# Xu Qin

University of Pittsburgh, School of Education

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## EDUCATION

### 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

### 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

### 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), *Health Policy Statistics Section of the American Statistical Association*     2015

Best Paper Award for the 7th Forum on International Competitiveness of China's Industries, *Ministry of Commerce of China*     2011

National Award for the College Student Innovative Project, *Ministry of Education of China*     2009

Excellence Award for the Chinese College Student Statistics Modeling Competition,
*National Bureau of Statistics of China*                                                                    2009
Second Prize for the "Creativity Cup" College Student Academic Paper Competition,
*Renmin University of China*                                                                                        2008

## Research Funding

Principal Investigator, "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, 2022-2023.

Principal Investigator, "Causal Moderation and Mediation Analyses in Multisite Randomized Trials", Pitt Momentum Funds, $25,000, 2023-2024.

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

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

Co-Principal Investigator, "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, 2020-2023. (Principal Investigator: Guanglei Hong, University of Chicago)

Co-Principal Investigator, "Direct and Indirect Effects of Program Participation with an Instrumental Variable," National Science Foundation. $450,000, declined. (Principal Investigator: Guanglei Hong, University of Chicago)

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

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

# PAPERS

<u>**Peer-Reviewed Articles**</u> (* indicates alphabetical authorship; ‡ indicates student co-author)
Hong, G., Yang, F., & **Qin, X.** (in press). Post-Treatment Confounding in Causal Mediation Studies: A Cutting-Edge Problem and A Novel Solution via Sensitivity Analysis. *Biometrics*.

‡ Guzman-Alvarez, A., **Qin, X.**, & Scott, P. (in press). Deep neural networks for propensity score estimation (abstract), *Multivariate Behavioral Research*.
(* Funded by 2021 NAEd/Spencer Dissertation Fellowship awarded to the first author, Ph.D. mentee)

Park, S., **Qin, X.**, & Lee, C. (in press). Estimation and sensitivity analysis for causal decomposition analysis in disparity research. *Sociological Methods and Research*.

**Qin, X.** & Yang, F. (in press). Simulation-based sensitivity analysis for causal mediation studies. *Psychological Methods.*

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.

**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. *The Journal of Research on Educational Effectiveness*, 14(3), 617-644.

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)

**Qin, X.**, Deutsch, J, & Hong, G. (2021). Unpacking complex mediation mechanisms and their heterogeneity between sites in a Job Corps evaluation. *The Journal of Policy Analysis and Management,* 40(1), 158-190.

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.

**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. *The Journal of the Royal Statistical Society, Series A (Statistics in Society)*, 182(4), 1343-1370.

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.

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.

**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.

**Conference Proceedings**

**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 Joint Statistical Meetings Student Paper Award, American Statistical Association)

**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 (R Packages)

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

### Invited Presentations

**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 presentation 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 (‡ indicates student co-author)

‡ 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

### Instructor at the University of Pittsburgh

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|---|---|
| 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

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| Introduction to Causal Inference (BIOST 2068) | Fall 2021 |

### Teaching Assistant/ Lab Instructor at the University of Chicago

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

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|---|---|
| *Instructor: Prof. Stephen Raudenbush* | Spring 2016 |

Mediation, Moderation, and Spillover Effects (CHDV 32411)

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| *Instructor:* Prof. *Guanglei Hong* | Spring 2016 |

Causal Inference (CHDV 30102)

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| *Instructor: Prof. Guanglei Hong* | Spring 2015 |

Applied Statistics in Human Development Research (CHDV 30101)

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|---|---|
| *Instructor: Prof. Guanglei Hong* | Winter 2015; Fall 2017 |

## GRADUATE STUDENT SUPERVISION

### Doctoral Theses (co-advisor)

Alberto Guzman-Alvarez (Research Methodology in Education, Expected 2022)

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

*(Recipient of 2021 National Academy of Education/Spencer Dissertation Fellowship)*

### Doctoral Theses (committee member)

Annette Han (Education, Expected 2024)

Ruoyun Zheng (Education, Expected 2023)

Xiaoshuang Xun (Epidemiology, Expected 2022)

"Phthalate Exposure During Pregnancy and Infant/Child Development: evaluating phthalate mixtures, time varying exposures, and placentally mediated biologic mechanisms."

Conor Brown (Business, Expected 2022)

"What are you hiding? The Strategic Use of Pay Secrecy to Affect Managerial Honesty."

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

"Causal mediation analysis with the latent growth curve mediation model."

### Master's Theses

David Manning (Research Methodology in Education, 2021)

Fajer Shamsaldeen (Research Methodology in Education, 2019)

"Predictive Validity Evidence for the Kuwait University Aptitude Test in STEM Colleges."

## PROFESSIONAL AFFILIATIONS

American Educational Research Association                                                2015-present

Society for Research on Educational Effectiveness                                   2014-present

American Statistical Association                                                              2013-present

Society for Causal Inference                                                                    2021-present


## PROFFESIONAL SERVICES

**Editorial Board**

*Journal of Research on Educational Effectiveness*                                  2021-Present

*Sociological Methodology*                                                                      2022-Presnet


**Referee Service**

*Scientific Reports*

*Journal of the Royal Statistical Society: Series B (Statistical Methodology)*

*Journal of Research on Educational Effectiveness*

*Educational Researcher*

*Sociological Methodology*

*Journal of the American Statistical Association*

*Journal of Educational and Behavioral Statistics*

*Research in Social Stratification and Mobility*

*Psychological Methods*

*Multivariate Behavioral Research*

*Journal of Causal Inference*

*Educational and Psychological Measurement*

*Sage Open*

*AERA Open, American Educational Research Association*

*American Journal of Sociology*


**Session Chair**

*Applied Statistics Symposium, International Chinese Statistical Association*                2017

*Joint Statistical Meetings, American Statistical Association*                                          2021