

Matthew Walter

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EDUCATION

University of Delaware 2020-present
PhD Candidate
Department of Geography and Spatial Sciences

University of Delaware 2018-2020
MS in Geography
Department of Geography and Spatial Sciences

University of Delaware 2014-2018
BA in Environmental Studies (Minor in Public Policy)
Graduate Certificate in Geographic Information Systems (GIS)

PUBLICATIONS

Walter, M., Bagozzi, B., Ajibade, I., Mondal, P. 2023. Social media analysis reveals environmental injustices in Philadelphia urban parks. Scientific Reports 13 (12571), doi: 10.1038/s41598-023-39579-4

Mondal, P., **Walter, M.,** Miller, J., Epanchin-Niell, R., Gedan, K., Yawatkar, V., Nguyen, E., Tully, K. 2023. The spread and cost of saltwater intrusion in the US Mid-Atlantic. Nature Sustainability, doi: 10.1038/s41893-023-01186-6.

Walter, M., Mondal, P. 2023. Mapping of Phragmites in estuarine wetlands using high-resolution aerial imagery. Environmental Monitoring and Assessment. 195(478), doi: 10.1007/s10661-023-11071-6.

Walter, M., Mondal, P. 2019. A rapidly assessed wetland stress index (RAWSI) using Landsat 8 and Sentinel-1 radar data. Remote Sensing 11(21), 2549, doi: 10.3390/rs11212549.

DATA SETS

Walter, M., Mondal, P. High resolution Phragmites australis classification in Delaware estuaries. 2023. Available at: <https://doi.org/10.5281/zenodo.7644495>.

Walter, M., Mondal, P. High resolution greenspace land cover in Philadelphia, Pennsylvania. 2023. Available at: <https://doi.org/10.5281/zenodo.7604104>.

Mondal, P., **Walter, M.,** Miller, J., Epanchin-Niell, R., Yawatkar, V., Nguyen, E., Gedan, K., Tully, K. 2022. High resolution remotely sensed datasets for saltwater intrusion across the Delmarva Peninsula.

Available at: <https://doi.org/10.5281/zenodo.6685695>.

RESEARCH GRANTS

Doctoral Fellowship for Excellence (\$32,667 + tuition)	2023
NASA Delaware Space Grant Graduate Fellowship (\$30,000 + tuition)	2022
NASA Delaware Space Grant Graduate Fellowship (\$30,000 + tuition)	2021
Dr. John R. Mather Graduate Research Fellowship (\$750)	2019

HONORS & AWARDS

Katherine S. McCarter Graduate Student Policy Award Ecological Society of America	2022
Second Place for Graduate Student Poster Award Delaware Environmental Institute Research Symposium	2022
Geospatial Data Visualization – Honorable Mention University of Delaware Student Competition for Geospatial Data Visualization	2022
Data Science Institute Fellow UD Data Science Institute	2021
First Place for Outstanding Graduate Student Paper Award Middle States Division for the American Association of Geographers Annual Meeting	2020
2019-2020 Teaching Excellence Award University of Delaware - Department of Geography and Spatial Sciences	2020
First Place for Outstanding Graduate Student Paper Award Middle States Division for the American Association of Geographers Annual Meeting	2019
First Place Poster, Human and Climate Series III: Water Management and Policy: Local and Global Perspectives Symposium	2019
Special Merit Award in Environmental Studies University of Delaware - Department of Geography and Spatial Sciences	2018

RESEARCH EXPERIENCE

Cascading Hazards in the Portland Metro Region Research Contractor for Dr. Jola Ajibade	2022-2023
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Portland State University, Portland, Oregon, USA

- Mapped indices of vulnerability and resilience in Oregon.
- Spatial-statistical analysis of vulnerability, resilience, and multiple disasters.

Mapping Land Cover in the Delmarva Peninsula

2018-2021

Research Assistant for Dr. Pinki Mondal - Earth Observation for Sustainable Ecosystem and Livelihood (EASEL)

University of Delaware, Newark, Delaware, USA

- Analyzed and processed high-resolution aerial imagery using techniques such as principal component analysis and spatial smoothing.
- Mapped land cover and climate change impacts in the Delmarva Peninsula.

The Effect of Human Activities on Wetlands in Delaware

2018-2020

Master's Thesis (advisor: Dr. Pinki Mondal)

University of Delaware, Newark, Delaware, USA

- Mapped wetlands and other land covers in the State of Delaware using Landsat and Sentinel 1 Synthetic Aperture Radar (SAR) data.
- Developed an index for assessing wetland stress using remotely sensed data using land cover, vegetation, and hydrologic information.
- Mapped the invasive plant species *phragmites* in the State of Delaware.
- Collected soil and water samples and analyzed plant species in Delaware wetlands.

The Impact of Inter-municipal Planning in Lancaster, PA

2018-2020

Research Contractor for Dr. Nina David

University of Delaware, Newark, Delaware, USA

- Managed GIS data related to public policy such as zoning, urban expansion, and land cover data in Lancaster County, PA.
- Maintained databases and performed geospatial analysis to quantify land cover change and the effectiveness of inter-municipal plans on urban development.

Monitoring Small Farms in Pakistan, Ethiopia, and Bangladesh

2019-2021

Research Contractor for Dr. Sabrin Beg

University of Delaware, Newark, Delaware, USA

- Created time series Normalized Difference Vegetation Index (NDVI) dataset for Tehsils in Pakistan using Moderate Resolution Imaging Spectroradiometer (MODIS) data.
- Processed time series night light data and created maps for farms in Bangladesh using Visual Infrared Imaging Radiometer Suite (VIIRS) data.
- Performed spatial analysis on soil quality datasets in Pakistan and Ethiopia.

Measuring the Stemflow of Different Oak Species in an Urban Forest

2014-2018

Research Assistant for PhD student Asia Downtin

University of Delaware, Newark, Delaware, USA

- Assisted PhD student in monitoring forest ecohydrology in Wilmington, Delaware.

- Set up stemflow and throughfall collectors, collecting throughfall and stemflow water samples, measuring Leaf Area Index with the LI-COR LAI 2000 plant canopy analyzer.

CONFERENCE PRESENTATIONS

Ajibade, I., Sauer, J., **Walter, M.**, Raghunathasami, A., Done, J., Ge, M., Sowards, M., Lower, C., Goldstein, S. Advancing Equitable Resilience Planning for Climate Hazards in the Portland Region. National Center for Atmospheric Research Student Symposium. April 2023. Poster presentation.

Walter, M., Bagozzi, B., Ajibade, I., Mondal, P. Unequal Urban Park Quality leads to environmental injustices in Philadelphia, Pennsylvania. Delaware Environmental Institute Environmental Research Symposium. April 2023. Poster presentation.

Walter, M., Bagozzi, B., Ajibade, I., Mondal, P. Unequal Urban Park Quality leads to environmental injustices in Philadelphia, Pennsylvania. American Association of Geographers Annual Meeting. March 2023. Oral presentation.

Mondal, P., **Walter, M.**, Sarupria, M., Miller, J., Epanchin-Niell, R., Gedan, K., Tully, K. Marsh expansion on the Delmarva farmlands: Can ongoing changes be a part of long-term land management? American Association of Geographers Annual Meeting. March 2023. Oral presentation.

Sarupria, M., **Walter, M.**, Mondal, P. Estimating the impacts of saltwater intrusion on Coastal Farmlands of Delmarva Peninsula using Sentinel-2 Imagery and spectral unmixing. The American Association of Geographers Annual Meeting. March 2023. Oral Presentation.

Ajibade, I., Lower, C., **Walter, M.**, Done, J., Ge, M., Pallathadka, A., Sauer, J., Goldstein, S., Chung, H. Unequal vulnerability and resilience to compounding climate hazards: centering the lived experiences of marginalized populations in Portland, Oregon. The American Association of Geographers Annual Meeting. March 2023. Oral Presentation.

Walter, M., Bagozzi, B., Ajibade, I., Mondal, P. Unequal Urban Park Quality leads to environmental injustices in Philadelphia, Pennsylvania. Delaware Space Grant Consortium Research Symposium. March 2023. Poster presentation.

Walter, M., Bagozzi, B., Ajibade, I., Mondal, P. Semi-supervised topic modeling and Random Forest for identifying environmental injustice in Philadelphia. DARWIN Computing Symposium. February 2023. Poster presentation

Sarupria, M., **Walter, M.**, Mondal, P. Mapping Salt-Impacted Coastal Farmlands of Delmarva Peninsula Using Sentinel-2 Imagery. American Geophysical Union Fall Meeting. December 2022. Poster presentation (virtual).

Ajibade, I., Lower, C., **Walter, M.**, Loikith, P., Done, J., Ge, M., Pallathadka, A., Sauer, J., Russell, E., and Chang, H. Who Matters and Why: Identifying Hotspots of Vulnerability and Resilience to Cascading and Consecutive Disasters in Portland, Oregon. American Geophysical Union Fall Meeting. December 2022. Oral presentation.

Walter, M., Miller, J., Yawatkar, V., Epanchin-Niell, R., Nguyen, E., Gedan, K., Tully, K., Mondal, P. Mapping Salt Deposits in the Delmarva Peninsula using Aerial Imagery and Landsat. 2022 Mid-Atlantic Regional Space Grant Consortia Meeting. August 2022. Poster presentation.

Walter, M., Mondal, P. Inequalities of Urban Park Quality using Remote Sensing and Social Media Data. Delaware Environmental Institute Research Symposium. April 2022. Poster presentation.

Walter, M., Miller, J., Yawatkar, V., Epanchin-Niell, R., Nguyen, E., Gedan, K., Tully, K., Mondal, P. Mapping Salt Deposits in the Delmarva Peninsula using Aerial Imagery and Landsat. Delaware Space Grant Symposium. April 2022. Poster presentation.

Mondal, P., **Walter, M.,** Miller, J., Yawatkar, V., Epanchin-Niell, R., Nguyen, E., Gedan, K., Tully, K. The invisible threat of saltwater intrusion on the Delmarva farmlands. The American Association of Geographers Annual Meeting. February 2022. Oral Presentation.

Walter, M. and Mondal, P. Invasive Species Mapping in Estuarine Wetlands Using High-Resolution Aerial Imagery. American Association of Geographer's Annual Meeting. April 2021. Oral presentation.

Mondal, P., **Walter, M.,** Miller, J., Yawatkar, V., Epanchin-Niell, R., Nguyen, E., Gedan, K., Tully, K. Visual evidence of saltwater intrusion in coastal Maryland. Maryland Water Monitoring Council Annual Conference. December 2021. Oral Presentation.

Walter, M. and Mondal, P. Invasive Species Mapping in Estuarine Wetlands Using High-Resolution Aerial Imagery. GIS Day - University of Delaware. November 2020. Oral presentation.

Yawatkar, V., Nguyen, E., **Walter, M.,** Tully, K., Modal, P. Quantifying Land Cover Changes due to Saltwater Intrusion in the Delmarva Peninsula Using Machine-learning and NAIP Imagery. Middle States American Association of Geographers Annual Meeting. October 2020. Poster presentation.

Walter, M. and Mondal, P. Invasive Species Mapping in Estuarine Wetlands Using High-Resolution Aerial Imagery. Middle States American Association of Geographer's Annual Meeting. October 2020. Oral presentation.

Walter, M. and Mondal, P. A Rapidly Assessed Wetland Stress Index (RAWSI) Using Landsat 8 and Sentinel-1 Radar Data. American Association of Geographer's Annual Meeting. April 2020. Oral presentation.

Yawatkar, V., Nguyen, E., **Walter, M.,** Tully, K., Modal, P. Quantifying Land Cover Changes Due to Saltwater Intrusion in the Delmarva Peninsula Using Machine-learning and NAIP Imagery. DENIN Graduate Research Symposium for Environmental Research. March 2020. Poster presentation.

Yawatkar, V., **Walter, M.,** Qadir, A., Mondal, P. Machine Learning and Cloud Computing for Environmental Research. University of Delaware Data Science: DARWIN Computing Symposium. February 2020. Poster presentation.

Walter, M. and Mondal, P. Using Satellite Data to Quantify and Map Wetland Stress. Delaware Wetland Conference. January 2020. Poster presentation.

Walter, M. Wetland Stress and Remote Sensing – 90 second research talk. Delaware Environmental Institute – Pitch 90. November 2019. Oral presentation.

Walter, M. and Mondal, P. Using Satellite Data to Quantify and Map Wetland Stress. Data Science Symposium – University of Delaware. November 2019. Poster presentation.

Walter, M. and Mondal, P. Using Satellite Data to Quantify and Map Wetland Stress. GIS Day – University of Delaware. November 2019. Poster presentation.

Walter, M. and Mondal, P. A Rapidly Assessed Wetland Stress Index (RAWSI) Using Landsat 8 and Sentinel-1 Radar Data. Middle States American Association of Geographers Annual Meeting. October 2019. Oral presentation.

Walter, M. and Mondal, P. Analyzing the Health of Wetland Buffers in Delaware using Land Cover. Human and Climate Series III: Water Management and Policy. June 2019. Poster presentation.

Walter, M. and Mondal, P. Analyzing the Health of Wetland Buffers in Delaware using Land Cover. Graduate Students' Forum for Research and Creative Works. May 2019. Poster presentation.

Walter, M. and Mondal, P. Analyzing the Health of Wetland Buffers in Delaware using Land Cover. Delaware Environmental Monitoring Summit. April 2019. Poster presentation.

Walter, M. and Mondal, P. Analyzing the Health of Wetland Buffers in Delaware using Land Cover. American Association of Geographer's Annual Meeting. April 2019. Poster presentation.

Walter, M. and Nina, D. Using GIS to Measure the Effectiveness of Inter-Municipal Planning. Delmarva GIS Conference. May 2018. Poster presentation.

MEDIA COVERAGE

[Scripps News story](#) covering co-authored publication on saltwater intrusion 2023

[UDaily article](#) covering co-authored publication on saltwater intrusion 2023

[University of Maryland article](#) covering co-authored publication on saltwater intrusion 2023

[UDaily article](#) covering fieldwork with saltwater intrusion 2022

TEACHING EXPERIENCE

Introduction to GIS (GEOG 372) Spring 2020
Dr. Pinki Mondal
University of Delaware, Newark, Delaware, USA

- Ran lab section in various topics of geographic information science (GIS)
- Assisted students in troubleshooting weekly labs.
- Graded weekly GIS lab assignments and aided in creating assignments

Know Your Satellites (GEOG 480/680) Fall 2019

Dr. Pinki Mondal
University of Delaware, Newark, Delaware, USA

- Helped to develop a graduate/undergraduate level course in remote sensing by creating scripts in Google Earth Engine with remote sensing applications such as filtering imagery, classifications, normalized difference indices, and raster calculations. Course development was supported by a Center for Teaching and Assessment for Learning (CTAL) grant to Dr. Mondal.
- Assisted in teaching the course by providing feedback for student's remote sensing research projects, and assisting students in writing and debugging codes in JavaScript within the Google Earth Engine Platform.
- Provided technical demonstrations for specific remote sensing workflows such as training a machine learning classifier.

Proseminar: Environmental Science (ENSC 450) Spring 2019

Dr. Xiao-Hai Yan
University of Delaware, Newark, Delaware, USA

- Delivered lectures and provided professional development advice for students in topics such as CVs, resumes, and cover letters.
- Assisted in teaching senior undergraduate students by managing the course website and creating and grading assignments

Conservation: Natural Resources (GEOG 235) Fall 2018

Dr. Terrienne Lavin
University of Delaware, Newark, Delaware, USA

- Assisted in teaching by creating assignments and exams for various topics in environmental science (pollution, water quality, food scarcity, climatology)
- Graded assignments and worked with students to understand course materials.

GUEST LECTURES

Introduction to GIS – University of Delaware 2020-2023

SERVICE

EmPOWER Mentor 2022-2023
University of Delaware Department of Geography and Spatial Sciences

Wrote and administered the *Remote Sensing* exam for the Delaware Science Olympiad 2022-2023

Webinar developer and co-presenter 2022
Teacher Professional Development Webinar, Delaware Sea Grant

Treasurer 2022-2023
Delaware Data Science Student Association

Volunteer 2022
Delaware Nature Society – Coverdale Farm Preserve

Volunteer 2021
Delaware Department of Natural Resources and Environmental Control - Environmental Justice Team

OTHER EMPLOYMENT

Biological Aide 2014-2022
Delaware Division of Fish and Wildlife
Department of Natural Resources and Environmental Control (DNREC), Smyrna, DE

- Educated children on aquatic ecosystems by teaching 5th grade field trips, running educational programs for children, creating educational materials such as posters, activities, and lesson plans, and providing information at a nature center.
- Worked in Hunter Education and Land Acquisition filing and updating GIS data and recording hunter data.
- Created virtual GIS assignment to introduce Middle School students to concepts in GIS.

TECHNICAL SKILLS

Coding Languages

Python, JavaScript, R, Matlab

Geospatial Analysis

ArcMap, ArcGIS Pro, ArcGIS Online

QGIS

Google Earth Engine

ENVI

Arcpy, Geopandas

Jupyter notebooks, Google Collaboratory

R Studio

Quantitative Data Analysis

Python

Excel

R

SPSS

Matlab

Other Skills

Microsoft Word and PowerPoint

Adobe Photoshop and Illustrator

Adobe Premiere and After Effects

PROFESSIONAL MEMBERSHIP

American Geophysical Union

2022-present

American Association of Geographers

2019-present