

Morgan Steckler

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EDUCATION

Master of Science

May 2023

Department of Geography, University of Tennessee

Thesis work on unsupervised machine learning of strong tornado-producing storms in the central to eastern US from 2000 to 2020. Used doppler radar-derived attributes with a focus on cloud computing and open data science techniques.

Bachelor of Arts, Summa Cum Laude

May 2020

Department of Geography, University of Tennessee

Undergraduate thesis work on a short-term climatology of tornado-producing Tennessee storm types and modelling the forecastability of storm types based on success metrics.

EMPLOYMENT

Geospatial Modeler

September 2023 to Present

Oak Ridge National Laboratory, Oak Ridge, TN

Develop automated workflows to collect and pre-process open-source satellite remote sensing imagery and field data in support of Arctic vegetation mapping. Create geospatial products for use in terrestrial earth system models. Document, organize, and maintain data stores and scripts in Bash, Python and Git on local systems.

Graduate Research Assistant

January 2023 to May 2023

University of Tennessee, Knoxville, TN

Designed and applied ArcGIS Pro and Python-based methodology to identify counties of high Latino population density and high strong tornado occurrence. Developed a story map to share results with the National Weather Service and Latino community partners.

Data Science Intern

June 2022 to August 2022

Maxar Technologies LLC, Remote

Documented, visualized, and statistically analyzed complex, heterogenous, big data on maritime vessel tracks. Proposed methodologies for identifying potential illicit vessel behavior using Python, Jupyter, and Apache Iceberg based on SQL principles. Scaled methods to very large data queries.

SULI ORISE Intern

June 2020 to August 2021

Oak Ridge National Laboratory, Oak Ridge, TN

Analyzed remote satellite imagery from Google Earth Engine using Python and the Jupyter IDE to develop phenological maps and relevant statistics of the tropics. Visualized high-resolution, remotely sensed Sentinel-2 vegetation indices using Bash and GRASS GIS.

Undergraduate Research Assistant

February 2018 to May 2020

University of Tennessee, Knoxville, TN

Compared state-shared tax revenue allocation to local government before differential privacy and after using RStudio. Mapped hurricane lifetime maximum intensity locations in the North Atlantic using ArcGIS Pro, Excel, and SQL. Performed lab duties such as loss-on-ignition, soil sampling, and soil acidification to create a soil sediment profile of study sites in Costa Rica.

Environmental Educator

Summer 2018 and Summer 2019

Wesselman Woods, Evansville, IN

Managed invasive species and nature preserve boundary projects using Survey123, ArcGIS Pro, QGIS, and Python on a volunteer-basis. Developed and implemented learning programs for children and adults at the nature preserve.

TEACHING**Graduate Teaching Assistant**

August 2021 to December 2022

University of Tennessee, Knoxville, TN

Taught laboratory sessions for Geography 131: Weather, Climate, and Climate Change and Geography 132: Landscapes and Environmental Change.

SOFTWARE

ArcGIS Suite (5)
 Google Earth Engine (4)
 GRASS GIS (4)
 Microsoft Office Suite (5)
 SNAP ESA (5)
 QGIS (3)

LANGUAGES

Python (5)
 GDAL (3)
 Geemap (4)
 Git (3)
 Matplotlib (5)
 Numpy (5)

Pandas/GeoPandas (5)
 Py-Art (5)
 PyTorch (2)
 Scikit-Learn/Image (4)
 Seaborn (5)
 Xarray (3)

Other Languages

Bash (4)
 HTML (2)
 LaTeX (2)
 RStudio (3)
 SQL (3)

*1–Fundamental Awareness**2–Novice**3–Intermediate**4–Advanced**5–Expert***PUBLICATION**

Steckler, M., K. Ellis. 2021. A climatology of how storm types in Nashville affect forecast verification metrics from 2012 to 2018. *Pursuit Undergraduate Research Journal*. Volume 11, Issue 1.

PRESENTATIONS

Steckler, M., K. Ellis, Q. Wu, H. Herrero. 2023. Unsupervised machine learning of tornado-producing storms in the southeastern US. American Geophysical Union Annual Meeting. San Francisco, CA.

Steckler, M., K. Ellis. 2023. Unsupervised machine learning of strong, tornado-producing storms in the east-southeastern US. Southern Appalachia Weather and Climate workshop. Asheville, NC.

Kumar, J., **M. Steckler**, B. Sharma, R. Limber, W. Hargrove, F. Hoffman. 2023. Drivers of phenological patterns and variability in heterogeneous tropical vegetation. International Association for Landscape Ecology. Riverside, CA.

Steckler, M., K. Ellis. 2023. Unsupervised machine learning of tornado-producing storms in the US. GeoSymposium. Knoxville, TN.

Steckler, M., B. Sharma, F. Hoffman, W. Hargrove, J. Kumar. 2021. Effects of meteorological and ecological disturbances on tropical vegetation phenology. American Geophysical Union. Virtual.

Steckler, M., J. Kumar, F. Hoffman, W. Hargrove. 2021. High resolution remote sensing of tropical phenology in Brazil. Science Undergraduate Laboratory Internship Exhibition. Virtual.

Horn, S., E. Johanson, M. Herrera, C. Lane, **M. Steckler**, M. Boehm, T. Friedel, Q. Wu. 2021. Stable carbon and nitrogen isotope ratios in the sediments of Laguna Arancibia, Costa Rica. American Association of Geographers. Virtual.

Steckler, M., K. Ellis. 2019. Movement of lifetime maximum intensity locations during the North Atlantic hurricane season. American Association of Geographers. Washington, DC.

Steckler, M., R. Russ, K. Ellis, L. Mason. 2018. How different storm types contribute to tornadoes, false alarms, and forecasting challenges in Tennessee. Southeastern Division of the American Association of Geographers. Johnson City, TN.

OTHER RESEARCH

Project Management Course Presentation 2022

UT Parking Web Application

Project manager role. Planned meetings and project deadlines, coordinated roles, and participated in the creation of a parking web app for the University of Tennessee by building a geodatabase on ArcGIS Pro and ArcGIS Online. Created ArcGIS Dashboards. Presented findings to UTK parking staff.

Advanced Remote Sensing Course Presentation 2022

Unsupervised machine learning of convection in Tennessee tornado-producing storms

Presented preliminary thesis work on Python-scripted unsupervised machine learning of strong, tornado-producing storms. Explored how K-Means, Fuzzy C-Means, and DBSCAN could be applied to simple radar-derived attributes in Tennessee.

Wesselman Woods Project 2019

Invasive Plant Species at Wesselman Woods nature preserve

Digitized land survey bearings to map official nature preserve boundaries. Developed an ArcGIS Online Survey123 for the remote collection of invasive plant species data within the preserve. Compiled, visualized, and synthesized results into a report for land managers at the preserve.

Intermediate GIS Course Presentation 2019

How fireball sighting coverage varies over space

Explored online databases of fireball sightings from the International Meteor Organization and determined spatial gaps in sightings due to proximity to urban areas and national parks.

- Remote Sensing Course Poster – Project Member** 2019
Defensible Space Prior to the Chimney Tops II Fire
 Led project mapping of building footprints in ArcGIS Pro and calculated the percent of buildings affected by the Chimney Tops II fire that did not adhere to defensible space guidelines.
- Introduction to GIS Course Presentation – Project Lead** 2018
Tornado warnings with distance to radar
 Accessed radar locations in Tennessee, plotted tiered distance buffers from the radar in ArcGIS Pro, and determined differences in tornado warning issuance with distance from the radars.
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PROFESSIONAL MEMBERSHIPS

- American Geophysical Union 2021 to Present
- American Association of Geographers 2019 to 2020
- Climate Reality Leadership Corps. 2019 to Present
- Southeastern Division of the American Association of Geographers 2018 to 2019
- Geological Society of America 2018 to 2019
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AWARDS & RECOGNITION

- Exceptional Professional Accomplishment Award** 2023
 UTK Geography Department
- Graduate Teaching Assistant Award** 2022
 UTK Geography Department
- Excellence in Undergraduate Research** 2020
 UTK Office of Undergraduate Research
- Highly Commended Entrant Award** 2020
 The Global Undergraduate Awards
- Outstanding Graduate Award** 2020
 UTK Geography Department
- Undergraduate Research Travel Award** 2019
 UTK Office of Undergraduate Research