

STANFORD UNIVERSITY

Ph.D. in Computational and Mathematical Engineering
Advised by Professor Daniel Tartakovsky

Palo Alto, CA
Current

UNIVERSITY of OXFORD

M.Sc. in Mathematical Modelling and Scientific Computing
Dissertation title: “Simulating 3D Orthotropic Cardiac Electromechanics Incorporating Stress-Assisted Diffusion,” supervised by Professor Ricardo Ruiz-Baier

Oxford, United Kingdom
November 2018

HARVARD UNIVERSITY

B.A. in Applied Mathematics; Magna Cum Laude with High Honors
Honors thesis title: “MethaneSat: Detecting Methane Emissions in the Barnett Shale Region,” supervised by Professor Steven C. Wofsy and Dr. Joshua Benmergui

Cambridge, MA
May 2017

Academic & Research Experience

PhD Candidate – Stanford University

Sep 2021 – Current

- Dissertation topic: advancing SciML tools for use in data-poor regimes, working towards efficient and uncertainty-aware graph-based surrogates for multiscale, multiphysics systems (with Daniel Tartakovsky)
- In 2nd-year research rotation, developed model selection algorithm for contextual bandits, leveraging tools from machine learning and statistical learning theory (with Susan Athey)

Researcher – Wofsy Lab, Harvard University Dept. of Earth & Planetary Sciences

Jan 2016 – Sep 2017

- Designed and implemented large-scale inversion model using Python, HPC & simulated geospatial data to assess effectiveness of MethaneSat (recently launched in 2024!) in constraining methane emissions

Teaching Fellow – Harvard University Dept. of Applied Mathematics

- AM105: Ordinary & Partial Differential Equations Spring 2016, Fall 2016
- AM21a: Multivariable Calculus Fall 2015
- Twice awarded *Certificate of Distinction in Teaching* based on students’ end-year reviews

SULI DOE Intern – Glenzer Lab, SLAC National Accelerator Laboratory

June 2015 – Aug 2015

- Developed cryogenic hydrogen microjet targets for ion acceleration from laser-plasma interaction; managed ion spectrometers and radiochromic film diagnostics during experiments at LLNL Jupiter Laser Facility

Professional Experience

Graduate Intern – Computer Science Research Institute (CSRI), Sandia National Labs

Summer 2025

- Developing physics-inspired GNN-based surrogate modeling framework for massive-scale ice sheet simulations, incorporating transfer learning, fine-tuning, and domain decomposition techniques

Machine Learning & Mathematical Sciences Intern – Apple

Summer 2024

- Developed data-driven coarse graining and surrogate modeling methods for high-impact application as part of the Exploratory Design Group (XDG)

Technical Analyst – The RAND Corporation

Jan 2019 – Sep 2021

- Developed Markov Chain Monte Carlo models to study financial impact of proposed healthcare reforms; conducted network analysis to explore strategic ally relationships across economic, diplomatic, and military domains; led theoretical analysis and implementation of adversarial AI techniques, including model stealing, model inversion, and membership inference; developed models for rapid decision-making under uncertainty; advised state-level policymakers on modeling the COVID-19 pandemic; project manager for TALIS Video Study and Global Teaching Insights

Publications

(*) indicates first author

- Propp, A.***, Actor, J., Walker, E., Owhadi, H., Tartakovsky, D., Trask, N. (2025) “Learning Dirichlet-to-Neumann Maps on Graphs via Gaussian Processes.” (*submitted*). <https://arxiv.org/abs/2506.02337>.
- Propp, A.***, Perego, M., Howard, A., Gruber, A., Stinis, P., Cyr, E., Tartakovsky, D. (2025) “Domain-decomposed GNN-based surrogate modeling for ice sheets.” (*submitted*).
- Propp, A.***, Vardavas, R., Price, C., Kapinos, K. (2025) “LHIEM: the Longitudinal Health, Income, and Employment Model.” Journal of Artificial Societies and Social Simulation. <https://www.jasss.org/28/2/1.html>.
- Propp, A.***, Tartakovsky, D. (2025). “Transfer learning on multi-dimensional data: A novel approach to neural network-based surrogate modeling.” Journal of Machine Learning for Modeling and Computing. <https://doi.org/10.1615/JMachLearnModelComput.2024057138>.
- Krishnamurthy, S.K.* , **Propp, A.***, Athey, S. (2024). “Towards Costless Model Selection in Contextual Bandits: A Bias-Variance Perspective.” Proceedings of the 27th International Conference on Artificial Intelligence and Statistics (AISTATS). <https://proceedings.mlr.press/v238/kumar-krishnamurthy24a/kumar-krishnamurthy24a.pdf>.
- Propp, A.***, Gizzi, A. , Levrero-Florencio, F., Ruiz-Baier, R. (2019). “An orthotropic electro-viscoelastic model for the heart with stress-assisted diffusion.” Biomechanics and Modeling in Mechanobiology. <https://doi.org/10.1007/s10237-019-01237-y>.
- Gauthier, M.* et al. [**including Propp, A**] (2016). “High intensity laser-accelerated ion beam produced from cryogenic micro-jet target”. AIP Review of Scientific Instruments. <https://doi.org/10.1063/1.4961270>.
- Chen, S. N.* et al. [**including Propp, A**] (2016). “Absolute dosimetric characterization of Gafchromic EBT3 and HDv2 films using commercial flat-bed scanners and evaluation of the scanner response function variability”. AIP Review of Scientific Instruments. <https://doi.org/10.1063/1.4954921>.

Selected Conferences and Workshops

- Propp, A.**, Actor, J., Walker, E., Owhadi, H., Tartakovsky, D., Trask, N. “Learning Dirichlet-to-Neumann maps on graphs with Gaussian processes”. SIAM Mathematics of Data Science (*Poster*, 2024).
- Propp, A.**, Howard, A., Perego, M., Heinlein, A., Tartakovsky, D., Stinis, P. “Graph neural operators for quantification of geometric uncertainty.” WCCM / PANACM (*Invited talk*, 2024).
- Propp, A.**, Actor, J., Walker, E., Owhadi, H., Tartakovsky, D., Trask, N. “Discovery of Dirichlet-to-Neumann maps on graphs via Gaussian processes”. Scientific Machine Learning: Emerging Topics (*Contributed talk*, 2024).
- Propp, A.** and Tartakovsky, D. “Transfer learning for surrogate models of PDEs.” Mathematical and Scientific Machine Learning, ICERM (*Invited talk*, 2023).
- Propp, A.**, Price, C., Vardavas, R., Kapinos, K. “Dynamic microsimulation modeling for healthcare expenditures.” Conference of the American Society of Health Economists (ASHEcon) (*Contributed talk*, 2021).
- Gizzi, A., **Propp, A.**, Ruiz-Baier, R. “Mixed formulations for stress-assisted diffusion problems in cardiac biomechanics.” ICNumACA (2018).
- Propp, A.** et al. “MethaneSat: Detecting methane emissions in the Barnett Shale region.” American Geophysical Union (AGU) Fall Meeting (*Contributed talk*, 2017).
- Propp, A.** et al. “Development of and laser-driven proton acceleration from a cryogenic hydrogen microjet.” 3rd High-Power Laser Workshop at SLAC National Accelerator Laboratory (*Poster*, 2015).

Awards & Fellowships

ICME Student Leadership Award, Stanford University	May 2023
Stanford Graduate Fellowship	Sep 2021
Enhancing Diversity in Graduate Education (EDGE) Fellowship, Stanford University	Sep 2021
RAND Corporation Spotlight Award	April 2020
Distinction on M.Sc. dissertation, Oxford Mathematical Institute	Sep 2018

Magna Cum Laude, Harvard University
Certificate of Distinction in Teaching, Harvard University
Certificate of Distinction in Teaching, Harvard University
Harvard College Scholar
“Hanging Jig,” U.S. Patent D679,613 S

May 2017
Dec 2016
May 2016
May 2014
April 2013

Service

Reviewer – JASSS; Neural Networks; IJUQ

Peer mentor – Stanford EDGE Program; Stanford ICME Buddy Program

Board member – Stanford Women in Mathematics, Statistics, and Computational Engineering (WiMSCE)

Member – ICME Student Action Group