# Ruxin Shi

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Department of Statistics and Probability, Michigan State University

## EDUCATION

**Michigan State University (MSU),** East Lansing, MI — Aug. 2020 - present
Ph.D in Statistics

**University of Science and Technology of China (USTC),** Hefei, CN — Sept. 2016 - June 2020
Bachelor of Science in Statistics

## ACADEMIC EXPERIENCE

**Mendelian Randomization, Michigan State University, East Lansing, US** — Aug. 2021 - present
**Advisor: Professor Yuehua Cui**

- Conducted an extensive review of literature on Mendelian Randomization (MR), focusing on its use of genetic variants as instrumental variables to assess causal relationships between exposures and outcomes.
- Developed a novel method, MR-SPLIT, to address biases related to instrumental variable (IV) selection and weak IVs within the 2SLS IV regression framework. Performed comprehensive simulation studies demonstrating MR- SPLIT's superior performance in bias reduction, effective type I error control, and increased statistical power compared to existing methods.
- Presented at the 2024 Joint Statistical Meetings (JSM) in Portland: Delivered a 15-minute academic presentation on MR-SPLIT, highlighting its methodological advancements and research implications.
- Currently extending MR-SPLIT to handle multiple exposures and outcomes, aiming to establish direct causal relationships among multiple variables.

**EWOUC-NETS-DA, Emory University, Atlanta, US** — July 2019 - Jan. 2020
**Advisor: Professor Zhengjia Chen**

- Reviewed literature on methodologies for determining optimal dosing in cancer phase I clinical trials, with a focus on overdose and underdose control. Developed the EWOUC-NETS-DA method to enhance dose selection accuracy, minimize toxicity, and improve patient outcomes.
- Designed realistic scenarios for simulation, generated potential outcomes, and implemented simulation codes for both existing methods and the newly developed EWOUC-NETS-DA.

## INTERNSHIP

**ModernaTX. Inc | Intern, Infectious Disease** — May 16, 2022 - Aug. 12, 2022; Jun. 05, 2023 - Aug. 18, 2023

- Worked with senior-level statistician on research project: On the Confidence Interval Construction for Relative Risk Endpoint in Super-Superiority Efficacy Vaccine Trials of Infectious Diseases
- Reviewed previous papers and selected appropriate methods by doing simulations and theory calculations.
- Created SMH, which is an updated method based on YTH (1994), to improve the CI skewness (due to rare event) correction.
- Developed an R package that provides functions to apply SMH and other previously proposed methods. It also includes numerous additional functions for designing experiments, conducting simulations, and performing tests.

**MSU Center for Statistical Training and Consulting | Research Assistant** — Aug. 2022 - May 2023; Aug. 2023 - May 2024

- Collaborated on Research Projects and Provided Statistical Support: Worked with a diverse range of clients, including PhD students and professors from various disciplines such as Human Medicine, Education, and Communication Arts & Sciences.
- Provided comprehensive guidance on research design, statistical methodology selection, data management, data interpretation, statistical analysis and presentation of results, along with software recommendations for conducting analyses. Successfully served 36 cases.
- Expertise in Statistical Modeling: Applied a wide range of statistical models, including linear regression, logistic regression, Poisson regression, mixed-effects models, survival analysis, time series analysis, factor analysis, ANCOVA, principal component analysis and more, tailored to the specific needs of each project.
- Commitment to Research Reproducibility: Prioritized the reproducibility of research outcomes by meticulously documenting and organizing all processes. Participated in weekly staff meetings to discuss challenges encountered in ongoing cases, ensuring continuous improvement and knowledge sharing

## TEACHING EXPERIENMENT

**STT231 Statistics for Scientists | Teaching Assistant** Aug. 2020 - May 2021
Jan. 2022 - May 2022

**Statistics Learning Center | Tutor** May 2021- Aug 2021

- Independently managed the Statistical Learning Center daily, providing students with guidance and solutions to their study related challenges and questions

**STT867 Linear Model Methodology | Grader** Aug. 2021 - Dec 2021

**STT861 Theory of Prob & Stat I | Grader** Aug. 2021 - Dec 2021

## PAPER

**Incidence of bandemia in canine patients undergoing chemotherapy: Band neutrophils during canine CHOP**, Eliason, C., Shi, R., Pierce, S. J., & Masyr, A. (2024), Manuscript submitted for publication.

**MR-SPLIT: a novel method to address selection and weak instrument bias in one-sample Mendelian randomization studies**, Shi, R., Wang, L., Burgess, S., & Cui, Y. (2024). PLoS genetics.

**Michigan Reading Corps Racial Equity Evaluation Report**, Witmer, S., Shi, R., & Bachmann, J. (2023)., Michigan State University, East Lansing, MI.

**Modeling Tail Index With Autoregressive Conditional Pareto Model**, Zhouyu Shen, Yu Chen & Ruxin Shi (2022), Journal of Business & Economic Statistics.

## ACTIVITY

**China Young Development Program, Columbia University, NewYork, US** Aug. 2018 - Sep. 2018

- Enrolled in a variety of courses taught by Columbia faculty from different departments in quantitative investment, risk management, consulting, marketing.
- Participated in a case study competition to create business idea to promote public welfare and well-being.
- Won *Best Creative Award* in the case study competition.
- Won *Most Valuable Player* in Meixin US-China Tech Investment Research Program based on scientific nature of data sources, concise PPT and clear logic, especially answered the opponent's questions accurately.

## SKILLS

**Programming Languages:** R, Python, C