

# Ming Gao

[minggao97.github.io](https://minggao97.github.io) • [minggao@chicagobooth.edu](mailto:minggao@chicagobooth.edu)

## Research Interests

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- Statistical machine learning and causal graphical models
- Structure learning and causal discovery
- High-dimensional statistics and minimax theory

## Education

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Ph.D. in Econometrics and Statistics	2021.09 – now
M.B.A.	2023.09 – now
Booth School of Business, University of Chicago, Chicago, IL, USA	
Advisor: Bryon Aragam	
M.Sc. in Statistics	2019.09 – 2021.04
Department of Statistics, University of Chicago, Chicago, IL, USA	
Advisor: Jingshu Wang	
B.Sc. in Statistics	2015.09 – 2019.06
School of Statistics, Renmin University of China, Beijing, China	

## Awards

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Arnold Zellner Doctoral Prize	Chicago Booth, 2024
Stevens Doctoral Program research funding	Chicago Booth, 2023 – 2024
Ph.D Program Fellowship	Chicago Booth, 2021 – now
Outstanding Thesis Award	RUC, 2019

## Research

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11. **Ming Gao**, Wai Ming Tai, and Bryon Aragam. [KL-BSS: Rethinking optimality for neighbourhood selection in structural equation models](#). *R&R invited at JRSS-B*, 2025.
10. **Ming Gao**, Yuhao Wang, and Bryon Aragam. [Optimal structure learning and conditional independence testing](#). *Submitted*, 2025.
9. **Ming Gao** and Bryon Aragam. [Optimality and computational barriers in variable selection under dependence](#). *Submitted*, 2025.

8. **Ming Gao** and Cong Zhang. [Optimizing return forecasts: A bayesian intermediary asset pricing approach](#). *Submitted*, 2024. (Presented at SFS Cavalcade North America 2025)
7. Jin-Hong Du, Tianyu Chen, **Ming Gao**, and Jingshu Wang. [Joint trajectory inference for single-cell genomics using deep learning with a mixture prior](#). *Proceedings of the National Academy of Sciences*, 2024.
6. Yuhao Wang, **Ming Gao**, Wai Ming Tai, Bryon Aragam, and Arnab Bhattacharyya. [Optimal estimation of gaussian \(poly\)trees](#). *International Conference on Artificial Intelligence and Statistics*, 2024.
5. Yuxuan Guo, **Ming Gao**, and Xiaoling Lu. [Multivariate change point detection for heterogeneous series](#). *Neurocomputing*, 2022.
4. **Ming Gao**, Wai Ming Tai, and Bryon Aragam. [Optimal estimation of gaussian dag models](#). *International Conference on Artificial Intelligence and Statistics*, 2022.
3. **Ming Gao** and Bryon Aragam. [Efficient bayesian network structure learning via local markov boundary search](#). *Advances in Neural Information Processing Systems*, 2021.
2. Goutham Rajendran, Bohdan Kivva, **Ming Gao**, and Bryon Aragam. [Structure learning in polynomial time: Greedy algorithms, bregman information, and exponential families](#). *Advances in Neural Information Processing Systems*, 2021.
1. **Ming Gao**, Yi Ding, and Bryon Aragam. [A polynomial-time algorithm for learning nonparametric causal graphs](#). *Advances in Neural Information Processing Systems*, 2020.

## Software

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### *KL-BSS* ([Link](#)):

Improving best subset selection (BSS) on neighbourhood selection/variable selection/support recovery in structural equation models and causal discovery.

### *PC-tree algorithm* ([Link](#)):

Optimal estimation of causal poly-tree/forest models via a modified PC algorithm.

### *NPVAR algorithm* ([Link](#)):

Learning nonparametric DAGs in polynomial time with conditional variance assumptions.

### *TAM algorithm* ([Link](#)):

Efficient nonparametric structure learning via Testing and Masking with entropic conditions.

### *VITAE* ([Link](#)):

Single-cell genomics trajectory inference and data integration with uncertainty quantification via variational autoencoders and hierarchical mixture priors.

## Teaching Experience

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### *Teaching Assistant*

- BUSN 41901: Probability and Statistics (PhD), Autumn, 2023-2024
- BUSN 41916: Bayes, AI and Deep Learning (PhD), Autumn, 2025
- BUSN 41000: Business Statistics (MBA), Winter, 2024-2026

## Professional Service

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### *Reviewer*

- **Journals:** JMLR, JCGS, CSDA, TMLR
- **Conferences:** ICML 2023-2025, NeurIPS 2022-2025, AISTATS 2022-2026, ICLR 2025-2026, CLeaR 2025, AAAI 2025, UAI 2025

## Internship Experience

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**Data Analyst Intern**, 2018.12 – 2019.05

Department of Dynamic Drilling Computing Engineering, Schlumberger, Beijing, China

**Data Analyst Intern**, 2018.07 – 2018.08

Department of Science and Technology, Industrial Bank of China, Shanghai, China

**Quantitative Research Intern**, 2018.01 – 2018.03

Lion Fund Management, Beijing, China

## References

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### **Bryon Aragam**

Associate Professor of Econometrics and Statistics

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University of Chicago, Booth School of Business

### **Jingshu Wang**

Assistant Professor of Statistics

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University of Chicago, Department of Statistics

### **Cong Zhang**

Assistant Professor of Finance

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Bentley University, Finance Department