

# Yuchen Xu

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## EDUCATION

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| 2018 - 2023 | Ph.D. Candidate in Statistics & Data Science<br>Cornell University, Ithaca, NY                                       |
| 2014 - 2018 | B.S. in Mathematics & Applied Mathematics, Zhiyuan Honored Program<br>Shanghai Jiao Tong University, Shanghai, China |
| Fall 2017   | Research Intern Exchange<br>Center for Applied Mathematics, Cornell University, Ithaca, NY                           |
| August 2016 | Summer Course on Partial Differential Equations<br>Hertford College, Oxford University, Oxford, UK                   |

## RESEARCH THEORY & METHODS

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|-------------------------------|---------------------------------|-------------------------|
| <b>Time Series Analysis:</b>  | • Changepoints                  | • (Hidden) Markov model |
| <b>Multivariate Analysis:</b> | • Joint matrix diagonalization  | • Tensor decomposition  |
|                               | • Blind Source Separation (BSS) |                         |
| <b>Image Analysis:</b>        | • Blob detection                | • Ridge detection       |

## RESEARCH APPLICATIONS

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|------------------------------|----------------------|-----------|
| • Financial Econometrics     | • Nanoparticles      | • Geology |
| • Medical Images and Signals | • Molecular Dynamics |           |

## RESEARCH EXPERIENCE

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|----------------|---|
| 2018 - Present | Matteson Lab, Cornell University<br>Advisor: Prof. David S. Matteson<br>Tasks: Testing simultaneous diagonalizability.  |
| 2019 - Present | Atomic-Level Structural Dynamics in Catalysts (ALSDC) Group<br>Advisor: Prof. David S. Matteson<br>Tasks: Clustering nanoparticle structures, w/ Prof. Roberto Rivera;<br>Extraction of TEM atomic columns, w/ Prof. Peter A. Crozier;<br>Estimating transition rate matrices, w/ Prof. Mahmoud Moradi. |
| 2021 - Present | Enterprise Heart Failure Program, New York-Presbyterian (NYP) Hospital<br>Advisor: Prof. Martin Wells<br>Tasks: Heart failure inference from ECG data, w/ Ashley N. Beecy, MD.  |
| 2022 - Present | Department of Surgery, Icahn School of Medicine at Mount Sinai Hospital<br>Advisor: Prof. David S. Matteson<br>Tasks: Predicting thyroid cancer recurrence, w/ Denise Lee, MD.  |

## PUBLICATIONS<sup>1</sup>

**Xu, Y.**, Düker, M.-C., and Matteson, D. S., “Testing simultaneous diagonalizability,” *Journal of the American Statistical Association*, 2023. DOI: 10.1080/01621459.2023.2202435. [Online]. Available: <https://doi.org/10.1080/01621459.2023.2202435>.

Manzorro, \*, **\*Xu, Y.**, Vincent, J. L., Rivera, R., Matteson, D. S., and Crozier, P. A., “Exploring blob detection to determine atomic column positions and intensities in time-resolved TEM images with ultra-low signal-to-noise,” *Microscopy and Microanalysis*, vol. 28, no. 6, pp. 1917–1930, Mar. 2022. DOI: 10.1017/s1431927622000356. [Online]. Available: <https://doi.org/10.1017/s1431927622000356>,

◦ *The Most Outstanding Students Awards, Bronze Medal, UPSTAT 2021 Conference.*

Thomas, A. M., Crozier, P. A., **Xu, Y.**, and Matteson, D. S., “Detection and hypothesis testing of features in extremely noisy image series using topological data analysis, with applications to nanoparticle videos,” *Technometrics*, 2023. DOI: 10.1080/00401706.2023.2203744. [Online]. Available: <https://doi.org/10.1080/00401706.2023.2203744>.

## MANUSCRIPTS UNDER REVIEW OR REVISION

**Xu, Y.**, Thomas, A. M., Crozier, P. A., and Matteson, D. S., *Dynamic Atomic Column Detection in Transmission Electron Microscopy Videos via Ridge Estimation*, 2023. DOI: 10.48550/arXiv.2302.00816. [Online]. Available: <https://arxiv.org/abs/2302.00816>,

◦ *The Best Student Poster Award, 2022 IEEE Western New York Image and Signal Processing Workshop (WNYISPW).*

◦ *The First-Place Winner, Best Student Paper Competition Case Studies and Applications track, Statistical Methods in Imaging Conference 2023.*

Goolsby, C., Losey, J., **Xu, Y.**, Düker, M.-C., Sherman, M. G., Matteson, D. S., and Moradi, M., “Addressing the embeddability problem in transition rate estimation,” Aug. 2019. DOI: 10.1101/707919. [Online]. Available: <https://doi.org/10.1101/707919>, Submitted to the Journal of Physical Chemistry.

## SOFTWARE

**R** package `eigTest` available on Github: Jointly Estimate and Test for Common Eigenvectors.

## PRESENTATIONS

*Testing Simultaneous Diagonalizability*, Conference on Advances in Time Series Analysis, Speedy Session, Chicago, IL, May 2023.

*Dynamic Atomic Column Detection in Transmission Electron Microscopy Videos via Ridge Estimation*, The Statistical Methods in Imaging Conference 2023, Minneapolis, MN, May 2023.

*Non-parametric ridge recovery of TEM image series given temporal parameterization*, 2022 IEEE Western New York Image and Signal Processing Workshop (WNYISPW), (Hybrid) Rochester, NY, Nov. 2022.

*Non-parametric ridge recovery of TEM image series given temporal parameterization*, Science-Integrated Statistical Learning Section, 2022 INFORMS Annual Meeting, Indianapolis, IN, Oct. 2022.

*Recording atomic column positions and intensities via Blob Detection in noise-degraded TEM frames*, Data Science in Science Minisymposia, The 37th SIDIM, (Virtual) Puerto Rico, Feb. 2022.

*Recording atomic column positions and intensities via Blob Detection in noise-degraded TEM frames*, UP-STAT 2021 Conference, (Virtual) Rochester, NY, Apr. 2021.

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<sup>1\*</sup> First authors contributed equally.

*Testing Simultaneous Diagonalizability*, Cornell Celebration of Statistics and Data Science, Ithaca, NY, Sep. 2019.

*Testing Simultaneous Diagonalizability*, Business and Economic Statistics Section, Speed Session, Joint Statistical Meeting (JSM), Denver, CO, Jul. 2019.

## LINKS

Website	Github	LinkedIn	Google Scholar	ORCID
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## SKILLS

<b>Programming:</b>	R SQL	Python AWS & Azure	Matlab Stan	L <sup>A</sup> T <sub>E</sub> X Java
<b>Language:</b>	English		Mandarin	

## TEACHING EXPERIENCE

Spring 2023 @ Cornell	Understanding Machine Learning Instructor: Andrew M. Thomas	Teaching Assistant STSCI 4750
Fall 2021 @ Cornell	Operations Research Tools for Financial Engineering Instructor: David Ruppert	Teaching Assistant STSCI 4630
Spring 2021 @ Cornell	Statistics for Financial Engineering Instructor: David S. Matteson	Teaching Assistant STSCI 5640
Fall 2020 @ Cornell	Statistical Sampling Instructor: Thomas DiCiccio	Teaching Assistant STSCI 3100
Spring 2020 @ Cornell	Basic Probability Instructor: Laurent Saloff-Coste	Teaching Assistant MATH 4710
Fall 2019 @ Cornell	Probability Models and Inference Instructor: Florentina Bunea	Teaching assistant STSCI 3080

## SERVICE

January 2023	Reviewer for the Journal of Service Research.
November 2021	Reviewer for the Journal of Econometrics.
January 2021	Reviewer for the Best Student Paper Competition of Joint Statistical Meeting (JSM) Business and Economic Statistics Section (B&E).

## INDUSTRY EXPERIENCE

May 2022 — — Aug 2022	Data Scientist Intern Amazon Web Services (AWS), Seattle, WA Tasks: Modeling efficacy for internal IT-Services products; Optimizing data aggregation and interpretation logics.
Mar 2018 — — May 2018	Algorithm & Data Science Intern China Appraisal Association Data Analysis (CAAD), Shanghai, China Tasks: Regressing and predicting real estate appraisals; Optimizing address search algorithms.