REETAM MAJUMDER

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RESEARCH EXPERIENCE

Assistant Professor, University of Arkansas — Aug 2024 – present
Department of Mathematical Sciences

Postdoctoral Fellow, North Carolina State University — Nov 2021 – Aug 2024
Southeast Climate Adaptation Science Center
Mentors: Brian J. Reich, Adam J. Terando, Jaime A. Collazo (NCSU)

Visiting Scholar, University of Chicago — Sep 2022 – Oct 2022
Institute of Mathematical and Statistical Innovation

Graduate Research Assistant, University of Maryland Baltimore County — Jan 2019 – Oct 2021
High Performance Computing Facility
Mentor: Matthias K. Gobbert (UMBC)

Center for Interdisciplinary Research and Consulting
Mentors: Amita V. Mehta (GESTAR II, UMBC), Erika Podest (NASA JPL)

EDUCATION

PhD in Statistics — Oct 2021
University of Maryland, Baltimore County, MD, USA

MS in Statistics — May 2017
University of Toledo, OH, USA

MSc in Statistics — Jul 2011
University of Kalyani, Kalyani, India

BSc in Statistics — Jun 2008
Fergusson College, Pune, India

PROFESSIONAL EXPERIENCE

Senior Analyst - Data Science — Apr 2015 – Jun 2015
Covacsis Technologies, Mumbai, India

Senior Analyst - Innovation Product Leadership — Aug 2011 – Mar 2015
Nielsen, Mumbai, India

RESEARCH INTERESTS

Theory and Methods

Geostatistics, Geometric extremes, Spatial extremes, Probabilistic machine learning, Deep learning, Bayesian computation, Variational Bayes, Uncertainty quantification, Causal inference, Parallel computing

Applications

Climate model downscaling and bias correction, Prescribed burning, Extreme weather, Environmental epidemiology

PUBLICATIONS

Peer-reviewed

1. **R. Majumder**, B. J. Reich, B. A. Shaby (2024). Modeling extremal streamflow using deep learning approximations and a flexible spatial process. *Annals of Applied Statistics*, 18(2):1519–1542.
2. A. Russell, N. Fontana, T. Hoecker, A. Kamanu, **R. Majumder**, J. Stephens, A. M. Young, A. E. Cravens, C. Giardina, J. K. Hiers, J. Littell, A. J. Terando (2024). A fire-use decision model to improve the United States' wildfire management and support climate change adaptation. *Cell Reports Sustainability*, 1(6):100125.
3. **R. Majumder** and B. J. Reich (2023). A deep learning synthetic likelihood approximation of a non-stationary spatial model for extreme streamflow forecasting. *Spatial Statistics*, 55:100755.
4. **R. Majumder**, Q. Ji, N.K. Neerchal (2023). Optimal stock portfolio selection with a multivariate hidden Markov model. *Sankhya B*, **85** (Suppl 1), 177–198 .
5. J. X. Xie, X. Fan, C. A. Drummond, **R. Majumder**, Y. Xie, T. Chen, L. Liu, S. T. Haller, P. S. Brewster, L. D. Dworkin, C. J. Cooper, J. Tian (2017). MicroRNA profiling in kidney disease: Plasma versus plasma-derived exosomes. *Gene*, 627:1–8.

In review

1. **R. Majumder**, B. A. Shaby, B. J. Reich, D. S. Cooley (2024+). Semiparametric estimation of the shape of the limiting bivariate point cloud. *arXiv:2306.13257*.
2. C. J. R. Murphy-Barltrop, **R. Majumder**, J. Richards (2024+). Deep Learning of Multivariate Extremes via a Geometric Representation. *arXiv:2406.19936*.
3. **R. Majumder**, A. J. Terando, J. K. Hiers, J. A. Collazo, B. J. Reich (2024+). A spatiotemporal recommendation engine for prescribed burning in the Southeast US.
4. B. Feng, **R. Majumder**, B. J. Reich, M. A. Abba (2024+). Amortized Bayesian Local Interpolation NetworK: Fast covariance parameter estimation for Gaussian Processes.

Conference publications

1. M. A. Abba, B. J. Reich, **R. Majumder**, B. Feng (2024). Stochastic gradient MCMC for massive geostatistical data. *NeurIPS 2024 Workshop on Bayesian Decision-making and Uncertainty (accepted)*.
2. **R. Majumder**, M. K. Gobbert, N. K. Neerchal (2021). A modified minibatch sampling method for parameter estimation in hidden Markov models using stochastic variational Bayes. *Proc. Appl. Math. Mech.*, 21(1):e202100203.
3. G. C. Kroiz, **R. Majumder**, N. K. Neerchal, M. K. Gobbert, A. Mehta, K. Markert (2020). Daily precipitation generation using a hidden Markov model with correlated emissions for the Potomac river basin. *Proc. Appl. Math. Mech.*, 20(1):e202000117.

Other publications

1. **R. Majumder**, B. A. Shaby, B. J. Reich (2024). Introduction to Bayesian methods of extreme value analysis. In M. de Carvalho, R. Huser, P. Naveau, and B. J. Reich (Eds.), *Handbook on Statistics of Extremes*, to appear.
2. S. G. Xu, **R. Majumder**, B. J. Reich (2022). SPQR: An R Package for Semi-Parametric Density and Quantile Regression. *arXiv:2210.14482*.
3. **R. Majumder** (2021). Hidden Markov models for high dimensional data with geostatistical applications. PhD Thesis, Department of Mathematics and Statistics, University of Maryland, Baltimore County.

FUNDING

- National Climate Adaptation Science Center G24AC00197 (2024). *Advancement of a prescribed fire recommendation engine: laying the foundation for climate change-informed prescribed fire management.* Role: Co-PI.

SOFTWARE

- `BezELS`: Bézier splines for Estimating Limit Sets of bivariate extremes data. [GitHub]
- `SPQR`: Semi-Parametric Quantile Regression using deep learning (joint with Steven G. Xu). [GitHub]
- `spSGMCMC`: spatial Stochastic Gradient Markov Chain Monte Carlo sampling (with Mohamed A. Abba). [GitHub]

TEACHING

University of Arkansas, Department of Mathematical Sciences

- Instructor, Introduction to Probability (2024)
- Instructor, Bayesian Methods (2025)

North Carolina State University, Department of Statistics

- Assistant instructor, Applied Bayesian Analysis (2023)
- Guest lecture, Bayesian Inference (2022)

University of Maryland, Baltimore County, Department of Mathematics and Statistics

- Guest lecture, Spatial Statistics and Image Analysis (2023)
- Teaching Assistant, Introduction to Parallel Computing (2021)
- Teaching Assistant, Statistics for Business and Economics, and Statistics for the Biological Sciences (2017–2020)

University of Toledo, Department of Mathematics

- Instructor, Introduction to Statistics (2017)
- Teaching Assistant, Calculus for Business with Applications, and Single Variable Calculus I (2015–2016)

TALKS AND SEMINARS

Neural amortized kriging for scalable Gaussian process inference.

- Invited session at JSM, Portland, 2024

A spatiotemporal recommendation engine for RxFire in the Southeast US.
- Science Seminar at the Southeast Climate Adaptation Science Center, virtual, 2024

Fire regimes in the Southeast US: quantifying extreme events.
- Extreme Disturbances and Climate Change in the Southeast US workshop, virtual, 2023

Non-stationary process mixtures for extreme streamflow forecasting in the central US.
- Topic Contributed Session at JSM, Toronto, Canada, 2023
- Invited Session at the ICSA Applied Statistics Symposium, Ann Arbor, MI, 2023
- Invited Session at the IISA Conference, Golden, CO, 2023
- Poster at the Clemson Climate Extremes workshop, Clemson, SC, 2023

Approximating spatial extreme value processes with deep learning.
- Workshop on Sparse Models for Spatio-temporal Extremes, virtual, 2024
- Invited Session at CMStatistics, London, UK, 2022
- Climate and Weather Extremes workshop, IMSI, Chicago, IL, 2022
- Topic Contributed Session at JSM, Washington, D.C., 2022

Stochastic variational Bayes for multi-site daily precipitation models.
- Contributed Session at the International Association of Applied Mathematics and Mechanics Conference (GAMM), virtual, 2021
- Poster at the SIAM CSE21 Conference, virtual, 2021

AWARDS

- Awarded travel support to participate in the ForceSMIP Hackathon at NCAR, 2023.
- Awarded travel support to present at the IISA Conference, 2023.
- Awarded travel support to present at the Clemson Climate Extremes Workshop, 2023.
- Outstanding Graduate Research in Statistics Award from the College of Natural Sciences and Mathematics, University of Maryland, Baltimore County, 2021.
- SIAM Student Travel Award to present at the SIAM Conference on Computational Science and Engineering, 2021.
- Awarded travel support to present at the IISA Conference, 2019.
- Certificate of Excellence from the Department of Mathematics and Statistics, University of Toledo, in recognition of valuable contributions to Tutoring Excellence, 2017.

ORGANIZATIONS AND SERVICE

- (2024–) Associate Editor for Advances in Statistical Climatology, Meteorology and Oceanography.
- (2022–) Peer reviewer for the Journal of the Royal Statistical Society (Series A), Annals of Applied Statistics, Biometrics, the Journal of Agricultural, Biological and Environmental Statistics, Statistical Analysis and Data Mining, Advances in Statistical Climatology, Meteorology and Oceanography, Data Science in Science, the International Journal of Wildland Fire, and Agricultural and Forest Meteorology.
- (2024) Organized Invited Session at JSM - *Amortized Learning for Environmental Data using Neural Networks*.
- (2023) Organized Oral Session at the Ecological Society of America (ESA) Annual Meeting - *The Future of Fire: sociocultural and biophysical contexts for fire stewardship under climate change*.
- (2023) Organized Invited Sessions at the IISA Conference - *Advances in extreme value analysis*, and *Methods and computing for large spatial data*.
- (2022–) Member of the Justice, Equity, Diversity, and Inclusion (JEDI) Outreach Group of the ASA.
- (2020–2021) Member of the Delivery and Quality Assurance team at Statistics Without Borders (SWB-DQA), a volunteer outreach group within the ASA.
- (2020–2021) Founding member and Treasurer for the UMBC ASA Student Chapter.
- (2017–2019) Officer for the UMBC Mathematics and Statistics Graduate Student Association (MSGSA); served as Senator (2017–2018) and Vice-President (2018–2019).

Updated October 13, 2024.