Yuchen Xu

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EDUCATION

CORNELL UNIVERSITY

PhD Candidate in Statistics and Data Science
Expected July 2023 | Ithaca, NY
Cum. GPA: 4.0/4.0

SHANGHAI JIAO TONG UNIVERSITY

BS in Mathematics and Applied Mathematics
Zhiyuan College Honored Program
July 2018 | Shanghai, China
Major GPA: 3.85 / 4.3

CORNELL UNIVERSITY

Research Intern Exchange
Fall 2017 | Ithaca, NY

OXFORD UNIVERSITY

HertFord College Summer Course
Partial Differential Equations
Aug 2016 | Oxford, UK

RELEVANT COURSEWORK

- Probability Theory
- Mathematical Statistics
- Time Series and Spatial Data Science
- Statistical/Machine Learning Theory
- Bayesian Statistics
- Causal Inference
- Statistical Consulting
- Matrix Computation

RESEARCH INTERESTS

TIME SERIES ANALYSIS

- Change point detection.
- (Hidden) Markov model.

STRUCTURED DATA ANALYSIS

- Joint matrix diagonalization.
- Tensor decomposition.
- Blind source separation / Independent component analysis.

IMAGE ANALYSIS

- Blob detection.
- Ridge detection.

PUBLICATIONS & PREPRINTS

PEER-REVIEWED

• Manzorro, R., **Xu, Y.**, Vincent, J., Rivera, R., Matteson, D., & Crozier, P. (2022). *Exploring Blob Detection to Determine Atomic Column Positions and Intensities in Time-Resolved TEM Images with Ultra-Low Signal-to-Noise. Microscopy and Microanalysis*, 1-14. doi:10.1017/S1431927622000356

SUBMITTED

• **Xu, Y.**, Düker, M. C., & Matteson, D. S. (2021). *Testing Simultaneous Diagonalizability. arXiv preprint **arXiv:2101.07776**.*
• Goolsby, C., Losey, J., **Xu, Y.**, Düker, M. C., Sherman, M. G., Matteson, D. S., & Moradi, M. (2021). *Addressing the Embeddability Problem in Transition Rate Estimation. bioRxiv preprint **bioRxiv:707919**.*
• Thomas, A. M., Crozier, P. A., **Xu, Y.**, & Matteson, D. S. (2022). *Detection and hypothesis testing of features in extremely noisy image series using topological data analysis, with applications to nanoparticle videos. arXiv preprint **arXiv:2209.13584**.*

IN-PREP

• **Xu, Y.**, Matteson, D. S. (2022). *Non-parametric ridge recovery of TEM image time series given temporal parameterization.*

LINKS

Website:// Yuchen Xu
Github:// XycYuchenXu
LinkedIn:// YuchenXu1015
Google Scholar:// Yuchen Xu
ORCID:// Yuchen Xu

SKILLS

PROGRAMMING

R • Matlab
Python • LaTeX
SQL • AWS
Stan • Java

LANGUAGE

Mandarin: native
English: advanced

PRESENTATIONS

Testing Simultaneous Diagonalizability

Joint Statistical Meeting (JSM) | Speed Session
Business and Economic Statistics Section
July 2019 | Denver, CO — Contributed & Poster

Cornell Celebration of Statistics and Data Science | Poster Session
Sept 2019 | Ithaca, NY — Poster

Recording atomic column positions and intensities via Blob Detection in noise-degraded TEM frames

UPSTAT 2021 Conference | Parallel Session
Bronze Medal Presenter
Apr 2021 | (Virtual) Rochester, NY — Contributed

The 37th SIDIM | Parallel Session
Data Science in Science Minisymposia
Feb 2022 | (Virtual) Puerto Rico — Contributed

Non-parametric ridge recovery of TEM image series given temporal parameterization

2022 INFORMS Annual Meeting | Technical Session
Science-Integrated Statistical Learning Section
Oct 2022 | Indianapolis, IN — Contributed

2022 IEEE Western New York Image and Signal Processing Workshop (WNYISPW) | Poster Session
Nov 2022 | (Hybrid) Rochester, NY — Poster

TEACHING EXPERIENCE

PROBABILITY MODELS AND INFERENCE
STSCI 3080 | Teaching assistant
Fall 2019 @ Cornell
Instructor: Florentina Bunea

BASIC PROBABILITY
MATH 4710 | Teaching assistant
Spring 2020 @ Cornell
Instructor: Laurent Saloff-Coste

STATISTICAL SAMPLING
STSCI 3100 | Teaching assistant
Fall, 2020 @ Cornell
Instructor: Thomas DiCiccio

STATISTICS FOR FINANCIAL ENGINEERING
STSCI 5640 | Teaching assistant
Spring, 2021 @ Cornell
Instructor: David S. Matteson

OPERATIONS RESEARCH TOOLS FOR FINANCIAL ENGINEERING
STSCI 4630 | Teaching assistant
Fall, 2021 @ Cornell
Instructor: David Ruppert

RESEARCH EXPERIENCE

CORNELL UNIVERSITY | PhD Candidate
Department of Statistics and Data Science
Member of Prof. David S. Matteson's Group
Aug 2018 – Present | Ithaca, NY

- Testing simultaneous diagonalizability of matrix-valued functional.
- Change point detection for matrix-variate time series.
- Non-parametric ridge recovery from image data.
- Inference on heart failure history data from New York-Presbyterian.

HDR CATALYST PROJECT | Researcher
Nov 2019 - Present | Ithaca, NY
Collaborate with groups of:

- **Prof. Roberto Rivera**: propose and adapt hidden Markov models to dynamically cluster nanoparticle atomic structural configurations.
- **Prof. Peter A. Crozier**: adapt blob detection algorithm to extract locations and intensities of atomic columns.
- **Prof. Mahmoud Moradi**: refine the estimators of Markov chain transition rate matrices from transition probability matrices.

HEART FAILURE PROJECT | Researcher
Dec 2021 - Present | Ithaca, NY
Collaborate with New York-Presbyterian (NYP) Hospital to conduct patients' heart failure inference from Electrocardiograms (ECG) data with other hospital-visit records.

INDUSTRIAL EXPERIENCE

CHINA APPRAISAL ASSOCIATION DATA ANALYSIS (CAAD) | Algorithm & Data Science Intern
Mar 2018 – May 2018 | Shanghai, China

- Conducted real estate appraisal price smoothing and prediction: implementing spectral analysis, support vector machine, and spatial auto-regression, etc.
- Optimized property keywords searching algorithms.

AMAZON WEB SERVICES (AWS) | Data Scientist Intern
May 2022 – Aug 2022 | Seattle, WA
IT services development team

- Proposed a referential probabilistic metric quantifying efficacy of internal IT-Services products: implementing hypothesis testing, Natural Language Embedding, mixture model estimation, etc.
- Optimized data products on aggregation and interpretation logic.