

# 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

Github:// [XycYuchenXu](#)

LinkedIn:// [YuchenXu1015](#)

Google Scholar:// [Yuchen Xu](#)

ORCID:// 0000-0003-1128-3774

Website:// [Yuchen Xu](#)

## SKILLS

### PROGRAMMING

R • Matlab

Python •  $\text{\LaTeX}$

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

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### 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

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## 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.