

Mary I. Letey

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EDUCATION

Present	Harvard University Applied Mathematics PhD with the Pehlevan Group
2023	Perimeter Institute Theoretical Physics MSc
2022	University of Cambridge Mathematics BA (Tripos)
2018	University of Colorado Mathematics & Computer Science, 135 Credit Hours

PUBLICATIONS

2024	Asymptotic Theory of In-Context Learning by Linear Attention Yue Lu, Mary Letey, Jacob Zavatore-Veth, Anindita Maiti, Cengiz Pehlevan Preprint 2405.11751
2022	Quantum Initial Conditions for Curved Inflating Universes Mary Letey, Zakhar Shumaylov, Fruzsina Agocs, Will Handley, Michael Hobson, Anthony Lasenby <i>In Review</i> , Preprint 2211.17248

RESEARCH

Summer 2023	Montreal Institute for Learning Algorithms (Mila) Supervisor • Professor Siamak Ravanbakhsh <i>Generalising continuous kernel CNNs for neural operators continuously dependent on input functions.</i>
Thesis 2022-23	Perimeter Institute for Theoretical Physics Supervisor • Professor Latham Boyle <i>Extending the use of reflection groups in classifying discrete structures in Lorentzian spaces, we demonstrate substantial differences between reflection groups in Euclidean and Lorentzian spaces.</i>
Summer 2022	Kavli Institute for Cosmology, University of Cambridge Supervisor • Dr Will Handley <i>A novel comoving curvature perturbation variable for inflaton fluctuations in curved universes is proposed. Initial conditions are derived by setting the vacuum using renormalised stress energy tensor.</i>

PROJECTS

• For more detailed descriptions, fun maths, and earlier projects, please see my website •	
Spring 2024	High Performance Computing, Harvard University Instructor • Professor Boris Kozinsky, Ignacio Becker-Troncoso <i>Parallelisable algorithm for covariance estimation for data with structured missingness, w/ finance applications.</i>
Spring 2024	Geometric Methods in Machine Learning, Harvard University Instructor • Professor Melanie Webber <i>Implementing a generalisable taxonomy of manifold learning algorithms.</i>
Fall 2023	Algorithms for Data Science, Harvard University Instructor • Professor Sitan Chen <i>On diffusion-based generative models; connecting variational inference in graphical models to score approx.</i>
Fall 2022	Perimeter Quantum Intelligence Lab Supervisor • Professor Roger Melko <i>Generalising data-enhanced Variational Monte Carlo simulations to include measurement error in Rydberg arrays.</i>

AWARDS

2024	Clare Marie Doris Innovation Fund Harvard University	
2023	Graduate Prize Fellowship Harvard University	Summer Research Bursary McGill University, 4000CAD
2022	International Scholarship Perimeter Institute, 45000CAD	Summer Research Bursary Royal Society, 3000GBP

COMMUNITY & SPORT

2021-23	Tutor • Mathematics & Physics. Over 20 Pupils, through Blue Education and U2Tuition .
2021	Senior Coxswain • Cambridge City Rowing Club (employed) & St Johns College Rowing Club (volunteer).
2019-21	President • St Johns College Entrepreneurs' Club