Andrew Edward Brettin

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Education

PhD, Atmosphere-Ocean Science and Mathematics — **May 2025**
Courant Institute of Mathematical Sciences, New York University — New York, NY
Advisor: Dr. Laure Zanna

Bachelor of Science, Mathematics — **May 2019**
University of Minnesota, College of Science & Engineering — Minneapolis, MN
Summa cum laude with High Distinction (GPA 3.92)

Publications

1. Brettin, A., Zanna, L., & Barnes, E. A. (2025). Learning Propagators for Sea Surface Height Forecasts Using Koopman Autoencoders. *Geophysical Research Letters*, *52*(4), e2024GL112835. https://doi.org/10.1029/2024GL112835
2. Brettin, A., Zanna, L., & Barnes, E. A. (2025). Uncertainty-permitting machine learning reveals sources of dynamic sea level predictability across daily-to-seasonal timescales. Submitted to *Artificial Intelligence for the Earth Systems*. https://doi.org/10.48550/arXiv.2502.11293
3. Falasca, F., Brettin, A., Zanna, L., Griffies, S. M., Yin, J., & Zhao, M. (2023). Exploring the nonstationarity of coastal sea level probability distributions. *Environmental Data Science*, *2*, e16. https://doi.org/10.1017/eds.2023.10.
4. Meyer, K., Broda, J., Brettin, A., Muñiz, M., Gorman, S. Isbell, F. Hobbie, S., Zeeman, M.L., and McGehee, R. (2023). "Nitrogen-Induced Hysteresis in Grassland Biodiversity: A Theoretical Test of Litter-Mediated Mechanisms." *American Naturalist* 201(6). https://doi.org/10.1086/724383.
5. Brettin, A., Rossi–Goldthorpe, R., Weishaar, K., & Erovenko, I. V. (2018). Ebola could be eradicated through voluntary vaccination. *Royal Society Open Science*, *5*(1), 171591. https://doi.org/10.1098/rsos.171591

Selected Conference Presentations

Andrew Brettin, Laure Zanna, and Elizabeth Barnes (2023). Identifying Drivers of Subseasonal-to-Seasonal Sea Level Predictability Using Uncertainty- Permitting Machine Learning. Oral session presented at AGU Fall Meeting.

Andrew Brettin and Laure Zanna (2022). Characterizing the Impacts of Continental Shelf Depth on Sea Level Variability Using Clustering. Poster session presented at AGU Ocean Sciences Meeting.

María Sanchez-Muñiz, Kate Meyer, and Andrew Brettin (May 2019). Ecological Management Strategies Informed by Flow-Kick Dynamics. Poster session presented at SIAM Conference on the Applications of Dynamical Systems, Snowbird, UT.

Andrew Brettin and Kyle Weishaar (November 2017). Ebola Could Be Eradicated Through Voluntary Vaccination. Undergraduate Research Conference at the Interface of Biology and Mathematics, Knoxville, TN.

Teaching Experience

- Teaching Assistant, Numerical Analysis — Fall 2022
  New York University
- Tutor, Honors Calculus I–IV — Fall 2016–Spring 2019
  University Honors Program, University of Minnesota
- Grader, Honors Physics II — Spring 2017
  Department of Physics, University of Minnesota

Service

- Volunteer tutor, math grades 5-8 — Fall 2021–Spring 2022
  Common Denominator, New York, NY
- Project mentor—Undergraduate Research Program in Data Science — Spring 2021
  NYU Center for Data Science, collaboration with the National Society for Black Physicists

Departmental

- Vice President, Courant Student Organization — Fall 2021–Summer 2022
- PhD Student mentor, Courant — Fall 2020–present
- Master's student mentor, Courant — Spring 2020
- Social coordinator, Courant Student Organization — Fall 2019–Spring 2020

Other Experience

- NASA Summer School on Satellite Observations and Climate Models — Summer 2023
  Keck Institute for Space Studies, Caltech, Pasadena, CA
- LEAP Momentum Bootcamp on Climate Data Science — Summer 2022
  Columbia University, New York, NY
- OceanHackWeek Data Science and Oceanography Workshop — Summer 2021
  University of Washington eScience Institute, Virtual workshop
- Workshop on Climate Change and Resilience: Dynamical Systems and Data Assimilation — Summer 2018
  American Institute of Mathematics, San Jose, CA

Technical Skills

Programming languages and software:

- Languages: Python (packages: numpy, scipy, matplotlib, xarray, dask, pandas, scikit-learn), Julia, MATLAB, C++ (OpenMP, CUDA)
- Software: bash, git/GitHub, vim, SLURM, Jupyter, LaTeX, Mathematica