

# Nicholas Di

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## EDUCATION

### Rice University

PhD Statistics GPA: 3.9

Houston, TX, USA

Aug 2023 - May 2028 (Expected)

### Macalester College

BA Economics (Honors), BA Applied Mathematics/Statistics GPA: 3.96

Saint Paul, MN, USA

Aug 2018 - Dec 2022

## PUBLICATIONS

- Shaw C, Williams C, Tan T, **Di N**, Shulman J, Belmont J. (2024). The Polygenic Score Rare Variant Causal Pivot: A Conditional Approach to Discovery and Segmentation in Complex Disease Genetics - Submitted
- Di N**. (2023). Gendered Labor Market Outcomes During COVID-19: Evidence from Early Withdrawal of Federal Pandemic Unemployment Compensation. *The Developing Economist*. (Won Best Undergraduate Paper Award)  
[Paper Link](#) [News Link](#) - Accepted

## RESEARCH EXPERIENCE

### Convexity-Preserving Non-Convex Penalties via Proximal MCMC

Advised by Dr. Eric Chi (Rice University)

Sep 2024 - Current

- Enhanced Bayesian inference methods by integrating convexity-preserving non-convex optimization with Moreau-Yosida importance sampling, improving scalability and accuracy in high-dimensional data analysis
- Applying methods to Bayesian inverse imaging problems to reconstruct latent images or signals from noisy, indirect measurements, and obtain uncertainty quantification on ill-posed and instable problems

### PRS-RV Causal Pivot: A Segmentation Approach to Complex Disease Genetics

Advised by Dr. Chad Shaw (Baylor College of Medicine)

May 2024 - Aug 2024

- Developed a structural equation model categorizing diseases into four types using Polygenic Risk Scores (PRS) and rare variants (RV), showing that RV-PRS exclusion can aid in disease discovery
- Tested the model on UK Biobank data for hypercholesterolemia, breast cancer, and Alzheimer's disease, finding significant negative correlation between RV and PRS in affected individuals

### Gendered Labor Market Outcomes During COVID-19

Advised by Dr. Amy Damon (Macalester College)

Jun 2022 - Aug 2022

- Conducted independent research on the gender-specific effects of the cessation of Federal Pandemic Unemployment Compensation during the COVID-19 pandemic
- Collected and analyzed data from the U.S. Census Bureau; collaborated with a Federal Reserve researcher to gain deeper insights and validate findings

### Causal Inference

Advised by Dr. Leslie Myint (Macalester College)

May 2019 - Aug 2019

- Developed a causal diagram using R and Tetrad's search algorithms, gaining experience in applying causal inference techniques to enhance the reliability of biological research findings
- Conducted a meta-research study of cancer biological research using PLoS and Semantic MEDLINE abstract outputs

## WORKING EXPERIENCE

### Analyst

Ernst and Young, Quantitative Economics and Statistics, Washington D.C, USA

Jan 2023 - June 2023

- Collaborated with major environmental ESG (Environmental, Social, and Governance) consulting firms to evaluate, optimize, and elevate ESG scores for numerous corporate clients
- Performed econometric and statistical, predictive forecasting, and fiscal impact modeling for business and government clients on a broad range of topics including relocation decisions, federal and state policy, tax, and vaccine distributions

### Research Assistant Intern

Brattle Group, Boston, USA

Jun 2022 - Aug 2022

- Supported leading academics in applying sophisticated econometric and statistical models to legal, regulatory, and policy issues

- Utilized mathematical software to model and solve linear, nonlinear and mixed-integer optimization problems related to electricity demand

### **Analyst Intern**

*Ernst and Young, Quantitative Economics and Statistics, Washington DC, USA*

*Jun 2021 - Aug 2021*

- Developed and maintained comprehensive databases on Medicare cases and compliance with healthcare standards and regulations
- Worked on various projects related to economic policy analysis, impact analysis, survey design, and statistical sampling and analysis

### **Business Development Manager**

*NutriKarma, New York NY, USA*

*Aug 2020 - May 2021*

- Expanded the NutriKarma team by 11 employees and worked in project management, specifically with app-wire flow, data sets, and marketing
- Led meetings with potential angel investors, securing interest and building strategic partnerships with business leaders, dietitians, and personal trainers to advance market presence

### **Business Analyst Intern**

*U.S. Bank, Minneapolis MN, USA*

*Jun 2020 - Aug 2020*

- Facilitated projects regarding classification of product types for document custody services and preformed in-depth data and business analysis for automation of loan certification process

### **Business Data Analyst**

*Minnesota Association of Volunteer Administration, Minneapolis MN, USA*

*Oct 2018 - May 2019*

- Wrote R-scripts to compute regression models regarding membership recruitment data for over 500 clients
- Developed outreach plans regarding local organizations and sponsorship, and updated internal resources for manager to keep information and schedules up to date

## **AWARDS**

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- AAAS Annual Conference Statistics Travel Award** in AAAS - 2024
- Dean's Prize** in Rice University - 2023-2025
- 3M Scholar Award** in Macalester College Economics Department - 2022
- Best Undergraduate Paper Award** in Midwest Economics Association Conference - 2022
- Summa Cum Laude** in Macalester College - 2022
- Phi Beta Kappa** in Macalester College - 2022
- Deans List All Semesters** in Macalester College - 2018 - 2022

## **TEACHING ACTIVITIES**

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- Rice University**
  - Teaching Assistant, STAT 413: Statistical Machine Learning
  - Teaching Assistant, STAT 425: Introduction to Bayesian Inference
  - Teaching Assistant, STAT 405/605: Data Science in R
- Macalester College**
  - Teaching Assistant, COMP 123: Introduction to Computer Science
  - Teaching Assistant, STAT 155: Introduction to Statistical Modeling
  - Teaching Assistant, ECON 194: Calculus Based Principles of Economics
  - Teaching Assistant, STAT 253: Statistical Machine Learning
  - Supplemental Instructor, ECON 381: Econometrics

## **PRESENTATIONS**

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- The Polygenic Score Rare Variant Causal Pivot** American Society of Human Genetics - 2024
- American Statistical Association Panel** American Association for the Advancement of Science - 2024
- Spatial Analysis of Lead Levels in Twin Cities Metro Area** Capstone Seminar in Macalester College - 2022
- Economics Independent Research** Midwest Economics Association - 2022
- Causal Inference Research** Jr. Faculty-Hub Summer Research Fund Meeting, Macalester College - 2019

## **UNIVERSITY SERVICES**

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- Statistics Student Seminar Organizer** Rice University - 2024
- STAT 450 Project Judge** Rice University - 2022
- Graduate Student Representative** Rice University - 2023