

## Baichen Tan

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### EDUCATION

#### The University of Chicago

Chicago, IL

Bachelor of Arts in Statistics with *Honors*

September 2019 – June 2024

- Major GPA: 3.97 | Cumulative GPA: 3.94
- Relevant Coursework: Markov Chains, Martingales, and Brownian Motion; Multiple Testing, Modern Inference, and Replicability; Introduction to Causality with Machine Learning; Applied Linear Stat Methods; Machine Learning

### PUBLICATIONS

Nikolaos Ignatiadis, Wolfgang Huber, **Baichen Tan**, “Independent hypothesis weighting with total variation regularization via ADMM.” In progress.

Jingshu Wang, **Baichen Tan**, Yuxuan Ke, “Statistical inference in one-sample summary-data Mendelian randomization.” In progress.

### ACADEMIC EXPERIENCE

#### Honor BA Thesis, Dept. of Statistics, the University of Chicago

September 2023 – Present

*Advisor: Prof. Jingshu Wang*

- Enhanced the existing methodology in the paper "Powerful Three-Sample Genome-Wide Design and Robust Statistical Inference in Summary-Data Mendelian Randomization" by addressing situations of multiple risk factors.
- Established the validity of employing conditional score functions for the estimation of causal effects when there exist dependencies between risk factors and gene snippets.
- Applied the empirical Bayes method to estimate the true effect of gene snippets on risk factors by assuming a mixture Gaussian prior and designed simulations to validate the efficacy of the proposed method in enhancing statistical power.

#### Dept. of Statistics, the University of Chicago

September 2023 – Present

*Research Assistant (Advisor: Prof. Nikolaos Ignatiadis)*

- Studied the application of Lagrange multipliers in multiple testing optimization to enhance power of weighted Benjamini-Hochberg Procedure when p-values follow piece-wise linear distribution and am currently working on the development of an algorithm tailored for this methodology.
- Proposed the utilization of ADMM algorithm for independent hypothesis weighting with regularization.

#### Dept. of Statistics, the University of Chicago

June 2023 – September 2023

*Research Assistant (Advisor: Prof. Jingshu Wang)*

- Examined the papers "Sum of Single Effects model (SuSie)" and "SparsePro: an efficient genome-wide fine-mapping method" and explored their methodology and replicated their results in python and R.
- Improved the SuSie models by assuming, for different response types, the gene snippets type sharing the same prior, and write R codes to validate the results of the new models.
- Wrote an expository paper summarizing and comparing the methodologies of SuSie, SparsePro, and SharePro models in genetic causal inferences based on the two papers.

#### Booth School of Business, the University of Chicago

June 2023 – September 2023

*Research Assistant (Advisor: Prof. Panagiotis Toulis)*

- Examined and summarized the core methodologies of 8 papers investigating spillover effects in economics.
- Developed replication codes to recreate the regression models utilized in the 8 selected papers.

**Mathematics REU, the University of Chicago**

June 2023 – August 2023

*Participant*

- Examined the book *Geometric Structure of High-Dimensional Data and Dimensionality Reduction* and proved the validity of three linear dimensionality reduction methods: principal component analysis, classical multidimensional scaling methods, and random projections.
- Wrote and presented an expository paper “Introduction to linear dimensionality reduction methods.”

**Data Science Institute, the University of Chicago**

January 2023 – March 2023

*Research Assistant (Advisor: Dr. Anna Woodard)*

- Developed a Python preprocessing script that significantly improved the efficiency of ground truth data collection for Invenery’s wind turbine projects by 30%.
- Used TensorFlow to create advanced segmentation models and a damage detection model to increase the effectiveness of damage control for Invenery’s turbine blades. Utilized machine learning and image processing techniques to accurately identify and locate damage areas on turbine blades, improving the accuracy of the model from 70% to 95%.

**EXTRACURRICULAR ACTIVITIES AND OTHER EXPERIENCES**

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**Fire Escape Film, the University of Chicago****Chicago, IL***Technology Director*

September 2022 – June 2023

- Held regular tech lectures on sound, lighting, and cinematography to teach members operations over film equipment.
- Led casting, light design, and cinematography of the short film project, *The Lapse*.

**Keyi Lab Film Company, Tencent News****Beijing, China***Assistant Director*

September 2021 – December 2021

- Subtitled and synchronized sound for the documentary project "Bon Voyage," released on Tencent Video with on average 50K weekly views.
- In charge of casting and set coordination for the talk show "Sing for You," released on Tencent News with on average 40K weekly views.

**School of Sociology, Sun Yat-sen University****Guangzhou, China***Research Assistant (Advisor: Yucheng Liang)*

March 2021 – June 2021

- Constructed regression models to estimate the linear relationship between business ownership, housing, and ethnicity of African immigrants in Guangdong province.
- Built over 50 graphical user interface (GUI) visualizations that map populational variables to each of the district level of Guangzhou.

**HONORS AND AWARDS**

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|---|-------------|
| • Dean’s List, the University of Chicago                        | 2022 – 2023 |
| • Jeff Metcalf Fellowship Grant, the University of Chicago      | 2021 – 2022 |
| • Foreign Language Acquisition Grant, the University of Chicago | 2020        |

**SKILLS**

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<b>Languages</b>	English, Mandarin (native), Cantonese (Intermediate)
<b>Programming</b>	Python, R, MATLAB, SQL
<b>Tools</b>	TensorFlow, PyTorch, LaTeX
<b>Films</b>	Lighting Design, Cinematography, Sound Operator