# Manushi Welandawe

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## EDUCATION AND HONORS

Boston University — *Ph.D. in Statistics*
- Ralph B. D'Agostino Endowed Fellowship

University of Rhode Island — *M.S. in Statistics*
University of Sri Jayewardenepura (Sri Lanka) — *B.S. in Statistics (first class honors)*

## EXPERIENCE

**Boston University** | Research Fellow | June 2020 – May 2026
*Reliable Black-box Variational Inference (github.com/Manushi22/viabel)*
- Built an **end-to-end optimization framework** for black-box variational inference that tackles unreliable convergence, a critical gap for practitioners using approximate inference at scale. Integrated adaptive learning rate scheduling with automated termination.
- Engineered a **Bayesian regression-based estimator** to predict optimization accuracy without access to the ground-truth optimum, enabling automated accuracy-computation tradeoffs that practitioners can act on without manual tuning.
- Achieved **consistently superior performance** over established baselines across 18+ real-world models and diverse Gaussian targets, providing rigorous empirical evidence of reliability gains.

*Wasserstein Convergence Diagnostic for Markov Chains (github.com/TARPS-group/swasd)*
- Designed a **sliced Wasserstein distance-based diagnostic** that gives practitioners a quantitative estimate of distance to stationarity, replacing qualitative convergence judgments with a measurable signal.
- Applied **block-based regression modeling** to estimate convergence from pairwise sample distances, achieving **~2x faster detection** compared to the standard R-hat diagnostic, validated on real-world models with high dimensions (d=5,000+).

**Argonne National Laboratory** | Intern | May – Aug 2022
*Gradient Estimators for Derivative-Free Stochastic Optimization*
- **Benchmarked six gradient estimators for derivative-free stochastic optimization** across three function classes, identifying CRN-based methods as consistently lowest-bias and establishing quantitative bias-variance-cost tradeoffs to guide estimator selection in practice.

**University of Rhode Island** | Research Assistant | Sep 2018 – May 2019
*Bayesian Modeling for Longitudinal Microbiome Analysis*
- **Developed a Bayesian mixed-effects zero-inflated beta regression model** for longitudinal microbiome data with missingness; validated via simulation and applied to NICU patient data.

## INTERESTS AND SKILLS

Core Interests: Machine Learning | Stochastic Optimization | Bayesian Inference | Variational Inference | Feature engineering | Data Visualization | GLM
Technical Skills: Python, R, Julia, Stan, SQL, SAS | Git | NumPy, SciPy, matplotlib, scikit-learn, PyTorch

## TEACHING AND SERVICE

Instructor: Applied Statistics | Teaching Fellow: Machine Learning, Time Series, and Forecasting, Statistics I/II
Statistical Consultant: provided statistical consulting to faculty and students for research projects; delivered workshops in R, SAS, and SPSS
Reviewer: AISTATS (2025, 2024), NeurIPS (2025, 2024)

## SELECTED PUBLICATIONS

- **Welandawe, M.**, Andersen, M. R., Vehtari, A., & Huggins, J. H. (2024). A framework for improving the reliability of black-box variational inference. **Journal of Machine Learning Research**, 25(219), 1-71.