

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., Mondal, P. Mapping of Phragmites in estuarine wetlands using high-resolution aerial imagery. *Environmental Monitoring and Assessment*. Under review.

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.

Manuscripts in preparation:

Mondal, P., **Walter, M.**, Miller, J., Epanchin-Niell, R., Gedan, K., Yawatkar, V., Nguyen, E., Tully, K. Where crops don't grow: The spread and cost of saltwater intrusion in the US Mid-Atlantic. *Planned submission to "Nature Sustainability" in December 2022.*

Walter, M., Bagozzi, B., Ajibade, J., Mondal, P. Environmental injustices of urban parks in Philadelphia identified by social media reviews. *Planned submission to "Proceedings of the National Academy of Sciences of United States of America" in January 2023.*

RESEARCH GRANTS

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

RESEARCH EXPERIENCE

Cascading Hazards in the Portland Metro Region Research Contractor for Dr. Jola Ajibade Portland State University, Portland, Oregon, USA	2022
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- Mapped indices of vulnerability and resilience in Oregon.
- Spatial-statistical analysis of vulnerability, resilience, and multiple disasters.

Mapping Land Cover in the Delmarva Peninsula Research Assistant for Dr. Pinki Mondal - Earth Observation for Sustainable Ecosystem and Livelihood (EASEL) University of Delaware, Newark, Delaware, USA	2018-2021
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- 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

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

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.

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., Mondal, 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., Mondal, 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

[UDaily article](#) covering Walter's 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, 2021, 2022

SERVICE

EmPOWER Mentor

2022-2023

University of Delaware Department of Geography and Spatial Sciences

Webinar developer and co-presenter

Fall 2022

Teacher Professional Development Webinar, Delaware Sea Grant

Treasurer

2022-2023

Delaware Data Science Student Association

Volunteer

2021

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

Volunteer

Summer 2022

Delaware Nature Society – Coverdale Farm Preserve

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, Fortran, R, Matlab

Geospatial Analysis

ArcMap, ArcGIS Pro, ArcGIS Online (proficient)

QGIS (basic)

Google Earth Engine (proficient)

ENVI (moderate)

ArcGIS Python scripting (proficient)

Jupyter notebooks and Google Collaboratory (proficient)

R Studio (moderate)

Quantitative Data Analysis

Python (proficient)

Matlab (basic)

Excel (proficient)

JMP (moderate)

Fortran (basic)

Other Skills

Microsoft Word and PowerPoint (proficient)

Adobe Photoshop and Illustrator (moderate)

Adobe Premiere and After Effects (basic)

PROFESSIONAL MEMBERSHIP

American Geophysical Union

2022-present

American Association of Geographers

2019-present