Medha Agarwal

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EDUCATION

AUG 2026	**PhD, Statistics (Machine Learning and Big Data Track)** UNIVERSITY OF WASHINGTON ADVISOR: Alex Luedtke, Zaid Harchaoui COURSEWORK: Optimal transport & gradient flows, machine learning for big data, regression methods, statistical inference, statistical learning, measure-theoretic probability, advanced deep learning.
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, real & complex analysis, calculus, ordinary differential equations.

WORK EXPERIENCE

SUMMER 2025 - PRESENT	**Abrahms Lab** — *Seattle, WA* PREDOC RESEARCH INTERN, Advisor: Briana Abrahms • Representation and transfer learning methods for 10+ years of multi-modal biologging data.
SUMMER 2024	**Amazon Science** — *New York City, NY* APPLIED SCIENTIST INTERN • Foundation modeling for multi-horizon probabilistic forecasting of high-dimensional time series.
SUMMER 2023	**Amazon Science** — *Bellevue, WA* APPLIED SCIENTIST INTERN • Reinforcement learning using human feedback training pipeline for foundational LLMs. • Work featured in **Amazon Machine Learning Conference 2023**.
2021-PRESENT	**University of Washington** — *Seattle, WA* PREDOC RESEARCHER • Optimal transport and gradient flows for explainable generative modeling. • Statistical estimation and hypothesis testing using optimal transport in causal inference. • Machine learning methods for multi-modal wildlife sensor data (audio, video, GPS, acceleration).
SUMMER 2020	**Duke University** — *Durham, NC* RESEARCH INTERN, Advisor: Jason Xu • Accelerated monotonic optimization algorithms using quasi-Newton methods.
SUMMER 2020	**University of Edinburgh** — *Edinburgh, Scotland* RESEARCH INTERN, Advisor: Victor Elvira • Asymptotically valid convergence diagnostics and stopping criterion for importance sampling.

PUBLICATIONS

- **Medha Agarwal**, K. Rafiq, R. Mehta, B. Abrahms, and Z. Harchaoui. Leveraging machine learning and accelerometry to classify animal behaviours with uncertainty. *bioRxiv*, 2024
  Accepted at: Methods in Ecology and Evolution

- **Medha Agarwal**, Z. Harchaoui, G. Mulcahy, and S. Pal. Langevin diffusion approximation to same marginal Schrödinger bridge. *arXiv*, 2025
  Under peer review at: Journal of Functional Analysis

- **Medha Agarwal** and J. Xu. Quasi-Newton Acceleration of EM and MM Algorithms via Broyden's Method. *Journal of Computational and Graphical Statistics*, 2023

- **Medha Agarwal**, D. Vats, and V. Elvira. A principled stopping rule for importance sampling. *Electronic Journal of Statistics*, 2022

- **Medha Agarwal** and D. Vats. Globally Centered Autocovariances in MCMC. *Journal of Computational and Graphical Statistics*, 2022

Software & Datsets

2025	Dataset for **AWD Biologging**	[Zenodo]
2024	Code for **AWD Biologging**	[GitHub]
2024	Code for **Schrödinger Bridge Scheme**	[GitHub]
2023	Code for **Brenier Potential Flow**	[GitHub]
2020	**R** package quasiNewtonMM	[GitHub]
2020	**R** package multichainACF	[GitHub]

Academic Achievements and Scholarships

2025	Graduate Student Conference Presentation Award, University of Washington
2024	Winner, Student Paper Competition, ASA Conference on Statistical Learning and Data Science
2023	Finalist, Two-Sigma PhD Fellowship Program
2023	Hannan Graduate Student Award, Institute of Mathematical Statistics
2022	Center for Statistics and the Social Sciences Travel Award, University of Washington
2022	Institute for Foundations of Data Science Scholarship *Supported by the NSF Transdisciplinary Research in Principles of Data Science (TRIPODS) program*
2021	Proficiency Medal, Department of Mathematics and Statistics, IIT Kanpur *Awarded for the best academic performance among graduating students in each department*
2017	Academic Excellence Award-Dr. Sangeeta Goel Memorial Award, IIT Kanpur *Awarded for the highest All India Rank (womens' category) in IIT-JEE*
2017	All India Rank 365, JEE Advanced, IIT-JEE
2016	Certificate of Merit (Statewise Top 1%), National Standard Examination in Chemistry
2015	Fellow, All India Rank 212, Kishore Vigyan Protsahan Yojana, Department of Science and Technology *National Program of Fellowship in Basic Sciences, Government of India*
2015	National Talent Search Examination Scholarship, National Council of Educational Research and Training *National Scholarship Program, Government of India*

Talks and Workshops

Aug 2025	**Joint Statistical Meeting** Advances in Generative Models Session	*Nashville, TN*
Jul 2025	**Wasserstein Gradient Flows in Math and ML Workshop** Banff International Research Station *(invited attendee)*	*Banff, Canada*
Feb 2025	**Mathematics of Deep Learning Workshop** Institute for Foundations of Machine Learning	*Austin, TX*
Feb 2025	**UW Data Science Seminar** Seminar Series, AI@UW Seed Grant Awardees *(invited talk)*	*Seattle, WA*
Jan 2025	**Joint Mathematics Meetings** Mathematics of Adversarial, Interpretable, and Explainable AI *(invited talk)*	*Seattle, WA*
Nov 2024	**American Statistical Association Conference** Statistical Learning & Data Science Section	*Newport Beach, CA*
Oct 2024	**Society of Industrial and Applied Mathematics Conference** Mathematics of Data Science Section	*Atlanta, GA*
Oct 2023	**Society of Industrial and Applied Mathematics Conference** Pacific Northwest Section	*Bellingham, WA*
Mar 2023	**Bayes Comp** Session on MCMC diagnostics *(invited talk)*	*Levi, Finland*
Aug 2022	**Deep Learning Theory Workshop and Summer School** Simons Institute for the Theory of Computing	*Berkeley, CA*

Skills

Leadership	Organizer, Normalizing flows working group (2022-23)
Programming	Python, R, MATLAB, SQL
Tools & Framework	PyTorch, JAX, Tensorflow, LaTeX