UND AEROSPACE
UNIVERSITY OF NORTH DAKOTA

GRADUATE PROGRAMS

SPACE STUDIES

TO OUR PROSPECTIVE STUDENTS

As the first program of its kind in the world, the UND Master of Science degree in Space Studies is a unique and valuable educational experience, both for those seeking to enter this exciting field and for the aerospace professionals who wish to expand their breadth of knowledge.

The program features internationally and nationally recognized faculty with degrees in planetary science, engineering, history, policy and law. The eight full-time Ph.D.-level faculty have over 160 years of combined teaching and active research experience. Space Studies also includes Adjunct Professors, experts in their own fields drawn from across the country, who contribute to teaching specialized topics.

We have nurtured success for over 30 years, as indicated by the JSC Certificate of Appreciation for 25 years of outstanding leadership in university education in space studies, presented by NASA Johnson Space Center. Faculty and students produce publications in their diverse fields of expertise and maintain an outstanding record of service to the space community and the nation. Space Studies is home to the only analogue planetary surface habitat in the United States, and has a fully-operational, multi-instrument observatory conducting a wide variety of astronomical research. Our graduates have found professional success throughout the space industry, to include NASA and other federal agencies, academia, science museums, planetariums, and aerospace companies, both large and small.

Welcome to UND Space Studies.

Pablo de León
Department Chair, Space Studies

SPACE STUDIES
GRADUATE PROGRAMS

First and global leader in interdisciplinary graduate studies

Master of Science (M.S.)

The Department of Space Studies was the first to offer a multi-disciplinary space education at the graduate level. The M.S. program combines planetary science, space engineering, and life support systems as well as space-related aspects of policy and law, history, business, and management. Students are required to take courses across this wide range of disciplines to meet the breadth of knowledge required for leadership positions in the space industry.

- Online/Campus Programs
- Thesis/Non-thesis Options

Admission Requirements:

- 3.0 Bachelor's GPA
- Transcripts
- Statement of Purpose
- Letters of Recommendation
- Pre-Requisite Coursework
- ESL applicants must submit English Proficiency scores

Doctor of Philosophy (PH.D.)

The Departments of Aviation and Space Studies jointly offer a Ph.D. in Aerospace Sciences. The mission of the Aerospace Sciences Ph.D. program is to provide interdisciplinary teaching and research at the highest academic level. The program's goal is to provide highly educated scholars and leaders with the skills necessary to mix technology and science with an understanding of the politics and economics of the aerospace fields. The program is taught in a synchronous online learning environment. The program accepts students every fall with an application deadline of February 1st.

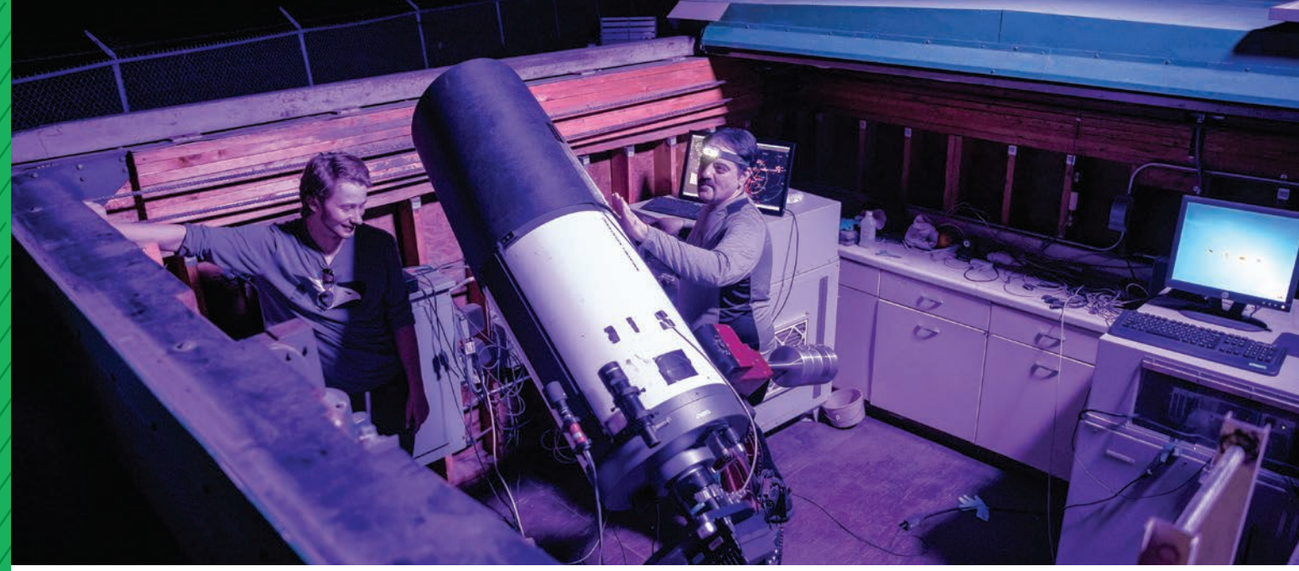
Admission Requirements:

- 3.25/4.00 Masters GPA and GRE score
- GRE scores
- Transcripts
- ESL applicants must submit English Proficiency scores
- Professional Resume or Curriculum Vitae
- Statement of Purpose
- Letters of Recommendation
- Industry Experience Preferred

WHAT WE OFFER

Our facilities include lab space for the investigation of terrestrial rocks and meteorites, planetary reflectance spectral data, research into life support technologies and human factors in space, and an astronomical observatory.

The observatory currently includes three remotely-controllable optical telescopes (two 16-inch and one 10-inch aperture) which can acquire astrometric, photometric, and spectroscopic data for planetary and stellar sources. Space Studies is also home to the Human Spaceflight Laboratory focused on spacesuit design and construction, the Spacecraft Simulator Facility that features both a vertical and a horizontal space simulator, the Integrated Lunar/Martian Analog Habitat (ILMAH), and a new Space Propulsion Lab.



Observatory

The UND Space Studies Observatory, under the direction of Dr. Sherry Fieber-Beyer, offers diverse observing-based research opportunities in the fields of planetary science and astrophysics.

Current and expanding astronomy research efforts in North Dakota include asteroid near-infrared (NIR) spectroscopic research, broadband asteroid and variable star photometry, asteroid astrometry, visible wavelength stellar spectroscopy, exoplanet transits, and astrophotography.

Through partnership with the North Dakota Space Grant Consortium (NDSGC) and the North Dakota NASA EPSCoR programs, the UND Space Studies Observatory promotes a primary Research Focus Area (RFA) in North Dakota, which is to increase and expand astronomical and planetary science research in the state.

Primary objectives include:

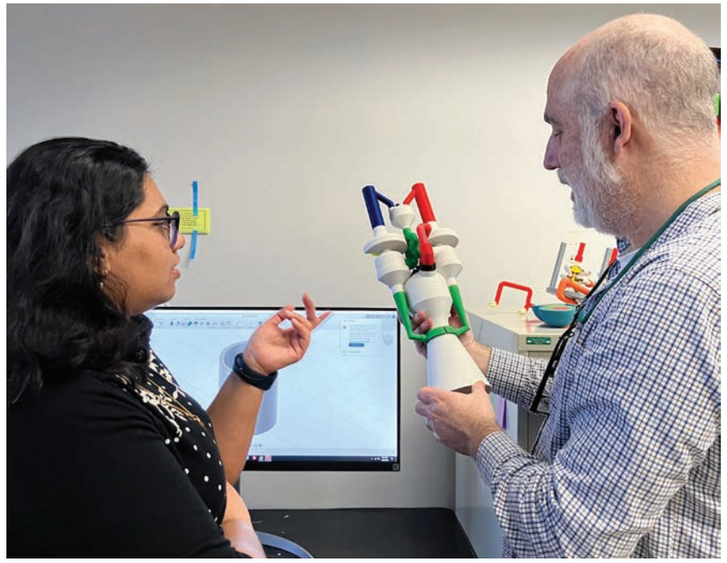
- Maintaining and operating a multi-telescope, multi-wavelength facility for the conduct of research and education projects
- Conducting complementary research projects that assist research programs at national observatories
- Offering research and educational opportunities for astrometry, photometry, spectroscopy, and astrophotography
- Promoting science, technology, engineering, and mathematics (STEM) education in North Dakota's colleges and K-12 schools

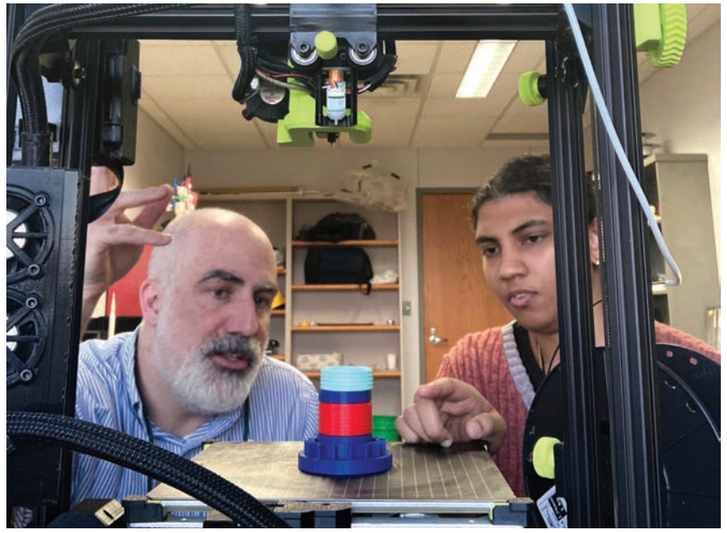
Human Spaceflight Laboratory

The Human Spaceflight Laboratory, under the leadership of Dr. Pablo de León, provides relevant, real-world experience in human spaceflight systems.

Students receive hands-on training through graduate/undergraduate research positions, NASA projects, and activities related to human spaceflight. The main focus of research is the design and production of space suits and planetary habitat prototypes. UND is the first university with a NASA-funded laboratory dedicated to designing and constructing space-exploration and planetary surface exploration suits. The first suit, the North Dakota Experimental-1 (NDX-1), was designed for use on the surface of Mars. The second suit, the North Dakota Experimental-2 (NDX-2) suit, was designed for testing in lunar simulations. Recent efforts also involve the design, construction, and testing of an Integrated Lunar/Mars Habitat concept demonstrator, the Integrated Lunar/Martian Analog Habitat (ILMAH), Pressurized Electric Rover (PER) and four dedicated science modules. The ILMAH is used to perform analog missions, routinely testing systems, experiments, and protocols that will be needed in the near future as NASA and commercial providers venture into deep space.

The Human Spaceflight Laboratory is funded through NASA to develop new manufacturing solutions for future space suits. Using 3D printing technologies we are designing and manufacturing prototypes for the space explorers of tomorrow.





Space Propulsion Lab

The Space Studies Propulsion Lab (SSPL) offers an exceptional opportunity to gain hands-on experience in propulsion technologies and hypersonic aerodynamics.

Students work on rocket propulsion experiments, actively participating in identifying research gaps, designing solutions for these gaps, and implementing them effectively. All problems are relevant to the current state of the space industry. Students pursue the highest quality standards, commensurate with real-world expectations, and use a variety of methods to anticipate the future of space propulsion in the industry.

Projects include:

- Development of a test stand for solid rocket motors
- Design of ablative plasma thrusters (electric propulsion)
- Investigation of machine learning (ML) techniques as they apply to nuclear space propulsion
- Research on hypersonic reentry vehicles

Integrated Lunar/Martian Analog Habitat (ILMAH)

The Integrated Lunar/Martian Analog Habitat (ILMAH) is a unique habitat simulating the challenges of planetary space exploration missions.

The Integrated Lunar/Martian Analog Habitat (ILMAH) provides an immersive and integrated environment combining use of the habitat, exploration rover, and EVA suits. This climate-controlled facility supports research activities into the physiological and psychological aspects of living and working in isolated and confined environments. ILMAH has been used by UND graduate students, NASA, private industries, and academic institutions.

BY THE NUMBERS

Space Studies

8
graduate faculty members

6
fields of space-related study

$3.5 million
dollars in NASA-funded research

800+
alumni in space fields

35
years supporting the space industry

Areas of Research

- Asteroids, and Early Solar System History
- Asteroids, Space Resources and Hazards
- Astronomy, Photometry & Visible Wavelength Spectroscopy
- Characterization of Near-Earth Asteroids
- Extravehicular Activity Systems
- Ground Station Development
- High Altitude Balloon Payload Development
- Human Centered Design
- Human Performance in Extreme Environments
- Human Space Flight
- Hypersonics Research
- International and Domestic Space Law
- Near-Earth Object Mission Design
- Near-IR Reflectance Spectroscopy of Main-Belt Asteroids
- Neutral Buoyancy Micro/Variable Gravity Simulation
- Orbital Mechanics
- Planetary Habitats
- Remote Sensing Law and Regulations
- Search for Meteorite Parent Bodies
- Small Spacecraft Development
- Space Agriculture
- Space History and Space Policy
- Space Nutrition
- Space Politics
- Space Propulsion Research
- Spacecraft Design
- Spacecraft Simulators
- Spacesuit Design

SPACE STUDIES
GRADUATE FACULTY

Department Chair | Professor | Human Spaceflight Laboratory Director

DR. PABLO DE LEÓN

Ph.D. 2013 History (of Science and Technology) University of San Andres, Buenos Aires, Argentina

RESEARCH INTERESTS:

Human Space Flight; Space Suit Design; Spacecraft Design; EVA Systems; History of the Space Age; Experimental Rocketry; History of Latin American Space programs; and Commercial Space Flight.

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Assistant Professor

DR. KEITH CRISMAN

Ph.D., 2020, Human Centered Design, Florida Institute of Technology

RESEARCH INTERESTS:

Human Centered Design, Microgravity Medical Systems and Procedures Architecture, Microgravity & Off-planet Habitation Simulation, Neutral Buoyancy Microgravity Analogs, Safety and Rescue Diving & Additive Manufacturing.

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Associate Professor | Director of Graduate Studies

MICHAEL DODGE, J.D., LL.M.

LLM. 2011, McGill University

RESEARCH INTERESTS:

International Space Law; United States Space Law; General International Law; Space Policy & History; Remote Sensing Law; International Aviation Law; and United States Aviation Law & Regulation.

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Associate Professor

DR. RONALD A. FEVIG

Ph.D. 2006, Planetary Sciences, University of Arizona

RESEARCH INTERESTS:

Small Spacecraft Development; Orbital Mechanics; NearEarth Object Mission Design; High-Altitude Balloon and Sounding Rocket Payload Development; Space Communications and Ground Station Operations; Asteroid and Comet Spectroscopy.

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Assistant Professor | Director of UND Observatory | Director of Undergraduate Studies

DR. SHERRY FIEBER-BEYER

Ph.D. 2010, Earth System Science and Policy, University of North Dakota

RESEARCH INTERESTS:

Photometry; VNIR spectroscopy; Asteroids; Comets; Meteorites; and Small-body mineralogy/petrology.

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Assistant Professor

FRANCISCO DEL CANTO VITERALE, PH.D.

Ph.D. 2014, International Studies, University of Deusto, Spain

RESEARCH INTERESTS:

Social Science and Space Studies; International Scientific Relations; International Space Relations, Geopolitics of Space, Space Diplomacy, Space Hubs, Space Policy, Global Space Economy, Comparative Politics, Critical Thinking, Systems Models, Interdisciplinary Approach, Social Science Methods.

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Assistant Professor

MARCOS FERNÁNDEZ-TOUS, PH.D.

Ph.D. 2022, Aerospace Sciences, University of North Dakota

RESEARCH INTERESTS:

Aerospace engineering: Rocket propulsion systems, Electric Propulsion, Hypersonic Aerodynamics, Aerospace Structures, Thermal Systems, Aerodynamic Reentry, Guidance and Control.

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Assistant Professor

DAVID KUGLER, PH.D.

Ph.D., 2015, Aerospace Sciences, University of North Dakota

RESEARCH INTERESTS:

Military Space Programs, Spacepower Theory, Space Policy and History, Project Management and Public Administration of Space Technology, General Aviation Safety.

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Learn more about the graduate Space Studies program

aero.UND.edu/space

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

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July 2024