UND AEROSPACE
UNIVERSITY OF NORTH DAKOTA

GRADUATE PROGRAMS
ATMOSPHERIC SCIENCES

TO OUR
PROSPECTIVE STUDENTS

Exciting opportunities are awaiting you in the Department of Atmospheric Sciences in the John D. Odegard School of Aerospace Sciences at the University of North Dakota.

Our department has a number of facilities described in this booklet and we closely collaborate with various research, public, and private partners to give you the experiences to excel in careers ranging from operational forecasting to scientific research. Our research portfolio is diverse with current faculty conducting observation and model based studies across a large variety of fields. Current projects leverage connections with groups such as the National Weather Service office in Grand Forks, ND, Weather Modification Inc. in Fargo, ND, and the Unmanned Aircraft Systems (UAS) Center of Excellence. The department is currently involved in ongoing research contracts totaling over $5 million.

We would like to offer you an opportunity to apply for graduate education in our nationally recognized research program. Our stipends and tuition waivers are nationally competitive. Graduate student housing is available, ranging from residence halls to two-bedroom apartments, making the University of North Dakota even more attractive.

Welcome to UND Atmospheric Sciences.

Dr. Aaron Kennedy
Graduate Program Director & Associate Professor
701.777.5269 | atscgrad@aero.und.edu

ATMOSPHERIC SCIENCES
GRADUATE PROGRAMS

MASTER OF SCIENCE (M.S.)

Our planet is reaching a crossroads of society and the environment. Join the next generation of atmospheric experts and help mankind navigate increasingly complex interactions.

Today's tumultuous, often life-threatening atmospheric changes requires a high level of expertise to help society navigate and cope in constructive ways. This program offers the experience to fill critical roles in research and helping society adapt. With this knowledge, you can help increase our understanding of the atmosphere, protect health and property in communities, and create opportunities in private industry.

With this UND graduate program, you'll have opportunities to:

- work with faculty who are conducting cutting edge research with agencies such as NASA, NSF, and the Naval Research Laboratory

- gain a solid understanding of evolving nature and the atmospheric forces all around us

- prepare to work in a wide variety of agencies, laboratories, businesses and educational institutions

ATMOSPHERIC SCIENCES PH.D.

Gain deep expertise in atmospheric sciences and lead the way in tackling the challenges of understanding and predicting our atmosphere.

Advance your education and talent to the highest level. Our comprehensive curriculum will prepare you for a leadership role in research, private industry or teaching in a university setting.

This UND Ph.D. program offers an advanced study in atmospheric sciences with opportunities to:

- be a part of significant research and discovery of new knowledge in the atmospheric sciences that can impact the world

- contribute to atmospheric studies conducted in a wide array of vital areas, such as:

  - cloud and climate change

  - satellite remote sensing of the atmosphere

  - radar meteorology

  - data assimilation

  - mesoscale modeling

WHAT WE OFFER

Our facilities are housed in Clifford Hall, part of the complex of buildings comprising the Odegard School of Aerospace Sciences on the west end of the University of North Dakota campus.

We have a number of research facilities, including a 5 cm wavelength polarimetric Doppler weather radar, a student computing cluster, two instrumented ground sites, and the Atmospheric Chemistry and Instrumentation Laboratory. Additionally, airborne research is also conducted utilizing UND instruments and a Cessna Citation research jet through an agreement with a private company.

Photo by Patrick C. Miller/UND Today.

ATMOSPHERIC OBSERVATORIES

The Department of Atmospheric Sciences has established multiple long-term atmospheric and hydrologic research facilities in the Northern Plains to provide high temporal and spatial observations to yield insight on atmospheric and hydrologic processes in the region.

Oakville Prairie Observatory

The Oakville Prairie Observatory resides within the biology field station operated by the UND Dept. of Biology. Located about 20 km (20 miles) west of Grand Forks, the site is located within open grassland typical of the region prior to agriculturalization. Oakville Prairie hosts the AERONET instrument and also features a 10m North Dakota Agricultural Weather Network (NDAWN, ndawn.org) meteorological tower. Besides standard instrumentation, the site serves as a testbed for winter weather and precipitation research and hosts instruments such as a laser disdrometer, visibility/present weather sensor, and acoustic blowing snow flux sensor.

Current observations are available at: emerado.ndawn.org.

(AERONET) AEROSOL ROBOTIC NETWORK

The first AErosol RObotic NETwork (AERONET) station in North Dakota was brought on line by Dr. Jianglong Zhang's research group at the UND Department of Atmospheric Sciences.

Coordinated by the NASA Goddard Space Flight Center, AERONET is a worldwide sun-photometer network that provides measurements of aerosol properties for climate and air quality related applications. The UND AERONET station is located at the UND observatory site west of Grand Forks and is used to study local aerosol phenomena as well as long range aerosol plume transports. The UND AERONET site is jointly supported by the office of the Dean of Aerospace Sciences, the Department of Atmospheric Sciences, and the Office of Naval Research.

Learn more
tinyurl.com/NDAERONET

SKYCAMS

High-definition cameras mounted on top of Clifford Hall (facing east and west) stream 24/7 on Youtube.

Funded by a number of generous donors during UND Alumni Association Crowdfunding campaigns, high-definition cameras are installed on top of Clifford Hall. Facing both east and west, they look across the UND campus (east) and Ryan and Robin Halls (west). The astute observer can even see the hustle and bustle of air traffic in and out of the Grand Forks Airport!

The cameras have witnessed a number of interesting weather phenomena including:

- gravity waves
- light pillars
- blowing snow
- severe thunderstorms
- sun dogs

Watch on YouTube
youtube.com/UNDAtmosphericSciences
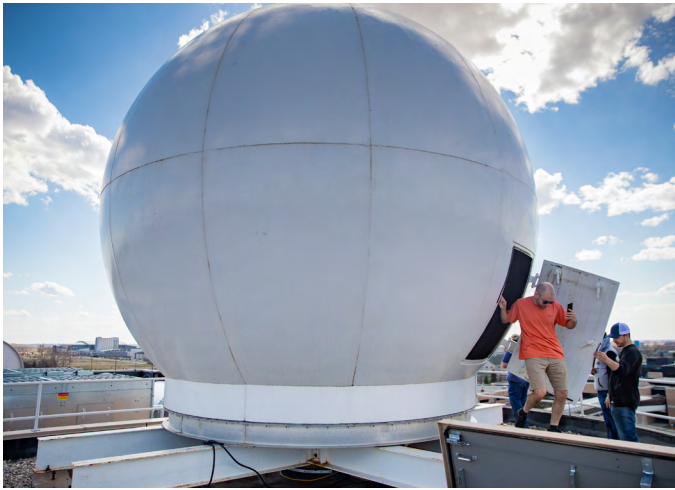
NORTHPOL WEATHER RADAR

The University of North Dakota owns and operates a 5-cm wavelength, C-Band weather radar in support of our research and education programs.

The radar — originally acquired in 1974 through funding from the National Science Foundation — has seen several updates throughout the years. Most recently, the radar was upgraded to a dual-polarization system with an antenna mounted receiver, capable of simultaneous transmission of horizontal and vertical polarizations.

NorthPol has been utilized in several research campaigns including examination of wind shear and microbursts near airports (which lead to the Terminal Doppler Weather Radar Program), Project Skywater, The Cooperative Convection Precipitation Experiment, North Dakota Tracer Experiment, and BLOWN-UNDER.

RESEARCH AIRCRAFT CESSNA CITATION II

The University of North Dakota, under an agreement with a private company, has owned and operated a Cessna Citation II aircraft for the purpose of atmospheric research since 1981.

The Citation II is a twin engine fanjet with an operating ceiling of 43,000 feet, cruise speeds of 140 to 340 knots and a climb rate of 3,300 feet per minute. These high performance capabilities are accompanied by relatively low fuel consumption at all altitudes, giving the Citation an onstation time of up to 4 hours or more, depending on mission type. The Citation is certified for flight into known icing conditions.

The Citation has been flown in major research programs in the study of a variety of atmospheric phenomena, including thunderstorm dynamics, aircraft icing, turbulence, cloud physics, low-level windshear, atmospheric chemistry, climate change, cirrus and atmospheric electric fields.

AREAS OF RESEARCH

- atmospheric aerosols
- atmospheric radiation
- aviation meteorology
- climate change
- cloud physics
- convective transport
- data assimilation
- dynamic meteorology
- mesoscale meteorology
- numerical weather prediction
- objective analysis
- storm dynamics
- radiative transfer
- radar meteorology
- regional climate change
- satellite precipitation studies
- severe convective weather
- weather modification
- winter weather

BY THE
NUMBERS

Atmospheric Sciences

14

faculty members

$5M

in active research grants

2

Skycams

90%+

placement rate

$99K

median salary for an atmospheric scientist

ATMOSPHERIC SCIENCES
GRADUATE FACULTY

DR. MATTHEW GILMORE

Interim Chair | Associate Professor

Ph.D., 2000, Atmospheric Sciences, Texas A&M University

Research Interests: Cloud Physics, Cloud Microphysics Parameterization, Cloud-Scale Modeling, Lightning, Radar Meteorology, Severe and Hazardous Weather, Supercell and Tornado Dynamics, Intercomparison Techniques between Observations and Models.

matthew.gilmore@UND.edu

DR. AARON KENNEDY

Graduate Program Director | Associate Professor

Ph.D., 2011, Atmospheric Sciences, University of North Dakota

Research Interests: Mesoscale meteorology and modeling, Winter weather and convective storms, In situ observations, Remote sensing, UAS.

aaron.kennedy@UND.edu

DR. JARED MARQUIS

Interim Graduate Program Director | Assistant Professor

Ph.D., 2021, Atmospheric Sciences, University of North Dakota

Research Interests: Data assimilation, remote sensing, radiation, agricultural weather.

jared.marquis@UND.edu

DR. JAKE CARSTENS

Assistant Professor

Ph.D., 2022, Meteorology, Florida State University

Research Interests: Hurricanes, tropical convection, climate modeling, broadcast and digital meteorology.

jacob.carstens@UND.edu

DR. JORDAN CHRISTIAN

Assistant Professor

Ph.D., 2020, Meteorology, University of Oklahoma

Research Interests: Subseasonal-to-seasonal weather and climate extremes, utilizing a combination of reanalysis data, satellite observations, and climate models.

jordan.i.christian@UND.edu

DR. MOUNIR CHRIT

Research Assistant Professor

Ph.D., 2018, Atmospheric Sciences, École des Ponts ParisTech, France

Research Interests: Trustworthy artificial intelligence, Mesoscale and microscale weather forecasting, environmental solutions for advanced air mobility, guidance to regulations on UAS integration, data assimilation, tropospheric chemistry and aerosol modeling.

mounir.chrit@UND.edu

DR. DAVID DELENE

Research Professor

Ph.D., 1998, Atmospheric Sciences, University of Wyoming

Research Interests: Air pollution, Atmospheric aerosols, Climate Change, Cloud Physics, Satellite remote sensing of aerosols and clouds, Weather modification.

david.delene@UND.edu

DR. CATHERINE FINLEY

Associate Professor

Ph.D., 1998, Atmospheric Science, Colorado State University

**Research Interests:** Severe storms, tornadoes, wind energy.

catherine.finley@UND.edu

DR. MARWA MAJDI

Research Assistant Professor

Ph.D., 2018, Atmospheric Sciences, École des Ponts ParisTech, France

Research Interests: Fog & Cloud Microphysics, Atmospheric Aerosols, Aerosol Chemistry and Mixing State Weather, Forecasting, Weather for Uncrewed Aircraft Systems, Machine Learning for Weather Prediction.

marwa.majdi@UND.edu
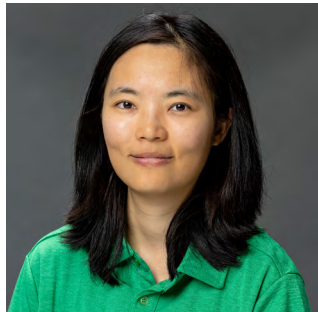
DR. DAILE ZHANG

Assistant Professor

Ph.D., 2019, Atmospheric Sciences, University of Arizona - Tucson

Research Interests: Atmospheric Electricity, Upper Troposphere and Lower Stratosphere, Remote Sensing, Atmospheric Instrumentation, Severe Storms, Cloud Physics, Natural Hazards and Safety.

daile.zhang@UND.edu

DR. JIANGLONG ZHANG

Professor

Ph.D., 2004, Atmospheric Science, University of Alabama in Huntsville

Research Interests: Aerosols and clouds, radiation and remote sensing, data assimilation, climate and agriculture.

jianglong.zhang@UND.edu

ADMISSION DEADLINES

Fall: February 1st

Spring: August 1st

CONNECT WITH US
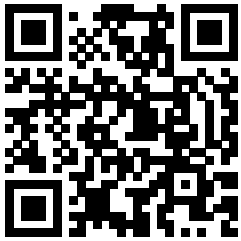
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f AtSc Atmospheric Sciences Alumni

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aero.UND.edu/atmos

Schedule Your Visit

See UND Aerospace up close and ask all the questions you want! An in-person visit is a great way to see what awaits you at UND.

UND.edu/admissions/visit

Apply today!

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