Matthew Goldberg

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EDUCATION

University of Texas, Austin, Texas — September 2020-present
PhD Student in Computational Science, Engineering & Mathematics (CSEM)
Research Interests: Computational climate science, Hessian uncertainty quantification, Bayesian inverse problems, data assimilation

Bates College, Lewiston, Maine — 2018
Bachelor of Arts Double Major: Mathematics and Physics
Mathematics Thesis: Numerical Solutions to Partial Differential Equations
Physics Thesis: Simulating Barotropic Vorticity on a 2-Sphere Using Spectral Methods
GPA: 3.84

Edinburgh University, Edinburgh, Scotland — Fall 2016

HONORS AND AWARDS

UT Austin Jackson School of Geosciences Research Symposium 1st Prize (2024)
CSEM Fellowship: four-year merit-based fellowship awarded by the Oden Institute at UT Austin
Bates College Judith Magyar Isaacson '65 Prize: awarded students demonstrating high academic achievement in CS or math
Bates College Physics & Astronomy Thesis Prize: awarded to a senior who has demonstrated high achievement in the senior thesis
Honors Societies: Phi Beta Kappa, Sigma Xi (2018)
Bates College Dean's List (2015-2018)

RESEARCH EXPERIENCE

Oden Institute for Computational Engineering and Sciences, Austin, TX — September 2021-present
PhD Student, Professor Patrick Heimbach

- Conducting observing system simulation experiments (OSSEs) for subsea cables in Vanuatu/New Caledonia region
- Computing dynamical proxy potential measuring complementary and redundancy of subsea cable information
- Investigating parameter inference for finite-element based monolithic convection coupled phase change model
- Developed neural networks to study parameter inference in chaotic pendulum

Harvard School of Engineering and Applied Sciences, Cambridge, MA — June-August 2016
Research Experience for Undergraduates (REU) Intern, Professor L. Mahadevan

- Studied inverse problems to determine design of mechanical metamaterials deployable to a prescribed target shape
- Implemented computational techniques from graph theory and optimization theory using MATLAB

WORK EXPERIENCE

GNS Healthcare, Cambridge, MA — December 2018-May 2020
Software Engineer

- Developed drug-treatment intervention software built with causal inference ML algorithms
- Managed automation platform including testing protocol, release builds

Freedman Healthcare, Newton, MA — June-December 2018
Data Analyst Intern

- Assisted in ETL design, testing, and documentation for web analytics product using Python and Excel
- Test spreadsheet version control software using SQL database

GNS Healthcare, Cambridge, MA — June-August 2017
Software Engineer Intern

- Created software integration tests for causal machine learning and simulation platforms
- Ran Metropolis-Hastings MCMC to determine optimal Bayesian statistical networks
- Scored and analyzed models using R

CONFERENCES

Estimating the Climate and Circulation of the Ocean (ECCO) Annual Meeting, Austin, TX March 2024
Presenter
- Presented on subsea cable observing system assessment in a Western Pacific regional circulation model
- Compared data assimilation (observing system simulation experiments) with Hessian uncertainty quantification based methods

University of Texas at Austin Jackson School of Geophysics Student Research Symposium, Austin, TX February 2024
Presenter
- Presented on subsea cable observing system simulation experiments
- Awarded 1st prize for late-career PhD students

JTF SMART Cable Workshop and Moore Science Meeting, O'ahu, HI January 2023
Presenter
- Presented on subsea cable observing system simulation experiments for improved ocean state estimation and modeling
- Worked with geophysicists, telecommunications scientists, and data managers to prepare an annual report and future goals

LEADERSHIP ACTIVITIES

University of Texas, Austin, TX Spring 2024
STEM Girl Day Volunteer
- Planned, assembled, and demonstrated activities for elementary and middle school students introducing concepts from oceanography

University of Texas, Austin, TX Fall 2021-Spring 2022
Teacher's Assistant
- Taught graduate Quantum Mechanics to computational science PhD students
- Taught Statics course to undergraduate engineering students
- Held weekly discussion sessions, recitations, and office hours, graded exams, quizzes, and homeworks

Bates College, Lewiston, ME Spring 2018
Teacher's Assistant
- Aided students in Computational Science Lab Skills course
- Introduced data and programming skills and tools such as UNIX command line, version control, and python

Bates College Ultimate Frisbee Team 2014-2018
- Four year varsity team member (Team Captain 2016, 2017; USA Ultimate 2nd Team D-III All-New England 2018)
- Organized tournaments, practices, and community events (Team Treasurer 2017)

SKILLS

- Experienced in Python, MATLAB, R, C++, Fortran, SQL, LaTeX, Bash, and UNIX command line
- Experienced with high performance computing practices such as batch-queue applications (PBS, Slurm), launching dynamic HPC clusters, managing continuous integration, as well as software testing, deployment and release cycles
- Experienced with project development services such as GitHub, Bitbucket, and Jira
- Experienced in Agile/scrum software development environments