# Bryan Keller

*Curriculum Vitae*

*Department of Human Development*
*Teachers College, Columbia University*
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## Appointments

2013– **Assistant Professor of Applied Statistics**, *Teachers College, Columbia University*, New York, NY.
2015– **Faculty-at-Large**, *Columbia University, Graduate School of Arts and Sciences*, New York, NY.

## Education

2013 **PhD, Educational Psychology, Quantitative Methods**, *Univ of Wisconsin–Madison*.
Dissertation committee: Jee-Seon Kim (Sponsor), Peter M. Steiner, and David Kaplan
2010 **MS, Educational Psychology, Quantitative Methods**, *Univ of Wisconsin–Madison*.
2002 **MA, Mathematics**, *Binghamton University*, State University of NY.
2002 **MAT, Mathematics (grades 8 – 12)**, *Binghamton University*, State University of NY.
2000 **BS, Mathematics (cum laude)**, *Binghamton University*, State University of NY.

## Publications (*indicates student)

### In Preparation

**Keller, B.** (In Preparation). The Six-Arm Within-Study Replication: Design, Results, and Implications.

Tsai, L., **Keller, B.**, *Liu, R., Seth, K., Tabassum, S., & Meenai, Z. (In Preparation). Assessing a workforce development program for women receiving human trafficking-specific services in India.

### Journal Articles (Peer Reviewed)

**Keller, B.** (Forthcoming). Variable Selection for Causal Effect Estimation: Conditional Random Forest Variable Importance Under Permutation. *Journal of Educational and Behavioral Statistics*.

**Keller, B.**, Chen, J., & *Zhang, T. (2019) Heterogeneous Subgroup Identification with Observational Data: A Case Study Based on the National Study of Learning Mindsets. *Observational Studies*, 5: 93–104.

Chen, J. & **Keller, B.** (2019). Heterogeneous Subgroup Identification in Observational Studies. *Journal of Research on Educational Effectiveness*, 12: 578–596. doi: 10.1080/19345747.2019.1615159.

Schwinn, T. M., Schinke, S. P., Hopkins, J. E., **Keller, B.** (2019). Two- and Three-Year Follow-Up from a Gender-Specific, Web-Based Drug Abuse Prevention Program for Adolescent Girls. *Addictive Behaviors*, 93: 86–92. doi: 10.1016/j.addbeh.2019.01.010.

*Jiang, Y., Clarke-Midura, J., **Keller, B.**, Baker, R. S., Paquette, L., & Ocumpaugh, J. (2018) Note-Taking and Science Inquiry in an Open-ended Learning Environment. *Journal of Contemporary Educational Psychology*, 55: 12–29. doi: 10.1016/j.cedpsych.2018.08.004.

*McCullough, A. K., **Keller, B.**, Qiud, S., & Ewing Garber, C. (2018). Analysis of accelerometer-derived interpersonal spatial proximities: A calibration, simulation, and validation study. *Measurement in Physical Education and Exercise Science*, 22: 275–286. doi: 10.1080/1091367X.2018.1437039.

Schwinn, T. M., Schinke, S. P., Hopkins, J. E., **Keller, B.**, & *Liu, X. (2018). An online drug abuse prevention program for adolescent girls: Posttest and 1-year outcomes. *Journal of Youth and Adolescence*, 47: 490–500. doi: 10.1007/s10964-017-0714-4.

*Bazaldua, D. A. L., Lee, Y.-S., **Keller, B.**, & *Fellers, L. (2017). Assessing the Performance of Classical Test Theory Item Discrimination Estimators in Monte Carlo Simulations. *Asia Pacific Education Review*, 18: 585–598. doi: 10.1007/s12564-017-9507-4.

**Keller, B.** & Tipton, E. (2016). Propensity score analysis in R: A software review. *Journal of Educational and Behavioral Statistics*, 41: 326–348. doi: 10.3102/1076998616631744.

*Weishaar, T., Rajan, S., **Keller, B.** (2016). Probability of vitamin D deficiency by body weight and race-ethnicity. *Journal of the American Board of Family Medicine*, 29: 226–232. doi: 10.3122/jabfm.2016.02.150251.

Rajan, S., *Weishaar, T., **Keller, B.** (2016). Weight and skin color as predictors of vitamin D status: Results of an epidemiological investigation using nationally representative data. *Public Health Nutrition*, 12: 1–8. doi: 10.1017/S1368980016000173.

**Keller, B.**, Kim, J.-S., & Steiner, P. M. (2013). Data mining alternatives to logistic regression for propensity score estimation: Neural networks and support vector machines. *Multivariate Behavioral Research*, 48, 164–164 (Abstract). doi: 10.1080/00273171.2013.752263.

**Keller, B.** (2012). Detecting treatment effects with small samples: The power of some tests under the randomization model. *Psychometrika*, 77, 324–338. doi: 10.1007/s11336-012-9249-5.

Kaplan, D. & **Keller, B.** (2011). A note on cluster effects in latent class analysis. *Structural Equation Modeling*, 18, 525–536. doi: 10.1080/10705511.2011.607071.

## Book Chapters

*Jiang, Y., Clarke-Midura, J., Baker, R. S., Paquette, L. & **Keller, B.** (2018). How immersive virtual environments foster self-regulated learning. In Zheng, R. (Ed.), *Digital Technologies and Instructional Design for Personalized Learning*. Hershey, PA: IGI Global.

**Keller, B.**, Kim, J.-S., & Steiner, P. M. (2015). Neural networks for propensity score estimation: Simulation results and recommendations. In L. A. van der Ark, D. M. Bolt, S.-M. Chow, J. A. Douglas, & W.-C. Wang (Eds.), *Quantitative psychology research*. New York, NY: Springer.

Kim, J.-S., Anderson, C. J., & **Keller, B.** (2014). Multilevel analysis of large-scale assessment data. In L. Rutkowski, M. von Davier, & D. Rutkowski (Eds.), *A handbook of international large-scale assessment: Background, technical issues, and methods of data analysis*. London: Chapman Hall/CRC Press.

Anderson, C. J., Kim, J.-S., & **Keller, B.** (2014). Modeling multilevel categorical response variables. In L. Rutkowski, M. von Davier, & D. Rutkowski (Eds.), *A handbook of international large-scale assessment: Background, technical issues, and methods of data analysis*. London: Chapman Hall/CRC Press.

## Grant Applications

### Funded

**Keller, B.** (2019; Funded). The Community College Compass: Mapping a Guided Pathway into Geosciences. Total budget: $49,918. National Science Foundation – Undergraduate STEM Education: Pathways into Geoscience. Role: PI for External Evaluation (Subaward). Prime Contractor: Lamont Doherty Earth Observatory, Columbia University.

**Keller, B.** (2018; Funded). Evaluating Causal Effect Estimators: A New Within-Study Comparison. Total budget: $9,083.33. 2017-2018 Teachers College Dean's Competitive Grant for Pre-Tenured Faculty. Role, Principal Investigator.

Schwinn, T., Marshal, M, Schinke, S. (2018; Funded). Preventing Drug Abuse among Sexual-Minority Youth. Total budget: $3,937,810. National Institute on Drug Abuse. Role: Statistician.

Tipton, B., Johnson, M. S. & **Keller, B.** (2016; Funded). Teaching Assistants and Multiple Lab Sections: A New Model for Improving Student Outcomes in Core Statistics Courses. Total budget: $20,000. Teachers College Provost Investment Fund. Role: Co-Investigator.

Johnson, M. S., Tipton, B., & **Keller, B.** (2014; Funded). Exploring "Twinned" Certificate Programs between EPSA and MEAS. Total budget: $20,000. Teachers College Provost Investment Fund. Role: Co-Investigator.

### Under Review & Unfunded

**Keller, B.** (2019; Under Review). Assessment and Demonstration of Methods for Estimating Heterogeneous Treatment Effects with Large-Scale Observational Data. Total budget: $25,000. Submitted September 2019 to AERA Grants Program. Role: Primary Investigator.

Corter, J. & **Keller, B.** (2018; Not funded). IGE: Diagnostic Assessment and individualized instruction in graduate applied statistics courses for the social sciences. Total budget: $459,594. Submitted September 2018 to NSF Innovations in Graduate Education Program. Role: Co-Investigator.

**Keller, B.** (2018; Not funded). Effect Heterogeneity in National Large-Scale Data Sets: Detection and Estimation. Total budget: $25,000. Submitted October 2018 to AERA Grants Program. Role: Primary Investigator.

Lang, C. & **Keller, B.** (2018; Not Funded). A Scalable Course in the Python Programming Language for Teachers College. Total budget: $20,000. Teachers College Provost Investment Fund. Role: Co-Investigator.

Geliebter, A. S. (2018; Not Funded) Predicting Bariatric Surgery Outcome from Neuroimaging, Eating Behavior, and Cognition. Total budget: $474,676. Submitted to NIH. Role: Statistician.

Poghosyan, L., Westaby, J., and **Keller, B.** (2016; Not Funded). Configurations of Teams in Medical Homes and their Impacts on Outcomes. Total budget: $1,638,647. Submitted June 2016 to the Agency for Healthcare Research & Quality. Role: Co-Investigator.

**Keller, B.**, Pacquette, L. and Baker, R. (2015; Not Funded). Unsupervised Learning for Cross-System Transfer of Digital Student Behavior Models. Submitted August 2015 to the National Science Foundation, Methodology, Measurement, and Statistics Program. Role: Primary Investigator.

## Conference Presentations (*student)

*Lu, R. & **Keller, B.** (2020, April, submitted). *The Role of Factor Analytic Techniques in Control-*

*ling for Confounding*, in invited session "When Measurement Meets Causal Inference: Making Both Count" with discussion by Dan McCaffrey. To be presented at the 2020 Meeting of the National Council on Measurement in Education, San Francisco, CA.

**Keller, B.** (2019, November, accepted). *The Six-Arm Design Replication Study*, in invited session "Issues and Evidence in within-Study Comparisons". Paper to be presented at the 2019 Meeting of the Association for Public Policy Analysis and Management, Denver, CO.

**Keller, B.** (2019, October, accepted). *Covariate Selection for Causal Inference based on Non-parametric Conditional Independence Testing with Random Forests*. Paper to be presented at the 2019 Fall Eastern Sectional Meeting of the American Mathematical Society, Binghamton, NY.

**Keller, B.** (2019, July). *A Six-Arm Design Replication Study: Design, Results, and Implications*, in invited session "Developing the Methodological Foundations for Replication Sciences" with discussion by Larry Hedges and Jennifer Hill. Paper presented at the 2019 Joint Statistical Meeting, Denver, CO.

*Lu, R. & **Keller, B.** (2019, April), *Controlling for latent confounding by confirmatory factor analysis*. Paper presented at the American Educational Research Association, Toronto, Canada.

**Keller, B.** (2019, March). *Preliminary Results from A Six-Arm Design Replication Study*, in symposium "The Methodological Foundations of Replication Sciences" with discussion by Larry Hedges and Elizabeth Stuart. To be presented at the 2019 Meeting of the Society for Research on Educational Effectiveness, Washington, DC.

*Lu, R. & **Keller, B.** (2018, July), *Covariate Selection for High Dimensional and Small Sample Size Causal Inference*. Presented at the International meeting of Psychometric Society, New York, NY.

**Keller, B.** (2018, May). *Permutation-Based Variable Selection with Random Forests*. Presented at the 2018 Atlantic Causal Inference Conference, Pittsburgh, PA.

**Keller, B.**, *Zhang, T., & Chen, J. (2018, May). *Heterogeneous Subgroup Identification with Observational Data*. Presented at the Workshop for Empirical Investigation of Methods for Heterogeneity, Pittsburgh, PA.

**Keller, B.** & *Hou, Z. (2018, April). *On the Standard Errors of Causal Effect Estimators After Variable Selection.* Presented at the Annual Meeting of the American Educational Research Association, Division D, New York, NY.

**Keller, B.** & *Zhang, T. (2018, March). *A New Method for Variable Selection with Random Forests in a Conditional Independence Framework.* Presented at the 2018 Society for Research on Educational Effectiveness Spring Conference, Washington, D. C.

**Keller, B.** & *Zhang, T. (2017, July). *CART-Based Methods for Variable Selection in a Conditional Independence Framework.* Paper presented at the 2017 International Meeting of the Psychometric Society, Zurich, Switzerland.

**Keller, B.** & *Hou, Z. (2017, May). *Causal Inference After Model Selection: Simulation Results.* Presented at the Columbia University Causal Inference Conference, New York, NY.

**Keller, B.** (2017, May). *Causal Inference After Model Selection*. Presented at the 2017 Atlantic Causal Inference Conference, Chapel Hill, NC.

**Keller, B.** & *Hou, Z. (2017, March). *On the Standard Errors of Causal Effect Estimators After Variable Selection.* Presented at the 2017 Society for Research on Educational Effectiveness Spring Conference, Washington, D. C.

Schwinn, T.M., Hopkins, J., Schinke, S., **Keller, B.**, *Liu, X. (2016, June) *A gender-specific, web-based intervention to prevent drug abuse among adolescent girls*. Presented at the 2016 Society for Prevention Research 24th Annual Meeting, San Francisco, CA.

**Keller, B.** & Chen, J. (2016, May). *Covariate selection with observational data Simulation results and discussion*. Presented at the 2016 Atlantic Causal Inference Conference, New York, NY.

Chen, J. & **Keller, B.** (2016, April). *Investigating heterogeneous treatment effects in observational studies using propensity score matching and regression trees*. Presented at the 2016 Annual Meeting of the American Educational Research Association, Division D, Washington, D. C.

**Keller, B.** & Chen, J. (2016, March). *Empirically driven variable selection for the estimation of causal effects with observational data*. Presented at the 2016 Society for Research on Educational Effectiveness Spring Conference, Washington, D. C.

**Keller, B.**, Swoboda, C. M., & *Liu, Xiang (2015, May). *On the predictive performance of data-mining methods with multi-level data*. Presented at the 2015 Atlantic Causal Inference Conference, Philadelphia, PA.

**Keller, B.** & *Han, Z. (2015, March). *A case study with nn4pse: An R package for propensity score estimation with neural networks*. Presented at the Society for Research on Educational Effectiveness Spring Conference, Washington, D. C.

**Keller, B.**, Kim, J.-S., & Steiner, P. M. (2014, July). *Neural networks and random forests for propensity score estimation: A simulation study*. Paper presented at the 2014 International Meeting of the Psychometric Society, Madison, WI.

Anderson, C. J., Kim, J.-S., & **Keller, B.** (2014, April). *Multilevel modeling of categorical variables from international large scale assessments*. Paper presented at the 2014 Annual Meeting of the National Council for Measurement in Education, Philadelphia, PA.

**Keller, B.**, Kim, J.-S., & Steiner, P. M. (2013, March). *Propensity score estimation with data mining techniques: Alternatives to logistic regression*. In P. M. Steiner (Chair), *Advances and Challenges in Propensity Score Matching*. Symposium at the Society for Research on Educational Effectiveness Spring Conference, Washington, D. C.

**Keller, B.**, Kim, J.-S., & Steiner, P. M. (2012, October). *Neural networks and support vector machines as alternatives to logistic regression for propensity score estimation: Why and when?* Presented at the 2012 Annual Meeting of the Society for Multivariate Experimental Psychology, Vancouver, BC, Canada.

**Keller, B.** (2012, July). *Randomization Tests: Why, When, and How?* Poster session presented at the 75th International Meeting of the Psychometric Society, Athens, GA.

Kaplan, D. & **Keller, B.** (2009, October). *Cluster effects in the latent class model.* Presented at the 2009 Annual Meeting of the Society for Multivariate Experimental Psychology, Salishan, Oregon.

## Invited Presentations

**Keller, B.** (2018, September). Detecting Heterogeneous Subgroup Effects with Observational Data: Results from a Monte Carlo Simulation and a Case Study with the ECLSK, Monday Seminar in Measurement and Statistics, Department of Human Development and Quantitative Methodology, University of Maryland, College Park, MD

**Keller, B.** (2015, October). Covariate Selection with Observational Data: Simulation Results

and Discussion. PRIISM Seminar Series, New York University, New York, NY

**Keller, B.** (2015, March). Data-mining alternatives to (generalized) linear regression: Why and how? Department of Psychology Research Colloquium, Fordham University, New York, NY

## Professional Service

**Journal Reviewing**

- Advances in Methods and Practices in Psychological Science
- Evaluation Review
- Journal of Causal Inference
- Journal of Educational and Behavioral Statistics
- Journal of Research on Educational Effectiveness
- Measurement in Physical Education and Exercise Science
- Multivariate Behavioral Research
- Pharmaceutical Statistics
- PLOS One
- Psychological Methods
- Research Synthesis Methods
- Structural Equation Modeling: A Multidisciplinary Journal

**Conference Reviewing**

- AERA Division D
- Atlantic Causal Inference
- SREE Methods Section

**Other**

- Member, Organizing Committee, Atlantic Causal Inference Conference, 2016
- Reviewer for the Flanders Research Foundation, Belgium (Fonds Wetenschappelijk Onderzoek - Vlaanderen, FWO)
- Reviewer for the Spencer Foundation, Lyle Spencer Research Awards program

## University Service

| | |
|---|---|
| 2018– | Program Director, MS in Applied Statistics, Department of Human Development |
| 2018– | Reviewer, Student Poster Session for Academic Festival |
| 2015–2016 | Member, Faculty Development Advisory Committee |
| 2016– | Member, Dean's Grant Review Committee |

## Doctoral Dissertation Committee Member

| Student | Student's Program | Deg | Year | Role |
|---|---|---|---|---|
| **Completed - Measurement, Evaluation, & Statistics** | | | | |
| Xinyu Ni | Measurement & Evaluation | EdD | 2018 | Second Reader |
| Bright Nsowaa | Measurement & Evaluation | PhD | 2017 | Second Reader |
| Lauren Fellers | Measurement & Evaluation | PhD | 2016 | Third Reader |
| Huacheng Li | Measurement & Evaluation | PhD | 2016 | Second Reader |
| Nicole DiCrecchio | Measurement & Evaluation | PhD | 2015 | Second Reader |
| **Completed - Other Programs** | | | | |
| Toi Sin Arvidsson | Developmental Psychology | PhD | 2018 | Third Reader/Chair |

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| Melissa Cesarano | Cognitive Science | PhD | 2018 | Second Reader |
| Yuchen Shi | Cognitive Science | PhD | 2018 | Third Reader/Chair |
| Ahram Choi | Instructional Technology | EdD | 2018 | Third Reader/Chair |
| Corinne Galgay | Counseling Psychology | PhD | 2018 | Third Reader/Chair |
| Yang Jiang | Cognitive Science | PhD | 2018 | Fourth Reader |
| Laura Malkiewich | Cognitive Science | PhD | 2018 | Second Reader |
| Aston McCullough | Kinesiology | PhD | 2018 | Second Reader |
| Marissa Morin | Developmental Psychology | PhD | 2018 | Second Reader |
| Melissa Zrada | Cognitive Science | PhD | 2018 | Second Reader |
| Leigh Boyd | Cognitive Science | PhD | 2017 | Second Reader |
| Vincent Bulone | Mathematics Education | EdD | 2017 | Outside Reader |
| Cheng-Ling Chen | Applied Linguistics & TESOL | EdD | 2017 | Third Reader/Chair |
| Chienwen Kao | Clinical Psychology | PhD | 2017 | Second Reader |
| Yang Liu | Cognitive Science | PhD | 2017 | Second Reader |
| Matteo Margaroli | Clinical Psychology | PhD | 2017 | Second Reader |
| Chun Hao Chang | Instructional Technology | EdD | 2016 | Outside Reader |
| Laura Guerra | Health Education | EdD | 2016 | Third Reader/Chair |
| Jacob Sawyer | Counseling Psychology | PhD | 2016 | Outside Reader |
| Jared Boyce | Educational Leadership | PhD | 2015 | Outside Reader |
| Adrienne Mercer | Health Education | EdD | 2015 | Outside Reader |
| Lia Papathomas | Developmental Psychology | PhD | 2015 | Third Reader/Chair |
| Jared Jax | Instructional Tech & Media | EdD | 2014 | Outside Reader |
| Nathaniel Olson | Music & Music Education | EdD | 2014 | Outside Reader |
| Julia Zavala | Developmental Psychology | PhD | 2014 | Second Reader |

### In Progress - Measurement, Evaluation, & Statistics

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|---|---|---|---|
| Hedyeh Ahmadi | Measurement & Evaluation | PhD | Chair |
| Rui Lu | Measurement & Evaluation | PhD | Sponsor |
| Nayeon Yoo | Measurement & Evaluation | EdD | Second Reader |

### In Progress - Other Programs

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|---|---|---|---|
| Sun Young Ban | Mathematics Education | PhD | Fourth Reader |
| Heidi Banerjee | Applied Linguistics & TESOL | EdD | Fourth Reader |
| Nirmaliz Colon-Acosta | Cognitive Science | PhD | Second Reader/Chair |
| Allison Faye | Interdisciplinary Studies | EdD | Third Reader/Chair |
| Geremy Grant | School Psychology | PhD | Third Reader |
| Kimberly Hinman | Counseling Psychology | PhD | Fourth Reader |
| Marianna Lamnina | Cognitive Science | PhD | Third Reader |
| Kan Long | Clinical Psychology | PhD | Second Reader |
| David Lynch | Clinical Psychology | PhD | Third Reader |
| Rina Seung Eun Park | Economics & Education | PhD | Fourth Reader |
| Sinead Sant-Barket | Counseling Psychology | PhD | Second Reader/Chair |
| Rebecca Semel | Counseling Psychology | PhD | Third Reader |
| DaHee Shon | Social & Organizational Psych | PhD | Fourth Reader |
| Ceren Sönmez | Clinical Psychology | PhD | Third Reader |
| Gregory Youdan | Movement Science | PhD | Second Reader/Chair |

## Teaching

### Teachers College, Columbia University

2014 – 2017 **HUDM 4125 - Statistical Inference**, Class sizes: 18, 57, 40, 18.

2014 – 2019 **HUDM 5026* - Intro to Data Analysis and Graphics in R**, Class sizes: 18, 19, 19, 24, 67.

2014 – 2019 **HUDM 5123 - Linear Models and Experimental Design**, Class sizes: 32, 76, 77, 75, 26, 43, 45.

2016 – 2019 **HUDM 5133 - Causal Inference and Program Evaluation**, Class sizes: 37, 20.

2018 – 2019 **HUDM 5150 - Capstone, Careers, and Communication**, Class sizes: 11, 15.

2014 – 2016 **HUDM 6026*** - **Computational Statistics**, Class sizes: 23, 40, 62.

2017 – 2017 **HUDM 6122** - **Multivariate Analysis**, Class sizes: 36.

*Denotes a course I designed.

### University of Wisconsin–Madison

2012 – 2013 **ED PSYCH 773** - **Factor Analysis, Multidimensional Scaling and Cluster Analysis**.

### Stephen F. Austin High School, Austin Independent School District, Austin, TX

2002 – 2007 **High School Math Teacher**.

2003 – 2007 **Founded and Directed AP Statistics Program**.

2005 – 2007 **Chair, Math Department**.

### Binghamton University

2002 – 2002 **Calculus I**.

2001 – 2001 **Calculus II**.

## Awards

- 2013 Graduate Student Peer Mentor Award in recognition of excellence in mentoring fellow students
- 2012 travel award recipient from the Society for Multivariate Experimental Psychology.
- 2012 recipient of the Genevieve Gorst Herfurth Honorable Mention Award for outstanding research in social studies.
- 2011-2012 recipient of the James B. and Susan Solie Patterson Graduate Student Scholarship.
- 2010 finalist (top four of more than thirty) for 2010 Best Poster Award, International Meeting of the Psychometric Society, Athens, GA.