Xiaoqian Liu

CONTACT INFORMATION

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RESEARCH INTERESTS

Numerical Optimization, High-dimensional Statistics, Machine Learning, Convex-Nonconvex Regularization, Applications in Cancer Genomics

PROFESSIONAL EXPERIENCE

University of Texas MD Anderson Cancer Center, Houston, TX

Postdoctoral Fellow 2022/08 – Present

- Mentor: Prof. Wenyi Wang

Argonne National Laboratory, Lemont, IL

Research Aide 2021/08 – 2022/07

Wallace Givens Associate 2021/05 – 2021/08

- Supervisor: Dr. Stefan M. Wild

EDUCATION

North Carolina State University, Raleigh, NC

Ph.D., Statistics 2018/08 – 2022/07

- Thesis: *Penalization Methods for Structured Data Analysis*
- Adviser: Prof. Eric C. Chi

Renmin University of China, Beijing, China

M.S., Statistics 2015/09 – 2018/06

- Thesis: *Sparse Principal Component Analysis with Fused Penalty*
- Adviser: Prof. Bo Zhang

China University of Mining and Technology, Xuzhou, China

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

- *Cum Laude Graduate of University*

HONORS AND AWARDS

Best Poster Prize at 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, Ministry of Education of China, 2017
First Class Academic Scholarship of University, Renmin University of China, 2015, 2016, 2017
National Scholarship for Undergraduates, Ministry of Education of China, 2012, 2013, 2014

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.

Published / Accepted

[1] **X. Liu** ✉, E. C. Chi, and K. L. Lange. A Sharper Computational Tool for L_2E Regression. *Technometrics*, 1-10, 2022. [Invited to present in the Technometrics session at The 65th Annual Fall Technical Conference].

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

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

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

Preprints and Manuscripts

[5] **X. Liu** ✉, A. J. Molstad, and E. C. Chi. A Convex-Nonconvex Strategy for Grouped Variable Selection. Minor revision at *Electronic Journal of Statistics*. arXiv:2111.15075 [stat.ME].

[6] **X. Liu** ✉,, X. Han, E. C. Chi, and B. Nadler. A Majorization-Minimization Gauss-Newton Method for 1-Bit Matrix Completion. arXiv:22304.13940 [stat.ML].

[7] S. Guo, X. Cheng, Y. Jiang, **X. Liu**, S. Ji, Q. Liang, A. Koval, Y. Li, L. A. Owen, I. K. Kim, J. Weinstein, S. Kopetz, J. P. Shen, M. M. DeAngelis, R. Chen, W. Wang ✉,. Integration with Benchmark Data of Paired Bulk and Single-Cell RNA Sequencing Data Substantially Improves the Accuracy of Bulk Tissue Deconvolution. *Manuscript available upon request.*

[8] Q. Heng^{+}, **X. Liu**$^{+}$, S. Ma, and E. C. Chi. A Unified Framework of Anderson Acceleration for Operator Splitting. *Manuscript available upon request.*

Working Papers

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

[10] **X. Liu**, E. C. Chi, and K. L. Lange. Dykstra's Problem via Splitting Methods.

PRESENTATIONS AND TALKS

[1] A Sharper Computational Tool for L_2E Regression. At: *The 65th Annual Fall Technical Conference. Oct. 4-6, 2023.* Invited talk.

[2] A Majorization-Minimization Gauss-Newton Method for 1-Bit Matrix Completion. At: *2023 Joint Statistical Meetings. Aug. 8, 2023.* Contributed paper presentation.

[3] A Convex-Nonconvex Strategy for Grouped Variable Selection. At: *The 36th New England Statistics Symposium. June 6, 2023.* Invited talk.

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

[5] A Convex-Nonconvex Strategy for Grouped Variable Selection. At: *Eastern North American Region International Biometric Society Spring Meeting. Mar. 21, 2023.* Oral-contributed presentation.

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

[7] A Convex-Nonconvex Strategy for Grouped Variable Selection. At: *Computational and Methodological Statistics. Dec. 19, 2022.* Invited session talk.

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

[9] R for Data Science. At: *Biomedical Data Science Workshop & Careers Panel, UCLA. July 17, 2022.* Workshop instructor.

[10] A Convex-Nonconvex Strategy for Grouped Variable Selection. At: *2022 Symposium on Data Science & Statistics*, June 9, 2022. Refereed presentation.

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

[12] A Tutorial on CART Algorithm. *Duke University (Randles Lab)*, Nov. 9, 2021. Invited talk.

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

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

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

[16] Revisiting Convexity-Preserving Signal Recovery with the Linearly Involved GMC Penalty. In: *Women in Statistics and Data Science Virtual Conference*, Oct. 1, 2020. E-poster presentation.

TEACHING EXPERIENCE

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

Renmin University of China, Beijing, China

Teaching Assistant

- Time Series Analysis — Fall 2017
- Stochastic Analysis — Spring 2016

SOFTWARE

`L2E`: R package for robust structured regression via the L_2 criterion.

`GMC`: R package for variable selection via a convex-nonconvex regularization strategy.

PROFESSIONAL SERVICES

Reviewer for Journals

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

Student Mentorship

- Haoming Shi (PhD student), Rice University
- Lisa Lin (undergraduate), Rice University
- Arie Ogranovich (undergraduate), Rice University

Other Services

- Chair of the *High-dimensional, Multivariate, and Missing Data Methods* session at *ENAR 2023 Spring Meeting*.
- Volunteer of poster judging for *ENAR 2023 Spring Meeting Poster Competition*.
- Chair of the *High-dimensional Statistics* session at *2022 Symposium on Data Science & Statistics*.

VOLUNTEER AND LEADERSHIP

Volunteer, The Green Chair Project, Raleigh, NC 2021/09 – 2021/12

- Worked as a volunteer using data science skills to help the nonprofit understand the needs of the community (e.g., the number of children that need beds in Wake County) and the impact of the organization (e.g., on educational outcomes).

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 in 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.