REETAM MAJUMDER, PH.D.

Climate Adaptation Postdoctoral Fellow, North Carolina State University

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EDUCATION

University of Maryland, Baltimore County — Baltimore, Maryland
PhD Statistics — 2021

University of Toledo — Toledo, Ohio
MS Statistics — 2017

University of Kalyani — Kalyani, India
MSc Statistics — 2011

Fergusson College — Pune, India
BSc Statistics — 2008

RESEARCH EXPERIENCE

Climate Adaptation Postdoctoral Fellow (CAPF), NCSU

Southeast Climate Adaptation Science Center (`secasc.ncsu.edu`)

Nov 2021 – Ongoing Supervised by Brian Reich, Adam Terando, Jaime Collazo (NCSU)

- Developing spatio-temporal risk models to assist prescribed fire managers in their decision making.
- Developing spatio-temporal models to characterize extreme wildfire risk on decadal time scales.
- Collaborating with cohort of CAPF scholars on national-scale research and synthesis on climate-fire issues.

Visiting Scholar, IMSI

Institute of Mathematical and Statistical Innovation (`imsi.institute`)

Sep 2022 – Oct 2022

- Participant at the Fall 2022 long program on Confronting Global Climate Change.
- Presented ongoing research at the Climate and Weather Extremes workshop and engaged in collaborative research with fellow visiting researchers.

Graduate Research Assistant, UMBC

High Performance Computing Facility (`hpcf.umbc.edu`)

Jan 2019 – Oct 2021 Supervised by Matthias K. Gobbert (UMBC)

- Maintained and documented computing packages, including geospatial and parallel computing packages for R.
- Assisted system administrators with the release of the 8-node Big Data Cluster for the HPCF. Conducted initial testing and documentation of cluster features.
- Provided user support and facilitated research through online and in-person meetings.

Center for Interdisciplinary Research and Consulting (`circ.umbc.edu`)

Aug 2019 – Oct 2021 Supervised by Amita Mehta (GESTAR II, UMBC), Erika Podest (NASA JPL)

Project title: *Sustainable Forest Management Practices in Panama*.

- Developed statistical methodology to track forest area change in Panama using Random Forest classifiers as part of a research project funded by the NASA Applied Sciences Biodiversity and Ecological Forecasting program.
- Assisted in the development and testing of open-source tool for forest cover classification over Panama (ongoing).

UMBC CyberTraining (`cybertraining.umbc.edu`)

Spring 2019 Supervised by Matthias K. Gobbert (UMBC)

- Completed research project as part of a three-person team to test the sensitivity of the VIC hydrologic model to precipitation forcings, and estimated the water budget for the Potomac river basin in the USA using geostatistical modeling.

TEACHING AND MENTORING

Teaching Experience

NC State University

- Assistant instructor, Applied Bayesian Analysis (2023): Led lab sessions, created and graded exams.
- Guest lecturer, Bayesian Inference (2022): Variational Bayes for latent variable models.

University of Maryland, Baltimore County

- Teaching Assistant, Introduction to Parallel Computing (2021): Graded assignments, oversaw code-debugging sessions, provided feedback on reports and code implementation.
- Teaching Assistant, Applied Statistics for Business and Economics and Statistics for the Biological Sciences (2017–2020): Led discussion sections, created worksheets and assignments, and graded quizzes and exams.

University of Toledo

- Instructor, Introduction to Statistics (2017): Prepared and delivered lectures, created and graded assignments and exams.
- Teaching Assistant, Calculus for Business with Applications and for Single Variable Calculus I (2015–2016): Led discussions and problem-solving sessions with the students, graded homework and quizzes.

Mentoring Experience

- Supervised team of undergraduates for UMBC CyberTraining (2020); completed research project that compared stochastic precipitation generators and modeled precipitation using hidden Markov models.
- Co-mentoring a PhD student (2022) on causal spatial quantile regression for extremes.

PROFESSIONAL EXPERIENCE

Senior Analyst - Data Science Division

Mumbai, India

Covacsis Technologies

Apr 2015–Jun 2015

- Lead developer for Root Cause Analysis and Early Warning System; utilized Support Vector Machines and naive Bayes classifiers.

Senior Analyst - Innovation Product Leadership Team

Mumbai, India

Nielsen

Aug 2011–Mar 2015

- Developer for Category Advisor; used Linear Regression, Cluster Analysis, and Multidimensional Scaling to analyze data, execute pilot project, and create deliverables and documentation for future projects.
- Developer for Trend Rider Analysis and Brand Engagement Analysis; utilized Factor Analysis, Linear Regression, and Latent Class Regression.

PUBLICATIONS

(*Under revision*) **R. Majumder** and B. J. Reich. A deep learning synthetic likelihood approximation of a non-stationary spatial model for extreme streamflow forecasting. *Spatial Statistics*, 2022.

(*Under revision*) **R. Majumder**, B. J. Reich, and B. A. Shaby. Modeling extremal streamflow using deep learning approximations and a flexible spatial process. *Annals of Applied Statistics*, 2022.

(*Submitted*) **R. Majumder**, N. K. Neerchal, and A. Mehta. Stochastic precipitation generation for the Chesapeake Bay watershed using hidden Markov models with variational Bayes parameter estimation. *arXiv*, 2022.

(*Submitted*) S. G. Xu, **R. Majumder**, and B. J. Reich. SPQR: An R Package for Semi-Parametric Density and Quantile Regression. *arXiv*, 2022.

(Peer-Reviewed Journal) **R. Majumder**, Q. Ji, and N.K. Neerchal. Optimal stock portfolio selection with a multivariate hidden Markov model. *Sankhya B*, 2022.

(Peer-Reviewed Journal) 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, and J. Tian. MicroRNA profiling in kidney disease: Plasma versus plasma-derived exosomes. *Gene*, 627:1–8, 2017.

(Refereed Proceedings) **R. Majumder**, M. K. Gobbert, and N. K. Neerchal. A modified minibatch sampling method for parameter estimation in hidden Markov models using stochastic variational Bayes. *Proc. Appl. Math. Mech.*, 21(1):e202100203, 2021.

(Refereed Proceedings) **R. Majumder**, A. Mehta, and N. K. Neerchal. Copula-based correlation structure for multivariate emission distributions in hidden Markov models. In *JSM Proceedings, Section on Statistics and the Environment*. Alexandria, VA: American Statistical Association, 2020.

(Refereed Proceedings) G. C. Kroiz, **R. Majumder**, N. K. Neerchal, M. K. Gobbert, A. Mehta, and K. Markert. Daily precipitation generation using a hidden Markov model with correlated emissions for the Potomac river basin. *Proc. Appl. Math. Mech.*, 20(1):e202000117, 2020.

(Open-Source Software) S. Xu and **R. Majumder**. SPQR: Semi-Parametric Quantile Regression. R package version 0.1.0, 2022.

(*PhD Thesis*) Hidden Markov models for high dimensional data with geostatistical applications. Department of Mathematics and Statistics, University of Maryland, Baltimore County, 2021.

SELECTED CONFERENCE PRESENTATIONS

CMStatistics Invited Session, 2022. *Approximating Likelihoods for Spatial Extremes with Deep Learning*.

Climate and Weather Extremes workshop, Institute of Mathematical and Statistical Innovation (IMSI), 2022. *Approximating Spatial Extreme Value Processes with Deep Learning*.

JSM Topic Contributed Session, 2022. *Approximating Likelihoods for Extreme Value Analysis with Deep Learning*.

International Association of Applied Mathematics and Mechanics Conference (GAMM) Contributed Session, 2021. *Stochastic variational Bayes for multi-site daily precipitation models*.

SIAM CSE21 Poster Presentation, 2021. *Variational Bayes approaches for multi-site daily precipitation models*.

AGU eLightning Session, 2020. *Forest cover classification in Panama using multi-satellite optical images*.

GRANTS AND AWARDS

- 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.
- NSF-funded travel award to present at the International Indian Statistical Association 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

- (2022–) Member of the Justice, Equity, Diversity, and Inclusion (JEDI) Outreach Group of the ASA.
- (2022) Session chair for contributed session on Analyses in Climate and Epidemiology at the Joint Statistical Meetings.
- (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).

COMPUTING SKILLS

Statistical Packages
- R in both an integrated development environment and in a distributed computing setup.
- Prior experience with SPSS and SAS.

Data Science and Machine Learning
- Python scripting and working with GDAL, sklearn, NumPy, and Keras.
- Google Earth Engine through both the JavaScript editor and its Python API.

Parallel Computing
- C/C++, and Message Passing Interface (MPI) using C.
- MPI implementations for R and Python.

Updated February 24, 2023.