

SUMMER 2012 | JOHN D. ODEGARD
SCHOOL OF AEROSPACE SCIENCES

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A MESSAGE FROM THE DEAN

Fall enrollments are on the upswing. Next month when fall classes begin, the Odegard School will have approximately 30% more entering freshmen than last fall. These increases are across the entire School in all academic departments. They are due in part to the nation's economy which is driving students back into higher education across the nation. The increase in Aviation is a result of the now age 65 retirements and a projected shortage of pilots worldwide. All of this is good news for UND and the Odegard School. We are setting flight training hour records every month.

The combination of the increased undergraduate enrollments and the continuing international programs have given us a great economy of scale with regard to the cost of our educational and flight training programs. The comparatively low tuition at UND also makes a UND degree and the flight ratings a great value. However, even with our efforts to remain as affordable as possible, the overall costs of a college degree continue to rise.

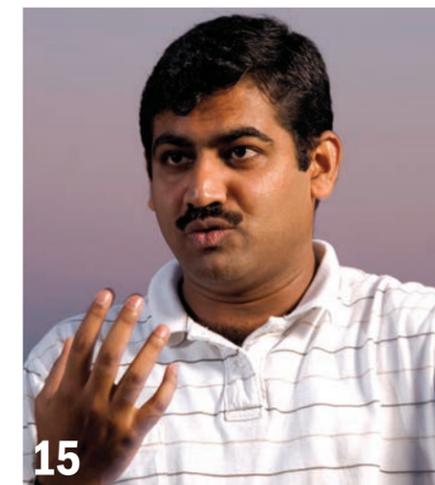
On behalf of the entire Odegard School I want to thank all of our generous donors who help to offset this expense. This past academic year, more than \$220,000 was distributed to Odegard School students as scholarships. Your gifts are essential to the success of the students who benefit from your thoughtfulness.

The Odegard School continues to thrive based on the efforts and contributions of everyone internal to the School—including faculty, staff, instructors, and mechanics. Equally important are the external factors, including the quality of the students, the support of their parents, the contributions of our alumni, and the generosity of all our benefactors.

We wouldn't be where we are today without you.

Thank You!

—Bruce Smith
Dean, John D. Odegard School of Aerospace Sciences



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Past issues of Aerocom available online
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Photo Credit
Jackie Lorentz

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UP, UP, & AWAY

UND AIRPORT MANAGEMENT ALUMS GO WITH THE FLOW

By Juan Miguel Pedraza
Photography by Jackie Lorentz

Cows, movie stars, presidents. They're all part of the job for Darren Anderson, a graduate of the University of North Dakota's airport management program.

"I have met a variety of different, very interesting people—and cargoes—over the years," said Anderson, a Grand Forks native who is the assistant director of Fargo's Hector International Airport, the biggest and busiest in North Dakota. A typical day for Anderson might include dealing with a Secret Service advance crew preparing for a visit by the President on Air Force One. Similarly, Anderson could be kept busy facilitating the movement of 195 pregnant purebred North Dakota cows for shipment on a Korean Air 747 to Kazakhstan for an ongoing herd rebuilding program.

"It's never boring around here," stated Anderson, whose wife Sheri, a Niagara, N.D. native and associate vice president in the North Dakota State University Vice President for Research Office, is also a graduate of the UND airport management program.

Anderson's aviation goes way back to the days when he begged dad for lifts to the Grand Forks airport to spot aircraft. "My dad bought me my first ride on an airplane—we flew over Grand Forks and I was hooked," said Anderson, who worked at John Wayne Airport in Orange County, California, right after graduation, where he often worked with movie directors, crews, and stars such as Tom Cruise. Anderson also wasn't far from his soon-to-be wife, who was interning for Lockheed at San Bernardino Airport. After getting an associate degree in industrial electronics, Anderson—who paid his way through college by farming for a relative in Minnesota and driving loads of anhydrous ammonia for Cenex—got back into aviation at the University of North Dakota.

“I thought I wanted to be a pilot, but I discovered the UND airport management program and loved it.”

Darren Anderson, Hector Int'l Airport

Anderson, who works at one of the country's 17,000 airports, puts the skills he learned in UND's airport management program to use everyday. “Generally, we don't directly control flying activities,” Anderson said. “But as the day-to-day manager of this airport, I do make sure that federal, state, and local regulations are enforced—and in this business, there are lots of rules and regulations. I spend about half my time on regulatory paperwork. I'm also Hector's airport security coordinator, and I work closely with the Transportation Safety Administration folks here. Basically, it's all about ensuring safe, efficient operations for our employees and all the passengers who come through here, about 700,000 annually.”

These days, Anderson's job also means directly supervising more than \$10 million in current and planned construction work, including an updated general aviation runway and several parking projects. He and his boss, the airport director, also work closely with the Air National Guard at Hector, which provides—under contract—fire suppression personnel and equipment for the airport.

“Airport managers don't necessarily need to be pilots, but that helps,” said Kim Kenville, professor of aviation at UND and director of the airport management and aviation management programs. Kenville, like Anderson, also graduated from UND's airport management program.

“The UND airport management program is for those who are interested in aviation but don't want to fly for a living,” said Kenville, herself a flier. “An essential requirement for this degree is that students attain the valuable knowledge that comes from getting a private pilot's license; John Odegard was adamant about this requirement—everyone who comes out of UND's aviation program is going to be a pilot.”

It's all about perspective.

“If you're a pilot, you really have so much more understanding of how our aviation system works, between air traffic control, general aviation, airlines, and airports,” stated Kenville. “You understand why airfields are the way they are, why the runways are numbered in certain ways, why the stripes are colored this way or that, what a taxiway is, and what's an approach.”

Today's new airport managers, replacing the wave of industry leaders from the Vietnam era who are retiring, are tops in their field. They are moving from smaller grounds to larger airports as assistant managers and other senior leadership positions, noted Kenville, whose father is a retired fighter pilot from the Happy Hooligans Air National Guard unit in Fargo (he did not fly F-16's... he retired before then).

Kenville, who has many years of experience working with commercial and general aviation operations and management, organized the development, delivery and implementation

of UND's undergraduate degree program in airport management. Kenville oversees both the airport management and the aviation management degree programs and since 2008, she has acted as director of the graduate aviation program.

“The airport management curriculum teaches students the skills necessary to get jobs in administrative positions with companies in and related to the groundside activities of the aviation industry,” said Kenville, who has worked in management positions at several airports around the country. “We run both the airport and the aviation management programs in collaboration with the College of Business and Public Administration,” stated Kenville. “I believe that we're the only school in the country that has a fully-accredited business degree behind our aviation program. The others offer a BS in aviation management or airport management, which means a couple of business courses; ours is a BBA in either of those two fields, which means the full set of business core courses from a fully accredited business school. It's a rigorous business education.”

UND airport management alums work all over the continent, in airports big and small, taking on positions ranging from safety bosses to airport managers and/or directors. In North Dakota, UND alums are at work across the state, including Fargo, Bismarck, Dickinson, and Minot. Two of the program's alums, Jim Koslosky, A.A.E., and Jerry Olson, A.A.E., were nationally known leaders in the airport management industry and past chairs of the top airport management industry association, the American Association of Airport Executives (AAAE). ■



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SPINNING ON TOP

UND's helicopter program outranks all others

By Juan Miguel Pedraza | Photography by Jackie Lorentz

Mike Krotz beats his way to work just about every day. There's no getting around that in rotorcraft circles. Krotz is the University of North Dakota's chief helicopter pilot and head of the helicopter training program.

"I've been flying helicopters for 12 years, and flying airplanes for nearly 40 years," said Krotz, who also spent 20 years as an air traffic controller in the U.S. Air Force. Besides instructing and managing UND's rotorcraft program, Krotz, along with two instructors on his team of 25, is a Federal Aviation Administration Designated Pilot Examiner, testing student pilots before they can get their helicopter ticket.

UND's helicopter program is unique in American higher education and underscores the special stature of the John D. Odegard School of Aerospace Sciences overall flight training program: it's the only such program in the country that actually owns and operates its own fleet of rotorcraft. (All helicopters are rotorcraft but not all rotorcraft are helicopters; the class includes autogyros, or gyroplanes, and other aircraft that depend on rotating blades for lift.) With more than 140 training aircraft—including 3 ultra-sleek Bell Ranger 206 helicopters—UND owns the largest non-military fleet, by some counts in the whole world. Today's helicopter pilot trainees at UND—now numbering around 100 students, or three times more than when the program started over 25 years ago—head for many different careers.

"Besides the military and law enforcement careers, it's the utility market that drives the demand for helicopter pilots," said Krotz. The "utility market" includes emergency medical services, fire suppression, fish spotting, tour operators—think Grand Canyon—and companies that provide flight services to offshore oil rigs.

Keeping all of this machinery safely operational is demanding. "Repair and maintenance is a big operation here," Krotz said, noting that UND has a team of former airplane mechanics specifically trained to work on helicopters, which are among the most complex flying machines. "That's all they do, and we keep them busy because we are required to submit each helicopter to a thorough inspection every 100 hours; some parts have a designated lifetime, such as the main rotor blades of the H300, which must be replaced after 5500 hours of use, whether they need it or not."

UND's helicopter operation includes a recently built hangar dedicated just for the birds. "We can store all 13 helicopters in the hangar plus a few airplanes, too," stated Krotz. "Having our own building located close to where we park the helicopters is great. Before, we had to walk a ¼ mile each way to get to the helicopters from the main aviation building and now we've got everyone, students, instructors, examiners, in one building (though the mechanics that work on the helicopters are still in the large shop area in the main facility)."

Today's helicopter student population—roughly 100 in all—consists of about 50 individuals who are being trained under contract with Saudi Arabia's Interior Ministry; about 40 ROTC cadets who are in the commercial aviation program; and about 20 independent students, including several veterans. For several years in the mid-2000s, UND also trained a group of West Point and ROTC cadets every summer. "That was really a helicopter familiarization program—we just took them to solo, but Congress cut the appropriated funds for the program, so those West Pointers aren't here now," stated Krotz.

Learning to fly helicopters costs roughly \$500/hour to more than \$900/hour, including an instructor, depending on which machine you want to fly. A new Sikorsky Schweizer, similar to the kind UND operates, costs about \$350,000 new at the factory. The larger and faster Bells run \$650,000 to \$1.2 million depending on how many extras you tack on. "The newest Bell we have—a 2006 model—costs about \$920,000" said Krotz.

About the equipment:

Bell JetRanger

Engine | 317 SHP Rolls-Royce Allison
Max Takeoff Weight | 3200 lbs.
Max Altitude | 13,500 ft.

The Bell 206 is a family of two-bladed, single- or twin-engine helicopters, manufactured by Bell Helicopter at their plant in Mirabel, Quebec. The JetRanger is well-known for matching speed with versatility. Known for being the most reliable and safest helicopter, the JetRanger can handle all types of environments, from the Arctic's blistering cold to the world's hottest deserts. UND Aerospace incorporates the JetRanger in Commercial and Instrument flight courses.

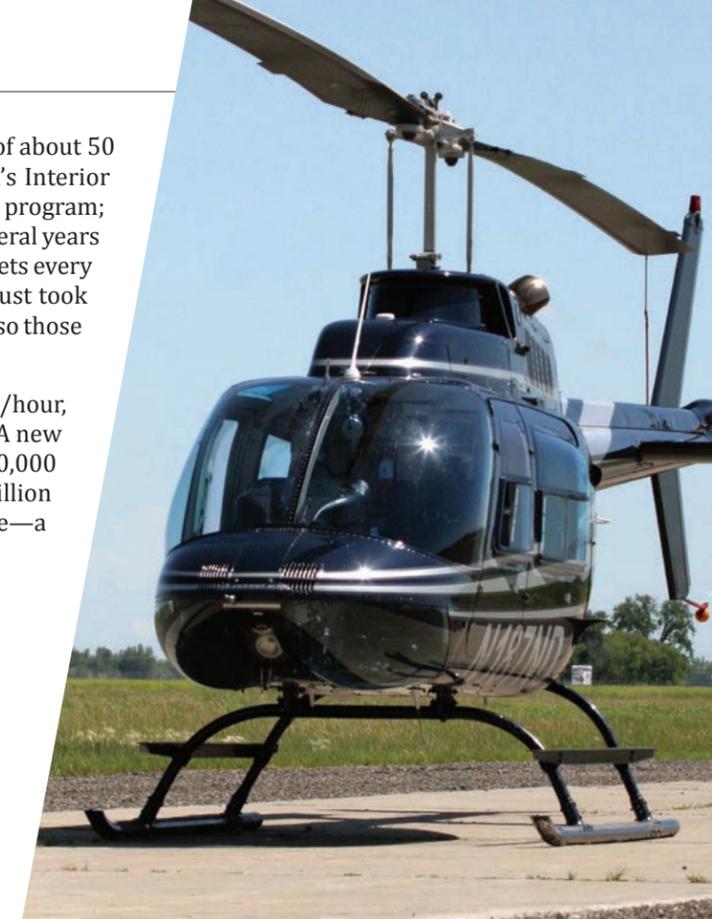
Schweizer 300

Engine | 190 HP Lycoming engine
Max Takeoff Weight | 2050 lbs.
Max Altitude | 10,800 ft.

Sikorsky Aircraft Corporation, based in Stratford, Connecticut, manufactures the Schweizer 300, ten of which are in UND's helicopter training fleet. The Schweizer 300 (formerly Hughes 300) is classified as a light utility helicopter; it was originally produced by Hughes Helicopters. The Schweizer 300 is one of the most powerful piston-powered helicopters in production. When creating the Schweizer 300, the manufacturer had training specifically in mind and created a large cabin which allows comfortable seating for both student and instructor. UND Aerospace incorporates the Schweizer 300 in Private, Commercial, Instrument, and CFI flight courses.

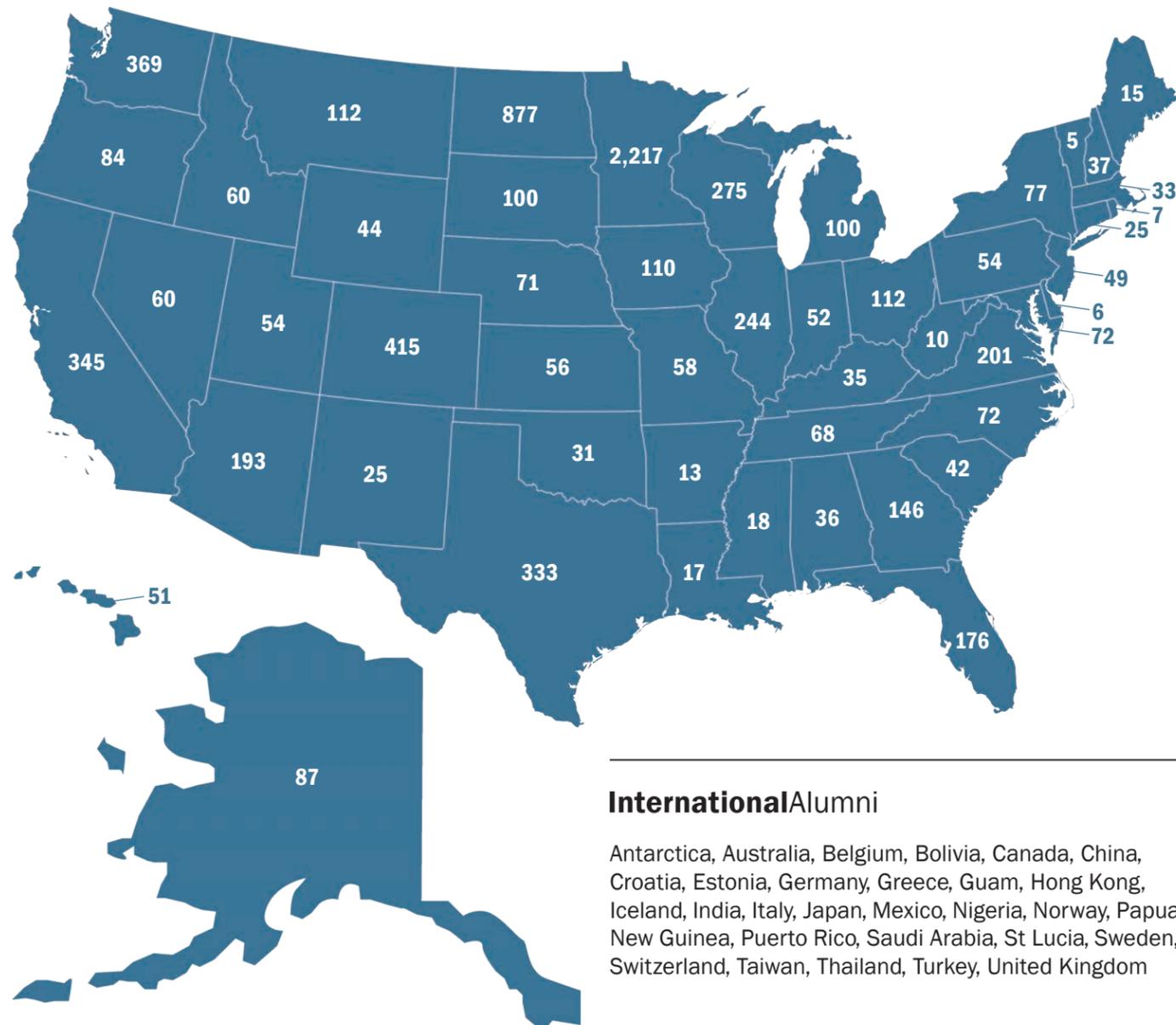
About UND aviation degrees:

The John D. Odegard School of Aerospace Sciences at UND was the nation's first school to offer an undergraduate business degree combined with aviation education and professional training. Internationally recognized for its academic excellence, the Odegard School provides 1,500 students from around the globe with an aviation education that is second to none. With highly qualified and dedicated faculty, state-of-the-art facilities and the world's largest collegiate training fleet of 140 aircraft, there's no better place to receive your aviation degree.



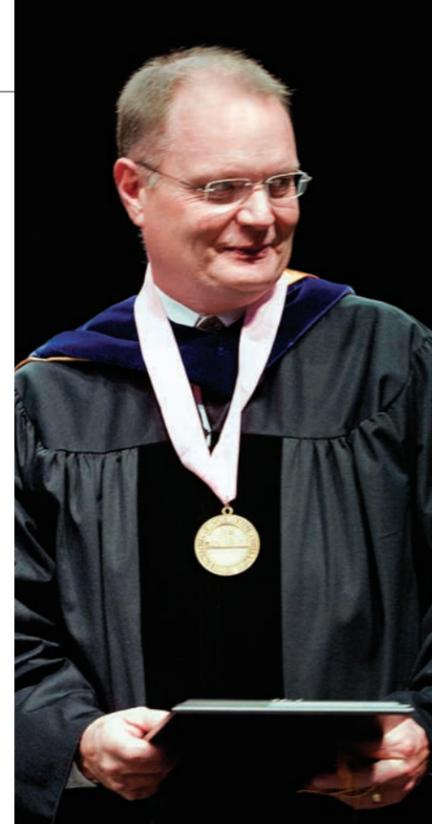
AlumniProfile

FIND ODEGARD SCHOOL ALUMNI ACROSS THE GLOBE
– numbers represent alumni living in each state



International Alumni

Antarctica, Australia, Belgium, Bolivia, Canada, China, Croatia, Estonia, Germany, Greece, Guam, Hong Kong, Iceland, India, Italy, Japan, Mexico, Nigeria, Norway, Papua New Guinea, Puerto Rico, Saudi Arabia, St Lucia, Sweden, Switzerland, Taiwan, Thailand, Turkey, United Kingdom



Chester Fritz Distinguished Professor

AWARDED TO DR. WARREN JENSEN

Dr. Warren Jensen, professor of aviation in the John D. Odegard School of Aerospace Sciences, was honored as the Aviation Department's first Chester Fritz Distinguished Professor during the commencement ceremony on May 12, 2012. The Chester Fritz Distinguished Professorships were established with an endowment gift from the late UND benefactor Chester Fritz, 1892-1983. Revenue from the endowment provides for cash stipends to one or more full-time UND faculty members, who thereafter may use the title "Chester Fritz Distinguished Professor." Dr. Jensen serves as the school's director of aeromedical research and as its flight surgeon. He received his bachelor's degree from UND in 1980 and came to work for the University in 1993 as a faculty member in aviation. In nominating Dr. Jensen, Bruce Smith, dean of the Odegard School, wrote, "Put quite simply, Dr. Jensen is an invaluable asset to the Aerospace College, the University, and the State of North Dakota." Smith also noted that: "Dr. Jensen is an integral faculty member providing his superior expertise to the Odegard School curriculum, allowing us to be recognized nationally and internationally as the premier collegiate Aviation program."

Jensen received his medical degree from the University of California, San Francisco, in 1982 and did his post-graduate internship at Pacific Presbyterian Hospital in San Francisco in 1983. He earned a master's in aerospace medicine from Wright State University in Dayton, Ohio, in 1993 and completed the U.S. Air Force flight surgeon course at Brooks Air Force Base in Texas in 1994. Jensen's research areas include human flight performance, decision-making in emergency settings and oxygen delivery systems. He teaches courses in the Odegard School's aviation and space studies departments in the area of human factors in aviation and aerospace physiology. As a guest lecturer, Jensen has presented such topics as medical aspects of aviation safety, medical certification issues in the aviation industry, aerospace physiology, human factors in flight simulation design and many others. He is also involved in the continuing education of pilots in an aerospace physiology professional development course offered through the UND Aerospace Foundation. Jensen serves as an academic advisor to 25-30 aviation undergraduate and graduate students. He is the aviation medical advisor to students, flight instructors and faculty for medical certification issues. Jensen has authored and co-authored articles in such publications as the *International Journal of Aviation and Psychology*, *Proceedings of the Military Health Conference* and the *Journal of the American Dietetic Association*.

Jensen is also the recipient of UND's Outstanding Undergraduate Teaching Award and the Humanism in Medicine Award from the School of Medicine and Health Sciences. Other service involvement includes acting as senior aviation medical examiner with air traffic control designation and assistant chair for faculty development in the Department of Aviation. He has also served as the state air surgeon for the North Dakota Air National Guard. Paul Lindseth, associate dean for academics in aerospace science, wrote that Dr. Jensen's "superior performance as a professor of aviation, adjunct professor of space studies and teacher of second year medical students is very deserving of the Chester Fritz Professor award." Lindseth continued, "Because of his reputation as a respected educator and researcher, the Mayo Clinic in Rochester, Minnesota sought out the University of North Dakota's Aerospace College to implement an Aerospace Medicine Residency program for newly minted physicians interested in pursuing a Flight Medicine or Flight Surgeon career. Furthermore, Dr. Jensen is a gifted medical care giver, taking time to travel to Central American countries during Spring Break for many years and providing medical care to at-risk children and adults."

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UND'S ODEGARD SCHOOL OF AEROSPACE SCIENCES GRADUATES FIRST DOCTORATE IN COMPUTER SCIENCE



**BISMARCK NATIVE
KIRK OGAARD IS USING
HIS KNOW-HOW TO
MINE FLIGHT DATA
FOR THE ARMY'S
ABERDEEN TEST CENTER**

By Juan Miguel Pedraza

You hear them flying overhead every day—they're the aircraft that University of North Dakota aviation majors use to learn their trade. UND's aviation program makes the Grand Forks Airport one of the busiest in the country in terms of takeoffs and landings.

But for Kirk Ogaard, there's a very different kind of business associated with those aircraft: he mines flight data gathered directly from devices aboard. Ogaard, originally from Bismarck, collected UND's first Ph.D. in computer science at this year's spring commencement ceremonies, opening the path for several others behind him who are also enrolled in the program. Ogaard also got his bachelor's and master's degrees in computer science from UND, known for its prowess as a center of learning in computational science.

"For my Ph.D. dissertation, I wrote a program—a software package—to mine the data that we collected from airplanes used to train UND aviation students," said Ogaard. His successful Ph.D. completion won Ogaard a spot in a coveted

one-to five-year post-doctoral program with the U.S. Army Aberdeen Test Center in Maryland. That's one of nine such centers that support the Developmental Test Command, the Army's premier organization for developmental testing of weapons and equipment.

"At Aberdeen, I'll be doing stuff similar to what I did for my Ph.D.—data mining and probably some visualization," said Ogaard, who plans to go into full-time research once he's done with his post-doc.

"I got help from Jim Higgins, a former captain with American Eagle Airlines, who now teaches in UND's aviation program," Ogaard said. "He organized the system that collected all the data direct from the aircraft—such as global positioning system information—and offloaded it into a computer at the completion of each flight."

The challenge, he says, is that once you collect and mine data, there's more than straight analysis.

"To make the data analysis useful you need to be able to draw useful conclusions from it," Ogaard said. "The real problem, then, is interpreting those results. Visualization can help you do that, whether you convert the answers into some sort of chart or other graphic—in other words, it helps you understand what you've found in the data."

You can use off-the-shelf visualization software to create the graphics or you can write your own—Ogaard wrote his own.

What is the University of North Dakota doing with Ogaard's aviation data mining results?

"Applicability is the key—the University can use it to look at the kinds of maneuvers that students perform and see which maneuvers are most frequent," Ogaard said. "I think the most useful thing for the University is the methodology I developed for analyzing and extracting value from the data."

Advice for the next generation of Ph.D.'s?

"I would say the most important thing is be persistent, keep working, don't get frustrated," Ogaard said. He completed his PhD in three and a half years after completing the two year master's program.

About the UND computer science PhD program:

The Department of Computer Science offers graduate study leading to the Doctor of Philosophy in Scientific Computing (emphasizing the development of software, the science, and the technology required to support computational science and simulation based science and engineering). The department is a part of the John D. Odegard School of Aerospace Sciences, which provides unique opportunities for research by faculty and graduate students. There is especially strong interest within the department in the areas of artificial intelligence, compiler design, database, networks, operating systems, graphics, simulation, software engineering, and theoretical computer science.

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THE \$300 MILLION CAMPAIGN FOR UND



North Dakota Spirit is

INNOVATIVE

Programs like the UND Unmanned Aircraft Systems Engineering Laboratory spark the fire in students to be exceptional.

Kaci Lemler and six other UND students claimed first place in last year's UAV Outback Search and Rescue competition in Australia through their involvement in one of UND's many innovative programs. When you support the North Dakota Spirit campaign, you provide critical funding for innovative programs, and make possible exceptional experiences for our students and faculty.

Share Your Spirit: spirit.UND.edu | 800.543.8764

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UND SPACE SCIENTIST HELPS NASA PROBE SOLAR SYSTEM HISTORY

By Juan Miguel Pedraza

In its first global analysis of the giant asteroid Vesta, NASA's Dawn mission has confirmed Vesta's status as a special fossil of the early solar system and revealed a world more varied and diverse than originally thought. Dawn's work at Vesta now marks it as NASA's first "reverse" sample return mission in which we have identified samples before we visited the body.

The National Aeronautics and Space Administration (NASA) made the announcement at a news conference to present the new analysis of the giant asteroid Vesta using data from the agency's Dawn spacecraft. The news conference panelist comprised of scientists involved in the Dawn project, including the University of North Dakota Space Studies faculty member Vishnu Reddy, well-known for his research on asteroids and his discovery of an asteroid later named "North Dakota." Reddy is a Dawn framing camera team member, currently working at Germany's Max Planck Institute for Solar System Research.

Dawn has now provided a full picture of the body, showing that Vesta is the only known intact, layered planetary building-block with an iron core surviving from the earliest days of the solar system. Therefore, it more closely resembles a small planet or the moon than other asteroids. The first published results from Dawn appear in six papers released by the journal Science. "Dawn's visit to Vesta has confirmed our broad theories of this giant asteroid's history, while also helping to fill in details it would have been impossible to know from afar," said Carol Raymond, deputy principal investigator based at NASA's Jet Propulsion Laboratory in Pasadena, California. "Dawn's residence at Vesta of nearly a year has made Vesta's planet-like qualities obvious and has shown us our connection to that bright orb in our night sky."

"We know a lot about the moon, but we're only now coming up to speed on Vesta," said Vishnu Reddy. "Comparing the two gives us two storylines for how these fraternal twins evolved in the early solar system." UND planetary geologist and Chester Fritz Distinguished Professor of Space Studies Mike Gaffey is also a member of the Dawn team.

Vesta's geologic complexity is related to a process, known as "differentiation," that segregated Vesta into a crust, mantle and core about 4.56 billion years ago, very close to the birth of the solar system itself. This history makes Vesta similar to terrestrial planets and our moon, which are also segregated into a crust, mantle and core. In fact, Dawn has been able to confirm that Vesta has an iron core with a radius of about 110 kilometers, which proves that Vesta differentiated. Launched in 2007, Dawn began its exploration of the approximately 330-mile-wide (530-kilometers) asteroid Vesta in mid-2011. The spacecraft's next task will be to study the dwarf planet Ceres in 2015.

Dawn's mission to Vesta and Ceres is managed by NASA's Jet Propulsion Laboratory for NASA's Science Mission Directorate in Washington. JPL is a division of the California Institute of Technology in Pasadena. Dawn is a project of the directorate's Discovery Program, managed by NASA's Marshall Space Flight Center in Huntsville, Alabama. UCLA is responsible for overall Dawn mission science. Orbital Sciences Corporation in Dulles, Virginia, designed and built the spacecraft. The German Aerospace Center, the Max Planck Institute for Solar System Research, the Italian Space Agency and the Italian National Astrophysical Institute are all international partners on the mission team. For more information, please visit:

<http://www.nasa.gov/dawn>



Student Team Invited to Showcase NDX Space Suit at International Conference in Europe

The University of North Dakota has made big waves globally with its planetary exploration system, dubbed NDX. With funding sources that include the National Aeronautics and Space Administration (NASA) and the North Dakota Space Grant Consortium, the NDX system includes a space suit and wheeled rover. The NDX-2 suit will be connected to the rover by means of a suit port or suit lock assembly.

This year, NDX broke new ground in the attention department with an invitation to be part of the “Building Technological Habitats” exhibit at the Institute of Modern Art in Valencia (IVAM), Spain. The May-June exhibit featured far-out technology and designs including FoxLin, Foster and Partners, Gehry Technologies, Hoberman, several groups from NASA—and UND’s own NDX.

The NDX suit, together with the Portable Life Support System (PLSS) assembly and hatches, are all designed to function cooperatively for relatively rapid coupling and uncoupling of the sealed suit and sealed vehicle. It also works for the coup-

ling and uncoupling of the PLSS assembly and the suit. Lastly, it’s designed to facilitate the transfer of the PLSS assembly and the wearer through the hatch at the appropriate phases of operation.

NDX—designed and mostly student-built in the UND Department of Space Studies—is the brainchild of UND senior research associate Pablo de Leon. De Leon, an Argentine aerospace engineer, is the principal investigator for the space suit project and director of the Human Spaceflight Laboratory at the Odegard School.

Useful links:

UND Department of Space Studies: <http://www.space.edu/>

UND NDX planetary exploration system: <http://spacesuitlab.blogspot.com/>

UND NDX2: <http://human.space.edu/projects/NDX-2.htm>

Instituto Valenciano de Arte Moderno IVAM: <http://www.ivam.es/>

UND Space Studies Observatory Banquet and Fund-Raiser

University of North Dakota faculty, staff, students and the Greater Grand Forks community participated in the inaugural UND Observatory Banquet and Fund-Raiser on Monday, April 23, at the Hilton Garden Inn in Grand Forks.

The banquet featured keynote speaker Paul Abell, a UND Space Studies alumnus, now with the NASA Johnson Space Center, as well as local speakers. Abell’s presentation was titled “Near-Earth Objects: Targets for Future Human Exploration, Solar System Science, Resource Utilization, and Planetary Defense.”

The fund-raising event provided a social hour, a buffet dinner and a silent auction of space/technology items and space art, to support the development of astronomy research and education at UND.

The event raised \$2,400 that will be dedicated to the development and maintenance of the UND Observatory, according to Paul Hardersen, a faculty member and researcher in the Department of Space Studies.

About the UND Observatory:

As the leader in astronomy research and education in North Dakota, the UND Observatory is leading the way to building a dynamic and growing astronomy infrastructure in North Dakota.

The UND Observatory is the only active astronomical observatory in North Dakota and offers diverse observing opportunities with multiple internet-controllable telescopes. The mission of the UND Observatory is to increase and expand the astronomical research and education infrastructure in North Dakota.

For more info about the UND Observatory, visit: <http://observatory.space.edu/>

TOP: Carol Stoker, Senior Scientist with NASA Ames, gives instructions to Chris Haberle (NASA Ames) who is using the NDX-1 space suit, while Tim Holland (UND Space Studies) and Noah Warnke (Cornell) assist.

BOTTOM: NASA, MDRS and UND Space Studies crew with the NDX-1 space suit

Photo Credit: Jackie Lorentz



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UND Flying Team
washing up
(c. 1965)