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## Professional Experience

2016- CARNEGIE MELLON UNIVERSITY  
*Associate Professor with Tenure*, Department of Statistics & Data Science. (2024-present)  
*Associate Professor*, Department of Statistics & Data Science. (2021-2024)  
*Assistant Professor*, Department of Statistics & Data Science. (2016-2021)  
*Courtesy Faculty*, Heinz College of Information Systems & Public Policy. (2017-present)

## Education

2012-2016 UNIVERSITY OF PENNSYLVANIA  
Ph.D. in Biostatistics. (Advisor: Dylan Small. Co-advisor: Marshall Joffe.)  
Dissertation: “Doubly robust causal inference with complex parameters”.

2013-2014 THE WHARTON SCHOOL, UNIVERSITY OF PENNSYLVANIA  
M.A. in Statistics. (Advisors: Marshall Joffe, Dylan Small.)  
Thesis: “Optimal restricted estimation for more efficient longitudinal causal inference”.

2007-2009 UNIVERSITY OF MICHIGAN  
M.S. in Biostatistics. (Advisor: Jeremy Taylor.)

2003-2007 UNIVERSITY OF PENNSYLVANIA  
B.A. *magna cum laude* in Mathematics, with a minor in Statistics.

## Research Interests

Theory: causal inference, high-dimensional data, machine learning, nonparametric methods  
Application: criminal justice, health services research, medicine, public policy

## Other Experience & Training

2012-2016 *Research & Teaching Assistant*, Department of Biostatistics, University of Pennsylvania  
Grant support: “Selective and future ignorability in causal inference” (NIH R01-DK090385).

2010-2012 *Research Health Science Specialist*, Ann Arbor VA Center for Clinical Management Research  
Duties: statistical analysis and consulting for research in critical care medicine and patient safety.

2010-2011 *Statistical Consultant*, University of Michigan Law School  
Research area: wrongful convictions. Supervisors: J.J. Prescott, Brandon Garrett, Samuel Gross.

2008-2010 *Research Assistant*, Department of Biostatistics, University of Michigan

## Grants & Funding

### *As Principal Investigator*

- 2022-2025 PCORI Grant (Co-Principal Investigator)  
“Improved statistical methods for IV designs in comparative effectiveness” (Co-PI: Luke Keele)
- 2021-2026 NIH R01 Grant LM013361-01A1 (Co-Principal Investigator)  
“Efficient nonparametric estimation of heterogeneous treatment effects” (Co-PI: Luke Keele)
- 2021-2025 NSF CAREER Award 2047444 (Principal Investigator)  
“Advances in modern causal inference: high dimensions, heterogeneity, and beyond”
- 2019-2020 University of Pennsylvania Synergy Grant (Co-Principal Investigator)  
“Regression discontinuity to quantify outcomes & optimize thresholds” (Co-PI: Luke Keele)
- 2019-2020 Carnegie Mellon Block Center for Technology and Society Grant (Co-Principal Investigator)  
“Counterfactual risk assessment in child welfare services” (Co-PI: Alexandra Chouldechova)
- 2018-2021 NSF DMS Grant 1810979 (Principal Investigator)  
“Optimal nonparametric estimation of high-dimensional functionals in causal inference”
- 2017-2018 Carnegie Mellon University Berkman Faculty Development Grant (Principal Investigator)  
“Nonparametric methods for high-dimensional capture-recapture designs”
- 2017 University of Pittsburgh CTSI Biomedical Modeling Pilot Award (Co-Principal Investigator)  
“Modeling partial non-compliance in clinical trials” (Co-PI: Ashley Naimi)

### *As Co-Investigator*

- 2020-2025 NIH R01 Grant HD102313 (Co-Investigator)  
“Informing national guidelines on diet patterns that promote healthy pregnancy outcomes”  
(PIs: Lisa Bodnar & Ashley Naimi)
- 2018-2019 Pennsylvania Department of Health CURE Grant (Co-Investigator)  
“Smarter big data for a healthy Pennsylvania” (PIs: Daniel Polsky, Kevin Volpp)

## Selected Awards & Honors

- 2021 CAREER Award, National Science Foundation
- 2017 David P. Byar Young Investigator Award, *Joint Statistical Meetings*
- 2016 Saul Winegrad Award for outstanding dissertation, University of Pennsylvania
- 2016 Young Statistician Showcase Award, *International Biometric Conference*
- 2016 Young Researcher Award, *Conference of the International Society for Nonparametric Statistics*
- 2016 JSM Student Paper Award (Health Policy Statistics Section), *Joint Statistical Meetings*
- 2015 Ten Have Award for exceptional causal inference research, *Atlantic Causal Inference Conference*
- 2015 ENAR Distinguished Student Paper Award, *International Biometric Society ENAR Spring Meeting*
- 2013 Jonathan Raz Award for best performance on qualifying exam, University of Pennsylvania

## Publications & Manuscripts

(Note: \* indicates lead author was student or advisee at time of writing; pre-prints are left unnumbered)

### Statistical Theory & Methods

Kennedy EH, Balakrishnan S, Wasserman LA. Minimax estimation of sample average causal effects.

Rubio MD\*, Kennedy EH. Nonparametric population size estimation with covariates and multiple lists.

- won JSM Student Paper Award (Social Statistics Section) in 2024.

Schindl K\*, Shen S\*, Kennedy EH. Incremental effects for continuous exposures.

McClellan A\*, Branson Z, Kennedy EH. Calibrated sensitivity models. [arxiv.org:2405.08738](https://arxiv.org/abs/2405.08738)

Levis AW\*, Ben-Michael E, Kennedy EH. Intervention effects based on potential benefit. [arxiv.org:2405.08727](https://arxiv.org/abs/2405.08727)

Bonvini M\*, Kennedy EH, Dukes O, Balakrishnan S. Doubly-robust inference and optimality in structure-agnostic models with smoothness. [arxiv.org:2405.08525](https://arxiv.org/abs/2405.08525)

Kim K\*, Kim J, Kennedy EH. Causal k-means clustering. [arxiv.org:2405.03083](https://arxiv.org/abs/2405.03083)

- won WNAR Most Outstanding Student Paper Award in 2020.

Zeng Z\*, Balakrishnan S, Han Y, Kennedy EH. Causal inference with high-dimensional discrete covariates. [arxiv.org:2405.00118](https://arxiv.org/abs/2405.00118)

- won JSM Student Paper Award (Statistical Learning and Data Science Section) in 2024.

Du J\*, Zeng Z\*, Kennedy EH, Wasserman LA, Roeder K. Causal inference for genomic data with multiple heterogeneous outcomes. [arxiv.org:2404.09119](https://arxiv.org/abs/2404.09119)

McClellan A\*, Kennedy EH, Balakrishnan S, Wasserman LA. Double cross-fit doubly robust estimators: beyond series regression. [arxiv.org:2403.15175](https://arxiv.org/abs/2403.15175)

- won ACIC Thomas Ten Have Award in 2023.

Levis AW\*, Kennedy EH, Keele L. Nonparametric identification and efficient estimation of causal effects with instrumental variables. [arxiv.org:2402.09332](https://arxiv.org/abs/2402.09332)

Bonvini M\*, Zeng Z\*, Yu M, Kennedy EH, Keele L. Flexibly estimating and interpreting heterogeneous treatment effects of laparoscopic surgery for cholecystitis patients. [arxiv.org:2311.04359](https://arxiv.org/abs/2311.04359)

Waudby-Smith I\*, Kennedy EH, Ramdas A. Distribution-uniform anytime-valid sequential inference. [arxiv.org:2311.03343](https://arxiv.org/abs/2311.03343)

Balakrishnan S, Kennedy EH, Wasserman LA. Conservative inference for counterfactuals. [arxiv.org:2310.12757](https://arxiv.org/abs/2310.12757)

Rubio MD\*, Kennedy EH, Bacak V, Nagin DS. Effects of adolescent victimization on offending: flexible methods for missing data & unmeasured confounding. [arxiv.org:2309.12595](https://arxiv.org/abs/2309.12595)

Branson Z, Kennedy EH, Balakrishnan S, Wasserman LA. Causal effect estimation after propensity score trimming with continuous treatments. [arxiv.org:2309.00706](https://arxiv.org/abs/2309.00706)

Takatsu K\*, Levis AW\*, Kennedy EH, Kelz R, Keele L. Doubly robust machine learning for an instrumental variable study of surgical care for cholecystitis. [arxiv.org:2307.06269](https://arxiv.org/abs/2307.06269)

Bonvini M\*, Kennedy EH. Minimax optimal subgroup identification. [arxiv.org:2306.17464](https://arxiv.org/abs/2306.17464)

Balakrishnan S, Kennedy EH, Wasserman LA. The fundamental limits of structure-agnostic functional estimation. [arxiv.org:2305.04116](https://arxiv.org/abs/2305.04116)

Zeng Z\*, Kennedy EH, Bodnar LM, Naimi AI. Efficient generalization and transportation. [arxiv.org:2302.00092](https://arxiv.org/abs/2302.00092)

- won ENAR Distinguished Student Paper Award in 2022.

Levis AW\*, Bonvini M\*, Zeng Z\*, Keele L, Kennedy EH. Covariate-assisted bounds on causal effects with instrumental variables. [arxiv.org:2301.12106](https://arxiv.org/abs/2301.12106)

Bonvini M\*, Kennedy EH, Ventura V, Wasserman LA. Sensitivity analysis for marginal structural models. [arxiv.org:2210.04681](https://arxiv.org/abs/2210.04681)

Rambachan A, Coston A\*, Kennedy EH. Counterfactual risk assessments under unmeasured confounding. [arxiv.org:2212.09844](https://arxiv.org/abs/2212.09844)

Bonvini M\*, Kennedy EH. Fast convergence rates for dose-response estimation. [arxiv.org:2207.11825](https://arxiv.org/abs/2207.11825)

Coston A\*, Kennedy EH. The role of the geometric mean in case-control studies. [arxiv.org:2207.09016](https://arxiv.org/abs/2207.09016)

Bates S, Kennedy EH, Tibshirani R, Ventura V, Wasserman L. Nonlinear regression with residuals: causal estimation with time-varying treatments and covariates. [arxiv.org:2201.13451](https://arxiv.org/abs/2201.13451)

Das M\*, Kennedy EH. drpop: Efficient and doubly robust population size estimation in R. [arxiv.org:2111.07191](https://arxiv.org/abs/2111.07191)

Scharfstein DO, Nabi R, Kennedy EH, Huang MY, Bonvini M, Smid M. Semiparametric sensitivity analysis. [arxiv.org:2104.08300](https://arxiv.org/abs/2104.08300)

Waudby-Smith I\*, Arbour D, Sinha R, Kennedy EH, Ramdas A. Time-uniform central limit theory and asymptotic confidence sequences. [arxiv.org:2103.06476](https://arxiv.org/abs/2103.06476)

Liu L\*, Kennedy EH. Median optimal treatment regimes. [arxiv.org:2103.01802](https://arxiv.org/abs/2103.01802)

Lu Y, Scharfstein DO, Brooks MM, Quach K, Kennedy EH. Causal inference for comprehensive cohort studies. [arxiv.org:1910.03531](https://arxiv.org/abs/1910.03531)

Kim K\*, Kim J, Kennedy EH. Causal effects based on distributional distances. [arxiv.org:1806.02935](https://arxiv.org/abs/1806.02935)

37. Zeng Z\*, Arbour D, Feller A, Addanki R, Rossi R, Sinha R, Kennedy EH. Continuous treatment effects with surrogate outcomes. *41st International Conference on Machine Learning (ICML 2024)*. (to appear). [arxiv.org:2402.00168](https://arxiv.org/abs/2402.00168)

36. [Kennedy EH](#), Balakrishnan S, Robins JM, Wasserman LA. Minimax rates for heterogeneous causal effect estimation. *Annals of Statistics*. 2024; 52(2): 793-816. doi:10.1214/24-AOS2369 (arxiv.org:2203.00837)
35. McClean A\*, Branson Z, [Kennedy EH](#). Nonparametric estimation of conditional incremental effects. *Journal of Causal Inference*. (to appear). arxiv.org:2212.03578
34. Martinez-Taboada D\*, [Kennedy EH](#). Counterfactual density estimation using kernel Stein discrepancies. *Twelfth International Conference on Learning Representations (ICLR 2024)*. arxiv.org:2309.16129
33. Martinez-Taboada D\*, Ramdas A, [Kennedy EH](#). An efficient doubly-robust test for the kernel treatment effect. *Advances in Neural Information Processing Systems 37 (NeurIPS 2023)*. openreview (arxiv.org:2304.13237)
32. [Kennedy EH](#). Towards optimal doubly robust estimation of heterogeneous causal effects. *Electronic Journal of Statistics*. 2023; 17(2): 3008-3049. doi:10.1214/23-EJS2157 (arxiv.org:2004.14497)
31. Rubinstein M\*, Branson Z, [Kennedy EH](#). Heterogeneous interventional indirect effects with multiple mediators: nonparametric and semiparametric approaches. *Journal of Causal Inference*. 2023; 11(1): 1-23. arxiv.org:2210.08272
30. Das M\*, [Kennedy EH](#), Jewell NP. Doubly robust capture-recapture methods for estimating population size. *Journal of the American Statistical Association*. (to appear). doi:10.1080/01621459.2023.2187814 (arxiv.org:2104.14091)
29. [Kennedy EH](#), Balakrishnan S, Wasserman LA. Semiparametric counterfactual density estimation. *Biometrika*. 2023; 110(4): 875–896. doi:10.1093/biomet/asad017 (arxiv.org:2102.12034)
28. Kim K\*, [Kennedy EH](#), Zubizarreta JR. Doubly robust counterfactual classification. *Advances in Neural Information Processing Systems 36 (NeurIPS 2022)*. openreview (arxiv.org:2301.06199)
27. Mishler A\*, [Kennedy EH](#). FADE: FAir Double Ensemble learning for observable and counterfactual outcomes. *Proceedings of the ACM Conference on Fairness, Accountability, and Transparency (FAccT 2022)*. 2022. doi:10.1145/3531146.3533167 (arxiv.org:2109.00173)
26. Bonvini M\*, [Kennedy EH](#), Ventura V, Wasserman LA. Causal inference for the effect of mobility on COVID-19 deaths. *Annals of Applied Statistics*. 2022; 16(4): 2458-2480. doi:10.1214/22-AOAS1599 (arxiv.org:2103.04472)
25. Bahamyirou A\*, Schnitzer M, [Kennedy EH](#), Blais L, Yang Y. Doubly robust adaptive LASSO for effect modifier discovery. *International Journal of Biostatistics*. 2022; 18(2): 307–327. doi:10.1515/ijb-2020-0073 (arxiv.org:2011.12746)
24. Kim K\*, [Kennedy EH](#), Naimi AI. Incremental intervention effects in studies with many timepoints, repeated outcomes, and dropout. *Journal of Causal Inference*. 2021; 9(1): 302–344. doi:10.1515/jci-2020-0031 (arxiv.org:1907.04004)  
 - won JSM Student Paper Award (Nonparametric Statistics Section) in 2020.

23. Liu Y\*, Schnitzer M, Wang G, Kennedy EH, Viiklepp P, Vargas MH, Sotgiu G, Menzies D, Benedetti A. Modeling treatment effect modification in multidrug-resistant tuberculosis in an individual patient data meta-analysis. *Statistical Methods in Medical Research*. 2022; 31(4): 689-705. doi:10.1177/09622802211046383 (arxiv.org:2101.03997)
22. Lee Y\*, Kennedy EH, Mitra N. Doubly robust nonparametric instrumental variable estimators for survival outcomes. *Biostatistics*. 2023; 24(2): 518–537. doi:10.1093/biostatistics/kxab036 (arxiv.org:2007.12973)
21. Mishler A\*, Kennedy EH. Fairness in risk assessment instruments: post-processing to achieve counterfactual equalized odds. *Proceedings of the ACM Conference on Fairness, Accountability, and Transparency (FAccT 2021)*. doi:10.1145/3442188.3445902 (arxiv.org:2009.02841)
20. Bonvini M\*, Kennedy EH. Sensitivity analysis via the proportion of unmeasured confounding. *Journal of the American Statistical Association*. 2022; 117(539): 1540-1550. doi:10.1080/01621459.2020.1864382 (arxiv.org:1912.02793)  
- won JSM Student Paper Award (Statistics in Epidemiology Section) in 2020.
19. Coston A\*, Kennedy EH, Chouldechova A. Counterfactual predictions under runtime confounding. *Advances in Neural Information Processing Systems 33 (NeurIPS 2020)*. <https://papers.nips.cc/paper/...> (arxiv.org:2006.16916)
18. Kennedy EH. Efficient nonparametric causal inference with missing exposure information. *International Journal of Biostatistics*. 2020; 16(1): 1-11. doi:10.1515/ijb-2019-0087 (arxiv.org:1802.08952)
17. Mauro JA\*, Kennedy EH, Nagin D. Instrumental variable methods using dynamic interventions. *Journal of the Royal Statistical Society: Series A*. 2020; 183(4): 1523-1551. doi:10.1111/rssa.12563 (arxiv.org:1811.01301)  
- won JSM Student Paper Award (Government, Social Science, & Survey Methods Section) in 2018.
16. Coston A\*, Mishler A\*, Kennedy EH, Chouldechova A. Counterfactual risk assessments, evaluation, and fairness. *Proceedings of the ACM Conference on Fairness, Accountability, and Transparency (FAT\* 2020)*. 2020; 582-593. doi:10.1145/3351095.3372851 (arxiv.org:1909.00066)
15. Cuellar M\*, Kennedy EH. A nonparametric projection-based estimator for the probability of causation, with application to water sanitation in Kenya. *Journal of the Royal Statistical Society: Series A*. 2020; 183(4): 1793-1818. doi:10.1111/rssa.12548 (arxiv.org:1810.00767)  
- won JSM Student Paper Award (Breslow Prize, Statistics in Epidemiology Section) in 2018.
14. Fisher A, Kennedy EH. Visually communicating and teaching intuition for influence functions. *The American Statistician*. 2021; 75(2): 162-172. doi:10.1080/00031305.2020.1717620 (arxiv.org:1810.03260)
13. Kennedy EH, Balakrishnan S, G'Sell M. Sharp instruments for classifying compliers and generalizing causal effects. *Annals of Statistics*. 2020; 48(4): 2008-2030. doi:10.1214/19-AOS1874 (arxiv.org:1801.03635)
12. Kennedy EH, Small DS. Paradoxes in instrumental variable studies with missing data and one-sided noncompliance. *Journal of the French Statistical Society*. 2020; 161(1): 120-134. <http://journal-sfds.fr/article/view/784/831> (arxiv.org:1705.00506)

11. Kennedy EH, Lorch SA, Small DS. Robust causal inference with continuous instruments using the local instrumental variable curve. *Journal of the Royal Statistical Society: Series B*. 2019; 81(1): 121-143. doi:10.1111/rssb.12300 (arxiv:1607.02566)  
- won JSM Student Paper Award (David P. Byar Young Investigator Award, Biometrics Section) in 2017 & Young Statistician Showcase Award in 2016; earlier draft won the Thomas Ten Have Award in 2015.
10. Kennedy EH, Mauro JA, Daniels MJ, Hogan JW, Small DS. Handling missing data in instrumental variable methods for causal inference. *Annual Review of Statistics and Its Application*. 2019; 6: 125-148. doi:10.1146/annurev-statistics-031017-100353
9. Kennedy EH, Harris S, Keele LJ. Survivor-complier effects in the presence of selection on treatment, with application to a study of prompt ICU admission. *Journal of the American Statistical Association*. 2019; 114(525): 93-104. doi:10.1080/01621459.2018.1469990 (arxiv.org:1704.05706)
8. Kennedy EH. Nonparametric causal effects based on incremental propensity score interventions. *Journal of the American Statistical Association*. 2019; 114(526): 645-656. doi:10.1080/01621459.2017.1422737 (arxiv:1704.00211)
7. Kennedy EH, Kangovi S, Mitra N. Estimating scaled treatment effects with multiple outcomes. *Statistical Methods in Medical Research*. 2019; 28(4): 1094-1104. doi:10.1177/0962280217747130 (arxiv:1608.02273)
6. Kennedy EH, Ma Z, McHugh MD, Small DS. Nonparametric methods for doubly robust estimation of continuous treatment effects. *Journal of the Royal Statistical Society: Series B*. 2017; 79(4): 1229-1245. doi:10.1111/rssb.12212 (arxiv:1507.00747)  
- won JSM Student Paper Award (Health Policy Statistics Section) & Young Researcher Award in 2016.
5. Kennedy EH, Sjölander A, Small DS. Semiparametric causal inference in matched cohort studies. *Biometrika*. 2015; 102(3): 739-746. doi:10.1093/biomet/asv025 (pdf here)  
- won ENAR Distinguished Student Paper Award in 2015.
4. Hsu JY, Kennedy EH, Roy JA, Stephens-Shields AJ, Small DS, Joffe MM. Surrogate markers for time-varying treatments and outcomes. *Clinical Trials*. 2015; 12(4): 309-316. doi:10.1177/1740774515583500
3. Kennedy EH, Joffe MM, Small DS. Optimal restricted estimation for more efficient longitudinal causal inference. *Statistics & Probability Letters*. 2015; 97: 185-191. doi:10.1016/j.spl.2014.11.022
2. Taylor JMG, Shen J, Kennedy EH, Wang L, Schaubel DE. Comparison of methods for estimating the effect of salvage therapy in prostate cancer when treatment is given by indication. *Statistics in Medicine*. 2014; 33(2): 257-274. doi:10.1002/sim.5890
1. Kennedy EH, Taylor JMG, Schaubel DE, Williams S. The effect of salvage therapy on survival in a longitudinal study with treatment by indication. *Statistics in Medicine*. 2010; 29(25): 2569-2580. doi:10.1002/sim.4017



*Book Chapters & Discussions*

- Kennedy EH. Semiparametric doubly robust targeted double machine learning: a review. [arxiv.org:2203.06469](https://arxiv.org/2203.06469)
11. \*Coston A, \*Rubio MD, Kennedy EH. Randomized experiments. In *AI for Social Impact*, edited by Tambe M, Fang F, Wilder B. ([preprint](#))
  10. Hsu JY, Kennedy EH, Landis JR, Mitra N, Robins JM, Small DS, Stephens-Shields AJ, Yang W. Marshall Joffe's contributions to causal inference, biostatistics and epidemiology. *American Journal of Epidemiology*. 2024; 193 (4): 563-576. doi:10.1093/aje/kwad217
  9. Zivich PN, Breskin A, Kennedy EH. Machine learning and causal inference. *Wiley StatsRef: Statistics Reference Online*. New York: Wiley & Sons. doi:10.1002/9781118445112.stat08412
  8. \*Bonvini M, \*McClean A, Branson Z, Kennedy EH. Incremental causal effects: an introduction and review. In *Handbook of Matching and Weighting in Causal Inference*, edited by Zubizarreta J, Stuart EA, Small DS, Rosenbaum PR. Boca Raton: Chapman & Hall/CRC. 2023; 349-372. [arxiv:2110.10532](https://arxiv.org/2110.10532)
  7. Naimi AI, Mishler A, Kennedy EH. Practical strategies for mitigating the unknowable. *American Journal of Epidemiology*. 2023; 192(9): 1550-1551. doi:10.1093/aje/kwab202
  6. Bonvini M\*, Mishler A\*, Kennedy EH. Discussion of "Statistical modeling: the two cultures" by Leo Breiman. *Observational Studies*. 2021; 7(1). doi:10.1353/obs.2021.0001 ([arxiv:2103.15281](https://arxiv.org/2103.15281))
  5. Kennedy EH, Balakrishnan B, Wasserman LA. Discussion of "On nearly assumption-free tests of nominal confidence interval coverage for causal parameters estimated by machine learning" by Lin Liu, Rajarshi Mukherjee, and James Robins. *Statistical Science*. 2020; 35(3): 540-544. doi:10.1214/20-STS796 ([arxiv:2006.09613](https://arxiv.org/2006.09613))
  4. Greenhouse JB, Kennedy EH. Review of "Observation and experiment: an introduction to causal inference" by Paul Rosenbaum. *Psychometrika*. 2018; 83(4): 1007-1010. doi:10.1007/s11336-018-9632-y
  3. Kennedy EH, Balakrishnan S. Discussion of "Data-driven confounder selection via Markov and Bayesian networks" by Jenny Häggström. *Biometrics*. 2018; 74(2): 399-402. doi:10.1111/biom.12787 ([arxiv:1710.11566](https://arxiv.org/1710.11566))
  2. Kennedy EH. Semiparametric theory. *Wiley StatsRef: Statistics Reference Online*. New York: Wiley & Sons. doi:10.1002/9781118445112.stat08083 ([arxiv:1709.06418](https://arxiv.org/1709.06418))
  1. Kennedy EH. Semiparametric theory and empirical processes in causal inference. In *Statistical Causal Inferences and Their Applications in Public Health Research*, edited by He H, Wu P, Chen D. New York: Springer. 2016; 141-167. doi:10.1007/978-3-319-41259-7\_8 ([arxiv:1510.04740](https://arxiv.org/1510.04740))



39. Z Shahn, B Jung, D Talmor, Kennedy EH, LH Lehman, Beadorf-Kassis E. The impact of aggressive and conservative propensity for initiation of neuromuscular blockade in mechanically ventilated patients with hypoxemic respiratory failure. *Journal of Critical Care*. (to appear). doi:10.1016/j.jcrc.2024.154803
38. Jacobs LA, McClean A, Branson Z, Kennedy EH, Fixler A. Incremental propensity score effects for criminology: an application assessing the relationship between houselessness, behavioral health problems, and recidivism. *Journal of Quantitative Criminology*. (to appear). doi:10.1007/s10940-024-09582-7 (arxiv:2305.14040)
37. Zhou M, Abhishek V, Kennedy EH, Srinivasan K, Sinha R. Linking clicks to bricks: understanding the effects of email advertising on multichannel sales. *Information Systems Research*. (to appear). doi:10.1287/isre.2020.0557
36. Bodnar LM, Kirkpatrick SI, Roberts J, Kennedy EH, Naimi AI. Is the association between fruits and vegetables and preeclampsia due to higher dietary vitamin C and carotenoid intakes? *American Journal of Clinical Nutrition*. 2023; 118(2): 459-467. doi:10.1016/j.ajcnut.2023.06.007
35. Nyhan B, Settle J, Thorson E, Wojcieszak M, Barbera P, Chen AY, Allcott H, Brown T, Crespo-Tenorio A, Dimmery D, Freelon D, Gentzkow M, Gonzalez-Bailon S, Guess AM, Kennedy EH, Kim YM, Lazer D, Malhotra N, Moehler D, Pan J, Thomas DR, Tromble R, Rivera CV, Wilkins A, Xiong B, Kiewiet de Jonge CP, Franco A, Mason W, Stroud NJ, Tucker JA. Like-minded sources on Facebook are prevalent but not polarizing. *Nature*. 2023; 620; 137–144. doi:10.1038/s41586-023-06297-w
34. Guess AM, Malhotra N, Pan J, Barbera P, Allcott H, Brown T, Crespo-Tenorio A, Dimmery D, Freelon D, Gentzkow M, Gonzalez-Bailon S, Kennedy EH, Kim YM, Lazer D, Moehler D, Nyhan B, Rivera CV, Settle J, Thorson E, Tromble ER, Wilkins A, Wojcieszak M, Kiewiet de Jonge C, Franco A, Mason W, Stroud N, Tucker JA. Reshares on social media amplify political news but do not detectably affect beliefs or opinions. *Science*. 2023; 381(6656): 404-408. doi:10.1126/science.add8424
33. Guess AM, Malhotra N, Pan J, Barbera P, Allcott H, Brown T, Crespo-Tenorio A, Dimmery D, Freelon D, Gentzkow M, Gonzalez-Bailon S, Kennedy EH, Kim YM, Lazer D, Moehler D, Nyhan B, Rivera CV, Settle J, Thorson E, Tromble ER, Wilkins A, Wojcieszak M, Kiewiet de Jonge C, Franco A, Mason W, Stroud N, Tucker JA. How do social media feed algorithms affect attitudes and behavior in an election campaign? *Science*. 2023; 381(6656): 398-404. doi:10.1126/science.abp9364
32. Rudolph JE, Kim K, Kennedy EH, Naimi AI. Estimation of the time-varying incremental effect of low dose aspirin on incidence of pregnancy. *Epidemiology*. 2023; 34(1): 38-44. doi:10.1097/EDE.0000000000001545.
31. Bodnar LM, Cartus A, Kennedy EH, Kirkpatrick SI, Parisi S, Himes KP, Parker C, Grobman W, Simhan H, Silver R, Wing D, Naimi AI. A doubly robust machine learning-based approach to evaluate body mass index as a modifier of the association between fruit and vegetable intake and preeclampsia. *American Journal of Epidemiology*. 2022; 191(8): 1396-1406. doi:10.1093/aje/kwac062
30. Wesson P, Das M, Chen M, Hsu L, McFarland W, Kennedy EH, Jewell NP. Evaluating a targeted minimum loss-based estimator for capture-recapture analysis: an application to HIV surveillance in San Francisco, CA. *American Journal of Epidemiology*. 2024; 193(4): 673-683. doi:10.1093/aje/kwad231

29. Kennedy TM, Kennedy EH, Ceballo R. Marginal structural models for estimating the longitudinal effects of community violence exposure on youth's externalizing and internalizing symptoms. *Psychological Trauma: Theory, Research, Practice, and Policy*. 2023; 15 (6): 906-916. doi:10.1037/tra0001398
28. Rudolph JE, Kennedy EH, Benkeser D, Schisterman EF, Naimi AI. Estimation of the average causal effect in longitudinal data with time-varying exposures: the challenge of non-positivity and the impact of model flexibility. *American Journal of Epidemiology*. 2022; 191(11): 1962-1969. doi:10.1093/aje/kwac136
27. Zhong Y, Brooks MM, Kennedy EH, Triantafyllou S, Bodnar LM, Naimi AI. Use of machine learning to estimate the per-protocol effect of low-dose aspirin on pregnancy outcomes in a randomized clinical trial. *JAMA Network Open*. 2022; 5(3):e2143414. doi:10.1001/jamanetworkopen.2021.43414
26. Conzuelo-Rodriguez G, Bodnar LM, Brook MM, Wahed A, Kennedy EH, Schisterman EF, Naimi AI. Performance evaluation of parametric and nonparametric methods when assessing effect measure modification. *American Journal of Epidemiology*. 2022; 191(1): 198-207. doi:10.1093/aje/kwab220
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19. Bodnar LM, Cartus A, Himes KP, Kennedy EH, Kirkpatrick SI, Simhan HN, Naimi AI. Machine learning as a strategy to account for dietary synergy: an illustration based on dietary intake and adverse pregnancy outcomes. *American Journal of Clinical Nutrition*. 2020; 111(6): 1235-1243. doi:10.1093/ajcn/nqaa027

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8. Chen LM, Kennedy EH, Sales AE, Hofer TP. Use of health information technology for higher-value critical care. *New England Journal of Medicine*. 2013; 368(7): 594-597. doi:10.1056/NEJMp1213273
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2. Fakh MG, Watson SR, Greene MT, Kennedy EH, Olmsted R, Krein SL, Saint S. Promoting patient safety by reducing inappropriate urinary catheter use: a statewide effort in Michigan. *Archives of Internal Medicine*. 2012; 172(3): 255-260. doi:10.1001/archinternmed.2011.627
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## Invited Talks

(Note: \* indicates presentation scheduled for future date)

### *Invited Conference & Workshop Presentations*

44. \*Joint Statistical Meetings, Portland, OR. (8/2024)
43. \*New England Statistics Symposium, Storrs, CT. (5/2024)
42. \*American Causal Inference Conference, Seattle, WA. (5/2024)
41. International Conference on Computational & Methodological Statistics, Berlin, DE. (12/2023)
40. Joint Statistical Meetings, Toronto, ON. (8/2023)
39. International Chinese Statistical Association Applied Statistics Symposium, Ann Arbor, MI. (6/2023)
38. American Causal Inference Conference, Austin, TX. (5/2023)
37. International Conference on Computational & Methodological Statistics, London, UK. (12/2022)
36. American Mathematical Society Sectional Meeting on Causality, Amherst, MA (10/2022).
35. Joint Statistical Meetings, Washington, DC. (8/2022)
34. International Chinese Statistical Association Conference, Xi'an, CN. (7/2022)
33. American Causal Inference Conference, Berkeley, CA. (5/2022)
32. Banff International Research Station workshop on complex data, Kelowna, BC. (5/2022)
31. International Conference on Computational & Methodological Statistics, London, UK. (12/2021)
30. IMS workshop on "Causal Inference with Big Data", Singapore. (12/2021)
29. Institute for Foundations of Data Science ML Workshop, Madison, WI. (8/2021)
28. Frontiers of Causal Inference in Data Science, Penn Center for Causal Inference (discussant). (5/2021)
27. International Biometric Society ENAR Spring Meeting, Baltimore, MD. (3/2021)
26. Joint Statistical Meetings, Philadelphia, PA. (8/2020)
25. International Conference on Computational & Methodological Statistics, London, UK. (12/2019)
24. Statistical & Applied Mathematical Sciences Institute (SAMSI) Workshop, Durham, NC. (12/2019)
23. Joint Statistical Meetings, Denver, CO. (8/2019)
22. International Biometric Society WNAR Meeting, Portland, OR. (6/2019)
21. Joint Statistical Meetings, Vancouver, BC. (8/2018)
20. Institute of Mathematical Statistics Annual Meeting, Vilnius, LT. (7/2018)
19. Causal Inference & Big Data Summer Institute, Philadelphia, PA (6/2018)
18. Society for Epidemiologic Research Annual Meeting, Baltimore, MD. (6/2018)
17. Conference on Statistical Learning & Data Science / Nonparametric Statistics, New York, NY. (6/2018)
16. Atlantic Causal Inference Conference, Pittsburgh, PA. (5/2018)
15. International Conference on Health Policy Statistics, Charleston, SC. (1/2018)
14. International Conference on Computational & Methodological Statistics, London, UK. (12/2017)
13. Joint Statistical Meetings, Baltimore, MD. (8/2017)
12. International Biometric Society WNAR Meeting, Santa Fe, NM. (7/2017)
11. Southern Regional Council on Statistics Summer Conference, Jekyll Island, GA. (6/2017)
10. Atlantic Causal Inference Conference, Chapel Hill, NC. (5/2017)
9. International Biometric Society ENAR Spring Meeting, Washington, DC. (3/2017)
8. Joint Statistical Meetings, Chicago, IL. (8/2016)
7. International Biometric Conference, Victoria, BC. (7/2016)
6. Conference of the International Society of Nonparametric Statistics, Avignon, FR. (6/2016)
5. Atlantic Causal Inference Conference, Philadelphia, PA. (5/2015)
4. Deming Conference on Applied Statistics, Atlantic City, NJ. (12/2014)
3. Joint Statistical Meetings, Boston, MA. (8/2014)
2. International Biometric Society ENAR Spring Meeting, Baltimore, MD. (3/2014)
1. Joint Statistical Meetings, Montreal, QC. (8/2013)

## *Invited Seminars*

66. RAND Statistics Group. (4/2021)
65. MIT, Stochastics & Statistics Seminar. (4/2024)
64. University of Florida, Department of Statistics. (3/2024)
63. University of Michigan, Department of Biostatistics. (2/2024)
62. Emory University, Causal Inference Group. (12/2023)
61. Michigan State University, Department of Statistics. (11/2023)
60. MIT / Harvard University, Econometrics Seminar. (10/2023)
59. University of California, Berkeley, Econometrics Seminar. (9/2023)
58. Stanford University, Econometrics Seminar. (9/2023).
57. PDT Partners. (7/2023)
56. University of Melbourne, School of Mathematics and Statistics. (5/2023)
55. Vanderbilt University, Econometrics Seminar. (3/2023)
54. Columbia University, Department of Statistics. (2/2023)
53. University of Pittsburgh, Department of Biostatistics. (2/2023)
52. Texas A&M University, Department of Statistics. (1/2023)
51. Emory University, Department of Epidemiology. (11/2022)
50. Harvard University, Causal Inference Group. (11/2022)
49. Harvard University, Applied Statistics Workshop. (11/2022)
48. Novartis Analytics. (4/2022)
47. Amazon Core AI. (4/2022)
46. University of Maryland, Baltimore County, Department of Mathematics & Statistics. (3/2022)
45. Emory University, Department of Biostatistics & Bioinformatics. (2/2022)
44. Boston University, Causal Inference Seminar. (10/2021)
43. University of Washington, CHOICE Institute. (5/2021)
42. RAND Statistics Group. (4/2021)
41. University of California, Irvine, Department of Economics. (4/2021)
40. Indiana University, Department of Biostatistics. (3/2021)
39. Singapore Institute for Clinical Sciences, Agency for Science, Technology & Research. (3/2021)
38. University of Chicago, Booth School of Business. (2/2021)
37. [International Seminar on Selective Inference](#) (discussant). (1/2021)
36. Yale University, Department of Biostatistics. (11/2020)
35. [Online Causal Inference Seminar](#). (4/2020)
34. University of Copenhagen, Department of Biostatistics. (4/2020, cancelled due to COVID-19).
33. Stanford University, Graduate School of Business. (2/2020)
32. University of Pittsburgh, Department of Biostatistics. (1/2020)
31. University of Pittsburgh, Department of Statistics. (11/2019)
30. University of Massachusetts, Amherst, Department of Biostatistics. (10/2019)
29. University of North Carolina, Chapel Hill, Department of Biostatistics. (10/2019)
28. University of Pennsylvania, Department of Biostatistics. (9/2019)
27. Harvard University, Department of Health Care Policy. (5/2019)
26. University of Pittsburgh, Katz School of Business. (4/2019)
25. Yale University, MacMillan-CSAP Workshop on Quantitative Research Methods. (10/2018)
24. North Carolina State University, Department of Statistics. (10/2018)
23. Johns Hopkins University, Department of Biostatistics. (10/2018)
22. Princeton University, Quantitative Social Science Colloquium. (4/2018)
21. University of California, Berkeley, Division of Biostatistics. (3/2018)
20. University of Washington, Department of Biostatistics. (2/2018)
19. Ohio State University, Division of Biostatistics. (2/2018)

18. Johns Hopkins University, Causal Inference & SLAM Working Groups. (11/2017)
17. University of California, Berkeley, Division of Biostatistics. (11/2016)
16. Carnegie Mellon University, Heinz College. (9/2016)
15. University of North Carolina, Chapel Hill, Causal Inference Research Group. (3/2016)
14. Carnegie Mellon University, Department of Statistics. (2/2016)
13. RAND Statistics Group. (2/2016)
12. University of California, Berkeley, Division of Biostatistics. (2/2016)
11. University of Minnesota, Division of Biostatistics. (2/2016)
10. University of Michigan, Department of Biostatistics. (2/2016)
9. Johns Hopkins University, Department of Biostatistics. (2/2016)
8. University of Illinois, Department of Statistics. (1/2016)
7. North Carolina State University, Department of Statistics. (1/2016)
6. University of Rochester, Department of Biostatistics & Computational Biology. (1/2016)
5. Emory University, Department of Biostatistics & Bioinformatics. (1/2016)
4. Yale University, Department of Biostatistics. (1/2016)
3. McGill University, Department of Epidemiology, Biostatistics & Occupational Health. (11/2015)
2. Johns Hopkins University, Causal Inference Working Group. (11/2015)
1. University of Pennsylvania, Department of Biostatistics. (9/2015)



## Advising

### *Ph.D. Advisor*

- 2020- Mateo Dulce Rubio, Ph.D. in Statistics & Public Policy  
Thesis: “Robust nonparametric methods for peacebuilding”
- 2020- Zhenghao (Tiger) Zeng, Ph.D. in Statistics  
Thesis: “Towards modern causal inference: external validity, high-dimensionality and beyond”
- 2019-2024 Alec McClean, Ph.D. in Statistics (co-advisor: Zach Branson)  
Thesis: “Heterogeneity and optimality in causal inference”  
→ Postdoctoral Fellow, School of Medicine, New York University
- 2018-2023 Amanda Coston, Ph.D. in Machine Learning & Public Policy (co-advisor: Alex Chouldechova)  
Thesis: “Principled machine learning for societally consequential decision making”  
→ Assistant Professor, Department of Statistics, University of California, Berkeley
- 2017-2023 Matteo Bonvini, Ph.D. in Statistics  
Thesis: “Topics in nonparametric causal inference”  
→ Assistant Professor, Department of Statistics, Rutgers University
- 2018-2022 Manjari Das, Ph.D. in Statistics  
Thesis: “Nonparametric estimation in capture-recapture designs”  
→ Data Scientist, Walmart
- 2018-2021 Alan Mishler, Ph.D. in Statistics  
Thesis: “Auditing and achieving counterfactual fairness”  
→ Research Scientist, Artificial Intelligence Research, JP Morgan
- 2016-2020 Kwangho Kim, Ph.D. in Statistics & Machine Learning  
Thesis: “Causal inference with complex data structures and non-standard effects”  
→ Seidman Postdoctoral Fellow, Department of Health Care Policy, Harvard University
- 2016-2018 Jackie Mauro, Ph.D. in Statistics & Public Policy  
Thesis: “Nonparametric estimation of the effects of policies to reduce recidivism”  
→ Postdoctoral Scholar, School of Information, University of California, Berkeley
- 2016-2017 Maria Cuellar, Ph.D. in Statistics & Public Policy (co-advisor: Stephen Fienberg)  
Thesis: “Causal reasoning and data analysis in the law: estimation of the probability of causation”  
→ Assistant Professor, Department of Criminology, University of Pennsylvania

### *Postdoc Mentor*

- 2022- Alex Levis
- 2019-2021 Jackie Rudolph (University of Pittsburgh, primary advisor: Ashley Naimi)

*Ph.D. Committee Member*

	Catherine Wang, Ph.D. in Statistics
	Liyuan Xu, Ph.D. in Theoretical Neuroscience & Machine Learning (University College London)
	Runjia Li, Ph.D. in Biostatistics (University of Pittsburgh)
	Ian Waudby-Smith, Ph.D. in Statistics
2024	Yukun Ma, Ph.D. in Economics (Vanderbilt University)
2023	Mikaela Meyer, Ph.D. in Statistics & Public Policy
2023	Beomjo Park, Ph.D. in Statistics
2023	YJ Choe, Ph.D. in Statistics & Machine Learning
2023	Max Rubinstein, Ph.D. in Statistics & Public Policy
2022	Anton Lundborg, Ph.D. in Statistics (University of Cambridge)
2021	Yongqi Zhong, Ph.D. in Epidemiology (University of Pittsburgh)
2021	Gabriel Conzuelo, Ph.D. in Epidemiology (University of Pittsburgh)
2020	Helene Rytgaard, Ph.D. in Biostatistics (University of Copenhagen)
2019	Rahul Ladhania, Ph.D. in Public Policy & Management
2017	Mi Zhou, Ph.D. in Information Systems & Management

*Advanced Data Analysis (ADA) Advisor*

2023-2024	JungHo Lee
2023-2024	Elsa Palumbo
2022-2023	Shuying Shen
2021-2022	Kenta Takatsu
2020-2021	Vinayak Bhatia
2020-2021	Holly Bossart (co-advisor: Zach Branson)
2020-2021	Victoria Lin
2020-2021	Mateo Dulce Rubio
2020-2021	Zhengao (Tiger) Zeng
2019-2020	Alec McClean (co-advisor: Zach Branson)
2017-2018	Natalia Lombardi de Oliveira (co-advisor: Ryan Tibshirani)
2017-2018	Matteo Bonvini
2016-2017	Kwangho Kim

## Editorial Service

2023-	Associate Editor, <i>Journal of the American Statistical Association: Theory &amp; Methods</i>
2021-	Associate Editor, <i>Electronic Journal of Statistics</i>
2021-	Associate Editor, <i>ACM/IMS Journal of Data Science</i>
2021-	Associate Editor, <i>Journal of the Royal Statistical Society: Series B</i>
2019-	Associate Editor, <i>International Journal of Biostatistics</i>
2019-2023	Associate Editor, <i>Biostatistics</i>

## Referee Service

### *Statistical & Methodological Journals*

Annals of Applied Statistics  
Annals of Statistics  
Bernoulli  
Biometrics  
Biometrika  
BMC Medical Research Methodology  
Clinical Trials  
Computational Statistics & Data Analysis  
Econometrics & Statistics  
Electronic Journal of Statistics  
Health Services & Outcomes Res. Methodology  
International Journal of Biostatistics  
Journal of Causal Inference  
Journal of Econometrics  
Journal of Educational and Behavioral Statistics  
Journal of Machine Learning Research  
Journal of Multivariate Analysis  
Journal of the American Statistical Association  
Journal of the Royal Statistical Society: Series B  
Journal of the Royal Statistical Society: Series C  
Machine Learning  
Quantitative Economics  
Review of Economic Studies  
Stat  
Statistical Methods in Medical Research  
Statistical Science  
Statistics in Medicine

### *Selected Other Scientific Journals*

American Journal of Epidemiology  
Archives of Internal Medicine  
Health Services Research  
Journal of Quantitative Criminology  
Medical Decision Making  
Proceedings of the National Academy of Sciences  
Sociological Methodology

### *Conferences*

AISTATS  
COLT  
NeurIPS

## Software

*npcausal*: R package for nonparametric causal inference ([github.com/ehkennedy/npcausal](https://github.com/ehkennedy/npcausal))

## Teaching Experience

### *As Primary Instructor at Carnegie Mellon*

Statistical Methods in Machine Learning (36-708)

- Spring 2025
- Spring 2024

Foundations of Causal Inference (36-731) & Modern Causal Inference (36-732)

- Fall 2023
- Fall 2022
- Spring 2020
- Spring 2018

Modern Regression (36-401)

- Fall 2024
- Spring 2023
- Fall 2021
- Fall 2020
- Fall 2019
- Fall 2018

Statistical Paradoxes (66-108)

- Fall 2017

Experimental Design & Time Series (36-618)

- Spring 2017

### *External Short Courses & Workshops*

“Machine Learning & Nonparametric Efficiency in Causal Inference”

American Causal Inference Conference, Austin, TX. (5/2023)

American Causal Inference Conference, Berkeley, CA. (5/2022)

University of North Carolina, Chapel Hill, Causal Inference Research Group. (10/2019)

Causal Inference and Big Data Summer Institute, Philadelphia, PA. (6/2019)

Winter Conference in Statistics, Hemavan, SE. (3/2019)

North Carolina State University, Department of Statistics. (10/2018)

Causal Inference and Big Data Summer Institute, Philadelphia, PA. (6/2018)

Atlantic Causal Inference Conference, Pittsburgh, PA. (5/2018)

Johns Hopkins University, Causal Inference & SLAM Working Groups. (12/2017)

Causal Inference and Big Data Summer Institute, Philadelphia, PA. (7/2017)

University of North Carolina, Chapel Hill, Causal Inference Research Group. (3/2016)

## Academic Service

### *Leadership*

Past President (2023-2024), Pittsburgh Chapter of the American Statistical Association  
President (2022-2023), Pittsburgh Chapter of the American Statistical Association  
President-Elect (2021-2022), Pittsburgh Chapter of the American Statistical Association

### *Conference Organizing*

Local Arrangements Chair, Conference on Uncertainty in Artificial Intelligence, Pittsburgh, PA. (8/2023)  
Organizing Committee Member, Atlantic Causal Inference Conference, Pittsburgh, PA. (5/2018)  
Organizing Committee Member, Atlantic Causal Inference Conference, Philadelphia, PA. (5/2015)

### *Conference Session Organizing*

Invited Session Organizer, Atlantic Causal Inference Conference, Pittsburgh, PA. (5/2018)  
Roundtable Discussion Leader, Joint Statistical Meetings, Chicago, IL. (8/2016)  
Topic-Contributed Session Chair, Joint Statistical Meetings, Boston, MA. (8/2014)  
Topic-Contributed Session Organizer, Joint Statistical Meetings, Boston, MA. (8/2014)  
Invited Session Organizer, International Biometric Society ENAR Spring Meeting, Baltimore, MD. (3/2014)

### *Award Committees*

Reviewer, Nonparametric Statistics Paper Award, Joint Statistical Meetings, Toronto, ON. (8/2023)  
Reviewer, Student Paper Award, International Chinese Statistical Association (virtual). (9/2021)  
Reviewer, Statistical Learning Paper Award, Joint Statistical Meetings, Seattle, WA. (8/2021)  
Reviewer, Health Policy Statistics Paper Award, Joint Statistical Meetings, Philadelphia, PA. (8/2019)  
Reviewer, Health Policy Statistics Paper Award, Joint Statistical Meetings, Baltimore, MD. (8/2017)

### *Professional Memberships*

American Statistical Association  
Institute of Mathematical Statistics  
International Biometric Society, Eastern North American Region (ENAR)  
Irish Statistical Association