# Xiaoqian Liu

| | | |
|---|---|---|
| CONTACT INFORMATION | 7007 Bertner Ave. MD Anderson Cancer Center<br>Houston, TX 77030-3403 | *E-mail:* xliu31@mdanderson.org<br>*Website:* https://xiaoqian-liu.github.io/ |

RESEARCH INTERESTS  Numerical Optimization, Computational Statistics, Machine Learning, Structured Estimation, Convex-Nonconvex Regularization, Robust Estimation, Omics Data Analysis

PROFESSIONAL EXPERIENCE

**University of Texas MD Anderson Cancer Center**, Houston, TX

*Postdoctoral Fellow*     2022/08 – Present
- Mentor: Wenyi Wang

**Argonne National Laboratory**, Lemont, IL

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

EDUCATION

**North Carolina State University**, Raleigh, NC

Ph.D., Statistics.     2018/08 – 2022/07
- Thesis: *Penalization Methods for Structured Data Analysis*
- Advisor: Eric C. Chi

**Renmin University of China**, Beijing, China

M.S., Statistics     2015/09 – 2018/06
- Thesis: *Sparse Principal Component Analysis with Fused Penalty*
- Advisor: 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, 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 |

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

[2] **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**].

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

[4] **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.

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

*Pre-prints / Manuscripts*

[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]. Major Revision at *Journal of Computational and Graphical Statistics*.

[7] S. Guo[†], **X. Liu**[†], X. Cheng[†], Y. Jiang, S. Ji, Q. Liang, A. Koval, Y. Li, L. A. Owen, I. K. Kim, A. Aparicio, J. N. Weinstein, S. Kopetz, J. P. Shen, M. M. DeAngelis, R. Chen, and W. Wang ✉. DeMixSC: A Deconvolution Framework that Uses Single-Cell Sequencing Plus a Small Benchmark Dataset for Improved Analysis of Cell-Type Ratios in Complex Tissue Samples. *Submitted.* bioRxiv 2023.10.10.561733. [**Best Poster Award at The 2023 Leading Edge of Cancer Research Symposium**].

[8] 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*

[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. Beyond Dykstra's Algorithm.

[11] **X. Liu** and W. Wang. Homogeneity Pursuit in Cox Regression and its Application to Gene Mutation Annotation.

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

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

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

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

*Poster Presentations*

[12] Annotating *TP53* Germline Mutations from Patient Time-to-Cancer Diagnosis via Homogeneity Pursuit in Cox Regression. *2023 University of Texas GSBS Genetics & Epigenetics Program Retreat. Oct. 28, 2023.*

[13] 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.*

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

[15] 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.

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

[17] 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

**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.

MMGN: R / MATLAB implementations for binary (1-bit) matrix completion.

PROFESSIONAL SERVICES

*Journal Reviewer*

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

*Student Mentor*

- Haoming Shi, PhD student at Rice University
- Lisa Lin, undergraduate at Rice University (now PhD student at Yale University)
- Hao Yan, PhD student at UTHealth
- Arie Ogranovich, undergraduate at Rice University

*Other Services*

- 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

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 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.