Stephen A. Shield

University of Nebraska-Lincoln
Department of Earth & Atmospheric Sciences
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Education

2018-Present: University of Nebraska-Lincoln
Doctor of Philosophy (expected 2022)
Earth and Atmospheric Sciences-Specialization: Meteorology-Climatology
Current Research: Analyzing spatiotemporal patterns in thunderstorm initiation and environmental characteristics using spatial statistics and machine learning.
Advisor: Dr. Adam Houston

Master of Arts in Geography (2018): The Ohio State University
Certification in Practice of Data Analytics
Thesis Title: Predictive Modeling of Thunderstorm Related Power Outages
Advisor: Dr. Steven Quiring

Bachelor of Science (2016): University of Nebraska-Lincoln
Major: Meteorology-Climatology
Minors: Mathematics, Geography

Research Interests

- Weather Impacts
- Machine Learning & Data Analytics
- Severe Weather

Professional Experience

August 2018-Present: University of Nebraska-Lincoln (Department of Earth and Atmospheric Sciences)
Graduate Associate: Create data processing pipelines to identify and track thunderstorms using high performance computing resources.

May 2019-June 2019: University of Nebraska-Lincoln (Department of Earth and Atmospheric Sciences)
Vehicle Lead: Targeted Observation by Radars and Unmanned aircraft systems of Supercells (TORUS). Assist in Collection of atmospheric data through the use of unmanned aircraft and mobile mesonet vehicles in and around Supercell thunderstorms.

August 2016-August 2018: The Ohio State University (Department of Geography)
Graduate Research Associate: Utilization of data analytics and machine learning techniques to analyze and predict the impact of weather events on power infrastructure.

August 2015-July 2016: National Drought Mitigation Center
Undergraduate Researcher: Evaluation of drought index performance, drought risk assessment, and evaluating the incorporation of drought mitigation in multi-hazard mitigation plans.

June 2016: University of Nebraska-Lincoln (Department of Earth and Atmospheric Sciences)
Field deployment team member: Collection of atmospheric data through the use of unmanned aircraft and mobile mesonet vehicles.

June 2015-August 2015: Los Alamos National Laboratory (Computational Earth Sciences Group)
Visiting Student: Research and generation of meteorological inputs for subsurface flow and transport modeling.

Grants

2017 Quiring S. M., **Shield S. A.** & Pino J.V. ($20,000)
Improving Power Outage Prediction and Response through Community Partnerships

2017 Quiring S. M., Pino J.V., **Shield S. A.** & Guikema S.D. ($20,000)
Improved Power Outage Modeling to Support Risk Management for Electrical Utilities

2015 **Shield S. A.** & Bathke D. J. ($2,400)
Analysis of Drought Mitigation in Multi-Hazard Mitigation Planning

Publications

Shield S. A., & Houston, A. L. (In Preparation)
A Comparison of Thunderstorm Identification Methods

Shield S. A., Quiring S.M., McRoberts D. B. (In Preparation)
Influence of Spatial Scale in the Prediction of Thunderstorm Related Power Outages

Shield S. A. & Houston, A. L. (Under Review)
Diagnosing Supercell Environments: A Machine Learning Approach

Shield S. A., Quiring S.M., Pino J.V., Buckstaff K.
Major Impacts of Weather Events on the Electrical Power Delivery System in the United States. *Energy*, *218*, 119434, https://doi.org/10.1016/j.energy.2020.119434.

Awards/Achievements

Department of Earth and Atmospheric Sciences Outstanding Graduate Student Award (2020)

Othmer Graduate Fellowship (2018-2021)

Second Place Oral Presentation
Ninth Conference on Weather, Water, Climate, and the New Energy Economy Student Competition at the 98th Annual Meeting of the American Meteorology Society, Austin, TX, January 2018.

University of Nebraska-Lincoln College of Arts & Sciences Dean's List
(Fall 2014, Spring 2015, Fall 2015, Spring 2016)

James Canfield Scholarship Recipient (2012)

Training/Skills

Proficient in Python programming using scikit-learn, matplotlib, pandas, geopandas, numpy, and scipy, with experience using keras/tensorflow.

Proficient in Bash Scripting, ArcGIS, and PostgreSQL

Experience in IDL, HTML/CSS, R, VBA, & FORTRAN

Completion of the following FEMA Emergency Management Institute Independent Study courses:
Fundamentals of Emergency Management, Emergency Manager: An Orientation to the Position

Teaching

Instructor for UNL Course METR 140 (Severe & Unusual Weather), Fall 2021:
Science course for primarily non-science major undergraduate students with an enrollment of ~90 students. Taught students to use scientific methods and knowledge to pose questions, frame hypotheses, interpret data, and evaluate whether conclusions about the natural and physical world are reasonable, with the assistance of two teaching assistants.

Guest Lecture to UNL Course METR 498/898 (Weather Impacts), April 12, 2021:
Lecture on Weather Impacts to the Electrical Energy Sector

Oral Presentations and Posters

Shield S. A. & Houston, A. L. (2022) *A Climatological Analysis of Deep Convection Initiation.* Contributed paper presented at the Annual Meeting of the American Meteorology Society, January 2022.

Shield S. A. & Houston, A. L. (2022) *The Fraction of Thunderstorms That Produce Cloud-to-Ground Lightning and the Implications for Thunderstorm Identification.* Contributed poster presented at the Annual Meeting of the American Meteorology Society, January 2022.

Shield S. A. & Houston, A. L. (2021) *Diagnosing Supercell Environments: A Machine Learning Approach*. Severe Local Storms Early Career Virtual Workshop November 4, 2021

Shield S. A. & Houston, A. L. (2021) *Diagnosing Supercell Environments: A Machine Learning Approach*, 3rd NOAA Workshop on Leveraging AI in Environmental Sciences (Virtual) September 16, 2021

Shield S. A. & Houston, A. L. (2021) *Diagnosing Supercell Environments: A Machine Learning Approach*, OAX Spring Severe Seminar March 23, 2021

Shield S. A. & Houston, A. L. (2021) *A Climatological Analysis of Convective Storm Initiation*, Invited Presentation: University of Nebraska – Lincoln School of Natural Resources Seminar Series February 4, 2021

Ford T. W., Quiring, S. M., Wang Y., Grady K., **Shield S. A**., & Houston, A. L. (2021)
Investigation of Soil Moisture-Precipitation Interactions in the Central United States using Thunderstorm Observation by Radar (ThOR). Contributed paper presented at the Annual Meeting of the American Meteorology Society, January 2021.

Shield S. A., McRoberts D. B. and Quiring S. M. (2018)
Development of a Thunderstorm Outage Prediction Model
Contributed paper presented at the Annual Meeting of the American Meteorology Society, Austin, TX, January 2018.

Shield S. A., McRoberts D. B. and Quiring S. M. (2017)
Statistical Modeling of Thunderstorm Related Power Outages
Contributed paper presented at the Annual Meeting of the American Association of Geographers, Boston, MA, April 2017.

Fuchs B., Svoboda M., Johs E., Sorensen W., **Shield S. A.**, and Schirle C. E. (2017)
Updating and Enhancing the National Drought Mitigation Center's Drought Risk Atlas
Contributed paper presented at the Annual Meeting of the American Meteorological Society, Seattle, WA, January 2017.

Quiring S. M., McRoberts D. B., **Shield S. A.**, Toy B. and Alvarado B. (2016)
Does NASA SMAP Improve the Accuracy of Power Outage Models?
Contributed poster presented at the Fall Meeting of the American Geophysical Union, San Francisco, CA, December 2016.

Service

Faculty meeting graduate student representative: Attend faculty meetings and represent student interests as well as keep graduate students informed of relevant information. (Primary Representative August 2020-August 2021; alternate representative July 2019-August 2020)

UNL Research Days: Undergraduate Creative Activities and Research Experience (UCARE) Judge (April 2021)

Organizer and speaker: Tips and Tricks for preparing applications. A workshop for the University of Nebraska-Lincoln Student Chapter of the American Meteorology Society (January 2020)

Proposal reviewer: Undergraduate Creative Activities and Research Experience (UCARE) (Spring 2019)

Graduate Studies Committee Student Representative for Ohio State Geography Graduate Student Organization (August 2017-August 2018)

Joint Social Events Chair for Ohio State Geography Graduate Student Organization (August 2017-August 2018)

Ohio State Fall Undergraduate Research Forum: Poster Judge (September 2016 & 2017)

Mentor for the University of Nebraska-Lincoln Department Earth and Atmospheric Sciences Mentoring Program (August 2014-May 2016)

Officer of the University of Nebraska-Lincoln Chapter of the American Meteorology Society (May 2014-May 2015)

University Involvement

University of Nebraska-Lincoln Student Chapter of the American Meteorology Society (2013-2016; 2018-Present)

Meteorology Club at The Ohio State University (2016-2018)

The Ohio State University Graduate Geography Student Organization (2016-2018)

Professional Development

Weather and Climate Risk
Fisher Risk Institute, The Ohio State University, Columbus, OH March 20, 2018

Storm Outage Prediction, Preparedness, and Response Workshop
The Ohio State University, Columbus, OH August 15-16, 2017

University Center for the Advancement of Teaching (UCAT) Teaching Orientation
The Ohio State University, Columbus, OH August 16-18, 2016

Outreach and Volunteer Work

Presentation to local 8th grade physical science class "The Science of Predicting the Weather" (December 2019, 2020)

Central Plains Severe Weather Symposium and Family Weatherfest (April 2014, 2016, & 2019)

Naturepalooza: Presented by the UNL School of Natural Resources (October 2015)

Red Cross & Crete Fire Department Home Fire Prevention Campaign (November 2014)

Dinosaurs and Disasters event at University of Nebraska State Museum (February 2014 & 2015)

University of Nebraska-Lincoln Math Day (November 2013 & 2014)

The Crossing at Lexington High School Camp (June 2013)

Professional Membership

American Meteorological Society
Member since 2014

American Association of Geographers
Member since 2016

The Risk Institute at The Ohio State University Fisher College of Business
Fellow since 2017