Jonquil Zhongling Liao

zliao42@wisc.edu 608-949-4586 jonquilliao.github.io zhongling-jonquil-liao

Education

University of Wisconsin–Madison **CGPA: 4.0/4.0**
Doctor of Philosophy in Statistics *Sept. 2021 - Expected 2026*
Master of Science in Statistics, Speciality in Data Science *Sept. 2020 - May 2021*
Visiting International Student *Sept. 2019 - May 2020*

Zhejiang University **CGPA: 3.8/4.0**
Bachelor of Natural Sciences in Statistics *Sept. 2016 - Jun. 2020*

Publications

Testing for latent structure via the Wilcoxon–Wigner random matrix of normalized rank statistics
Jonquil Z. Liao, Joshua Cape,
Submitted.

Robust spectral clustering with rank statistics
Joshua Cape, Xianshi Yu, **Jonquil Z. Liao**,
Journal of Machine Learning Research (2024+), accepted.

Selected Projects

Fundamental limits of Pass-to-ranks (PTR) spectral clustering
Supervisor: Joshua Cape *2023 - present*

- PTR clustering algorithm applies a rank transformation to adjacency matrices prior to estimating node embeddings and applying k-means clustering. This approach ensures consistent community detection, even with the presence of heavy-tailed distributions.
- Improved consistency guarantees for the PTR clustering algorithm and established the oracle exponential mis-clustering rate, characterizing sharp threshold boundaries for exact community recovery.

Testing for latent structure via the Wilcoxon–Wigner (WW) random matrix of normalized rank statistics
Supervisor: Joshua Cape *Sept. 2023 - Aug. 2024*

- Developed novel testing procedures utilizing the spectral properties of WW matrices, providing robust and flexible methods for detecting latent structure in large symmetric data matrices.

Censored AcF Model for Financial Market Risk Studies
Supervisor: Zhengjun Zhang *May 2020 - May 2021*

- Developed the Censored Autoregressive conditional Fréchet (AcF) model, an extension of the classic AcF, for modeling block maxima of negative log returns in stock markets with daily price limits and applied the CAcF model to CSI300, S&P 500, and DJI30, identifying systemic risks.

Exploratory Data Analysis and Feature Engineering for Educational video data
Course project: Computer Vision *Feb. 2024 – May 2024*

- Designed an algorithm for temporal segmentation of video data and performed hand gesture recognition using MediaPipe on selected gesture chunks. (https://orc-dev.github.io/cs766-final-project/)
- Tools: Python, Git, MediaPipe, OpenCV, Pandas, Numpy

Spectrum Similarity Analysis for cB58 Galaxy
Course project: Data Science Computing *Oct. 2020*

- Devised an efficient algorithm using statistical characteristics to identify spectra closely resembling the cB58 galaxy from a 25GB spectrum dataset containing 2.5 million spectra.
- Tools: R, High Throughput Computing, Distributed Computing

Selected Awards

Jun. 2024 2024 IRSA Poster Presentation Award
Aug. 2020 Academic Excellence Award, UW-Madison, Department of Statistics
Oct. 2019 Hailiang First Class Scholarship (Ranked 2nd), Academic First Class Scholarship, Zhejiang University
Sept. 2018 Outstanding Student Leaders, Zhejiang University

Skills

Languages and Tech skills: Python, R, Matlab, Git, Shell Script, Vim.
Experience in distributed high-throughput computing with HTCondor on Linux.