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Qingyang Liu

Education

2019-2023 **PhD in Statistics**, *University of South Carolina, United States*

Dissertation: Parametric and Semiparametric Modal Regression Models
Advisor: Dr. Xianzheng Huang

2015-2017 **Master of Science in Statistics**, *Temple University, United States*

2011-2013 **Bachelor of Science in Accountancy**, *Northern Arizona University, United States*

2008-2011 **Bachelor of Economics in Finance**, *Hefei University, People's Republic of China*

Work Experience

2024-2026 **Postdoctoral Research Associate**, *University of Wisconsin - Madison*

Mentors: Dr. Debdeep Pati (University of Wisconsin - Madison) and Dr. Dipankar Bandyopadhyay (Virginia Commonwealth University).

2023-2024 **Postdoctoral Research Associate**, *Texas A&M University*

Mentors: Dr. Debdeep Pati (Texas A&M University) and Dr. Dipankar Bandyopadhyay (Virginia Commonwealth University).

2019-2023 **Instructor**, *University of South Carolina*

2017-2019 **Statistician**, *Corteva Agriscience*

2016-2017 **Data Analyst**, *Temple University - Wellness Resource Center*

Research Interests

Robust Regression Models; Computational Statistics; Deep Learning; Causal Inference

Publications

Ongoing Projects (* = Student Mentee)

Liu, Q., Pati, D., Ni, Y., & Bandyopadhyay, D. Causal Inference in Periodontal Disease Progression.

Sun, D., **Liu, Q.**, & Bandyopadhyay, D. A Joint Modeling Model for Skewed Longitudinal Periodontal Disease Data.

Tam, E., **Liu, Q.**, & Bai, R. An Artificial Neural Network Tailored for Skewed and Heavy Tailed Data.

Soon*, S., Bandyopadhyay, D., **Liu, Q.**, & Lachos, V. Matrix-Variate Skew Regression Models for Non-Gaussian Periodontal Data.

Soon*, S., **Liu, Q.**, Srivastava, S., Retnam R., Lachos, V., & Bandyopadhyay, D. An Asynchronous Distributed EM-Type Algorithm for Modeling Large Non-Gaussian Longitudinal Data.

Completed Projects

Liu, Q., & Huang, X. (2024). Parametric Modal Regression With Error in Covariates. Biometrical Journal, 66(1).

Liu, Q., Huang, X., & Zhou, H. (2024). The Flexible Gumbel Distribution: A New Model for Inference About the Mode. Stats, 7(1), 317–332.

Liu, Q., Huang, X., & Bai, R. (2024). Bayesian Modal Regression Based on Mixture Distributions. Computational Statistics & Data Analysis, 199, 108012.

Liu, Q., Wang, S., Bai, R., & Bandyopadhyay, D. (2025). A Robust Monotonic Single-Index Model for Skewed and Heavy-Tailed Data: A Deep Neural Network Approach Applied to Periodontal Studies. arXiv.

Liu, Q., Srivastava, S., & Bandyopadhyay, D. (2025), Efficient Asynchronous Distributed Algorithm for Matrix Variate Non-Gaussian Responses. Preprint available.

Liu, Q., Pati, D., & Bandyopadhyay, D. (2025), An Interpretable Single-Index Mixed-Effects Model for Non-Gaussian National Survey Data. Preprint available.

Presentations

Aug 2025 "A Monotonic Single-Index Model for Skewed and Heavy-Tailed Data: A Deep Neural Network Approach" , contributed talk at JSM 2025, Nashville, Tennessee.

Dec 2023 "A Semiparametric Single Index Model With Non-Gaussian Residuals for Quantifying Periodontal Disease" , invited talk at CMStatistics 2023 (hybrid conference).

Apr 2023 "Bayesian Modal Regression Based on Mixture Distributions" , SC-ASA Palmetto Symposium, University of South Carolina, Columbia, South Carolina. **Student presentation award**.

Contributed Presentations

Mar 2025 "A Monotonic Single-Index Model for Skewed and Heavy-Tailed Data: A Deep Neural Network Approach" . Oral presentation by Dipankar Bandyopadhyay at ENAR 2025, New Orleans, Louisiana.

Aug 2023 "Bayesian Modal Regression Based on Mixture Distributions" . Oral presentation by Ray Bai at EcoStat 2023, Tokyo, Japan.

Teaching Experience

University of South Carolina

STAT 201: Elementary Statistics, Fall 2020, Spring 2021, Summer 2021, Fall 2021. Served as an instructor.

STAT 205: Elementary Statistics for the Biological and Life Sciences , Fall 2022, Spring 2023. Served as an instructor.

STAT 201: Elementary Statistics, Fall 2019, Spring 2020. Served as a lab instructor.

Northern Arizona University

ACC 255: Principles Of Accounting (Financial), Summer 2013. Served as a supplemental instruction leader.

ACC 256: Principles Of Accounting (Managerial), Summer 2013, Fall 2013. Served as a supplemental instruction leader.

Grant Application

University of South Carolina. Support to Promote Advancement of Research and Creativity (SPARC). "A Flexible Modal Regression Based on Gumbel Mixture Distribution". **Role: PI**. Requested amount: $4,995.13. Submitted in October, 2021. **Result: not selected**.

Honours and Awards

- Citizenship Award,
  Department of Statistics, University of South Carolina, Year 2023.
- Outstanding Graduate Student in Academics,
  Department of Statistics, University of South Carolina, Year 2022.
- Outstanding Graduate Assistant,
  Department of Statistics, University of South Carolina, Year 2021.
- Outstanding First-Year Graduate Student,
  Department of Statistics, University of South Carolina, Year 2020.
- Dean's Certificate of Excellence,
  Fox School of Business, Temple University, Year 2017.

Editorial Activities

Journal Reviewer: Electronic Journal of Statistics (1); Journal of Statistical Theory and Applications (1); Modeling Earth Systems and Environment (1); Scientific Reports (1); Statistics and Computing (2); Statistics in Medicine (4).

Conference Reviewer: NeurIPS 2025; APHA 2024; Discover USC 2023.

Software Development

`DNNSIM` R package for single-index neural network for skewed heavy-tailed data, on CRAN.

`MSIMST` R package for the Bayesian monotonic single-index mixed-effect model with the skew-t likelihood, on CRAN.

`GUD` R package for the Bayesian modal regression based on the General Unimodal Distribution (GUD) family, on CRAN.

`BAREB` R package for simultaneously clustering the periodontal diseases patients and their tooth sites after taking the patient- and site-level covariates into consideration, on CRAN.

`STMATREG` R package for a linear regression based on the matrix variant skew-t distribution using the asynchronous parallel ECME, regular parallel ECME, and regular non-parallel ECME algorithms, on GitHub.

`pybetareg` Python package for the parametric modal regression with error in covariates, on PyPI.

Programming Languages C++, R, Python, Stan, SAS, JAGS