

Medha Agarwal

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EDUCATION

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| AUG 2026 | PhD, Statistics UNIVERSITY OF WASHINGTON ADVISOR: Alex Luedtke , Zaid Harchaoui COURSEWORK: Optimal transport & gradient flows, machine learning from big data, regression methods, statistical inference, statistical learning, measure-theoretic probability. |
| MAY 2021 | Bachelor in Science, Mathematics and Scientific Computing INDIAN INSTITUTE OF TECHNOLOGY KANPUR ADVISOR: Dootika Vats MINOR: English Literature COURSEWORK: Sampling and data analysis, data structures and algorithms, stochastic processes, Bayesian statistics, probability theory, multivariate analysis. |

WORK EXPERIENCE

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| SUMMER 2024 | Amazon Science APPLIED SCIENTIST INTERN • Foundational model for probabilistic forecasting of multi-horizon and multivariate time series using convolutional neural networks based Seq2Seq architectures. | <i>New York City, NY</i> |
| SUMMER 2023 | Amazon Science APPLIED SCIENTIST INTERN • Reinforcement learning using human feedback training pipeline for foundational LLMs. • Work featured in Amazon Machine Learning Conference 2023 . | <i>Bellevue, WA</i> |
| 2021-PRESENT | University of Washington PREDOC RESEARCH ASSOCIATE • Density estimation and generative modeling using normalizing flows. • Optimal transport and gradient flows for explainable artificial intelligence. • Machine learning for multi-modal wildlife sensor data - audio, video, GPS, and accelerometry. | <i>Seattle, WA</i> |
| SUMMER 2020 | Duke University RESEARCH INTERN, Advisor: Jason Xu • Accelerated monotonic optimization algorithms using quasi-Newton methods. • Asymptotically valid convergence diagnostics and stopping criterion for importance sampling. | <i>Durham, NC</i> |
| 2020-2021 | Indian Institute of Technology Kanpur RESEARCH INTERN, Advisor: Dootika Vats • Asymptotically valid autocovariance and spectral variance estimators for Markov chain Monte Carlo in the case of multimodal target distributions. | <i>Kanpur, India</i> |

PUBLICATIONS

- **Medha Agarwal**, Kasim Rafiq, Ronak Mehta, Briana Abrahms, and Zaid Harchaoui. Leveraging machine learning and accelerometry to classify animal behaviours with uncertainty. *bioRxiv*, pages 2024–12, 2024a
Submitted to: Methods in Ecology and Evolution
- **Medha Agarwal**, Zaid Harchaoui, Garrett Mulcahy, and Soumik Pal. Iterated Schrödinger bridge approximation to Wasserstein gradient flows. *arXiv preprint arXiv:2406.10823*, 2024b
Submitted to: Journal of Functional Analysis
- **Medha Agarwal** and Jason Xu. Quasi-Newton acceleration of EM and MM algorithms via Broyden’s method. *Journal of Computational and Graphical Statistics*, 2023
- **Medha Agarwal**, Dootika Vats, and Víctor Elvira. A principled stopping rule for importance sampling. *Electronic Journal of Statistics*, 16(2):5570–5590, 2022
- **Medha Agarwal** and Dootika Vats. Globally centered autocovariances in MCMC. *Journal of Computational and Graphical Statistics*, 31(3):629–638, 2022
- Akash Jain, Manish Kumar, Rithvik Patibandla, Abhinav Arora, Akash K Singh, Varun Pawar, Aditya Rai,

Medha Agarwal, Priank Prasad, Vandit Sanadhya, et al. Design and development of underwater vehicle: Anahita. *arXiv preprint arXiv:1903.00494*, 2019

WORK IN PROGRESS

- **Medha Agarwal**, Garrett Mulcahy, Soumik Pal, and Zaid Harchaoui. Relaxed information divergence gradient flow. 2025
Will be submitted to ICML 2025

SOFTWARE

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| 2024 | Code for AWD Biologging | [GitHub] |
| 2024 | Code for Schrödinger Bridge Scheme | [Algorithm] [GitHub] |
| 2023 | Code for Brenier Potential Flow | [GitHub] |
| 2020 | R package <code>quasiNewtonMM</code> | [GitHub] |
| 2020 | R package <code>multichainACF</code> | [Vignette] [GitHub] |

ACADEMIC ACHIEVEMENTS AND SCHOLARSHIPS

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| 2024 | Winner, Student Paper Competition, ASA Conference on Statistical Learning and Data Science . |
| 2023 | Finalist, Two-Sigma PhD Fellowship program. |
| 2023 | Institute of Mathematical Statistics Hannan Graduate Student Travel Award <i>Awarded to fund travel and registration for Bayes Comp 2023 to give an invited talk.</i> |
| 2022 | Center for Statistics and the Social Sciences Travel Award for BayesComp 2023 |
| 2022 | Institute for Foundations of Data Science Scholarship <i>Supported by the NSF Transdisciplinary Research in Principles of Data Science (TRIPODS) program</i> |
| 2021 | Proficiency Medal , Department of Mathematics and Statistics, IIT Kanpur <i>Awarded for the best academic performance among graduating students in each department</i> |
| 2017 | Academic Excellence Award-Dr. Sangeeta Goel Memorial Award at IIT Kanpur <i>Awarded to first-year female undergraduate student with highest All India Rank in Indian Institute of Technology Joint Entrance Examination.</i> |
| 2016 | Certificate of Merit (Statewise Top 1 %) in National Standard Examination in Chemistry |
| 2015 | Kishore Vigyan Protsahan Yojana fellow with All India Rank 212 <i>National Program of Fellowship in Basic Sciences funded by the Government of India</i> |
| 2015 | National Talent Search Examination scholar, Government of India <i>National level scholarship program by Govt. of India.</i> |

TALKS AND WORKSHOPS

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| JUL 2026 | Wasserstein Gradient Flows in Math and Machine Learning Workshop Banff International Research Station - invited attendee | <i>Banff, Canada</i> |
| JAN 2025 | 2025 Joint Mathematics Meetings Mathematics of Adversarial, Interpretable, and Explainable AI - invited session speaker | <i>Seattle, WA</i> |
| NOV 2024 | American Statistical Association Conference on Statistical Learning & Data Science - poster presentation | <i>Newport Beach, CA</i> |
| OCT 2024 | SIAM Conference on Mathematics of Data Science - poster presentation | <i>Atlanta, GA</i> |
| OCT 2023 | 4th Biennial Meeting of SIAM Pacific Northwest Section - contributed talk | <i>Bellingham, WA</i> |
| MAR 2023 | Bayes Comp - invited session speaker on MCMC diagnostics | <i>Levi, Finland</i> |
| AUG 2022 | Simons Institute Deep Learning Theory Workshop | <i>Berkeley, CA</i> |
| AUG 2020 | 14th International Conference in Monte Carlo & Quasi-Monte Carlo Methods in Scientific Computing | <i>Oxford, England</i> |
| JUL 2020 | noRth 2020 - a virtual conference for R users - scholarship recipient | <i>Minneapolis, MN</i> |

SKILLS

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| LEADERSHIP | Leader, Normalizing flows working group (2022-23) |
| PROGRAMMING | Python, R, MATLAB, SQL |
| TOOLS/Framework | PyTorch, JAX, Tensorflow, \LaTeX |