

Youmi Suk

Curriculum Vitae

Updated on Nov 2, 2023

Education

- 2016–2021 **Ph.D. in Quantitative Methods**, *Department of Educational Psychology. University of Wisconsin-Madison*
M.S. in Statistics, *Department of Statistics. University of Wisconsin-Madison*
- 2014–2016 **M.A. in Educational Measurement and Evaluation**, *Department of Education. Seoul National University. South Korea*
- 2010–2014 **B.S. in Earth Science Education**, *Department of Earth Science Education. Seoul National University. South Korea*

Academic Positions & Employment

- 9/2022– **Assistant Professor of Applied Statistics**, *Department of Human Development, Teachers College, Columbia University*
Faculty Member of the Data Science Institute (DSI), *Columbia University*
- 8/2021– **Assistant Professor of Data Science, General Faculty**, *School of Data Science, University of Virginia*
8/2022
- 2018 **Researcher Intern**, *The American Institutes for Research (AIR), Washington D.C*

Research Interests

Causal Machine Learning, Quasi-Experimental Designs, Multilevel Modeling, Optimal Treatment Regimes, Algorithmic Fairness, and Analysis of Process Data

- Robust machine learning for causal inference in multilevel data
- Optimal treatment regimes in education for data-driven, personalized learning
- Evaluating testing accommodations with quasi-experimental devices and process data
- Evaluating algorithmic fairness in educational settings

Selected Publications

○ Methods

Suk, Y., & Park, C. (2023). Designing optimal, data-driven policies from multisite randomized trials. *Psychometrika*. <https://doi.org/10.1007/s11336-023-09937-2>

Suk, Y., & Han, K. T. (2023). A psychometric framework for evaluating fairness in algorithmic decision making: Differential algorithmic functioning. *Journal of Educational and Behavioral Statistics*. <https://doi.org/10.3102/10769986231171711>

Suk, Y. (2023). A within-group approach to ensemble machine learning methods for causal inference in multilevel studies. *Journal of Educational and Behavioral Statistics*. <https://doi.org/10.3102/10769986231162096>

Lyu, W., Kim, J.-S., & **Suk, Y.** (2023). Estimating heterogeneous treatment effects within latent class multilevel models: A Bayesian approach. *Journal of Educational and Behavioral Statistics*, 48(1), 3-36. <https://doi.org/10.3102/10769986221115446>

Suk, Y., & Kang, H. (2023). Tuning random forests for causal inference under cluster-level unmeasured confounding. *Multivariate Behavioral Research*, 58(2), 408-440. <https://doi.org/10.1080/00273171.2021.1994364>

Suk, Y., Steiner, P. M., Kim, J.-S., & Kang, H. (2022). Regression discontinuity designs with an ordinal running variable: Evaluating the effects of extended time accommodations for English-language learners. *Journal of Educational and Behavioral Statistics*, 47(4), 459-484. <https://doi.org/10.3102/10769986221090275>

Suk, Y., & Kang, H. (2022). Robust machine learning for treatment effects in multilevel observational studies under cluster-level unmeasured confounding. *Psychometrika*, 87(1), 310-343. <https://doi.org/10.1007/s11336-021-09805-x>

Suk, Y., Kang, H., & Kim, J.-S. (2021). Random forests approach for causal inference with clustered observational data. *Multivariate Behavioral Research*, 56(6), 829-852. <https://doi.org/10.1080/00273171.2020.1808437>

Suk, Y., Kim, J.-S., & Kang, H. (2021). Hybridizing machine learning methods and finite mixture models for estimating heterogeneous treatment effects in latent classes. *Journal of Educational and Behavioral Statistics*, 46(3), 323-347. <https://doi.org/10.3102/1076998620951983>

○ Applications

Piasecki, T. M. **et al.** (2023). Smoking status, nicotine medication, vaccination, and COVID-19 hospital outcomes: Findings from the COVID EHR Cohort at the University of Wisconsin (CEC-UW) study. *Nicotine & Tobacco Research*, 25(6), 1184-1193. <https://doi.org/10.1093/ntr/ntac201>

Nolan, B. **et al.** (2023). Relations of current and past cancer with severe outcomes among 104,590 hospitalized COVID-19 patients: The COVID EHR cohort at the University of Wisconsin. *Cancer Epidemiology, Biomarkers & Prevention*, 32(1), 12-21. <https://doi.org/10.1158/1055-9965.EPI-22-0500>

Fiore, M. C. **et al.** (2022) The first 20 months of the COVID-19 pandemic: mortality, intubation and ICU rates among 104,590 patients hospitalized at 21 United States health systems. *PLOS ONE*. <https://doi.org/10.1371/journal.pone.0274571>

Suk, Y., & Lee, J. (2021). Evaluating the effects of school club activities on collaborative competency using random forests for causal inference. *Survey Research*, 22(4), 55-78. <http://dx.doi.org/10.20997/SR.22.4.3>

Kent, R. D., Eichhorn, J., Wilson, E. M., **Suk, Y.**, Bolt, D. M., & Vorperian, H. K. (2021). Auditory-perceptual features of speech in children and adults with Down syndrome: a speech profile analysis. *Journal of Speech, Language, and Hearing Research*, 64(4), 1157-1175. https://doi.org/10.1044/2021_JSLHR-20-00617

Suk, Y., Lyu, W., & Steiner, P. M. (2019, August 1). Review of the book Using Classification and Regression Trees: A Practical Primer, by X. Ma. Teachers College Record, <https://www.tcrecord.org> ID Number: 23015.

Suk, Y., & Kim, J.-S. (2019). Measuring the heterogeneity of treatment effects with multilevel observational data. In Wiberg, M., Culpepper, S., Janssen, R., González, J., & Molenaar, D (Eds.), *Quantitative psychology research: The 83rd annual meeting of the psychometric society* (pp. 265-277). New York, NY: Springer. https://doi.org/10.1007/978-3-030-01310-3_24

Kim, J.-S., & **Suk, Y.** (2019). Specifying multilevel mixture selection models in propensity score analysis. In Wiberg, M., Culpepper, S., Janssen, R., González, J., & Molenaar, D (Eds.), *Quantitative psychology research: The 83rd annual meeting of the psychometric society* (pp. 279-291). New York, NY: Springer.

Suk, Y., Cho, Y. H., & Jeong, D. H. (2017). Profile analysis of elementary school students' smart device usage. *Educational Technology International*, 18(1), 27-47.

Park, H.-J., Lee, J., & **Suk, Y.** (2016). A trend analysis of academically resilient students and school characteristics affecting students' academic resilience in middle school. *Asian Journal of Education*, 17(4), 193-213.

Cho, Y. H., Park, H.-J., Kim, J. Y., **Suk, Y.**, & Lee, S. (2015). Exploring roles of feedback to facilitate online discussion. *Asian Journal of Education*, 16(2), 289-313.

Working Papers

Suk, Y., & Han, K. T. (2023+). Evaluating intersectional fairness in algorithmic decision making using intersectional differential algorithmic functioning. *PsyArXiv*. <https://doi.org/10.31234/osf.io/e93js>

Suk, Y., & Kim, Y. (2023+). Fuzzy regression discontinuity designs with multiple control groups under one-sided noncompliance: Evaluating extended time accommodations. *PsyArXiv*. <https://doi.org/10.31234/osf.io/sa96g>

Suk, Y. (2023+). Regression discontinuity designs in education: A practitioner's guide. *PsyArXiv*. <https://doi.org/10.31234/osf.io/rhxs7>

Grants and Funding

○ Funded Projects

1/2023-**PI**, *Tailoring Personalized Mathematics Education for High School Students Using Dynamic*
12/2025 *Treatment Regimes*, National Science Foundation (NSF), \$349,995.

https://www.nsf.gov/awardsearch/showAward?AWD_ID=2225321&HistoricalAwards=false

6/2022-**PI**, *A Within-Group Approach to Random Forests for Evaluating Educational Programs in*
5/2024 *Multilevel Studies*, American Educational Research Association-National Science Foundation (AERA-NSF), \$35,000.

<https://www.aera.net/Newsroom/AERA-Highlights-E-newsletter/>

AERA-Highlights-February-2022/AERA-Announces-Dissertation-and-Research-Grant-Awardees

3/2021-**PI**, *Regression Discontinuity Design with an Ordinal Discrete Running Variable: Evaluating*
6/2022 *the Effects of Extended Time Accommodations for English Language Learners*, American Educational Research Association (AERA) Division D, \$5,000.

Selected Conference Presentations

Suk, Y., Kim, K., & Park, C. (2024, April). *Towards fair and personalized education policy: Reducing racial and state disparities in advanced math courses*. Paper submitted to the American Educational Research Association, Philadelphia, PA, U.S.

Suk, Y., & Han, K. T. (2024, April). *A framework for evaluating intersectional fairness in algorithmic decision making*. Paper submitted to the National Council on Measurement in Education, Philadelphia, PA, U.S.

Suk, Y., & Kim, Y. (2023, Sep.). *Fuzzy regression discontinuity designs with multiple control groups for evaluating extended time accommodations*. Paper presented at the Society for Research on Educational Effectiveness, Arlington, VA, U.S.

Suk, Y., & Han, K. T. (2023, Sep.). *A psychometric framework for evaluating fairness in algorithmic decision making: Differential algorithmic functioning*. Paper presented at the Society for Research on Educational Effectiveness for the symposium on *Algorithmic and Testing Fairness: Methods and Application*, Arlington, VA, U.S.

Suk, Y., & Han, K. T. (2023, July). *Differential algorithmic functioning: A framework for evaluating fairness in algorithmic decision making*. Paper presented at the International Meeting of Psychometric Society, College Park, MD, U.S.

Suk, Y., & Park, C. (2023, May). *Designing optimal, data-driven educational policies from multisite randomized trials*. Paper presented at the American Causal Inference Conference, Austin, TX, U.S.

Suk, Y. (2023, April). *A within-group approach to ensemble machine learning methods for causal inference in multilevel studies*. Poster presented at the American Educational Research Association, Chicago, IL, U.S. **(Invited talk as a recipient of the AERA-NSF early-career scholar grant)**

Suk, Y., & Han, K. T. (2023, April). *A framework for evaluating fairness in algorithmic decision making: differential algorithmic functioning*. Paper presented at the National Council on Measurement in Education, Chicago, IL, U.S.

Suk, Y., & Kang, H. (2022, Sep.). *Tuning random forests for causal inference under cluster-level unmeasured confounding*. Paper presented at the Society for Research on Educational Effectiveness, Arlington, VA, U.S.

Suk, Y., Steiner, P. M., Kim, J.-S., & Kang, H. (2022, April). *Regression discontinuity designs with an ordinal running variable: evaluating the effects of extended time accommodations for English language learners*. Paper presented at the American Educational Research Association, San Diego, CA, U.S. **(Invited talk as a recipient of the AERA-Division D grant)**

Suk, Y., Steiner, P. M., Kim, J.-S., & Kang, H. (2021, Sep.). *Regression discontinuity designs with an ordinal running variable: evaluating the effects of extended time accommodations for English language learners*. Paper presented at the Society for Research on Educational Effectiveness (Virtual Conference).

Suk, Y., Steiner, P. M., Kim, J.-S., & Kang, H. (2021, July). *Regression discontinuity designs with an ordinal running variable: evaluating the effects of extended time accommodations for English language learners*. Paper presented at the International Meeting of Psychometric Society (Virtual Conference).

Suk, Y., & Kang, H. (2021, April). *Robust estimation of causal effects in multilevel observational studies under arbitrary cluster-level unmeasured confounding*. Paper presented at the American Educational Research Association (Virtual Conference).

Suk, Y., Steiner, P. M., & Kim, J.-S. (2020, Sep.). *Evaluating effects of extended time accommodations for NAEP: multiple control groups*. Paper presented at the National Council on Measurement in Education (Virtual Conference; Limited).

Suk, Y., Steiner, P. M., & Kim, J.-S. (2020, July). *Evaluating the effects of extended time accommodations in observational studies*. Paper presented at the International Meeting of Psychometric Society (Virtual Conference).

Suk, Y., Kim, J.-S., & Kang, H. (2020, April). *Remedying selection bias and omitted variable bias with multilevel observational data*. Paper presented at the American Educational Research Association, San Francisco, CA, U.S. (Conference Canceled)

Suk, Y., Kim, J.-S., & Kang, H. (2019, July). *Machine learning algorithms for causal inference with cluster-structured observational data*. Paper presented to the International Meeting of Psychometric Society, Santiago, Chile.

Kim, J.-S., & **Suk, Y.** (2019, July). *Random forests versus matching methods for estimating heterogeneous treatment effects*. Paper presented at the International Meeting of Psychometric Society, Santiago, Chile.

Suk, Y., & Kim, J.-S. (2019, April). *Measuring treatment effects using random forests with multilevel observational data*. Paper presented at the American Educational Research Association, Toronto, Canada.

Suk, Y., Kim, Y. Y., & Zheng, X. (2019, April). *Evaluating the effects of extended time accommodation on writing performance in NAEP*. Paper presented at the National Council on Measurement in Education, Toronto, Canada.

Kim, Y. Y., Zheng, X., & **Suk, Y.** (2019, April). *Digital familiarity and warm-up effects in NAEP 2017 Mathematics*. Paper presented at the National Council on Measurement in Education, Toronto, Canada.

Suk, Y., & Kim, J.-S. (2018, July). *Measuring the heterogeneity of individual-level treatment effects with multilevel observational data*. Poster presented at the International Meeting of Psychometric Society, New York City, NY, U.S. **(2018 IMPS Best Poster Award)**

Kim, J.-S., & **Suk, Y.** (2018, July). *Fixed versus random effects models for multilevel propensity score analysis*. Paper presented at the International Meeting of Psychometric Society, New York City, NY, U.S.

Suk, Y., & Kim, J.-S. (2018, April). *Linear probability models as alternatives to logistic regression models for multilevel propensity score analysis*. Paper presented at the American Educational Research Association, New York City, NY, U.S.

Selected Talks

- 11/2023 **Suk, Y.** *Advancing regression discontinuity designs for evaluating extended time accommodations* at the Proseminar, Department of Human Development, Teachers College Columbia University.
- 9/2023 **Suk, Y.** *A psychometric framework for evaluating fairness in algorithmic decision making: Differential algorithmic functioning* at the Psychometrics Workshop at Columbia University.

- 10/2022 **Suk, Y.** *Robust machine learning for treatment effects in multilevel observational studies under cluster-level unmeasured confounding* at the quantitative lunch colloquium (Design and Data Analysis, or DADA), Department of Psychology, University of Virginia (Virtual).
- 03/2022 **Suk, Y.**, Eckerly, C., & Yuan, K. *Applications of data science in education* at the 2022 Women in Data Science Charlottesville (Virtual; Organizer, Moderator, Speaker).
- 11/2021 **Suk, Y.** *Robust machine learning for treatment effects in educational data* at the Research Methods and Data Science (RMDS), School of Education and Human Development and School of Data Science, University of Virginia (Virtual).
- 9/2021 **Suk, Y.** *Robust machine learning for treatment effects in complex educational assessment data* at the Proseminar, School of Data Science, University of Virginia.

Teaching Experiences

- Spring 2024 **Instructor**, *HUDM 5122 Applied Regression Analysis*, Department of Human Development, Teachers College, Columbia University
- Fall 2023 **Instructor**, *HUDM 5199 Programming for Data Science*, Department of Human Development, Teachers College, Columbia University
Instructor, *HUDM 5122 Applied Regression Analysis*, Department of Human Development, Teachers College, Columbia University
- Spring 2023 **Instructor**, *HUDM 5199 Programming for Data Science*, Department of Human Development, Teachers College, Columbia University
- Fall 2022 **Instructor**, *HUDM 5122 Applied Regression Analysis*, Department of Human Development, Teachers College, Columbia University
- Spring 2022 **Instructor**, *DS 6999 Independent Study*, School of Data Science, University of Virginia
Instructor, *DS 3003 Communicating with Data*, School of Data Science, University of Virginia
Instructor, *DS 2001 Programming for Data Science*, School of Data Science, University of Virginia
- Fall 2021 **Instructor**, *DS 3003 Communicating with Data*, School of Data Science, University of Virginia
- Fall 2020 **Instructor**, *ED PSYCH 763 Regression Models in Education*, Department of Educational Psychology, University of Wisconsin-Madison
- Spring 2020 **Instructor**, *ED PSYCH 763 Regression Models in Education*, Department of Educational Psychology, University of Wisconsin-Madison
- Fall 2019 **Instructor**, *ED PSYCH 763 Regression Models in Education*, Department of Educational Psychology, University of Wisconsin-Madison
- 9/2017–5/2018 **Statistical Consultant**, *Laboratory for Experimental Design (LED)*, Department of Educational Psychology, University of Wisconsin-Madison

Professional Memberships

- Reviewer Journal of Educational and Behavioral Statistics
 Psychometrika
 Asia Pacific Education Review
 Educational and Psychological Measurement

AERA Open
Conferences e.g., AERA
Member The American Educational Research Association (AERA)
The National Council on Measurement in Education (NCME)
The Psychometric Society
The Society for Research on Educational Effectiveness (SREE)
The Society for Causal Inference (SCI)
The Association for Computing Machinery (ACM)

Advising

- PhD/EdD thesis committee

Jitong Qi, Statistics, Columbia University (Degree: PhD) (Spring 2023-Summer 2023)

Marilyn Campbell, Nursing Education, Teachers College Columbia University (Degree: EdD) (Spring 2023)

- PhD/EdD proposal committee

Sangbaek Park, Measurement, Evaluation & Statistics, Teachers College Columbia University (Degree: PhD) (Spring 2023-Summer 2023)

Sizheng Zhu, Measurement, Evaluation & Statistics, Teachers College Columbia University (Degree: EdD) (Summer 2023)

Selected Research Experiences

- 1/2021– **Project Assistant**, *University of Wisconsin Center for Tobacco Research and Intervention*,
8/2021 Prof. Daniel Bolt, Department of Educational Psychology, University of Wisconsin-Madison
- 6/2020– **Project Assistant**, *The Roles and Prospects of Data Analytics in Educational Research*, Prof.
8/2020 Jee-Seon Kim, Department of Educational Psychology, University of Wisconsin-Madison
- 9/2018– **Project Assistant**, *Testing and Evaluation (T&E) Services at University of Wisconsin-Madison*,
8/2019 Prof. James Wollack, Department of Educational Psychology, and Director, Testing and
Evaluation Services and UW Center for Placement Testing, University of Wisconsin-Madison
- 9/2018– **Network Fellow**, *World-Class Instructional Design and Assessment (WIDA) Research &*
5/2019 *Development*, Dr. Kyoungwon Bishop, the Wisconsin Center for Education Research (WCER),
University of Wisconsin-Madison
- 9/2016– **Project Assistant**, *Testing and Evaluation (T&E) Services at University of Wisconsin-Madison*,
5/2018 Prof. James Wollack, Department of Educational Psychology, and Director, Testing and
Evaluation Services and UW Center for Placement Testing, University of Wisconsin-Madison
- 9/2016– **Project Assistant**, *To Test a Payer/treatment Agency Intervention to Increase Use of*
12/2016 *Buprenorphine*, Prof. Jee-Seon Kim, Department of Educational Psychology, University of
Wisconsin-Madison

Honors and Awards

- Fall 2020 **School of Education Teaching Innovation Grant**, *University of Wisconsin-Madison*
Grant for faculty and instructional staff who need additional time to develop courses to high quality online or hybrid course designs that foster student engagement and student learning, \$1,500.
- Spring 2019 **Conference Travel Award**, *University of Wisconsin-Madison*
Award for domestic and international conference travel for the purpose of presenting research, with a scholarship of \$1,200.
- 2018 **2018 IMPS Best Poster Award**, *The International Meeting of Psychometric Society*
The outstanding poster award for recognizing excellence in research, poster design and presentation, with a monetary prize of \$500.
- *Title: Measuring the Heterogeneity of Individual-level Treatment Effects with Multilevel Observational Data*
- 2018 & 2019 **The Busk Travel Scholarship**, *University of Wisconsin-Madison*
Travel award to a major national/international conference in support of a sole- or first-author presentation of research, with a scholarship of \$1,025 (2018) and \$500 (2019).
- 2014 **The Second Prize Winner**, *Seoul National University Human Rights Center, Seoul National University*
The 2nd Human Rights Research Competition
- 2013 **The First Prize Winner (SNU president's award)**, *Seoul National University*
The 2013 Volunteer Service Essay Competition for SNU Undergraduate Students
- 2013 **The Second Prize Winner**, *Dong A Science, South Korea*
The 2nd Science Essay Competition for College Students
- 2012 **The First Prize Winner (Presidential award)**, *Presidential Committee on Green Growth, South Korean government*
The 4th Green College Competition for College Students
- *Idea: Power generation utilizing daily temperature range*

Computer Skills

R, Python, Mplus, SPSS, Stata, AMOS, HLM, MATLAB, HTCondor, GitHub, and L^AT_EX

References

Jee-Seon Kim

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James Wollack

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Daniel Bolt

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Peter M. Steiner

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