# Zijian Guo

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CONTACT INFORMATION

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http://statistics.rutgers.edu/home/zijguo/

RESEARCH INTERESTS

High-dimensional inference, causal inference, nonparametric inference, econometrics and applications to health and genetics data analysis.

- Inference for high-dimensional regression
- Instrumental variable methods
- Nonparametric methods
- Efficient data imputation
- Mediation analysis
- Heritability and co-heritability analysis in genomics
- Electronic health data analysis

POSITIONS

*Assistant Professor*     Sep 2017-present
Department of Statistics
Rutgers, the State University of New Jersey

ACADEMIC VISITS

*Visiting Scholar*     Sep 2019
Department of Biostatistics, TH Chan School of Public Health, Harvard University
*Host:* Tianxi Cai

*Visiting Scholar*     Nov 2018
Forschungsinstitut für Mathematik, ETH, Zürich
*Host:* Peter Bühlmann

*Visiting Scholar*     Aug 2017
Center for Statistics in Big Data, Perelman School of Medicine, Upenn
*Host:* Hongzhe Li

EDUCATION

Ph.D. Statistics, University of Pennsylvania     2017
*Thesis advisor:* T. Tony Cai

B.S. Mathematics, The Chinese University of Hong Kong     2012

GRANTS

- National Science Foundation #DMS 1811857 "Inference in High-Dimensional Linear Models: Methods, Theory and Applications."
    - Amount $119,999; Period: Aug 2018 to July 2021.
    - Role: Principal Investigator

- National Institute of Health #R56-HL-138306-01 "Statistics Methods for Analyzing Electronic Health Record Data."
    - Amount $53,301; Period: June 2018 to Aug 2018.
    - Role: Co-Investigator

- Upenn Medical School "Statistics Methods for Analyzing Electronic Health Record Data" Subcontract.
    - Amount $12,778; Period: June 2019.
    - Role: Senior Investigator

Publication Published/Accepted Papers (* indicates alphabetical ordering authorship)

1. *Cai, T. T., & **Guo, Z.** (2019). Semi-supervised Inference for Explained Variance in High-dimensional Linear Regression and Its Applications. *Journal of the Royal Statistical Society: Series B*, to appear.

2. **Guo, Z.**, Wang, W., Cai, T. T., & Li, H. (2019). Optimal estimation of genetic relatedness in high-dimensional linear models. *Journal of the American Statistical Association*, 114(525), 358-369.

3. **Guo, Z.**, Kang, H., Cai, T. T., & Small, D. S. (2018). Testing Endogeneity with High Dimensional Covariates. *The Journal of Econometrics*, 207(1), 175-187.

4. **Guo, Z.**, Kang, H., Cai, T. T., & Small, D. S. (2018). Confidence Interval for Causal Effects with Invalid Instruments using Two-Stage Hard Thresholding. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*, 80(4), 793-815.

5. **Guo, Z.**, Small, D. S., Gansky, S. A., & Cheng, J. (2018). Mediation analysis for count and zero-inflated count data without sequential ignorability and its application in dental studies. *Journal of the Royal Statistical Society: Series C (Applied Statistics)*, 67(2), 371-394.

6. Cheng, J., Cheng N. F., **Guo, Z.**, Gregorich, S., Amid I. I., & Gansky, S. A. (2018). Mediation analysis for count and zero-inflated count data. *Statistical Methods in Medical Research*, 27(9), 2756-2774.

7. *Cai, T. T., & **Guo, Z.** (2018). Accuracy assessment for high-dimensional linear regression. *Annals of Statistics*, 46(4), 1807-1836.

8. *Cai, T. T., & **Guo, Z.** (2017). Confidence intervals for high-dimensional linear regression: Minimax rates and adaptivity. *Annals of Statistics*, 45(2), 615-646.

9. **Guo, Z.**, & Small, D. S. (2016). Control function instrumental variable estimation of nonlinear causal effect models. *Journal of Machine Learning Research*, 17(100), 1-35.

10. **Guo, Z.**, Cheng, J., Lorch, S. A., & Small, D. S. (2014). Using an instrumental variable to test for unmeasured confounding. *Statistics in Medicine*, 33(20), 3528-3546.

11. **Guo, Z.**, Kogan, R., Qiu, H., & Strichartz, R. S. (2014). Boundary value problems for a family of domains in the Sierpinski gasket. *Illinois Journal of Mathematics*, 58(2), 497-519.

Technical Reports

12. *Cai, T. , Cai, T. T., & **Guo, Z.** (2019). Individualized Treatment Selection: An Optimal Hypothesis Testing Approach In High-dimensional Models. Under revision at *Journal of the Royal Statistical Society: Series B.*

13. **Guo, Z.** & Zhang, C. (2019). Extreme Nonlinear Correlation for Multiple Random Variables and Stochastic Processes with Applications to Additive Models. Under revision at *Stochastic Processes and their Applications.*

14. **Guo, Z.** & Zhang, C. (2019). Local Inference in Additive Models with Decorrelated Local Linear Estimator. *Technical Report.*

15. **Guo, Z.**, Renaux, C., Bühlmann, P., & Cai, T. T. (2019). Group Inference in High Dimensions with Applications to Hierarchical Testing. *Technical Report.*

16. **Guo, Z.**, Herman, D., & Chen, J. (2019). Inference for Case Probability in High-dimensional Logistic Regression. *Technical Report.*

17. **Guo, Z.**, Ćevid, D., &Bühlmann, P. (2020). Doubly Debiased Lasso: High-Dimensional Inference under Hidden Confounding and Measurement Errors. *Technical Report.*

Software **Two Stage Hard Thresholding (TSHT)**
R code is available at `http://stat.wharton.upenn.edu/~zijguo/Software.html`.

**Functional Debiased Estimator (FDE)**
R code is available at `http://statgene.med.upenn.edu/software.htm`.

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| TEACHING<br>EXPERIENCE | **Instructor** |

**Instructor**

- Rutgers University

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|---|---|
| FSRM 588: Financial Data Mining | Fall 2019 |

*Instructor Rating:* 4.75 out of 5.0

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|---|---|
| STAT 594: Advanced Modern Statistical Inference II | Spring 2019 |

*Instructor Rating:* 4.82 out of 5.0

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|---|---|
| FSRM 588: Financial Data Mining | Fall 2018 |

*Instructor Rating:* 4.71 out of 5.0

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|---|---|
| FSRM 588: Financial Data Mining | Fall 2017 |

*Instructor Rating:* 4.82 out of 5.0

- The Wharton School, University of Pennsylvania

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|---|---|
| STAT 111 : Introductory Statistics | Summer 2016 |

*Instructor Rating:* 3.6 out of 4.0

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| **Recitation Instructor** | Fall 2014 |

The Wharton School, University of Pennsylvania

STAT 111: Introductory Statistics

**Teaching Assistant**

The Wharton School, University of Pennsylvania

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|---|---|
| STAT 102: Business Statistics | Spring 2017 |
| STAT 970: Mathematical Statistics | Fall 2016 |
| STAT 622: Statistical Modeling | Spring 2016 |
| STAT 550: Mathematical Statistics | Fall 2015 |

**PhD Thesis Advisor:** Prabrisha Rakshit (expected 2023)

**PhD Students and Post Doc Mentor[1]:** Domagoj Cevid (ETH); Jue Hou (Harvard); Molei Liu (Harvard); Lu Wang (Upenn); Rong Ma (Upenn); Claude Renaux (ETH); Ye Tian (Rutgers); Zheshi Zheng (Rutgers).

**PhD Thesis Committee:** Sai Li (2018); Yisha Yao (expected 2020)

**Master Thesis Advisor:** Yankun Xu (2018); Yangdi Li (2018); Guanyu Huang (2018); Haoze Tang (2018); Wenzhe Zhang (2018); Yaran Su (2018); Xinyi Zhang (2018); Yuan Liang (2019); Hequan Zhang (2019); Qiaochu Chen (2019); Jiamin Deng (2019); Zeen Huo (2019); Jianyu Li (2020); Junjie Chen (2020).

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| • ICSA New Researcher Award, ICSA 2019 | Dec. 2019 |
| • IMS travel Award, JSM | Aug. 2017 |
| • President Gutmann Leadership Award, University of Pennsylvania | Apr. 2017 |
| • J. Parker Bursk Prize | Sept. 2016 |

*Awarded by the Statistics Department at the Wharton School
for excellence in research.*

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| • Statistics in Epidemiology Young Investigator Award, JSM | Aug. 2013 |

*Awarded by the American Statistical Association section on
Statistics in Epidemiology for the paper "Using an
instrumental variable to test for unmeasured confounding."*

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[1]I am mentoring these PhD students or Post Doc for one or multiple projects but not their advisor

- Chung Chi College Departmental Prize, CUHK                                                    2011
- Dr. Chao Yong Chi-hsing Scholarship in Mathematics, CUHK                                      2011
- Chung Chi Traveling Award in Mathematics, CUHK                                                2011
- Chung Chi Ivy League Exchange Scholarship, CUHK                                               2010
- Caring Alumni Student Exchange Scholarship, CUHK                                              2010
- Dean's List, College of Arts and Science, UPenn                                               2010
- Dean's Honors List, Faculty of Science, CUHK                                              2008, 2009
- Chung Chi College Scholarship, CUHK                                                           2009
- Honors at Entrance to the Chinese University of Hong Kong (4 years)                           2008

ACADEMIC
SERVICE
- Department Retreat Chair (2019-2020), Department of Statistics, Rutgers
- Department Seminar Chair (2018-2019), Department of Statistics, Rutgers
- Other Rutgers Committee service: Department retreat (2017-2018); FSRM (2017-2018, 2018-2019, 2019-2020); Ph.D. Exam (2018-2019, 2019-2020); Graduate Curriculum (2019-2020);
- Organizing Committee for 2019 Rutgers Statistics Symposium
- Program Committee for ICSA 2019 11th International Conference
- Local Organizing Committee for 2018 ICSA Applied Symposium.
- Session organizer for 2019 Hangzhou Data Science Conference
- Session organizer for 2018 ICSA Applied Symposium.
- Reviewer for the following journals: *Annals of Statistics*, *JASA*, *JRSSB*, *Biometrica*, *Statistica Sinica*, *IEEE International Symposium on Information Theory*, *Journal of Applied Statistics*, *Biometrics*, *Journal of Machine Learning*, *COLT*.

TALKS
- Department seminar, Department of Statistics, East China Normal University, Shanghai, China, *"Group Inference in High Dimensions with Applications to Hierarchical Testing"*, Dec 2019
- Invited talk, 11th ICSA International Conference, Hangzhou, China, *"Group Inference in High Dimensions with Applications to Hierarchical Testing"*, Dec 2019
- Invited talk, International Statistical Conference in Memory of Professor Sik-Yum Lee, Hong Kong, China, *"Group Inference in High Dimensions with Applications to Hierarchical Testing"*, Dec 2019
- Department seminar, Department of Statistics, East China Normal University, Shanghai, China, *"Individualized Treatment Selection: A Hypothesis Testing Approach In High-dimensional Models"*, June. 2019
- Invited talk, 2019 Hangzhou Data Science Conference, Hangzhou, China, *"Local Inference in High-dimensional Sparse Additive Modeling"*, May. 2019
- Department seminar, School of Data Science, City University of Hong Kong, Hong Kong, China, *"Individualized Treatment Selection: A Hypothesis Testing Approach In High-dimensional Models"*, May. 2019
- Department seminar, ISOM, HKUST, Hong Kong, China, *"Local Inference in High-dimensional Sparse Additive Modeling"*, May. 2019
- Department seminar, Department of Statistics, University of Virginia, USA, *"Local Inference in High-dimensional Sparse Additive Modeling"*, March. 2019
- Invited Speaker, 2019 ICSA Data Science Conference, Xishuangbanna, Yunnan, China. *"Individualized Treatment Selection: A Hypothesis Testing Approach In High-dimensional Models"*,

Jan. 2019

- Young Research Session, Memorial Workshop for Lawrence D. Brown, University of Pennsylvania, USA. *"Individualized Treatment Selection: A Hypothesis Testing Approach In High-dimensional Models"*, Nov. 2018

- Seminar for Statistics, Department of Mathematics, ETH, Swiss, *"Semi-supervised Inference for Explained Variance in High-dimensional Linear Regression and Its Applications"*, Nov. 2018

- Department seminar, Department of Mathematics, NJIT, USA, *"Semi-supervised Inference for Explained Variance in High-dimensional Linear Regression and Its Applications"*, Nov. 2018

- Department seminar, ORFE, Princeton, USA, *"Semi-supervised Inference for Explained Variance in High-dimensional Linear Regression and Its Applications"*, Oct. 2018

- Department seminar, ISOM, HKUST, Hong Kong, China, *"Semi-supervised Inference for Explained Variance in High-dimensional Linear Regression and Its Applications"*, July. 2018

- Department seminar, Department of Statistics, Naikai University, China, *"Semi-supervised Inference for Explained Variance in High-dimensional Linear Regression and Its Applications"*, July. 2018

- Invited talk, IMS Asia Pacific Rim Meeting, Singapore, *"Semi-supervised Inference for Explained Variance in High-dimensional Linear Regression and Its Applications"*, June. 2018

- Invited talk, HongKong EcoStat Conference, Hong Kong, China, *"Semi-supervised Inference for Explained Variance in High-dimensional Linear Regression and Its Applications"*, June. 2018

- Invited talk, ICSA Symposium 2018, New Brunswick, USA, *"Semi-supervised Inference for Explained Variance in High-dimensional Linear Regression and Its Applications"*, June. 2018

- Invited talk, Purdue Symposium on Statistics, USA, *"Semi-supervised Inference for Explained Variance in High-dimensional Linear Regression and Its Applications"*, June. 2018

- Invited talk, 2018 Hangzhou Data Science Conference, Hangzhou, China, *"Semi-supervised Inference for Explained Variance in High-dimensional Linear Regression and Its Applications"*, May. 2018

- Invited talk, Lorentz Center, Leiden University, Netherlands, *"Semi-supervised Inference for Explained Variance in High-dimensional Linear Regression and Its Applications"*, Apr. 2018

- Department seminar, Department of Statistics, Columbia University, *"Semi-supervised Inference for Explained Variance in High-dimensional Linear Regression and Its Applications"*, Apr. 2018

- Topic contributed talk, Joint Statistical Meetings, Baltimore, USA, *"Optimal Estimation of Co-Heritability in High-Dimensional Linear Models"*, Aug. 2017

- Invited talk, Statistical Foundations of Uncertainty Quantification for Inverse Problem, Cambridge, *"Inference for Functionals in High-dimensional Linear Models"*, June. 2017

- Seminar, Center for Statistical Methods in Big Data, University of Pennsylvania, *"Inference with High-dimensional Covariates and Possibly Invalid Instruments"*, Apr. 2017

- Seminar, Institute of Data science, Fox Business School, Temple University, *"Inference for High Dimensional Linear Models: Fundamental Limits and Algorithms"*, Feb. 2017

- Department seminar, Department of Biostatistics, UC Berkeley, *"Inference for High Dimensional Linear Models: Fundamental Limits and Algorithms"*, Feb. 2017

- Department seminar, Department of Statistics, Rutgers, *"Inference for High Dimensional Linear Models: Fundamental Limits and Algorithms"*, Feb. 2017

- Department seminar, Department of Statistics, University of Michigan, *"Inference for High Dimensional Linear Models: Fundamental Limits and Algorithms"*, Jan. 2017

- Department seminar, Department of Statistics, University of Minnesota, *"Inference for High Dimensional Linear Models: Fundamental Limits and Algorithms"*, Jan. 2017

- Department seminar, Department of Statistics, UIUC, *"Inference for High Dimensional Linear*

*Models: Fundamental Limits and Algorithms"*, Jan. 2017

- Department seminar, DPMMS, University of Cambridge, *"Inference for High Dimensional Linear Regression: Fundamental Limits and Algorithms"*, Jan. 2017
- Department seminar, Department of Statistics, UC Santa Barbara, *"Inference for High Dimensional Linear Models: Fundamental Limits and Algorithms"*, Jan. 2017
- Invited talk, Mathematical Meeting in Statistics, Fréjus, France, *"Optimal Estimation of Genetic Correlation in High-dimensional Linear Models"*, Dec. 2016
- Econometrics Lunch, Department of Economics, University of Pennsylvania, *"Confidence Intervals for Treatment Effects in High-Dimensional Linear Models"*, Nov. 2016
- Contributed talk, Joint Statistical Meetings, Chicago, USA, *"Accuracy Assessment for High-dimensional Linear Regression"*, Aug. 2016
- Contributed talk, Eastern North American Region, Austin, USA, *"Confidence Intervals for High-Dimensional Linear Regression: Minimax Rates and Adaptivity"*, Mar. 2016
- Poster presentation, John W. Tukey Conference, Princeton University, *"Confidence Intervals for High-Dimensional Linear Regression: Minimax Rates and Adaptivity"*, Sept. 2015
- Contributed talk, Joint Statistical Meetings, Seattle, USA, *"Distance Matrix Estimation from Noisy Observation of Low Rank Position Matrix"*, Aug. 2015
- Contributed talk, Joint Statistical Meetings, Boston, USA, *"Instrumental Variable Approach for Mediation Analysis of Count Model"*, Aug. 2014
- Topic Contributed talk, Joint Statistical Meetings, Montreal, Canada, *" Instrumental Variable Approach for Mediation Analysis of Zero-Inflated Count Model"*, Aug. 2013
- Poster presentation, Atlantic Causal Inference Conference, Harvard University, *"Control Function Instrumental Variable Estimation of Nonlinear Causal Effect Models"*, May. 2013

MEMBERSHIPS
- American Statistical Association
- Institute of Mathematical Statistics
- International Chinese Statistical Association
- The Econometric Society