WILLIAM YIK

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EDUCATION

Harvey Mudd College *Claremont, CA*
B.S. Mathematics and Computer Science, Emphasis in Environmental Analysis Expected 2024
Major GPA: 4.00, Overall GPA: 3.95

Select Coursework:
Mathematics: Dynamical Systems, Mathematical Modeling, Stochastics, Differential Equations, Linear Algebra
Computer Science: Neural Networks, Scientific Computing, Algorithms, Programming Languages, Data Structures
Climate Science: Climate Dynamics, Oceanography, Global Climate Change, Climate Change in Context

PUBLICATIONS

[5] **Yik, W.**, Sonnewald, M., Clare, M. C. A., Lguensat, R. (2023). Southern Ocean Dynamics Under Climate Change: New Knowledge Through Physics-Guided Machine Learning. *NeurIPS Workshop: Tackling Climate Change with Machine Learning*. https://arxiv.org/abs/2310.13916

[4] Hom, C., **Yik, W.**, Montañez, G. D. (2023). Finite-Sample Bounds for Two-Distribution Hypothesis Tests. *IEEE International Conference on Data Science and Advanced Analytics (DSAA)*. https://doi.org/10.1109/DSAA60987.2023.10302643

[3] **Yik, W.**, Silva, S. J., Geiss, A., Watson-Parris, D. (2023). Exploring Randomly Wired Neural Networks for Climate Model Emulation. *Artificial Intelligence for the Earth Systems (AIES)*. https://doi.org/10.1175/AIES-D-22-0088.1

[2] **Yik, W.**, Silva, S. J., Geiss, A., Watson-Parris, D. (2022). Exploring Randomly Wired Neural Networks for Climate Model Emulation. *NeurIPS Workshop: Tackling Climate Change with Machine Learning*. https://www.climatechange.ai/papers/neurips2022/36/paper.pdf

[1] **Yik, W.**, Serafini, L., Lindsey, T., Montañez, G. D. (2022). Identifying Bias in Data Using Two-Distribution Hypothesis Tests. *AAAI/ACM Conference on Artificial Intelligence, Ethics, and Society (AIES)*. https://doi.org/10.1145/3514094.3534169

RESEARCH EXPERIENCE

University of California, Davis *Davis, CA*
Student Researcher, Computational Climate and Ocean Group Aug 2023 - Present

- Advisor: Maike Sonnewald
- Identifying and tracking Southern Ocean dynamics under climate change using neural networks

Lawrence Livermore National Laboratory *Livermore, CA*
Clinic Project Team Member, Harvey Mudd College Clinic Program Aug 2023 - Present

- Liaison: Robert Blake, Advisor: Naim Matasci
- Investigating empirical scaling of scientific machine learning emulators

University of Southern California *Los Angeles, CA*
Undergraduate Researcher, Atmospheric Composition and Earth Data Science Group May 2022 - Present

- Advisor: Sam Silva
- Exploring the utility of randomly wired neural networks for climate model emulation
- Investigating methods for enforcing fairness and equity in neural climate emulators

NOAA Geophysical Fluid Dynamics Laboratory *Princeton, NJ*
Research Intern, Ocean and Cryosphere Division May 2023 - Aug 2023

- Advisors: Maike Sonnewald, Stephen Griffies
- Applied deep ensemble learning methods for inferring subsurface ocean dynamics
- Improved the interpretability of models using explainable AI techniques such as layer-wise relevance propagation and Shapley additive explanations

Harvey Mudd College *Claremont, CA*
Undergraduate Researcher, AMISTAD Machine Learning Lab May 2021 - May 2023

- Advisor: George Montañez
- Implemented novel hypothesis tests to systematically identify bias in machine learning training data
- Derived mathematical finite-sample bounds for two-distribution hypothesis tests

Idaho National Laboratory *Idaho Falls, ID*
Research Intern, Energy Innovation Laboratory Aug 2020 - Sept 2020

- Advisor: Christopher Zarzana
- Tested separation and content analysis methods for ligands and biomass using gas chromatography and pyrolysis
- Utilized liquid chromatography and mass spectrometry to accelerate ligand sample production

CONTRIBUTED TALKS AND POSTERS

[9] Ocean Sciences Meeting, *Talk: Explainable Machine Learning for Inferring Subsurface Ocean Dynamics*, Upcoming Feb 2024.

[8] NeurIPS Workshop: Tackling Climate Change with Machine Learning, *Poster: Southern Ocean Dynamics Under Climate Change: New Knowledge Through Physics-Guided Machine Learning*, Dec 2023.

[7] American Geophysical Union Fall Meeting, *Talk: Enforcing Equity in Neural Climate Emulators*, Dec 2023.

[6] IEEE International Conference on Data Science and Advanced Analytics, *Talk: Finite-Sample Bounds for Two-Distribution Hypothesis Tests*, Oct 2023.

[5] Harvey Mudd College Student Symposium, *Poster: Explainable Machine Learning for Inferring Subsurface Ocean Dynamics*, Sept 2023.

[4] NOAA Science and Education Symposium, *Talk: Explainable Machine Learning for Inferring Subsurface Ocean Dynamics*, Aug 2023.

[3] NeurIPS Workshop: Tackling Climate Change with Machine Learning, *Poster: Exploring Randomly Wired Neural Networks for Climate Model Emulation*, Dec 2022.

[2] Harvey Mudd College Student Symposium, *Poster: Exploring Randomly Wired Neural Networks for Climate Model Emulation*, Sept 2022.

[1] AAAI/ACM Conference on Artificial Intelligence, Ethics, and Society, *Talk and Poster: Identifying Bias in Data Using Two-Distribution Hypothesis Tests*, Aug 2022.

AWARDS AND HONORS

Nominee, Outstanding Undergraduate Researcher (application pending) 2023
Computing Research Association

Ernest F. Hollings Undergraduate Scholarship 2022
National Oceanic and Atmospheric Administration

Dean's List Spring 2021 - Fall 2022
Harvey Mudd College

National Merit Scholarship 2020
National Merit Scholarship Corporation

TEACHING EXPERIENCE

Harvey Mudd College *Claremont, CA*
Mathematics Academic Excellence Facilitator Aug 2022 - Present

- Courses: Differential Equations, Discrete Mathematics, Linear Algebra, Probability and Statistics, Calculus
- Nominated by faculty to hold weekly tutoring sessions for groups of 10-50 students
- Hosting weekly facilitator meetings to improve mentor and tutor sessions across the college

Harvey Mudd College *Claremont, CA*
Teaching Assistant Aug 2021 - May 2022

- Courses: Computability and Logic, Discrete Mathematics, Introduction to Computer Science
- Held weekly tutoring sessions for groups of 5-30 students and graded homework assignments

SKILLS

Programming Languages	Python, R, MATLAB, C++, Java, Haskell
Machine Learning/Data Science	Tensorflow, PyTorch, Scikit-learn, SciPy, NumPy, Pandas, Xarray
Software/Web Development	Git, Docker, Visual Studio Code, Eclipse, Flask, HTML, CSS