

Medha Agarwal

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EDUCATION

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

SUMMER 2024	Amazon Science APPLIED SCIENTIST INTERN <ul style="list-style-type: none">Foundational model for probabilistic forecasting of multivariate time series using the Seq2Seq architectures of a multi-horizon quantile recurrent forecaster.	<i>New York City, NY</i>
SUMMER 2023	Amazon Science APPLIED SCIENTIST INTERN <ul style="list-style-type: none">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 <ul style="list-style-type: none">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 <ul style="list-style-type: none">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 <ul style="list-style-type: none">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
Under peer review at: 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
Under peer review at: 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 flows. 2025

SOFTWARE

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

ACADEMIC ACHIEVEMENTS AND SCHOLARSHIPS

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

JUL 2025	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

LEADERSHIP	Leader, Normalizing flows working group (2022-23)
PROGRAMMING	Python, R, MATLAB, SQL
TOOLS/Framework	PyTorch, JAX, Tensorflow, L ^A T _E X