Adrienne M. Propp

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STANFORD UNIVERSITY Palo Alto, CA
Ph.D. in Computational and Mathematical Engineering Current
Advised by Professor Daniel Tartakovsky

UNIVERSITY of OXFORD Oxford, United Kingdom
M.Sc. in Mathematical Modelling and Scientific Computing November 2018
Dissertation title: "Simulating 3D Orthotropic Cardiac Electromechanics Incorporating Stress-Assisted Diffusion," supervised by Professor Ricardo Ruiz-Baier

HARVARD UNIVERSITY Cambridge, MA
B.A. in Applied Mathematics; Magna Cum Laude with High Honors May 2017
Honors thesis title: "MethaneSat: Detecting Methane Emissions in the Barnett Shale Region," supervised by Professor Steven C. Wofsy and Dr. Joshua Benmergui

Academic & Professional Experience

PhD Candidate – Stanford University Sep 2021 – Current

- Advancing scientific machine learning tools for use in data-poor environments, working towards efficient solutions to multiscale PDEs with applications such as climate modeling (with Daniel Tartakovsky)
- Developed model selection algorithm for contextual bandits, leveraging tools from machine learning and statistical learning theory (with Susan Athey)
- Mathematical modeling to understand processes leading to instability in earth systems (with Jenny Suckale)

ML & Mathematical Sciences Intern – Apple June 2024 – Sep 2024

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

Technical Analyst – RAND Corporation Jan 2019 – Sep 2021

- Designed Markov Chain Monte Carlo models in R to study financial impact of proposed healthcare reforms; network analysis in Python to examine ally relationships along economic, diplomatic, and military lines; theoretical analysis and implementation of adversarial AI techniques such as model stealing, model inversion, and membership inference; modeling 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

Researcher – Wofsy Lab, Harvard University Dept. of Earth & Planetary Sciences Jan 2016 – Sep 2017

- Implemented large-scale inversion model using Python & simulated geospatial data to quantify ability of MethaneSat (a proposed satellite scheduled for launch in early 2024) to constrain methane emissions

Teaching Fellow – Harvard University Dept. of Applied Mathematics Aug 2015 – Dec 2017

- Teaching Fellow in multivariable calculus (AM21a) and differential equations (AM105)
- Two-time recipient of Certificate of Distinction in Teaching, awarded based on students' end-of-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

Peer Reviewed Publications

(*) indicates first author

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.

RAND Reports

Kapinos, K., Price, C., Anderson, D., **Propp, A.**, Vardavas, R., Whaley, C. (2020). "Analysis of the 10Plan: A Self-Pay System Designed to Minimize the Burden of Health Care Costs." RAND Corporation. https://www.rand.org/pubs/research_reports/RR4270.html.

Price, C., Klima, K., **Propp, A.**, Colbert-Kelly, S. (2020). "A Model of the Spread of the COVID-19 Pandemic During a Hurricane in Virginia." RAND Corporation. https://www.rand.org/pubs/research_reports/RRA323-2.html.

Price, C., and **Propp, A.** (2020). "A Framework for Assessing Models of the COVID-19 Pandemic to Inform Policymaking in Virginia." RAND Corporation. https://www.rand.org/pubs/research_reports/RRA323-1.html.

Conferences and Workshops

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).

Suckale, J., **Propp, A.**, Iacovino, K. "Towards a process-based understanding of deflation- inflation events and associated lava fountaining at Kilauea volcano." American Geophysical Union (AGU) Fall Meeting (2022).

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).

Benmergui, J. et al. [**including Propp, A**]. "Background concentrations for high resolution satellite observing systems of methane." American Geophysical Union (AGU) Fall Meeting (2017).

Curry, C. et al. [**including Propp, A**]. "Deflection of laser accelerated protons due to multi-megagauss magnetic fields in high-intensity laser-plasma interactions." IEEE International Conference on Plasma Science (2016).

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).

Curry, C. et al. [**including Propp, A**]. "Spectral Features in Laser Driven Proton Acceleration from Cylindrical Solid-density Hydrogen Jets." 57th Annual Meeting of the APS Division of Plasma Physics (*Poster*, 2015).

Gauthier, M. et al. [**including Propp, A**]. "Proton shock acceleration using a high contrast high intensity laser." 57th Annual Meeting of the APS Division of Plasma Physics (2015).

Kim, J. et al. [**including Propp, A**]. "Laser-driven proton and deuteron acceleration from a pure solid- density H2/D2 cryogenic jet." 57th Annual Meeting of the APS Division of Plasma Physics (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	May 2017
Certificate of Distinction in Teaching, Harvard University	May 2016
Certificate of Distinction in Teaching, Harvard University	Dec 2016
Harvard College Scholar	May 2014
"Hanging Jig," U.S. Patent D679,613 S	April 2013

Skills

Technical (in order of proficiency): Python, R, MATLAB, C++, SQL, Stata, C, Julia, PHP, JavaScript
Libraries: numpy, pandas, scipy, scikit-learn, networkx, pytorch, tensorflow, matplotlib, geopandas, rasterio
Language: English (native), French (B2), Spanish (B1)
Other: Git, vim, slurm, LaTeX, ArcGIS, Flask, React, Node.js

Service

Reviewer – JASSS, Neural Networks, IJUQ
Peer mentor – Stanford EDGE Program
Board member – Women in Mathematics, Statistics, and Computational Engineering (WiMSCE)
Member – ICME Student Action Group

Activities and Interests

Hiking, scuba diving, rock climbing, dance (mostly modern and hip-hop), surfing, skiing, pottery, painting