Nicolle T. Di Domenico

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# EDUCATION

The Pennsylvania State University *Expected Graduation 2023*

 M.S., Geography

Kent State University 2019

B.S., Geology, Minor in GIS

# RESEARCH EXPERIENCE

**Graduate Student Researcher** 2021-20232021-2023

**The Pennsylvania State University Department of Geography**

Principal Investigator(s): Dr. Shujie Wang

* Will apply machine learning classification methods of microtopography to the pan-Arctic
* Work will result in classified maps of Arctic tundra microtopography to be used in global carbon budgeting models and biogeochemical research

*This work is funded by the National Science Foundation.*

**Science Undergraduate Laboratory Internship,** Aug. 2020-Dec. 2020

## Oak Ridge Institute for Science Education, Oak Ridge National Laboratory

Principal Investigator(s): Dr. Elizabeth Herndon

* Improved machine learning classification accuracies and analyzed finer spatial resolutions using model developed during previous internship appointment
* Presented poster at AGU 2020 on internship project

*This work is funded by the United State Department of Energy (DOE).*

**Higher Education Research Experiences Intern,** 2019-2020

## Oak Ridge Institute for Science Education, Oak Ridge National Laboratory

Principal Investigator(s): Dr. Elizabeth Herndon, Dr. Peter Thornton

* Developed and implemented a novel geospatial analysis method for identifying greenhouse gas- emitting landscapes in the Arctic
* Identified optimal spatial scales, image textural features, machine learning algorithms and input parameters for landscape classification

*This work was funded through Next Generation Ecosystem Experiments (NGEE) - Arctic.*

## Undergraduate Research Assistant, 2019

**Department of Biological Sciences, Kent State University**

Principal Investigator(s): Dr. Lauren Kinsman-Costello

* Created time-series water depth maps of a vernal pond using field-collected data
* Synthesized water chemistry data as publication-quality graphics in R statistical software

**Undergraduate Research Assistant,** 2018-2019

## Department of Geology, Kent State University

Principal Investigator(s): Dr. Elizabeth Herndon

* + Demonstrated that Arctic microtopography influences carbon dynamics by creating gradient redox environments using analytical chemistry techniques
	+ Concluded poorly crystalline oxy-(hydr)oxides can limit potentially bioavailable phosphate in Arctic polygonal ground, and vary with soil active layer depth

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| --- | --- |
| *This work resulted in a publication in Environmental Science: Processes and Impacts.* |  |
| **AWARDS** |
| **Presentations** |  |
| *First Place –*Oak Ridge National Laboratory Ignite Presentation Competition*First Place –* Oak Ridge National Laboratory Research Abstract Writing Competition*First Place in Poster Division* – |  2020 2020 2019 |
| 2019 Kent State Undergraduate Symposium on Research, Scholarship, and Creative Activity |  |
| **Recent Scholarships*****National Science Foundation Graduate Research Fellowship - $92,000*** Earth and Environmental Systems Institute Scholarship - $2,000The Pennsylvania State University Recognition Scholarship - $500  |  2021-2023 2021-2023 2021 |
| John Allan Clark Geology Scholarship - $750 | 2019 |
| Glenn W. Frank Geology Scholarship - $2,500 | 2019 |
| Summer 2019 Unpaid Internship Scholarship - $1,000 | 2019 |
| Marie Barzan STEM Major Scholarship – $2,400 | 2018-2019 |
| **PUBLICATIONS** |  |

## Papers

Barczok, M., Smith, C., **Di Domenico, N.**, Kinsman-Costello, L., Singer, D., Herndon, E., 2021, Influence of iron (oxyhydr)oxide crystallinity on mineral transformation and phosphorus adsorption under contrasting redox conditions: Geochimica et Cosmochimica Acta, *In review.*

Herndon, E., Kinsman-Costello, L., **Di Domenico, N.**, Duroe, K., Barczok, M., Smith, C., Wullschleger, S., 2020, Iron and iron-bound phosphate accumulate in surface soils of ice-wedge polygons in arctic tundra: Environmental Science: Processes Impacts, v.22, p.1475–1490, doi: 10.1039/D0EM00142B.

## Published Datasets

Herndon, E., Kinsman-Costello, L., **Di Domenico, N.**, Duroe, K., Barczok, M., Smith, C., Wullschleger, S., 2020, Iron and Phosphorus Geochemistry in High-Centered and Low-Centered Polygon Soils from the Barrow Environmental Observatory, Utqiagvik, Alaska, 2015. Next Generation Ecosystem Experiments Arctic Data Collection, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA. https://doi.org/10.5440/1618325.

# POSTER PRESENTATIONS

**Di Domenico, N.**, Herndon, E., Thornton, P., Identifying polygonal ground in arctic regions using GLCM texture features for support vector machine classification, American Geophysical Union, Fall Meeting 2020.

**Di Domenico, N.**, Barczok, M., Herndon, E., Using sequential extractions to measure potentially bioavailable phosphate in soil systems with poorly crystalline iron oxides, 2019 Kent State University Undergraduate Symposium on Research, Scholarship, and Creative Activity: Kent, Ohio, Kent State University.

Link: [https://oaks.kent.edu/ugresearch/2019/using-sequential-extractions-measure-potentially-](https://oaks.kent.edu/ugresearch/2019/using-sequential-extractions-measure-potentially-bioavailable-phosphate-soil) [bioavailable-phosphate-soil](https://oaks.kent.edu/ugresearch/2019/using-sequential-extractions-measure-potentially-bioavailable-phosphate-soil)

# SKILLS & EXPERIENCE

## Laboratory Techniques & Instrumentation

* Sequential soil extractions of phosphate, iron - *expert*
* Degree of pyritization - *expert*
* Total Organic Carbon Analyzer- *expert*
* UV-Visible Light Spectrophotometry - *expert*
* Inductively Coupled Plasma - Optical Emission Spectrometry– *competent*
* X-ray Fluorescence Spectroscopy - *competent*

## Software

* ArcGIS Desktop Software Suite - *expert*
* ArcGIS Pro 2D and 3D Mapping Software – *proficient*
* TerrSet Geospatial Monitoring and Modelling Software – *proficient*
* QGIS – *proficient*
* R Statistical Programming Software - *expert*

o Machine learning applications – *proficient*

* Big data exploration and visualization - *competent*
* Pix4dmapper Drone Mapping Software – *competent*

# PROFESSIONAL AFFILIATIONS

Earth and Environmental Systems Institute (EESI), Permafrost Young Researchers Network (PYRN), Sigma Gamma Epsilon (National Geological Honor Society), Gamma Theta Upsilon (National Geography Honor Society)