Joseph J. Fogarty

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Summary

Graduate student enrolled in the department of Civil and Environmental Engineering (CEE) at Princeton University, conducting research in the Environmental Fluid Mechanics (EFM) group. Although my undergraduate studies were in meteorology, my interests have pivoted from traditional operational forecasting to fluid dynamics, environmental engineering, and data science. As a doctoral student, my thesis employs numerical, statistical, and observational tools to simulate the changing Arctic sea ice surface and overlying atmospheric dynamics.

Education

Princeton University — Princeton, NJ
Ph.D. in Civil and Environmental Engineering — Sep 2018–Jan 2024

- Advisor: Elie Bou-Zeid
- M.A. in Civil and Env. Eng. Earned Apr 2021

Rutgers University — New Brunswick, NJ
B.S. in Meteorology, *summa cum laude* — Sep 2014–May 2018

- Advisor: Mark Miller
- Minors in Mathematics and Environmental Sciences

Publications

1. J. Fogarty & E. Bou-Zeid, "The Atmospheric Boundary Layer above the Marginal Ice Zone: Scaling, Surface Fluxes, and Secondary Circulations", *Boundary-Layer Meteorology* (2023), https://doi.org/10.1007/s10546-023-00825-x
2. J. Fogarty, E. Bou-Zeid, M. Bushuk, & L. Boisvert, "How Many Parameters are Needed to Represent Polar Sea Ice Surface Patterns and Heterogeneity?", *Cryosphere* (2024), *In Review*
3. J. Fogarty & E. Bou-Zeid, "Numerical Simulations of Satellite-Sensed Polar Surfaces", *Geophysical Research Letters* (2024), *In Preparation*

Research Experience

Ice-Water-Air Exchanges in the Marginal Ice Zone: Numerical Simulations of Satellite-Sensed Surface States — Denver, CO
Oral Presentation at the Annual AMS Conference — Jan 2023

Turbulence-Resolving Simulations of Atmosphere-Surface Coupling in the Marginal Ice Zone: The Interacting Effects of Temperature Heterogeneity — Phoenix, AZ
Oral Presentation at the Annual APS-DFD Conference — Nov 2021

Nonlinearity of Air-Ice-Water Exchanges: Simulations of Remotely-Sensed Surface States — San Francisco, CA
Poster Presentation at the Annual AGU Conference — Dec 2019

Drizzle Evaporation in the Stratocumulus-Topped Marine Boundary Layer and its Relationship with Sub-Cloud Turbulence — New Brunswick, NJ
Oral Presentation for George H. Cook Honors Project — May 2018

Seasonal Trends in Extreme Minimum Temperatures at Six New Jersey Locations — Piscataway, NJ
Poster Presentation at Rutgers Climate Symposium — Nov 2017

Teaching

- **Assistant in Instruction** at Princeton University — Spring 2022, Spring 2023
  Hydrology: Water and Climate (CEE 306)
- **Assistant in Instruction** at Princeton University — Fall 2021, Fall 2019
  Environmental Fluid Mechanics (CEE 305)
- **Assistant in Instruction** at Princeton University — Fall 2020, Fall 2022
  The Climatological, Hydrological, & Environmental Footprints of Cities (CEE 474)
- **Rutgers Learning Center Tutor** at Rutgers University — 2016-2017
  Pre-Calculus, Calculus, Linear Algebra

Scholarships and Awards

- Gordon S. Wu Scholarship — 2018–Current
- Rutgers Dean's List — 2014–2018
- Meteorology Student of the Year — 2018

Projects

More details of projects on github.com/josephfogarty

- **Ice SUrface energy Budget Solver** *(Python, 2019)*
  IceSUBS was a program written to solve a surface energy budget of a sea ice surface with eventual implementation in a large-eddy simulation model
- **Forecast Verification** *(Python/Jupyter, 2017)*
  A Jupyter notebook created with the intention to explore techniques and libraries in Python relevant to data science, using forecast verification techniques as the motivation

Skills

- **Languages:** Python, MATLAB, Fortran
- **GIS:** ArcGIS Pro, QGIS
- **Version Control:** Git
- **Other:** LaTeX, Microsoft Office

Professional Experience

Office of the New Jersey State Climatologist — Piscataway, NJ
Research Assistant, 20-30 hours/week — Jun 2017–Sep 2018

- Regular quality control for NJ CoCoRaHS stations, a nationwide citizen science effort to observe and record daily rainfall data
- Synthesized national snow data for the 2016 Annual Snow Report, which required synthesizing multiple data sources to prepare snow reports for the State Climatologist

– Conducted multiple independent NJ climate research projects under the advice of the State Climatologist, including (1) how extreme precipitation events have increased in NJ due to anthropogenic climate change and (2) the statistical extremes of minimum temperature trends in NJ

Rutgers Environmental Sciences New Brunswick, NJ

Weather Observer, 2-5 hours/week Dec 2016–Aug 2018

– Conduct and record daily weather observations multiple days per week at the Cooperative Observer Network (COOP) Rutgers weather station at Rutgers Gardens

– Manage, train, and organize other student observers in the program, e.g. creating weekly schedules and finding observers to fill vacancies

Spot-On Weather Marlboro, NJ

Undergraduate Intern, 10 hours/week Aug - Dec 2016

– Handled operational forecasts for TV and film crews while also being on call for said production crews to call at any time for an on-the-spot weather report

– Created forensic meteorology reports by using collecting archival meteorological data for civil lawsuits