John D. Odegard School of Aerospace Sciences

Paul Lindseth, Dean

Mission and History

The mission of the John D. Odegard School of Aerospace Sciences is to preserve, create, and disseminate knowledge and to demonstrate the principled use of knowledge for and about aviation, atmospheric sciences, space studies, earth system science and policy, and computer science. In consort with other units of the University of North Dakota, it is committed to providing a comprehensive, high quality, relevant education for students preparing for careers in these fields.

Always at the forefront of technology, the School has earned national and international acclaim for its achievements in collegiate education, particularly in aviation. The School has received a steady stream of multi-million dollar research contracts and attracts students from every state and more than 50 foreign countries.

The aviation program was founded in 1968 as an academic department within the College of Business and Public Administration. It offered the nation's first four-year degree that combined an undergraduate business degree with an in-depth aviation education and professional flight training. Since then, new degree options and research programs have emerged at a rapid pace. In 1982, the Department of Aviation became the Center for Aerospace Sciences, now a degree-granting college within the University.

In 1992, the Center's aviation degree programs became the first nationally accredited program recognized by the Council on Aviation Accreditation. In 1998, the Center was renamed the John D. Odegard School of Aerospace Sciences, in honor of its founder and first Dean, John D. Odegard.

Scope

The college is comprised of five academic departments and four major research and support organizations. The **Department of Aviation** offers undergraduate and graduate degrees in aerospace fields including flight, air traffic control, aviation business and management, unmanned aircraft systems, and aviation education, as well as a master's degree in aviation and a doctoral degree in aerospace sciences. With its roots in research, the **Department of Atmospheric Sciences** undergraduate, masters and doctoral programs offer students unique opportunities to participate in funded research and operational forecasting enterprises, including airborne measurements, numerical modeling, remote sensing and surface transportation meteorology, to name a few. The graduate program within the **Department of Space Studies** offers an interdisciplinary approach to space exploration, research, and development. A master's degree and undergraduate minor in space studies are available through the Department, along with a doctoral degree in aerospace sciences. The Department uses extra-terrestrial resources in its study of the broad area of activities beyond earth's atmosphere. In addition to presenting the current and future technology needs, the program examines the social, political, economic, and legal issues of this new human experience. Computers are transforming almost every industry, especially the aerospace industry. To meet this challenge, the **Department of Computer Science** became a part of the School in 1982 offering undergraduate and graduate degrees. The doctoral degree is an interdisciplinary program and provides instruction in scientific computing that emphasizes the development of software, the science, and the technology required to support computational science. The newest academic department of the college, **Earth System Science and Policy**, provides an integrated and creative learning environment, fostering intellectual growth, critical thinking and practical engagement in research and management of the Earth system and resources. ESSP is at the intersection between science and human needs, i.e., Sustainability Science. Two masters degrees and one doctoral program are offered through the department. With the establishment of a joint Doctor of Philosophy degree in Aerospace Sciences between the Department of Aviation and the Department of Space Studies, the John D. Odegard School of Aerospace Sciences now has a doctoral program in each of its departments which fosters a strong research environment for all of its students and faculty.

To facilitate its unique mix of activities, the School has formed four major support organizations. **The Scientific Computing Center** supports the high performance computing needs of the college for research, academic, and administrative functions. The college's **Regional Weather Information Center** houses high performance computing systems and weather data acquisition and processing systems to support atmospheric research. The School for Aerospace Sciences is the home of a unique multimedia production facility called the **AeroSpace Network**. It supports distance learning activities via satellite and internet, develops state-of-the art multimedia classroom presentation tools for faculty, and develops computer-based instructional materials to aid student learning. **UND Flight Operations**, located at the Grand Forks International Airport, supports the flight training component of the School's aviation programs operating a fleet of more than 140 aircraft and simulators.

Facilities

The state-of-the-art aerospace facilities, built largely with grants from the Federal Aviation Administration, are located on the western edge of campus. The five-building complex houses some of the finest classrooms and specialized laboratories available on any college campus today. Among its many features are advanced flight simulators, cockpit procedure trainers, a high altitude chamber for aerospace physiology training, a unique air traffic control simulation lab, polarimetric Doppler weather radar, the Science Operations Center that remotely operates the UND built remote sensing sensor while it is onboard the International Space Station, sophisticated computing labs, and the Arthur C. Anderson Atmospherium — a computerized planetarium and multi-media instructional theater.

The School's computer facilities have developed into one of the most advanced technical and scientific computer systems in the nation. It has achieved a national reputation for the processing and analysis of digital radar data and cloud physics data collected during research flights. Fully integrated systems with advanced networking provide a wide range of computer support activities for academic, research, government, and industry programs. The facilities are linked by fiber optics to 20,000 square feet of space dedicated to computer studies.

The School operates two atmospheric science field research installations. The Road Weather Field Research Facility, along Interstate 29 south of Grand Forks, is the nation's only dedicated test bed for monitoring the interaction of pavement surfaces with varying weather conditions to support investigation of new concepts in transportation safety. The Glacial Ridge Atmospheric Observatory is an atmospheric and hydrologic research facility. The long-term goal of the facility is to deploy a highly instrumented monitoring network to better observe and understand atmospheric and hydrologic processes. The School also operates a Cessna Citation II jet for the purpose of atmospheric research.

The School operates a modern flight training facility with a fleet of more than 140 aircraft and simulators including reciprocating and turbine powered airplanes and helicopters. A Canadair Regional Jet (CRJ) ASCENT Full Flight Trainer is also available for those students taking upper division flight courses. Aviation students fly tens of thousands of flight hours each year as an integrated part of their undergraduate aviation degrees. A five-story office building with deli/cafeteria and seven hangars are among the expansive airport facilities. A high-speed fiber optic link provides access to the School's digital computer systems for dispatching, billing, student records, and weather data. A shuttle bus is available to transport students to and from the campus and flight operations.

The School manages the UND Observatory complex, which is located 10 miles west of Grand Forks and 2 miles southeast of Emerado. The observatory currently includes three remotely-controllable optical telescopes (two 16-inch and one 10-inch aperture, respectively). UND Observatory telescopes support student thesis and non-thesis astrometric, broadband photometric, solar chromospheric imaging, and stellar spectrographic research. The site also includes secure, wireless Internet access and an EarthCam, which is used to monitor observatory activities remotely.

Sophisticated geospatial laboratories are situated within the Space Studies and Earth System Science and Policy departments for carrying out land remote sensing and global change research. The laboratories contain extensive data archives from several satellite and aerial platforms.

A biochemistry laboratory located within the Earth System Science and Policy Department houses equipment such as a gas chromatograph, a fluometer, stereo microscope or Leica DM R HCS microscope system, etc. to undertake studies on geochemical cycles and their relationship with global change and ecosystem processes.

Degrees and Requirements for Graduation

The **Department of Atmospheric Sciences,** through the John D. Odegard School of Aerospace Sciences, offers the degrees of Bachelor of Science, Master of Science, and Doctor of Philosophy in Atmospheric Sciences. The B.S. degree is conferred upon a student who successfully fulfills the graduation requirements. A student must:

1. Complete the University's Essential Studies requirements.
2. Earn minimum cumulative and institutional Grade Point Averages of 2.50. (Note: transfer students must not only earn a minimum cumulative GPA of 2.50, but must also earn a minimum institutional GPA of 2.50 for studies completed at the University of North Dakota).
3. Complete the curriculum for the major as outlined in the departmental listings; and
4. Make formal application to the Registrar for the degree sought within four weeks of the beginning of the semester in which the student expects to graduate.

In addition, a student may earn a minor in Atmospheric Sciences. The curriculum for both the major and minor is outlined under the specific departmental listing.

The graduation requirements for the Master of Science and Doctor of Philosophy degrees are outlined in the graduate section of the catalog.

The Department of Aviation, through the John D. Odegard School of Aerospace Sciences, offers the degree of Bachelor of Science in Aeronautics and a Masters degree in Aviation. A Ph.D. in Aerospace Sciences is also offered jointly with the Department of Space Studies. The graduate programs are available online as well as on campus. The B.S. degree is conferred upon a student who successfully fulfills the graduation requirements. A student must:

1. Complete the University's Essential Studies requirements.
2. Earn minimum cumulative and institutional Grade Point Averages of 2.50. (Note: transfer students must not only earn a minimum cumulative GPA of 2.50, but must also earn a minimum institutional GPA of 2.50 for studies completed at the University of North Dakota).
3. Complete all required aviation courses with a grade no lower than a "C."
4. Complete the curriculum for the major as outlined in the departmental listings, and
5. Make formal application to the Registrar for the degree sought within four weeks of the beginning of the semester in which the student expects to graduate.

In addition, the Department of Aviation, in conjunction with the College of Business and Public Administration, offers the degree of Bachelor of Business Administration with majors in Aviation Management or Airport Management. Non-aviation degree seeking students may also earn minors in Aviation Management and Professional Flight. The curriculum for each of these programs is outlined under the specific departmental listings.

The graduation requirements for the Master of Science and Ph.D. degrees are outlined in the graduate section of the catalog.

The Department of Computer Science, through the John D. Odegard School of Aerospace Sciences, offers the degrees of Bachelor of Science, Bachelor of Arts, Master of Science in computer science, and Doctor of Philosophy in scientific computing. The B.S. degree is conferred upon a student who successfully fulfills the graduation requirements. A student must:

1. Complete the University's Essential Studies requirements.
2. Earn minimum cumulative and institutional Grade Point Averages of 2.00. (Note: computer science majors must earn a minimum cumulative GPA of 2.20 in all computer science courses).
3. Complete the curriculum for the major as outlined in the departmental listings, and
4. Make formal application to the Registrar for the degree sought within four weeks of the beginning of the semester in which the student expects to graduate.

In addition, the Department of Computer Sciences, in conjunction with the College of Arts and Sciences, awards the degree of Bachelor of Arts with a major in Computer Science. Students may also earn a minor in Computer Science. The curriculum for each of these programs is outlined under the specific departmental listings. The graduation requirements for the Master of Science and Doctor of Philosophy degrees are outlined in the graduate section of the catalog.

The **Department of Space Studies,** through the John D. Odegard School of Aerospace Sciences, offers an undergraduate minor in Space Studies and a Master of Science degree in Space Studies. A Ph.D. in Aerospace Sciences is also offered jointly with the Department of Aviation. The graduate programs are available online as well as on campus. The undergraduate minor introduces students to the variety of space related projects and issues that will affect their careers and lifestyles in the coming decades. It is rare to find courses at the undergraduate level dealing with such topics as space mission design, life support systems, space commercialization, and space law. The curriculum for this program is outlined under the specific departmental listing. The graduation requirements for the Master of Science and Ph.D. degrees are outlined in the graduate section of the catalog.

The **Department of Earth System Science and Policy,** through the John D. Odegard School of Aerospace Sciences, offers the degrees of Master of Environmental Management, Master of Science, and Doctor of Philosophy in the field of Earth System Science and Environmental Sustainability. The graduation requirements for the Master of Environmental Management, the Master of Science, and the Doctor of Philosophy degrees are outlined in the graduate section of the catalog.

Other Programs

Cooperative Education and Internships. The School encourages its students to gain practical on-the-job experience in their chosen field prior to graduation. Cooperative Education and Internship experiences allow students to secure salaried, career-related work experiences under the supervision of both a sponsoring employer and the appropriate academic department, while at the same time receiving academic credit.

Weather Modification Pilot Training. This one-of-a-kind cooperative education is offered in conjunction with the North Dakota Atmospheric Resource Board. Classes are offered in ground and air cloud seeding technology taught by nationally respected cloud physicists and meteorologists. Students selected to participate as weather modification pilots for the program must have a Commercial Pilot Certificate with instrument and multi-engine ratings.

Scholarships. An extensive scholarship program is available to recognize and reward high achievers in aviation, atmospheric science, and computer science. These scholarships are donated by numerous private individuals and companies who support the School's tradition of excellence.

Youth Programs. The Aerospace Camp offers a seven-day summer program to introduce the excitement and challenge of aerospace to 16 and 17 year old prospective aviators.

Student Organizations

Airline Pilots Association Aviation Collegiate Experience Club (ACE). ALPA ACE offers the opportunity for students to engage in aviation issues and meet professionals from the industry. The club aims to educate students using real life scenarios and to have speakers introduce and discuss topics valuable to future pilots.

Alpha Eta Rho (AHP). The Delta Chapter of Alpha Eta Rho, an international aviation fraternity, stresses closer ties between students and the industry through education. The group annually sponsors Parents' Day, an opportunity for parents to experience the excitement of aviation education.

American Association of Airport Executives (AAAE). Specifically geared towards students majoring in or interested in a career in airport management, this student chapter of AAAE promotes professional development and instills

professional attitudes in students who are studying aviation industry related developments, administration, and operations.

American Meteorological Society. The North Dakota chapter of the American Meteorological Society seeks to promote advancement and understanding of meteorology. The organization help students build valuable network ties and gives them an opportunity to learn more about the careers offered in Atmospheric Sciences.

Association for Computing Machinery Computer Club. The AMC Computer Club is a student club for computer science majors. It offers help sessions and allows members to visit and tour companies in the industry.

Association for Computing Machinery - Women in Computing Computer Club. The AMC Computer Club - WIC - is a student club for computer majors. It offers help sessions and allows members to visit and tour companies in the industry.

Atmospheric Science Graduate Student Association (ASGSA). The purpose of the organization is to provide atmospheric science graduate student feedback to the department atmospheric science graduate committee, unite graduate students throughout the department through organized sponsored events and activities, and provide opportunities for professional growth. Those eligible to join ASGSA is anyone who is a student at the University of North Dakota taking graduate level classes in the atmospheric science department or has an assistantship through the atmospheric science department, e.g., GRA, GTA, or GSA, and has paid the required dues. They meet about three times a semester.

Aviation Safety Association (ASA). ASA examines safety and professionalism issues in the aviation industry. The organization brings students together with professionals in the aviation industry for candid discussions on aviation and related matters to become further educated about the concerns in the professional community. ASA is open to students of all disciplines.

Dakota Space Society (DSS). The Dakota Space Society is a student organization which was established to educate and enlighten members and non-members about the benefits of space. DSS focuses on promoting space and establishing a relationship with the community of Grand Forks. DSS is open to all students from any field of study in both the undergraduate and graduate areas.

Experimental Aircraft Association (EAA). The purpose of this UND student chapter of the Experimental Aircraft Association is to bring together students and members of the community who are interested in recreational aviation, fly-ins, Oshkosh Air Show attendance, building airplanes, the EAA Young Eagles Program, and having fun with flying.

Flying Team. The UND Flying Team has won the National Championship title of the National Intercollegiate Flying Association (NIFA) numerous times. Students compete in regional and national events oriented toward increasing aviation safety, piloting skill, and aeronautical knowledge.

International Pilots Association (IPA). The purpose of IPA is to ease the transition of international students into the U.S. aviation community. While providing a network of contacts and moral support, the association actively collects facts regarding immigration and visa issues, as well as information on both U.S. and international internships and sponsorships.

Pilots for Kids. Pilots for Kids is an international organization founded in 1983 by airline crew members. Focusing on the needs of hospitalized children around December, they also go around and help underprivileged children in need. UND's Pilots for Kids is the only one in North Dakota. They are a charitable organization with the ability to give tax deductions for people who donate. One hundred percent of the money goes directly to those in need.

Student Air Traffic Control Association (SATCA). Students interested in Air Traffic Control get involved with this organization to have a voice in the policies and procedures affecting their program and to provide a forum for hiring information and job opportunities. In addition, the group seeks to further aviation safety, awareness, and education through air traffic control forums and meetings.

Student Aviation Advisory Council (SAAC). The nine-members of the Student Aviation Advisory Council are elected by their peers to collectively act as a liaison between students, aviation faculty, and administration. The council is a key player in the implementation of new student-oriented programs.

Student Aviation Management Association (SAMA). This student aviation organization promotes professionalism in the aviation industry at the college level, and is open to students from all of the aviation related majors. The group sponsors an annual conference featuring speakers from across the nation as well as aviation alumni. Trips to major aviation destinations are planned each year.

UND Aerospace R/C. This student-run organization is dedicated to the advancement of the arts, sciences, and technology of aviation and aerospace. The group stresses increased cooperative interdisciplinary opportunities for students in all disciplines, and is actively involved in radio-controlled aircraft design, construction, and development.

UND Aerobatic Team. The UND Aerobatic Team competes within the Collegiate Aerobatic Program of the International Aerobatic Club (IAC). Potential competitors must complete the Introduction to Aerobatics flight course or have equivalent experience prior to competing at their first aerobatic contest. The team members practice on both an individual and team basis with a UND Flight Instructor acting as a Safety Pilot. Once the team attends three competitions throughout the Midwest during each season, the scores are compared against other universities throughout the country.

UND Helicopter Association (UNDHA). UNDHA was established to promote helicopter aviation at UND to all who are interested. Through alumni and industry contacts, they give helicopter students and enthusiasts opportunities to further explore the rotor wing community. Students who wish to broaden their connections will be given opportunities nationwide to meet representatives from the industry's leading names.

Upsilon Pi Epsilon Honor Society. The student group is the National Computer Science honorary organization. The mission of UPE is to recognize academic excellence at both the undergraduate and graduate levels in the Computing and Information Disciplines. Members must be junior or senior Computer Science majors. Selection is based on high scholastic achievement and is by invitation only.

Wilderness Pilots Association (WPA). WPA was organized for aviation students who have a love of the outdoors, and for those who seek the challenge of conventional (tailwheel) airplanes, seaplanes, and skiplanes. The group promotes air safety as it relates to flying into remote areas.

Women in Aviation, International (WAI). This student organization was developed to encourage women who are seeking careers in aviation, however, all students are encouraged to participate. The group provides opportunities for women students to learn more about their chosen profession and to participate in a variety of aviation-related activities.

Service

Service to the University, the community and the aerospace industry is a vital part of the School of Aerospace Science's mission. This commitment is typified by such activities as hosting discipline specific workshops, seminars, and conferences.