William Hofgard

PhD Student, Mathematics
Berkeley, CA

hofgard@berkeley.edu
(303) 818-8145

EDUCATION

University of California, Berkeley Berkeley, CA
Doctor of Philosophy, Mathematics
Expected Graduation May 2030 GPA: 4.00/4.00

Stanford University Stanford, CA
Master of Science, Electrical Engineering
Advisor: John Duchi
April 2025 GPA: 4.09/4.00

Stanford University Stanford, CA
Major: *Bachelor of Science with Honors*, Mathematics
Minor: History
June 2024, with Distinction GPA: 4.15/4.00

PUBLICATIONS

Hofgard, W. (Oct 2024). *Convergence Guarantees for Neural Network-Based Hamilton–Jacobi Reachability*. NeurIPS '24 Workshop on Data-Driven, Differentiable Simulations, Surrogates, and Solvers (D3S3).

ATLAS Collaboration. (2022). *Measurement prospects of Higgs boson pair production in the $b\bar{b}\gamma\gamma$ final state with the ATLAS experiment at the HL-LHC.* ATLAS Public Note.

- Performed physics analysis and extrapolation studies for the publication in addition to writing several drafts and producing publication plots
- Acted as one of two contact editors during the drafting and revision processes, presented publication drafts and ongoing research multiple times to the ATLAS Upgrade Physics and Higgs Diboson Search working groups

EXPERIENCE

Lawrence Livermore National Laboratory **Jun 2024 – Present**
Livermore, CA
Control & Optimization – Graduate Researcher

- Worked under Andrew Mastin and Jean-Paul Watson on improving algorithms and convergence guarantees for large-scale combinatorial optimization problems, relevant to power systems and operations research
- Performed research in spectral graph theory, proving novel results about the spectra of graph Laplacians arising in combinatorial optimization

University of Michigan, Mathematics REU **Jun 2023 – May 2024**
Ann Arbor, MI
Undergraduate Researcher

- Worked with Prof. Asaf Cohen to prove two novel results concerning the convergence of deep learning-based numerical methods for solving mean-field control problems (MFCPs), and provided a JAX-based implementation of a new deep learning-based method for solving high-dimensional, nonlinear PDEs
- Presented research in a long-form talk, paper under review by the SIAM Journal on Mathematics of Data Science
- Extended research into an undergraduate honor's thesis in mathematics, advised by Prof. Lenya Ryzhik

Western Interstate Energy Board (WIEB) **May 2022 – Sep 2022**
Denver, CO
Shultz Energy Fellow

- Worked with researchers across the Western Interconnection to model the impacts on the grid caused by changing temperature and precipitation trends

- Built open-source machine learning frameworks based on XGBoost that planners, load forecasters, and utilities will use to analyze risk posed to generation and transmission by climate change throughout the Western United States

SLAC National Accelerator Laboratory **Mar 2021 – Apr 2022**
Stanford, CA
Undergraduate Researcher

- Under the ATLAS Collaboration, performed high energy physics analysis of the prospects of the Higgs Diboson Search at the Large Hadron Collider in light of planned upgrades to the ATLAS Detector
- Collaborated closely with scientists from across the ATLAS Collaboration, presenting findings and projections to a variety of groups within the organization, including the conveners of the ATLAS Upgrade Physics Working Group

HONORS & AWARDS

NSF Graduate Research Fellowship **Apr 2025**
- Awarded prestigious three-year, fully funded fellowship for graduate studies

Department of Mathematics Distinguished Service Award **Jun 2024**
- Recognized by the Stanford Department of Mathematics for my "outstanding contributions to the department, their fellow students, and the University as a whole"

Stanford Alumni Association Award of Excellence **May 2024**
- Received an award recognizing members of the senior class who "demonstrate a sincere commitment to the university through involvement, leadership and extraordinary Stanford spirit"

J.E. Wallace Sterling Award for Scholastic Achievement **Apr 2024**
- Received one of Stanford's most selective recognitions of a student's overall academic performance, awarded to the top 25 seniors in the School of Humanities and Sciences

Phi Beta Kappa **May 2023**
- Elected as one of 37 juniors to Stanford's Phi Beta Kappa chapter

Shultz Energy Fellow **Apr 2022**
- Selected as one of four undergraduate Shultz energy fellows at Stanford to receive funding for a public service fellowship in the energy sector

National Merit Scholar **Apr 2020**
- Recipient of a $2500 scholarship awarded by the National Merit Scholarship Corporation after a nationwide selection and application process

SELECTED PROJECTS & PREPRINTS

Mastin, A., Hofgard, W., & J.P. Watson. (Nov 2024). *A Tractable Formulation for Power Flow Interdiction with Bounded Big-M Values.* Submitted to Mathematical Programming.

Hofgard, W., Sun, J., & A. Cohen. (May 2024). *Convergence of the Deep Galerkin Method for Mean Field Control Problems*. Submitted to SIAM Journal on Mathematics of Data Science (SIMODS).

Hofgard, W. (Jun 2023). *Approximating Solutions of Hamilton-Jacobi-Bellman Equations with Semidefinite Programming.* Research and poster presented at the Spring 2023 final presentation session for EE 364B.

Hofgard, W. (Aug 2022). *Peaktemp.* Open-source Python package for modeling the impact that different CMIP6 climate scenarios have on the Western grid published to the Python Package Index (PyPI).

LEADERSHIP & TEACHING

Course Assistant, Partial Differential Equations (Math 220A) **Fall 2024**

- Held weekly office hours, wrote solutions for homework problems, and graded homeworks and exams for Stanford's graduate course on the theory and applications of partial differential equations, taught by Prof. Jonathan Luk

Grader, Theory of Partial Differential Equations (Math 173) **Spring 2024**

- Graded homework assignments for Stanford's advanced undergraduate course on the theory of partial differential equations

Course Assistant, Convex Optimization I (EE 364A) **Winter 2024**

- Held weekly office hours, answered student questions about concepts in convex analysis and optimization, and wrote homework and exam questions for Stanford's graduate course on convex optimization, taught by Prof. Stephen Boyd

Peer Tutoring Coordinator, Stanford Math Department **2021 – 2024**

- Managed 16 paid student tutors employed by the Stanford math department to provide tutoring support to students in a variety of introductory math courses
- Tutored students in single and multivariable calculus, linear algebra and matrix theory, and ordinary/partial differential equations

Sector Lead, Stanford Data and Mapping for Society **2020 – 2023**

- Coordinated data science projects with government and non-profit partners, including the U.S. Office of Naval Research and The Nature Conservancy
- Led a team to visualize global capital flows between investment banks and carbon-emitting infrastructure projects for the Stanford Climate of Infrastructure Project

SKILLS

Languages : Python, Julia, C++, R, Matlab, JavaScript
Tools/Frameworks : PyTorch, JAX, TensorFlow, CVX, Mathematica, PostGIS, Git, Leaflet
General : Machine Learning, Convex Optimization, Nonlinear and Combinatorial Optimization, Statistical Inference and Modeling, Data Structures, Object Oriented Programming, Spatial Data Science, Data Analysis and Visualization