

UAF Class of 2025

Doctor of Philosophy Degree Recipients Affiliated with the Geophysical Institute

Matthew Joseph Blandin*

Ph.D. Space Physics

B.S., University of New Hampshire at Durham, 2015

Thesis: Utilizing Different Machine Learning Algorithms to Progress

Geomagnetic Field Modeling from Solar Wind Drivers for

Geomagnetically Induced Current Detection and Prevention

Geomagnetically induced currents driven by changes in the Earth's magnetosphere can be highly destructive to our society. This study applied long short-term memory and convolutional neural networks to locally and globally predict geomagnetic field activity in response to solar wind drivers.

Major professors: Dr. Don Hampton and Dr. Hyunju Connor

Emily Rose Fedders

Ph.D. Geophysics

B.S., Appalachian State University, 2019

Thesis: Sea Ice Strain, Stress, and Fracture Activity at Kilometer Scales

Sea ice is composed of areas of effectively continuous ice bounded by active fractures. This study mapped fracture locations and measured strain (deformation) in continuous ice between them using radar interferometry. These observations allow novel measurement of sea ice elastic properties, spatial strain variability, and cycles of fracture quiescence and reactivation.

Major professor: Dr. Andrew R. Mahoney

Dillon McKenzie Gillespie

Ph.D. Space Physics

A.S., Paradise Valley Community College, 2013;

B.S., University of Alaska Fairbanks, 2019

Thesis: Wave Driven Diffuse Aurora and Ionospheric Conductance

Global Patterns

This study quantified the impact of chorus and electron cyclotron harmonic (ECH) waves on diffuse electron aurora and ionospheric conductance across varying geomagnetic conditions. Using satellite observations, we derived precipitated electron energy flux and conductance patterns, revealing that lower band chorus waves contribute significantly more to precipitation than upper band chorus and ECH waves.

Major professors: Dr. Doğan Su Öztürk and Dr. Hyunju Connor

Amy Sakura Hendricks**

Ph.D. Atmospheric Sciences

B.S., University of Oklahoma, 2012;

M.S., University of Alaska Fairbanks, 2016

Thesis: Climate Variability, Trends, and Impacts on the Yukon-

Kuskokwim Delta with Insights into Relationship-Building to Enhance Climate Science

This thesis explores climate variability in Alaska's Yukon-Kuskokwim Delta guided by insights from Yup'ik Elders. It examines climate links to tundra vegetation trends, shifting hydroclimate regimes, early-season wildland fires, and lessons learned from building relationships and context for Arctic climate research.

Major professor: Dr. Uma Bhatt

Jamshid Akbar Moshrefzadeh*

Ph.D. Geoscience: Geology

B.S., University of Wisconsin–River Falls, 2017;

M.S., University of Alaska Fairbanks, 2024

Thesis: Pinpointing Magma Processes in Time and Space

By studying chemical diffusion, crystal growth, and crystal dissolution, the study identified and dated the magma processes that triggered recent eruptions of two Alaska volcanoes. Our results aid in interpreting interdisciplinary monitoring data and contribute to the development of eruption forecasting models for Bogoslof and Redoubt volcanoes in Alaska.

Major professor: Dr. Jessica Larsen

David Polashenski*

Ph.D. Geophysics

B.A., Dartmouth College, 2017; B.E., Dartmouth College Thayer School of Engineering, 2018

Thesis: Ice Velocity and Basal Motion Evolution of Mountain Glaciers on Multi-Decadal to Centennial Timescales

The surface velocity of a glacier consists of two components — viscous deformation in the ice column and basal motion. This dissertation showed that basal motion is a primary control on glacier velocities for both surging and nonsurging glaciers over multi-decadal to centennial timescales.

Major professor: Dr. Martin Truffer