Shrijita Bhattacharya

CURRENT POSITION

Assistant Professor,
Department of Statistics and Probability,
Michigan State University.

CONTACT INFORMATION

Room: C419, Wells Hall
619 Red Cedar Rd,
East Lansing, MI 48824

Cell: (734) 834-6942
E-mail: bhatta61@msu.edu

RESEARCH INTERESTS

Variational Bayesian inference in neural networks, computer models and Ising models; Anomaly detection with extreme value theory.

EDUCATION

University of Michigan, Ann Arbor, MI USA — September 2013 - August 2018

Ph.D. in Statistics

Advisors: Professor Stilian Stoev and Professor George Michailidis
Thesis: Outlier Identification in Spatio-Temporal Processes.

Indian Statistical Institute, Kolkata, India

Master of Statistics, July 2011 - April 2013

Specialization: Mathematical Statistics & Probability
First Division with Distinction

Bachelor of Statistics, July 2008 - April 2013

First Division with Distinction

ACADEMIC APPOINTMENTS

Assistant Professor — Fall 2018-Spring 2026

Department of Statistics and Probability, Michigan State University

Courses:

STT 465: Bayesian Statistical Methods.
STT 441: Introduction to Probability.
STT 422: Introduction to Statistics.
STT 872: Statistical Inference I.
STT 867: Linear Model Methodology
STT 874: Introduction to Bayesian Analysis.

PAPERS IN PUBLICATION

Siddhartha Nandy, Minwoo Kim, Shrijita Bhattacharya, Tapabrata Maiti, *Variational inference aided variable selection for spatially structured high dimensional covariates*, 2025, accepted at Journal of Computational and Graphical Statistics.

Sanket Jantre, Shrijita Bhattacharya, Tapabrata Maiti, *Spike-and-slab shrinkage priors for structurally sparse Bayesian neural networks*, 2024, IEEE Transactions on Neural Networks and Learning Systems 36 (6), 11176-11188.

Minwoo Kim, Shrijita Bhattacharya, Tapabrata Maiti, *Statistically valid variational bayes algorithm for Ising model parameter estimation*, 2024, Journal of Computational and Graphical Statistics 33(1), 75-84.

Shrijita Bhattacharya, Zihuan Liu, Tapabrata Maiti, *Comprehensive study of variational Bayes classification for dense deep neural networks*, 2024, Statistics and Computing 34(1), 17.

Sumegha Premchandar, Shrijita Bhattacharya, Tapabrata Maiti, *Normalizing flows aided variational inference: a useful alternative to MCMC 2?*, 2023, Notices of the American Mathematical Society, 70(07).

Sanket Jantre, Shrijita Bhattacharya, Tapabrata Maiti, *Layer Adaptive Node Selection in Bayesian Neural Networks: Statistical Guarantees and Implementation Details*, 2021, Neural Networks 167, 309-330.

Shrijita Bhattacharya, Francois Kamper, Jan Beirlant, *Outlier detection based on extreme value theory and applications*, 2023, Scandinavian Journal of Statistics.

Zihuan Liu, Shrijita Bhattacharya, Tapabrata Maiti, *Variational Bayes Ensemble Learning Neural Networks With Compressed Feature Space*, 2022, IEEE Transactions on Neural Networks and Learning Systems, 1-7.

Vojtech Kejzlar, Shrijita Bhattacharya, Mookyong Son, Tapabrata Maiti, *Black box variational Bayesian model averaging*, 2022, The American Statistician 0(0) 1-12.

Vojtech Kejzlar, Mookyong Son, Shrijita Bhattacharya, Tapabrata Maiti, *A fast, scalable, and calibrated computer model emulator: an empirical Bayes approach*, 2021, Statistics and Computing 31(49), 1-49.

Sanket R. Jantre, Shrijita Bhattacharya, Tapabrata Maiti *Quantile regression neural networks: a Bayesian approach*, 2021, Journal of Statistical Theory and Practice 15(68) 1-34.

Shrijita Bhattacharya, Tapabrata Maiti, *Statistical foundation of variational Bayes neural networks*, Neural Networks 137, 151-173.

Shrijita Bhattacharya, Michael Kallitsis, Stilian Stoev, *Data-adaptive trimming of the Hill estimator and detection of outliers in the extremes of heavy-tailed data*, 2019, Electronic Journal of Statistics 13(1), 1872-1925.

Michael Kallitsis, Shrijita Bhattacharya, George Michailidis *Detection of false data injection attacks in smart grids based on forecasts*, 2018, IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm), 1-7.

Stilian Stoev, Shrijita Bhattacharya, *Inference on the endpoint of human lifespan and its inherent statistical difficulty*, 2018, Extremes 21, 415-424.

Michael Kallitsis, Shrijita Bhattacharya, Stilian Stoev, George Michailidis, *Adaptive statistical detection of false data injection attacks in smart grids*, 2017, IEEE Global Conference on Signal and Information Processing (GlobalSIP), 826-830.

Michael Kallitsis, Stilian Stoev, Shrijita Bhattacharya and George Michailidis, *AMON: An open source architecture for online monitoring, statistical analysis, and forensics of multi-gigabit Streams*, 2016, IEEE Journal on Selected Areas in Communications 34(6), 1834-1848.

Shrijita Bhattacharya, Biswabrata Pradhan, Debasis Kundu, *Analysis of hybrid censored competing risks data*, Statistics: A Journal of Theoretical and Applied Statistics 48(5), 2013, 1138-1154.

Papers under Revision

Siddhartha Nandy, Rachita Mondal, Shrijita Bhattacharya, Tapabrata Maiti, Scalable Bayesian LASSO for High-Dimensional Spatial Variable Selection with Strong Selection Guarantees, under revision at Journal of American Statistical Association.

Jiefu Zhou, Sumegha Premchandar, Shrijita Bhattacharya, Tapabrata Maiti, FlowSelect: A Scalable Bayesian Approach to High Dimensional Variable Selection, under revision at the Journal of American Statistical Association.

Sumegha Premchandar, Shrijita Bhattacharya, Tapabrata Maiti, *Normalizing flows for Bayesian inference: A case study with linear regression*, under revision at Statistical Science.

Jiefu Zhou, Shrijita Bhattacharya, *Neural Autoregressive Flows based Variational Bayes Model Averaging*, under revision at the The American Statistician.

Mookyong Son, Shrijita Bhattacharya, Vojtech Kejzlar, Tapabrata Maiti, *Statistical Foundation of Variational Bayes Computer Models*, under revision at the Journal of Nonparametric Statistics.

Grants

Current:

NAIRR Pilot grant: Bayesian Nonlinear Intrinsic Dimension Learning in ImageNet (Computational Resources Grant) PI: Shrijita Bhattacharya, Funding Agency: NSF, Total Award: 10000 hours of GPU use at Bridges-2 PSC.

Completed:

Collaborative Research: Variational Inference Approach to Computer Model Calibration, Uncertainty Quantification, Scalability, and Robustness: PI: Shrijita Bhattacharya, Funding Agency: NSF, Total Award Amount: $190,980.00, Dates: 09/2023-01/2026.

Submitted:

Generative Models aided Uncertainty Quantification in Bayesian Machine Learning: PI: Shrijita Bhattacharya, Funding Agency: NSF, Total Award Amount: $360,879.00

Graduate Student Advising

Current:

Jiefu Zhou
Defense topic: Normalizing Flows for Spike and Slab Models.
Rachita Mandal
Defense topic: Spatial variable selection with Ising models.

Graduated:

Thesis defense and Chair for Joseph Weaver in 2024
Defense topic: Bayesian Learning of Intrinsic Dimension in Image Datasets.

Thesis defense and Chair for Sumegha Premchandar in 2024
Defense topic: Normalizing Flows Aided Variational Inference for Uncertainty Quantification.

Thesis defense and co-chair for Mookyong Son in 2023
Defense topic: Calibrated computer models using Markov Chain Monte Carlo and Variational Bayes.

Thesis defense and co-chair for Mookyong Son in 2023
Defense topic: Calibrated computer models using Markov Chain Monte Carlo and Variational Bayes.

Thesis defense and co-chair for Sanket Jantre in 2022
Defense topic: Consistent Bayesian Learning for Neural Network Models: Theory and Computation

Thesis defense and co-chair for Minwoo Kim in 2022
Defense topic: Variational Bayes inference of Ising models and their applications.

Thesis defense and co-chair for Liu Zihuan in 2021
Defense topic: Variational Bayes deep neural network: Theory, Methods and Applications.

Thesis defense and co-chair for Raka Mandal in 2020
Defense topic: Quantile Regression and Extremes.

Thesis defense and co-chair for Fatimah Alshaharani in 2020
Defense topic: Mixture innovations' based auto-regressive processes with application to sea level rise data.

Review Experience

Journals Reviewed:

Annals of Applied Statistics, IEEE Transactions on Neural Networks and Learning Systems, Neural Networks, Computational Statistics and Data Analysis, Journal of the American Statistical Association, Electronic Journal of Statistics, Journal of Computation and Graphical Statistics, Statistics and Computing.

Selected Presentations

⋆ Variational inference aided variable selection for spatially structured high dimensional covariates.

Invited Talk: *Workshop on Efficient Approximate Bayesian Inference, BIRS, 2025* Banff, Canada.

Invited Talk: *Joint Statistical Meetings, 2024*, Portland, USA.

⋆ Variable Selection with Deep Neural Networks using α-Regularized Variational Inference.

Invited Talk: *Joint Statistical Meetings, 2023*, Toronto, Canada.

⋆ Statistically valid variational Bayes algorithm for Ising model parameter estimation

Invited Talk: *International Chinese Statistical Association, 2023*, Ann Arbor, USA.

⋆ Theory of Variational Bayes Computer Models.

Topic Contributed Talk: *Joint Statistical Meetings, 2022*, Washington DC, USA.

⋆ Layer Adaptive Node Selection in Bayesian Neural Networks: Statistical Guarantees and Implementation Details:

Invited Talk: *SIAM conference on Uncertainty Quantification, 2022*, Atlanta, USA.

Invited Talk: *International Chinese Statistical Association, 2022*, Gainesville, USA.

⋆ Black Box Variational Bayesian Model Averaging.

Invited Talk: *ISNET 8 (Information and Statistics for Nuclear Experiment and Theory), 2021*, Michigan State University, East Lansing, USA.

⋆ Spatial impact of extremes of heat waves.

Contributed Talk: *Extreme Value Analysis Conference, 2021*, Edinburgh, UK.

Contributed Talk: *Joint Statistical Meetings, 2019*, Denver, USA.

⋆ Variational Bayes neural network: posterior consistency, classification accuracy and computational challenges.

Invited Talk: *14th International Conference on Computational and Methodological Statistics, 2020*, Virtual Conference.

⋆ Outlier detection and a tail-adjusted boxplot based on extreme value theory.

Invited Talk: *Indian Statistical Institute, 2019*, Kolkata, India.

⋆ Data-adaptive trimming of the Hill estimator and detection of outliers in the extremes of heavy-tailed data.

Invited Talk: *International Indian Statistical Association Conference, 2017*, Hyderabad, India.

Contributed Talk: *10th Extreme Value Analysis Conference, 2017*, TU Delft, Delft.

Contributed Talk: *Joint Statistical Meetings, 2017*, Baltimore, USA.

⋆ AMON: An open source architecture for online monitoring, statistical analysis, and forensics of multi-gigabit streams.

Invited Talk: *9th International Conference of the ERCIM WG on Computational and Methodological Statistics, 2016*, Seville, Spain.

Contributed Talk: *Joint Statistical Meetings, 2016*, Chicago, USA.

⋆ Adaptive statistical detection of false data injection attacks in smart grids.

Contributed Talk: *IEEE Global Conference on Signal and Information Processing, 2016*, Washington D.C., USA.