Xiaoqian Liu

CONTACT INFORMATION

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RESEARCH INTERESTS

Methodology: Computational Statistics, Numerical Optimization, Statistical Machine Learning, Structured Estimation, Convex-Nonconvex Regularization, Robust Estimation

Application: Integrative Analysis of Multi-Omics Data, Transcriptome Deconvolution, Genetic Variation Annotation, Statistical Modeling for Tumor Heterogeneity and Evolution

EMPLOYMENT

University of California, Riverside, Riverside, CA

Tenure-track Assistant Professor of Statistics 2024/07 – present

University of Texas MD Anderson Cancer Center, Houston, TX

Postdoctoral Fellow, Supervisor: Wenyi Wang 2022/08 – 2024/06

Argonne National Laboratory, Lemont, IL

Research Aide, Supervisor: Stefan M. Wild 2021/08 – 2022/07
Wallace Givens Associate, Supervisor: Stefan M. Wild 2021/05 – 2021/08

EDUCATION

North Carolina State University, Raleigh, NC

Ph.D., Statistics, Advisor: Eric C. Chi 2018/08 – 2022/07

Renmin University of China, Beijing, China

M.S., Statistics, Advisor: Bo Zhang 2015/09 – 2018/06

China University of Mining and Technology, Xuzhou, China

B.S., Mathematics and Applied Mathematics 2011/08 – 2015/06

PUBLICATIONS

Note: the sign * at the beginning of a paper indicates alphabetical order of authorships; the sign † indicates co-first authorships; the sign ✉ denotes the corresponding author.

Peer-reviewed Publications

[1] **X. Liu** ✉, X. Han, E. C. Chi, and B. Nadler. A Majorization-Minimization Gauss-Newton Method for 1-Bit Matrix Completion. *Journal of Computational and Graphical Statistics*, 1-13, 2025. https://doi.org/10.1080/10618600.2024.2428610.

[2] S. Guo†, **X. Liu**†, X. Cheng†, Y. Jiang, S. Ji, Q. Liang, et al., and W. Wang ✉. A Deconvolution Framework that Uses Single-Cell Sequencing Plus a Small Benchmark Data Set for Accurate Analysis of Cell Type Ratios in Complex Tissue Samples. *Genome Research.* 2024. https://doi.org/10.1101/gr.278822.123. [**Best Poster Award at The 2023 Leading Edge of Cancer Research Symposium**].

[3] **X. Liu** ✉, A. J. Molstad, and E. C. Chi. A Convex-Nonconvex Strategy for Grouped Variable Selection. *Electronic Journal of Statistics*, 17(2):2912-2961, 2023.

[4] **X. Liu** ✉, E. C. Chi, and K. L. Lange. A Sharper Computational Tool for L_2E Regression. *Technometrics*, 65(1):117-126, 2023. [**Invited to present in the Technometrics session at The 65th Annual Fall Technical Conference**].

[5] **X. Liu** ✉ and E. C. Chi. Revisiting Convexity-Preserving Signal Recovery with the Linearly Involved GMC Penalty. *Pattern Recognition Letters*, 156:60-66, 2022.

[6] **X. Liu** ✉, M. Vardhan, Q. Wen, A. Das, A. Randles, and E. C. Chi. An Interpretable Machine Learning Model to Classify Coronary Bifurcation Lesions. *The 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*, Oct. 31 – Nov. 4, 2021.

[7] B. Zhang and **X. Liu** ✉. Sparse Principal Component Analysis with Fused Penalty. *Statistical Research*, 36(4):119–128, 2019.

Preprints / Manuscripts

[8] Y. Jiang†, M. D. Montierth†, K. Yu†, S. Ji, S. Guo, Q. Tran, **X. Liu**, et al., and W. Wang ✉. Pan-cancer Subclonal Mutation Analysis of 7,827 Tumors Predicts Clinical Outcome. Submitted. bioRxiv 2024.07.03.601939.

[9] Q. Heng†, **X. Liu**†, S. Ma, and E. C. Chi. Anderson Accelerated Operator Splitting Methods for Convex-Nonconvex Regularized Problems. *Manuscript Available upon Request.*

Working Papers

[10] **X. Liu**, H. Yan, H. Shi, E. Montellier, P. Hainaut, and W. Wang. Survival-based Clustering of Predictors in Cox Regression with an Application to *TP53* Mutation Annotation.

[11] * K. J. Dzahini, **X. Liu**, and S. M. Wild. Accelerating Randomized Adaptive Subspace Trust-Region Algorithms for Zeroth-Order Optimization.

[12] **X. Liu**, E. C. Chi, and K. L. Lange. Beyond Dykstra's Algorithm.

SOFTWARE

`MMGN`: R / MATLAB implementations of the MMGN method for 1-bit matrix completion.
`DeMixSC`: R implementation of the DeMixSC framework for bulk RNA-seq deconvolution.
`L2E`: R package for robust structured regression via the L_2 criterion.
`GMC`: R package for variable selection via a convex-nonconvex regularization strategy.

HONORS AND AWARDS

Best Poster Prize, 2023 SIAM Conference on Computational Science and Engineering 2023
UF Statistics 2023 Winter Workshop Travel Award, University of Florida 2023
2022 SDSS – Student & Early Career Travel Award, American Statistical Association 2022
Student Travel Award, North Carolina Chapter of the American Statistical Association 2020
National Scholarship for Graduate Students (Top 2%), Ministry of Education of China 2017
First Class Academic Scholarship of University, Renmin University of China 2015, 2016, 2017
National Scholarship for Undergraduates (Top 2%), Ministry of Education of China 2012, 2013, 2014

PRESENTATIONS AND TALKS

Invited Talks

[1] A Sharper Computational Tool for L_2E Regression. *The 65th Annual Fall Technical Conference. Oct. 5, 2023.*

[2] A Convex-Nonconvex Strategy for Grouped Variable Selection. *The 36th New England Statistics Symposium (NESS). June 6, 2023.*

[3] A Convex-Nonconvex Strategy for Grouped Variable Selection. *Computational and Methodological Statistics (CMStatistics) 2022. Dec. 19, 2022.*

[4] A Convex-Nonconvex Strategy for Grouped Variable Selection. *University of California, Los Angles (OpenMendel Group).* Nov. 10, 2021.

Tutorials and Workshops

[5] A Tutorial on Boosting Methods. *Duke University (Randles Lab)*. Nov. 17, 2022.

[6] R for Data Science. *Biomedical Data Science Workshop & Careers Panel, UCLA. July 17, 2022.*

[7] A Tutorial on the CART Algorithm. *Duke University (Randles Lab)*. Nov. 9, 2021.

Contributed / Refereed Presentations

[8] Survival-based Clustering of Predictors in Cox Regression with an Application to *TP53* Mutation Annotation. *2024 Joint Statistical Meetings (JSM). Aug. 8, 2024.*

[9] Survival-based Clustering of Predictors in Cox Regression with an Application to *TP53* Mutation Annotation. *NCI Spring School on Algorithmic Cancer Biology (SSACB) 2024.* April 3, 2024.

[10] A Majorization-Minimization Gauss-Newton Method for 1-Bit Matrix Completion. *2023 Joint Statistical Meetings (JSM). Aug. 8, 2023.*

[11] A Convex-Nonconvex Strategy for Grouped Variable Selection. *Eastern North American Region (ENAR) 2023 Spring Meeting. Mar. 21, 2023.*

[12] A Convex-Nonconvex Strategy for Grouped Variable Selection. *2022 Symposium on Data Science & Statistics (SDSS)*. June 9, 2022.

[13] Randomized Projections in Derivative-Free Optimization. *Summer Argonne Student Symposium (SASSy) 2021*. July 30, 2021.

Poster Presentations

[14] Annotating *TP53* Mutations via Survival-based Clustering of Predictors in Cox Regression. *REACH24 – The 7th International LFS Association Symposium. Oct. 20, 2024.*

[15] Survival-based Clustering of Predictors in Cox Regression with an Application to *TP53* Mutation Annotation. *American Association for Cancer Research (AACR) Annual Meeting 2024.* April 8, 2024.

[16] Annotating *TP53* Germline Mutations from Patient Time-to-Cancer Diagnosis via Homogeneity Pursuit in Cox Regression. *The 2023 Leading Edge of Cancer Research Symposium. Nov. 16, 2023.*

[17] A Majorization-Minimization Gauss-Newton Method for 1-Bit Matrix Completion. *Statistical Foundations of Data Science and their Applications: A Conference in Celebration of Jianqing Fan's 60th Birthday. May 9, 2023.*

[18] A Majorization-Minimization Gauss-Newton Method for 1-Bit Matrix Completion. *UF Statistics 2023 Winter Workshop. Jan. 13, 2023.*

[19] An Interpretable Machine Learning Model to Classify Coronary Bifurcation Lesions. *The 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*. Oct. 31 – Nov. 4, 2021.

[20] Revisiting Convexity-Preserving Signal Recovery with the Linearly Involved GMC Penalty. *International Chinese Statistical Association (ICSA) 2020 Applied Statistics Symposium*. Dec. 14, 2020.

[21] Revisiting Convexity-Preserving Signal Recovery with the Linearly Involved GMC Penalty. *The 2020 Women in Statistics and Data Science (WSDS) Virtual Conference*. Oct. 1, 2020.

Teaching Experience

University of California, Riverside, Riverside, CA

Instructor

- STAT 160A (Elements of Probability and Statistical Theory) Fall 2024
- STAT 160B (Elements of Probability and Statistical Theory) Winter 2025
- STAT 209 (Software Tools for Big Data Analysis) Spring 2025

Rice University, Houston, TX

Guest Lecturer

- STAT423/623 (Probability in Bioinformatics and Genetics) Spring 2024
  Topic: Regularized Likelihood Models in Bioinformatics

North Carolina State University, Raleigh, NC

Teaching Assistant

- ST779 (Advanced Probability for Statistical Inference) Spring 2022
- ST517 (Applied Statistical Methods) Fall 2021
- ST370 (Probability and Statistics for Engineers) Fall 2018, Spring 2019, Fall 2019

Mentoring and Advising

Research Mentor

- Rishabh Rai, Undergraduate in Actuarial Science at UC Riverside 2024/12 - present

University Honors Capstone Project Mentor

- Swaraj Dash, Undergraduate in Data Science at UC Riverside 2025/01 - present
- Tista Palmukhopadhyay, Undergraduate in Statistics at UC Riverside 2025/01 - present

Collaborative Project Advisor

- Haoming Shi, PhD student at Rice University 2023/01 -present
- Hao Yan, PhD student at UTHealth 2023/09 - present
- Lisa Lin, Undergraduate at Rice University (now PhD at Yale University) 2021/10 - 2022/12

PhD Qualifying Exam Committee

- John Pleines, PhD student in Statistics at UC Riverside 2025

Professional Services

Journal Reviewer

- Journal of Computational and Graphical Statistics
- Technometrics
- Journal of Statistical Computation and Simulation
- Communications in Statistics - Simulation and Computation
- Genetics
- PLOS Genetics

Department Service

- Graduate Program Committee 2024 - 2025
- Graduate Admission Committee 2024 - 2025

Other Services

- Reviewer for *2025 SLDS Student Paper Competition*.
- Chair of the *High-dimensional, Multivariate, and Missing Data Methods* session at *ENAR 2023 Spring Meeting*.
- Judge for *ENAR 2023 Spring Meeting Poster Competition*.
- Chair of the *High-dimensional Statistics* session at *2022 Symposium on Data Science & Statistics*.

VOLUNTEER AND LEADERSHIP

Member, Stats Up AI Alliance 2024/01 – present

- Work as a technical team member with cofounders to encourage and empower statisticians to fit in and embrace AI research.
- Build and maintain the website of Stats Up AI, including organizing data resources, collecting review articles from domain fields, and maintaining social media accounts.

Volunteer, Alternative Intercultural Service Break, NCSU 2019/03 – 2019/03

- Worked as a volunteer with ABCCM in Black Mountain, NC, including homeless services, gardening, and environmental protection services.
- Visited and gave presentations at Black Mountain middle and elementary schools to introduce international cultures.

President, University Youth Volunteers Association, CUMT 2013/06 – 2014/06

- Organized collaborative volunteer activities among local commonweal organizations in Xuzhou.
- Organized the inaugural University Volunteer Forum with five universities and colleges in Xuzhou.

Last updated on January 19, 2025