Cloud Modification Project

Co-Pilot Intern

"I will be flying a Piper Seneca on the North Dakota cloud seeding project. This project is designed to help the counties by either suppressing hail, or increasing rain. By doing that I will gain valuable experience flying in and around thunderstorms and inclement weather on the project, along with interacting with the local communities."



VICTORIA OMARKI | DANVILLE, IL

BBA Airport Management, BSA Air Traffic Management, & Minor in Spanish

Bullhead City, AZ at Laughlin Bullhead International Airport (KIFP)

Airport Management and Operations Intern

"I will be working alongside every section of the airport management team at Laughlin Bullhead International Airport. I will be learning about and gaining experience in management, operations, safety, and security. I am excited to gain hands-on landside and airside experience in a real world environment."



SAMANTHA REKUSKI | ARDEN HILLS, MN

BBA Airport Management

Bozeman Yellowstone International Airport

Intern in the operations department

"I will be doing ARFF training and being certificated to be able to respond to aircraft emergencies. I will be wearing a lot of different hats, and the operations department has something new for me every day! I am eager to learn as much as possible at BZN."



CARLY SHUKIAR | THOUSAND OAKS, CA

BSA Commercial Aviation major & Minor in Psychology

Vero Beach, Florida - Piper Aircraft

Marketing and Sales Intern

"I am working within the marketing and sales department at Piper Aircraft, primarily focusing on digital and social media marketing. My colleague Michael and I focus on posting through Instagram and TikTok, where we've already seen a substantial increase in audience numbers and engagement. We also perform market research and coordinate an administrative database of the flight schools in the United States and beyond. When we're not working within marketing, we are on the flight line, performing exercise flights, and delivering factory-new aircraft to flight schools in the area."



JOSEPH TAYLOR | NEW PRAGUE, MN

BSA Commercial Aviation

North Dakota Cloud Modification Project

Co-Pilot Intern

"I'll be moving between Bowman, Stanley, and Williston ND to relieve my peers during their assigned vacation periods. This will allow me to fly not only the Piper PA-34 Seneca but also the Cessna 340 and the Beechcraft C90 King Air. These aircraft are flown near the front side of thunderstorms to help reduce the amount of damaging hail in addition to producing more precipitation. I'll also assist the PICs with preflight inspections, mix the cloud seeding solution, and maintain an accurate log of events during every flight."



MIKE TROST | TINLEY PARK, IL

BSA Commercial Aviation with Business Aviation Specialization

Vero Beach, Florida - Piper Aircraft

Marketing and Sales Intern

"This summer I am working as a marketing and aircraft sales intern for Piper Aircraft in Vero Beach, Florida. Myself and my peer Carly have already delivered brand new training aircraft to Jacksonville, Florida and are currently making a database of every flight school in the country. In late July, we will both be flying a Piper Pilot 100i from Vero Beach, FL to Oshkosh, WI for the EAA AirVenture. At Oshkosh we will be working in Piper's booth and spreading the word on the Piper Ambassador Program. In our spare time we also run the social media platforms for the country."

LEADERSHIP AWARD MANNA KHAN

Manna Khan is a Ph.D. student in the Earth System Science and Policy Department. In spring 2020, following a class project on Urban Gardening, Manna, and fellow ESSP students, decided they'd like to start a UND community garden. Under Manna's leadership and involvement, the project Campus Gardening was born. One year later it is very much alive and moving forward despite COVID.



COMMUNITY GARDEN

Above: Manna Khan a Ph.D. student watering the plants in the community garden.

Left: Brenden Swanson, Sarah Owens, Dr. Soizik Laguette and Manna Khan pose for a picture while planting the community garden at UND.

Photos By: Jordon Gyapong



SCAN TO
LEARN MORE

EARN YOUR MASTER'S OF ENVIRONMENTAL MANAGEMENT (M.E.M.)

On Campus or Online

Be a part of the next generation of leaders that will help individuals, companies, and society solve pressing sustainability problems.

The M.E.M. offers an interdisciplinary-oriented education required by professionals working toward the management of earth systems and resources.

UND graduates can expect exciting opportunities to do field studies, research, policy setting, and other important work for top companies in a wide variety of industries and fields.

THE LIMIT IS BEYOND THE SKY

“We can help shape the future of spaceflight, but also **better our life** here on earth.”

STEFAN TOMOVIC, '18, '21

BACHELOR'S DEGREE:

ELECTRICAL ENGINEERING

MASTER'S DEGREE: **SPACE STUDIES**

HOMETOWN: **COLD SPRINGS, MINN.**



If you're a space buff, you may have seen images of Stefan Tomovic on the pages of National Geographic, his eyes gazing from under the helmet of a burly, orange spacesuit.

Tomovic is not an astronaut. But, he helps astronauts reach space and explore it. Tomovic is an experimental electronics engineer with NASA.

Now based at the Kennedy Space Center in Cape Canaveral, Fla., Tomovic earned a master's degree in space studies at the University of North Dakota in 2020. He also holds a bachelor's degree in electrical engineering from UND.

As an undergraduate student, Tomovic read a book that asserted that electrical engineers can — and should — build rockets. And that is what he decided to do.

Tomovic joined UND's Rocket Team, which competed in rocket-building contests sponsored by NASA. The team spent months putting together a rocket and then ventured to Marshall Space Flight Center in Alabama to blast it off.

"I was like, 'I love this, this is what I want to do,'" Tomovic said. "And it's a great launching pad for students to get into the space industry."

From assembling rockets, Tomovic moved to spacesuits in the lab of Pablo de Leon, director of the UND Human Spaceflight Lab and head of the Department of Space Studies. This is where he got to model the next-generation spacesuits, which de Leon is designing, for the likes of National Geographic photographers.

Twice "stationed" at the Inflatable Lunar/Mars Habitat near the UND School of Aerospace Sciences in Grand Forks, Tomovic also tested spacesuits for extended periods of time. For several weeks each year, the Habitat becomes a "space station" on Earth, where scientists and students conduct experiments to advance the exploration of space.

"This is a really unique place for students to be able to propose an experiment for a simulated human mission analog, and then also get to run their own experiment," Tomovic said.

His experiences at UND prepared Tomovic for a truly once-in-a-lifetime occasion: an internship with NASA in 2019. For two months, he put in 12-hour workdays, heeding his conviction that "you have to maximize the opportunities you are given."

"NASA was my first and only internship," Tomovic said.

In the summer of 2020, the internship became a full-time job. Today, Tomovic works on MSolo, or Mass Spectrometer Observing Lunar Operations. As an electronics engineer, he develops printed circuit boards to test the flight hardware for the four spectrometers NASA is sending to the Moon to search for molecules.

Tomovic also is building onto de Leon's research by studying the possibility of recycling plastics as feedstock for 3D-printed spacesuits and components for the International Space Station.

"What we do at NASA has a greater impact for all of humanity," Tomovic said. "That's one of the most rewarding things about the job: knowing that what we can do through research and development at NASA, we can help shape the future of spaceflight, but also better our life here on Earth."

Visit [UND.edu/leaders/](https://www.und.edu/leaders/) for the full story!

FLY ME TO THE NEAR-EARTH OBJECTS

NASA Chief Scientist and UND graduate Paul Abell looks at asteroids as ‘stepping stones’ to reaching Mars and beyond

Most people know how to navigate to a travel site and book a plane ticket for their next vacation. But how many know how to book a trip to an asteroid?

Paul Abell, a 1993 graduate of UND’s Space Studies program, is one.

As Chief Scientist for Small Body Exploration in the Astromaterials Research and Exploration Science Division at NASA’s Johnson Space Center in Houston, Texas, Abell is an expert on the comets and asteroids residing in our solar system.

In particular, Abell specializes in studying the millions of comets and (mostly) asteroids that can be found between the Sun and the main asteroid belt between Jupiter and Mars. These celestial bodies are classified as “near-earth objects” if their orbit passes within 1.3 Astronomical Units of the Sun, meaning within 1.3 times the distance between Earth and the Sun.

For more than a decade, Abell has taken part in some of the world’s most advanced efforts to understand these remnants of the solar system’s creation, including a collaboration with the Japanese Aerospace Exploration Agency (JAXA) through the Hayabusa and Hayabusa2 projects, as well as NASA’s ongoing OSIRIS-REx mission. These missions represent the first set of efforts to collect samples directly from the surfaces of near-earth asteroids (NEAs).

Abell was on the team in 2010 that collected the first-ever direct samples dropped to Earth by the Hayabusa probe, in Australia.

Presenting an overview of his work at the Department of Space Studies Colloquium Series on Monday, Abell talked about future phases of NEA exploration – including manned missions to the surfaces of asteroids.

In his words, space rocks of all sizes and shapes are literally the stepping stones for missions exploring distant planets, including future trips to Mars.

“We’re going back to the Moon, and that’s relatively close. But going to Mars is a really hard and long-duration mission,” Abell remarked. “In looking at nearby asteroids, we can execute missions that will take less than a year.

“There are lots of reasons and benefits for considering NEAs for potential missions.”

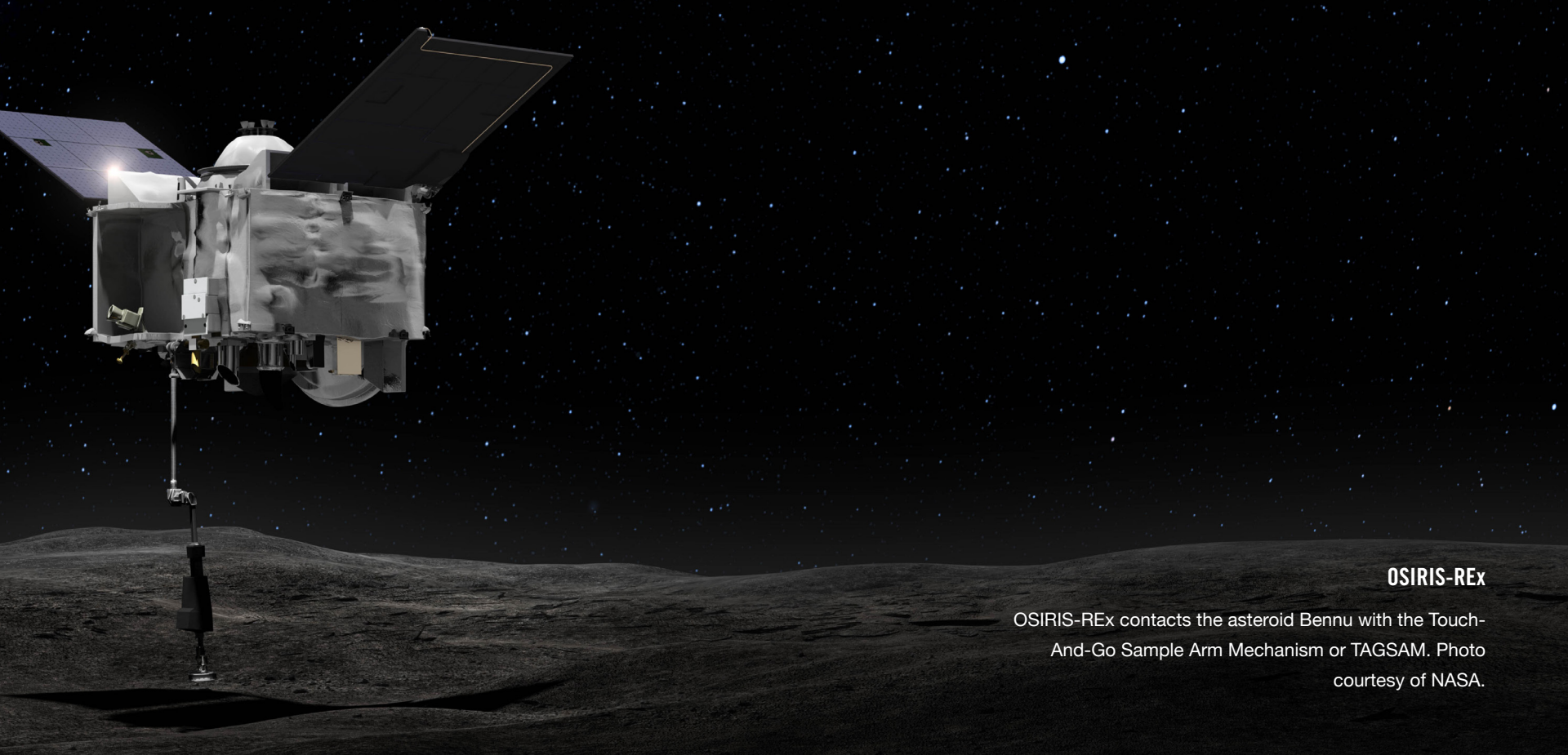
Through relatively short-term missions to NEAs, NASA and similar agencies can gain vital operational experience in developing deep-space systems. There are also implications for scientific discovery, resource use and planetary defense when it comes to visiting small bodies wholly different from other worlds we’ve encountered. Along the way, international, commercial and academic partnerships stand to benefit from NEA exploration both manned and unmanned, Abell said.

Said Professor Pablo De Leon, chair of the UND Department of Space Studies and host of the Colloquium Series: “A question that I get a lot is, ‘What can I do once I graduate?’ The answer, ‘You can be a NASA Chief Scientist like Paul Abell,’ is not a bad one!”

Booking a trip to the solar system

True, it’s too early to find any listings on Expedia for your next trip to an asteroid. But there is in fact a website that has made it possible for people with the prerequisite knowledge to plan a rendezvous. Abell spent a portion of his talk describing how it works.

The trip planner, so to speak, is the result of NASA’s Near-Earth Object Human Space Flight Accessible Targets Study (NHATS). As the name of the long-term study infers, NASA has been tracking the thousands upon thousands of objects that are viable for interaction, given Earth’s own orbit and the velocities necessary for a safe meetup and return.



OSIRIS-REx

OSIRIS-REx contacts the asteroid Bennu with the Touch-And-Go Sample Arm Mechanism or TAGSAM. Photo courtesy of NASA.

Those thousands are only a fraction of the millions of objects – ranging from a few meters to hundreds of meters in diameter, located from the inner solar system to the main asteroid belt beyond Mars’ orbit – that have so far been discovered, independently of known planets and moons.

Going through some examples of the website in his PowerPoint presentation, Abell walked through the factors that scientists are looking at in terms of mission viability. The table shows an object’s estimated diameter in meters, its absolute magnitude (luminosity), the number of possible trajectories by which to reach it and even a range of mission durations depending on the launch date and approach velocity, among other factors. Regularly updated, the site provides results for mission windows through 2045.

“NHATS also gives you an orbit condition code, which signifies how well the object has been observed on a scale from zero to nine,” Abell said. “The lower the number, the more those orbits are known and reliably calculated.”

If there’s further interest in booking an itinerary, it’s possible to click on the name of the object to get a more detailed and color-coded view of opportunities available. Abell mentioned that he and his colleagues regularly publish updates in a newsletter style that indicates the objects to which NASA is paying attention.

“Typically we’re looking at NEAs that have a number of trajectories well over 100,000 and a size above 50 meters,” he said. “That’s about the lowest diameter that we consider.”

To explore the past and secure the future

A student question following Abell’s NHATS tutorial evoked more of why his work is of importance to NASA and the future of space exploration: What would human missions to NEAs accomplish what robotics missions can’t?

In response, Abell pointed to the ongoing OSIRIS-REx mission and how it addresses the motivations behind NEA exploration – scientific discovery, resource use, development of operational capabilities and planetary defense.

“With that project gathering a sample from an asteroid, it’s covering a few of those bases,” Abell said. In other words, analyzing samples can tell us more about that particular body’s origins (science), its available resources (such as water or possible fuel sources) as well as its composition (in the event we have to mitigate its path to prevent a collision with Earth).

“At the same time, that robotic mission doesn’t address any of the human mission considerations,” he continued. “You can cover all of those aspects in a manned mission while at the same time testing the capabilities of the spacecraft without committing to a long-duration, complex mission.”

Basically, in getting out to explore the solar system, it’s best to fill the knowledge gaps in small chunks, as opposed to trying to do everything in one shot, Abell said. Using the stepping stones of Earth’s neighborhood, space agencies can progress from robotic surveillance, to human interaction, to habitation and so forth.

When thinking about Mars in particular, NASA needs opportunities to learn about the reliability and reparability of propulsion systems, developing high-capacity communications systems, radiation shielding and the effects of microgravity on humans, according to Abell.

“Near-earth asteroids are really important for exploring our past and securing our future,” Abell remarked.

—Connor Murphy / UND Today

A RECORD BREAKING YEAR

126,772
FLIGHT HOURS
FLOWN SAFELY



@UNDaerospace