Kathryn I. Wheeler

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EDUCATION

Boston University   Boston, MA
Doctor of Philosophy in Earth and Environment   Jan. 2023
Certificate in Biogeosciences
GPA: 3.95
Dissertation: "Cold-deciduous broadleaf phenology: monitoring using a geostationary satellite and predicting using trigger-less dynamic models"
Academic Awards: National Science Foundation Graduate Research Fellowship and Dean's Fellowship
Relevant Courses: Remote sensing, multivariate analysis, Bayesian statistics, ecological forecasting, terrestrial carbon, and physical climatology

University of Delaware   Newark, DE
Bachelor of Science in Environmental Science   May 2017
Honors with Distinction, summa cum laude
GPA: 3.95
Academic Awards: Full four-year merit scholarship, NOAA Hollings Scholarship, UD American Association of University Professors Outstanding Senior, and Outstanding Senior in Environmental Science
Relevant Courses: GIS, microeconomics, meteorology, geology, ocean sciences, chemistry, biology, environmental modeling, hydrogeology, climatology, forensic environmental chemistry, soil science, plant physiology, ecosystem ecology, computer science, and data structures

RELEVANT EXPERIENCE

Industrial Economics, Incorporated   Cambridge, MA
Environmental Consulting Associate   June 2023 – Present
- Processed and analysed spatial and temporal environmental data to assist with Natural Resource Damage Assessments for three Superfund sites using R, Python, and ArcGIS Pro
- Improved efficiency of a Shiny app to display spatial data to clients by 5x
- Performed advanced statistical models of spatial and spatial-temporal Inverse Distance Weighting, distributed lag for time series, PCA, mixed effects, generalized estimating equations, and non-negative matrix factorization to estimate contaminant impacts on fish populations
- Presented findings to clients who have limited technical knowledge
- Mentored two research analysts

Massachusetts Institute of Technology   Cambridge, MA
NOAA Climate and Global Change Postdoctoral Fellow   Sep. 2022 – June 2023
- Funded through a highly competitive 2-year fellowship ($200k) selected through a written research proposal
- Utilized Google Earth Engine and MODIS data to assess drought impacts on tropical forest biomass
- Used LiDAR and eddy covariance flux data to investigate relationship between forest structure and productivity
- Led a multidisciplinary team of 43 scientists and technicians to conduct ecological forecasts of tree leaf growth
- Coded Bayesian and random forest models to analyze impacts of soil properties and biota on leaf seasonality
- Mentored four undergraduate students and earned a mentorship certificate through a course

Boston University   Boston, MA
Research Assistant   Sep. 2017 – Aug. 2022
- Created novel Bayesian statistical models in R to predict tree leaf seasonality
- Conducted field work at Harvard Forest to investigate the link between senescence and photosynthesis
- Developed automation pipeline to download, clean, organize, and condense 30 TB of satellite data from MODIS and GOES using a high-performance distributed system
- Maintained lab safety compliance of Professor Michael Dietze's research lab

Teaching Fellow and Lab Instructor   Jan. 2022 – May 2022
- Led weekly lab based in R for 30 students in an environmental modeling course

University of Delaware   Newark, DE
Delaware Environmental Institute Environmental Scholar   Aug. 2014 – May 2017
- Analyzed water quality data using MATLAB to fit advanced statistical and machine learning models to available data
- Collected and analyzed 1,700 measurements of hyperspectral observations on leaves using a portable spectrophotometer and Python
- Conducted lab work using a Vario EL cube to analyze nitrogen concentrations in collected leaves
- Presented research at AGU and won two student presentation awards in hydrology and biogeoscience (top 5%)

General Computer Science for Engineers Course Teacher Assistant   Aug. 2014 – Dec. 2016
- Provided teaching assistance for a weekly lab based in Python and MATLAB

PUBLICATIONS

1. **Wheeler** et al. (2024). "Predicting spring phenology in deciduous broadleaf forests: NEON Phenology Forecasting Community Challenge." *Agr Forest Meteorol* 345: 109810.
2. Thomas et al.[+] (2023). "The NEON Ecological Forecasting Challenge." *Front Ecol Evol* 21(3): 112–113.
3. Halpern et al.[+] (2023) "Priorities for synthesis in ecology and environmental science." *Ecosphere* 14(1):e4342.
4. **Wheeler** & Dietze (2021). "Improving the monitoring of deciduous broadleaf phenology using the Geostationary Operational Environmental Satellite (GOES) 16 and 17." *Biogeosciences* 18: 1971-1985.
5. Iida[*] & **Wheeler**[*] et al. (2021). "Canopy structure metrics governing stemflow funneling differs between leafed and leafless states: Insights from a large-scale rainfall simulator". *Hydrol Processes* 35:e14294.
    [*]**These authors contributed equally to this paper**
6. Woelmer et al.[+] (2021). "10 Simple Rules for training yourself in an emerging field" *PLoS Comput Biol* 17(10): e1009440. https://doi.org/10.1371/journal.pcbi.1009440
7. Rollinson et al.[+] (2021) "Working across space and time: nonstationarity in ecological research and application." *Front Ecol Evol* 19(1): 66-72.
8. **Wheeler** et al. (2020). "Visible and near-infrared hyperspectral indices explain more variation in lower-crown leaf nitrogen concentrations in autumn than in summer." *Oecologia*. 192:13-27.
    Award: Highlighted Student Paper
9. **Wheeler** & Dietze (2019). "A statistical model for estimating midday NDVI from the Geostationary Operational Environmental Satellite (GOES) 16 and 17." *Remote Sensing* 11(21):2507.
10. Dietze et al.[+] (2018). "Ecological Forecasting." *Oxford Bibliographies.*
11. Hudson et al.[+] (2018). "American beech leaf-litter leachate chemistry: effects of geography and phenophase." *J Plant Nutr Soil Sci* 181(2):287-295.
12. **Wheeler** et al. (2017). "Tracking senescence-induced patterns in leaf litter leachate using parallel factor analysis modeling (PARAFAC) and self-organizing maps." *J. Geophys Res Biogeosci* 122(9):2233-2250.

13. Preprint: **Wheeler** & Dietze (2023). "A trigger may not be necessary to cause senescence in deciduous broadleaf forests." *bioRxiv* 10.1101/2023.06.07.544057.

[+]Includes K.I. Wheeler

SKILLS AND INTERESTS

Computer: R (Expert), ArcGIS (Intermediate), Python (Intermediate), Excel (Intermediate), High-Performance Computing (Expert), Bash (Expert), Unix (Expert), Git (Expert), MATLAB (Intermediate), Java (Familiar), and C++ (Familiar)
Science: Geospatial analysis, Bayesian and multivariate statistics, machine learning, ecological forecasting, and environmental modeling
Communication: Proposal writing, technical presentations, project management, leadership, and mentorship
Interests: Running, hiking, cycling, backpacking, and reading