

**Xu Qin**

University of Pittsburgh, School of Education  
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**EDUCATION**

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**University of Chicago**

Ph.D., Quantitative Methods in Education and Human Development 2018  
Dissertation: Causal mediation analysis in multisite trials with an evaluation of the Job Corps program  
Dissertation Committee: Guanglei Hong (Chair), Stephen Raudenbush, Donald Hedeker, Margaret Beale Spencer

**Renmin University of China**

M.S., Statistics 2012  
B.S., Statistics 2010

**EMPLOYMENT**

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**University of Pittsburgh**

Assistant Professor of Research Methodology (Primary) 2018-present  
Department of Health and Human Development  
Assistant Professor of Biostatistics (Secondary) 2022-present  
Department of Biostatistics

**HONORS AND AWARDS**

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**Fellowships**

National Academy of Education/Spencer Postdoctoral Fellowship, *Spencer Foundation* 2022  
National Study of Learning Mindsets Early Career Fellowship, *Bezos Family Foundation* 2018 - 2019  
National Academy of Education/Spencer Dissertation Fellowship, *Spencer Foundation* 2017 - 2018  
Social Science Division Fellowship, *University of Chicago* 2014 - 2017  
Quantitative Methods in Education and Human Development Fellowship, *University of Chicago* 2012 - 2014  
Social Sciences Summer Fellowship, *University of Chicago* 2013, 2015

**Awards**

William E. Henry prize for the best PhD dissertation,  
*Department of Comparative Human Development, University of Chicago* 2019  
Outstanding Dissertation Award, *American Educational Research Association, Division D* 2019  
Joint Statistical Meetings Student Paper Award, *American Statistical Association* 2016  
UChicagoGRAD Travel Fund Grant, *University of Chicago* 2016  
Advanced Graduate Council Travel Fund Grant, *University of Chicago* 2016  
Conference Travel Grant, *Giannino Graduate Research Fund* 2015

Travel Award for the 11th International Conference on Health Policy Statistics (ICHPS), <i>Health Policy Statistics Section of the American Statistical Association</i>	2015
Best Paper Award for the 7th Forum on International Competitiveness of China's Industries, <i>Ministry of Commerce of China</i>	2011
National Award for the College Student Innovative Project, <i>Ministry of Education of China</i>	2009
Excellence Award for the Chinese College Student Statistics Modeling Competition, <i>National Bureau of Statistics of China</i>	2009
Second Prize for the "Creativity Cup" College Student Academic Paper Competition, <i>Renmin University of China</i>	2008

## **RESEARCH FUNDING**

### ***As Principal Investigator/Co-Principal Investigator***

Principal Investigator (2022-2023), "New Tools for Causal Investigations of for Whom and Where an Educational Intervention is Effective and Why", National Academy of Education/Spencer Postdoctoral Fellowship, Spencer Foundation, \$70,000.

Principal Investigator (2022-2023), "Causal Moderation and Mediation Analyses in Multisite Randomized Trials", Pitt Momentum Funds Priming Grants, \$25,000.

Principal Investigator (2021-2022), "Statistical Power Analysis for Causal Mediation Studies in Single-Site and Multi-Site Randomized Trials Using Monte Carlo Simulations," Spencer Foundation, \$50,000.

Principal Investigator (2019-2020), "Sensitivity Analysis for Causal Mediation Analysis in the Presence of Unmeasured Pretreatment or Posttreatment Confounding," Spencer Foundation, \$49,898.

Co-Principal Investigator (2019-2022). "Student Engagement in Mathematics: A Longitudinal Study of Classroom and Psychosocial Processes," National Science Foundation, \$1,744,513. (Principal Investigator: Ming-Te Wang, University of Pittsburgh)

Co-Principal Investigator (2020-2023), "Causal Moderation and Mediation Analyses in Single-Site and Multisite Randomized Trials with Noncompliance," the Institute of Education Sciences (IES) Statistical and Research Methodology in Education Grants. \$899,920. (Principal Investigator: Guanglei Hong, University of Chicago)

### ***As Co-Investigator***

Co-Investigator (2023-2027), "Statistical methods for population-level cell-type-specific analyses of tissue omics data for Alzheimer's disease", National Institute of Health (NIH) R01 Grant, \$1,891,625. (Principal Investigator: Jiebiao Wang)

Co-Investigator (2023-2024), "Examining Psychosocial Correlates of Loneliness Among Marginalized Youth", Pitt Momentum Funds Scaling Grants, \$394,645. (Principal Investigator: César Escobar-Viera)

Co-Investigator (2021-2022), "Placental origins of phthalate-induced changes in fetal reproductive development", National Institute of Health (NIH), \$25,912. (Principal Investigator: Jennifer Adibi)

## PAPERS

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(\* indicates alphabetical authorship; underline indicates student co-author)

### Refereed Journal Papers

1. **Qin, X.** (conditionally accepted). Introduction to causal mediation analysis. *Asia Pacific Education Review*. (Invited paper for a special issue on causal research designs and analysis in education.)
2. **Qin, X.** (in press). Sample size and power calculations for causal mediation analysis: a tutorial and Shiny app. *Behavior Research Methods*.
3. **Qin, X.** & Wang, L. (in press). Causal moderated mediation analysis: methods and software. *Behavior Research Methods*.
4. Xun, X., **Qin, X.**, Layden, A.J., Yin, Q., Swan, S.H., Barrett, E., Bush, N.R., Sathyanarayana, S., & Adibi, J.J. (in press). Application of 4-way decomposition to the analysis of placental hormones as intermediary variables between maternal body mass index and birthweight. *Frontiers in Reproductive Health*.
5. Park, S., **Qin, X.**, & Lee, C. (in press). Estimation and sensitivity analysis for causal decomposition analysis in disparity research. *Sociological Methods and Research*.
6. Hong, G., Yang, F., & **Qin, X.** (2023). Post-treatment confounding in causal mediation studies: a cutting-edge problem and a novel solution via sensitivity analysis. *Biometrics*, 79(2), 1042-1056.
7. **Qin, X.** & Yang, F. (2022). Simulation-based sensitivity analysis for causal mediation studies. *Psychological Methods*, 27(6), 1000–1013.
8. Wang, M.-T., Zepeda, C., **Qin, X.**, Del Toro, J., & Binning, K. R. (2021). More than growth mindset: individual and interactive links among socioeconomically disadvantaged adolescents' ability mindsets, metacognitive skills, and math engagement. *Child Development*, 92(5), e957-e976.
9. **Qin, X.**, Wormington, S., Guzman-Alvarez, A., & Wang, M.-T. (2021). Why does a growth mindset intervention impact achievement differently across secondary schools? Unpacking the mediation mechanism from a national multisite randomized experiment. *Journal of Research on Educational Effectiveness*, 14(3), 617-644.
10. Wang, M.-T., Binning, K. R., Del Toro, J., **Qin, X.**, & Zepeda, C. (2021). Skill, thrill, and will: The role of metacognition and motivation in predicting student engagement over time. *Child Development*, 92(4), 1369-1387. (Del Toro and Qin had equal intellectual contribution)
11. **Qin, X.**, Deutsch, J., & Hong, G. (2021). Unpacking complex mediation mechanisms and their heterogeneity between sites in a Job Corps evaluation. *Journal of Policy Analysis and Management*, 40(1), 158-190.
12. Hong, G., Yang, F., & **Qin, X.** (2021). Did you conduct a sensitivity analysis? A new weighting-based approach for evaluations of the average treatment effect for the treated. *Journal of the Royal Statistical Society, Series A (Statistics in Society)*, 184(1), 227-254.
13. **Qin, X.**, Hong, G., Deutsch, J., & Bein, E. (2019). Multisite causal mediation analysis in the presence of complex sample and survey designs and non-random nonresponse. *Journal of the Royal Statistical Society, Series A (Statistics in Society)*, 182(4), 1343-1370.
14. Hong, G., **Qin, X.**, & Yang, F. (2018). Weighting-based sensitivity analysis in causal mediation studies. *Journal of Educational and Behavioral Statistics*, 43(1), 32-56.

15. Bein, E., Deutsch, J., Hong, G., Porter, K., **Qin, X.**, & Yang, C. \*(2018). Two-step estimation in rmpw analysis. *Statistics in Medicine*, 37(8), 1304-1324.
16. **Qin, X.**, & Hong, G. (2017). A weighting method for assessing between-site heterogeneity in causal mediation mechanism. *Journal of Educational and Behavioral Statistics*, 42(3), 308-340.

### **Refereed Journal Abstract**

17. Guzman-Alvarez, A., **Qin, X.**, & Scott, P. (2022). Deep neural networks for propensity score estimation (abstract), *Multivariate Behavioral Research.*, 57 (1), 164-165.  
(\* Funded by 2021 NAEEd/Spencer Dissertation Fellowship awarded to the first author, Ph.D. mentee)

### **Book Chapter**

18. Chen, C-C., **Qin, X.**, DeVlieger, S., & Farmer, T. W. (2022). Longitudinal research to support tailored interventions: Person- and process-oriented approaches (pp.245-256). In T.W. Farmer, E. Talbott, D. Lee, K. McMaster, & T. Aceves (Eds). *Handbook of special education research: Theory, methods, & developmental processes*. Routledge.

### **Conference Proceedings**

19. **Qin, X.**, & Hong, G. (2016). Analyzing heterogeneous causal mediation effects in multi-site trials with application to the National Job Corps Study. In *JSM Proceedings*, Survey Research Methods Section. Alexandria, VA: American Statistical Association. pp.910-938.  
(\* Winner of 2016 Joint Statistical Meetings Student Paper Award, American Statistical Association)
20. **Qin, X.**, & Hong, G. (2014). Causal mediation analysis in multi-site trials: An application of ratio-of-mediator-probability weighting to the Head Start Impact Study. In *JSM Proceedings*, Social Statistics Section. Alexandria, VA: American Statistical Association, pp.912-926.

## **STATISTICAL SOFTWARE DEVELOPMENT**

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R shiny app for power analysis (<https://xuqin.shinyapps.io/CausalMediationPowerAnalysis>)

moderate.mediation (<https://cran.r-project.org/web/packages/moderate.mediation>)

mediationsens (<https://cran.r-project.org/web/packages/mediationsens>)

MultisiteMediation (<https://cran.r-project.org/web/packages/MultisiteMediation>)

rmpw (<https://cran.r-project.org/web/packages/rmpw>)

## **SELECTED PRESENTATIONS**

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### **Invited Presentations**

**Qin, X.** & Wang, L. (2023). *Causal Moderated Mediation Analysis: Methods and Software*. 2023 Association for Psychological Science Annual Convention, Washington, DC, U.S.

**Qin, X.** & Yang, F. (2021). *Simulation-based sensitivity analysis for causal mediation studies*. Invited presentation at the Department of Biostatistics at the University of Pittsburgh, Pittsburgh, Pennsylvania, U.S.

**Qin, X.** (2021). *Causal mediation analysis in multisite trials*. Invited presentation at the Annual Meeting of the American Educational Research Association, Virtual.

**Qin, X.** (2017). *Evaluating Between-Site Variation of Mediation Mechanisms in the Job Corps Impact Using a Weighting Method*. Invited presentations at the University of Pittsburgh, Pittsburgh, Pennsylvania, U.S.; University of Florida, Gainesville, Florida, U.S.; University of Georgia, Athens, Georgia, U.S.; University of Miami, Miami, Florida, U.S.; University of California, Riverside, California, U.S.; University of Houston, Houston, Texas, U.S.

**Qin, X.** & Hong, G (2016). *Evaluating between-site variation of mediation mechanisms in the Job Corps impact using a weighting method*. Invited presentation at the University of Chicago Education Workshop, Chicago, Illinois, U.S.

**Qin, X.** (2016). *Using potential outcomes to assess heterogeneity of causal mediation mechanism in multi-site trials*. Invited presentation at the University of Notre Dame Quantitative Psychology Program, South Bend, Indiana, U.S.

**Qin, X.** (2016). *Multi-site causal mediation analysis*. Invited instructor (with Prof. Howard Bloom, Prof. Guanglei Hong, Prof. Lindsay Page, Prof. Stephen Raudenbush, and Prof. Sean Reardon) at the Stanford University Workshop on Learning About and From Variation in Treatment Effects, the Stanford Center for Education Policy Analysis, Stanford, California, U.S.

**Qin, X.** & Hong, G. (2014). *Causal mediation analysis in multi-site trials*. Invited presentation at the University of Chicago Workshop on Quantitative Research Methods in Education, Health, and Social Sciences, Chicago, Illinois, U.S.

**Qin, X.** & Wang, J. (2011). *An application of quantile regression model for examining the influence of Chinese innovation capacity on water use efficiency*. Invited presentation at the 58th World Statistics Congress of the International Statistical Institute, Dublin, Ireland.

#### **Refereed Presentations** (underline indicates student co-author)

**Qin, X.** & Wang, L. (2022). *Causal Moderated Mediation Analysis*. Paper presented at the Society for Research on Educational Effectiveness Annual Conference, Washington, DC, U.S.

Guzman-Alvarez, A., **Qin, X.**, & Scott, P. (2021). *Deep Neural Networks for Propensity Score Estimation: A Simulation Study*. Paper presented at the Annual Meeting of the Society of Multivariate Experimental Psychology, Virtual.

**Qin, X.** & Wang, J. (2021). *Bayesian inference for causal investigations of mediation and moderation in multisite randomized trials*. Paper presented at the Society for Research on Educational Effectiveness Spring Conference, Virtual.

**Qin, X.** & Yang, F. (2020). *Simulation-Based Sensitivity Analysis for Causal Mediation Analysis*. Paper presented at the Society for Research on Educational Effectiveness Spring Conference, Virtual.

**Qin, X.**, Wormington, S., Guzman-Alvarez, A., & Wang, M.-T (2019). *Why does a growth mindset intervention impact achievement differently across secondary schools? Unpacking the mediation mechanism from a national multisite randomized experiment*. Paper presented at the Capstone event of the National Study of Learning Mindsets Early Career Fellowship, Seattle, WA, U.S.

**Qin, X.**, Yang, F. (2019). *Sensitivity Analysis for Causal Mediation Analysis in the Presence of Unmeasured Pretreatment Confounding*. Paper presented at the Joint Statistical Meetings, Denver, Colorado, U.S.

**Qin, X.**, Deutsch, J., Hong, G., & Bein, E. (2018). *Unpacking between-site heterogeneity in complex mediation mechanisms of the Job Corps impact: two concurrent mediators*. Paper presented at the Annual Meeting of the American Educational Research Association, New York city, New York, U.S.

- Qin, X.**, Hong, G., Deutsch, J., & Bein, E. (2018). *A template for multi-site causal mediation analysis*. Paper presented at the Society for Research on Educational Effectiveness spring conference, Washington, DC, U.S.
- Qin, X.**, Deutsch, J., & Hong, G. (2017). *Unpacking between-site heterogeneity in complex mediation mechanisms in the Job Corps impact*. Paper presented at the Association for Public Policy Analysis and Management Fall Research Conference, Washington, DC, U.S.
- Hong, G., & **Qin, X.** (2017). *Weighting-Based Sensitivity Analysis in Causal Mediation Studies*. Paper presented at the American Sociological Association Methodology Midyear Meeting, Chicago, Illinois, U.S.
- Qin, X.**, Bein, E., Deutsch, J., Hong, G., Porter, K., & Vigil, A. (2017). *Unpacking complex mediation mechanisms in the multisite Job Corps evaluation*. Paper presented at the Society for Research on Educational Effectiveness spring conference, Washington, DC, U.S.
- Qin, X.**, & Hong, G. (2016). *Analyzing heterogeneous causal mediation effects in multi-site trials with application to the National Job Corps Study*. Topic-contributed paper presented at the Joint Statistical Meetings, Chicago, Illinois, U.S. (\* Joint Statistical Meetings Student Paper Award, American Statistical Association)
- Qin, X.**, & Hong, G. (2016). *Investigating heterogeneous causal mediation mechanisms in multi-site trials*. Poster presented at the Annual Meeting of the American Educational Research Association, Washington, DC, U.S.
- Qin, X.**, & Hong, G. (2015). *Weighting methods for assessing mediation effect variation in multi-site trials*. Paper presented at the International Conference on Health Policy Statistics (ICHPS), Providence, Rhode Island, U.S. (\* Travel Award, Health Policy Statistics Section of the American Statistical Association.)
- Qin, X.**, & Hong, G. (2015). *Weighting methods for assessing mediation effect variation in multi-site trials with an application to the National Job Corps Study*. Topic-contributed paper presented at the Joint Statistical Meetings, Seattle, Washington, U.S.
- Qin, X.**, & Hong, G. (2014). *Ratio-of-mediator-probability weighting for causal mediation analysis in multi-site trials*. Poster presented at the Atlantic Causal Inference Conference, Providence, Rhode Island, U.S.; paper presented at the VI European Congress of Methodology, Utrecht, Netherlands.
- Qin, X.**, & Hong, G. (2014). *Causal mediation analysis in multi-site trials: an application of ratio-of-mediator-probability weighting to the Head Start Impacts Study*. Paper presented at the Society for Research on Educational Effectiveness spring conference, Washington, DC, U.S.; the Joint Statistical Meetings, Boston, Massachusetts, U.S.
- Qin, X.**, Wang, J., Zhao, Y., Wang, L., & Lu, X. (2013). *A comparison study on creativity of college students in China and USA*. Paper presented at the Annual Meeting of the Midwestern Psychological Association, Chicago, Illinois, U.S.

## **TEACHING EXPERIENCE**

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### **Instructor at the University of Pittsburgh**

Hierarchical Linear Modeling (PSYED 3408)	Spring 2019, Spring 2020, Spring 2021, Spring 2022
Applied Regression Analysis (PSYED 2410)	Fall 2018, Fall 2019, Fall 2020, Fall 2021
Statistical Methods I (PSYED 2018)	Spring 2018, Fall 2019, Fall 2020

### **Guest Lecturer at the University of Pittsburgh**

Introduction to Causal Inference (BIOST 2068)	Fall 2021, Fall 2022
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## **Teaching Assistant/ Lab Instructor at the University of Chicago**

Applications of Hierarchical Models in Longitudinal and Multilevel Research (SOVI 20112)

*Instructor: Prof. Stephen Raudenbush*

Spring 2016

Mediation, Moderation, and Spillover Effects (CHDV 32411)

*Instructor: Prof. Guanglei Hong*

Spring 2016

Causal Inference (CHDV 30102)

*Instructor: Prof. Guanglei Hong*

Spring 2015

Applied Statistics in Human Development Research (CHDV 30101)

*Instructor: Prof. Guanglei Hong*

Winter 2015; Fall 2017

## **GRADUATE STUDENT SUPERVISION**

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### **Doctoral Theses (co-advisor)**

Tetsuya Yamada (Education, Expected 2025)

Alberto Guzman-Alvarez (Education, Graduated 2023)

*Thesis:* Deep learning for investigating causal effects with high-dimensional data: analytic tools and applications to educational interventions.

*Award:* 2021 National Academy of Education/Spencer Dissertation Fellowship

*Current position:* Research Data Scientist, American Institute for Research

### **Doctoral Theses (committee member)**

Yuan Gao (Education, Expected 2025)

Ximing Li (Education, Expected 2024)

Annette Han (Education, Expected 2024)

Ruoyun Zheng (Education, Expected 2024)

Kanoko Kamata (Sociology, Expected 2024)

Conor Brown (Business, Graduated 2023)

*Thesis:* What Are You Hiding? The Strategic Use of Pay Secrecy to Affect Managerial Honesty.

*Current position:* Assistant Professor of Business, Grand Valley State University

Xiaoshuang Xun (Epidemiology, Graduated 2022)

*Thesis:* Prenatal Phthalate Exposure and Infant Anogenital Distance: infant size adjustment, evaluating phthalate mixture effects, and exposure patterns.

*Current position:* Senior Biostatistician, Johns Hopkins Bloomberg School of Public Health

Xiao Liu (Quantitative Psychology, Notre Dame University, Graduated 2022)

*Thesis:* Causal Mediation Analysis with The Latent Growth Curve Mediation Model.

*Award:* 2023 Outstanding Dissertation Award, American Educational Research Association, Division D

*Current position:* Assistant Professor of Quantitative Psychology, University of Texas Austin

### **Master's Theses (advisor)**

Abraham, Kimberly (Education, Expected 2024)

David Manning (Education, Graduated 2021)

*Thesis:* Science Growth: The Role of Time, Student, and School Level Factors in a Longitudinal 3-Level Hierarchical Linear Growth Model.

*Current position:* Data Analyst, Niche

### **Master's Theses (committee member)**

Fajer Shamsaldeen (Education, Graduated 2019)

*Thesis:* Predictive Validity Evidence for the Kuwait University Aptitude Test in STEM Colleges.

*Current position:* Ph.D. Student, University of Miami

## **PROFESSIONAL AFFILIATIONS**

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Western North American Region of The International Biometric Society	2023-present
Society for Causal Inference	2021-present
American Educational Research Association	2015-present
Society for Research on Educational Effectiveness	2014-present
American Statistical Association	2013-present

## **PROFFESIONAL SERVICES**

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### **Editorial Board**

<i>Sociological Methodology</i>	2022-Present
<i>Journal of Research on Educational Effectiveness</i>	2021-Present

### **Grant Review**

<i>NSF Grant Application Reviewer</i>	2022-2023
<i>Spencer Small Research Grants Application Reviewer</i>	2023
<i>Pitt Momentum Funds Grant Application Reviewer</i>	2022

### **Referee Service**

<i>Journal of the American Statistical Association</i>
<i>Journal of the Royal Statistical Society: Series B (Statistical Methodology)</i>
<i>Annals of Applied Statistics</i>
<i>Journal of Causal Inference</i>
<i>Statistics in Medicine</i>
<i>BMC Medical Research Methodology</i>
<i>Journal of Educational and Behavioral Statistics</i>
<i>Journal of Research on Educational Effectiveness</i>
<i>Educational Evaluation and Policy Analysis</i>
<i>Educational Researcher</i>
<i>AERA Open</i>
<i>Psychological Methods</i>
<i>Multivariate Behavioral Research</i>
<i>Structural Equation Modeling: A Multidisciplinary Journal</i>
<i>Psychometrika</i>
<i>Educational and Psychological Measurement</i>
<i>Sociological Methodology</i>
<i>American Journal of Sociology</i>



*Research in Social Stratification and Mobility*

*SAGE Open*

*Psychological Trauma: Theory, Research, Practice, and Policy*

*Journal of Community Psychology*

*Scientific Reports*

**Conference**

Proposal Reviewer, <i>Society for Research on Educational Effectiveness Annual Conference</i>	2021, 2023
Session Chair, <i>Joint Statistical Meetings, American Statistical Association</i>	2021
Session Chair, <i>Applied Statistics Symposium, International Chinese Statistical Association</i>	2017

**University of Pittsburgh**

Committee Member, <i>Research Division Committee, School of Education</i>	2020-Present
Committee Member, <i>Quant Policy Search Committee, School of Education</i>	2021-2022
Committee Member, <i>Online Teaching Committee, School of Education</i>	2019 - 2020
Committee Member, <i>Research Methodology Committee, School of Education</i>	2018 – 2020
Mentor, <i>Biostatistics Journal Club (Causal Inference Reading Group), Department of Biostatistics</i>	2022