

April 1, 2021

## Kwonsang Lee

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### Research Interests

Causal Inference, Instrumental Variables, Design and Analysis of Observational Studies, Application in Environmental Health, Public Policy and Medicine.

### Academic Appointments

2020 - Present **Assistant Professor**, Department of Statistics, Sungkyunkwan University  
2019 - 2020 **Research Associate**, Department of Biostatistics, Harvard T.H. Chan School of Public Health  
2017 - 2019 **Postdoctoral Research Fellow**, Department of Biostatistics, Harvard T.H. Chan School of Public Health  
Mentor: Francesca Dominici

### Education

2012 - 2017 **Ph.D.**, Applied Mathematics and Computational Science (emphasis in Statistics), University of Pennsylvania  
Advisor: Dylan S. Small  
Dissertation Committee: Dylan S. Small, Paul R. Rosenbaum, Bhaswar B. Bhattacharya  
2015 - 2016 **M.A.**, Statistics, University of Pennsylvania  
2006 - 2010 **B.S.**, Mathematics and **B.A.**, Economics, *summa cum laude*, Seoul National University

### Honors and Awards

2018 *Statistics in Epidemiology (SIE) Young Investigator Award*  
Awarded by the American Statistical Association's Section on Statistics in Epidemiology for the paper "A powerful approach to the study of moderate effect modification in observational studies."

- 2016 - 2017     *Russell Ackoff Doctoral Student Fellowship Award*  
 Awarded by the Wharton Risk Management and Decision Processes Center, University of Pennsylvania for pursuing research in decision making under risk and uncertainty
- 2012 - 2016     *Benjamin Franklin Fellowship*  
 Awarded by School of Arts and Sciences, University of Pennsylvania
- Summer 2015   *GAPSA Research Travel Grant Award*  
 Awarded by Graduate and Professional Student Assembly (GAPSA), University of Pennsylvania
- Spring 2014     *Department Good Teaching Award*  
 Awarded by Department of Mathematics, University of Pennsylvania for excellence in teaching

## Papers

### Refereed Publications

1. Lee, K., Small, D. S., and Dominici, F. (2021) Discovering heterogeneous exposure effects using randomization inference in air pollution studies. *Journal of the American Statistical Association*, to appear.
2. Fogarty, C. B., Lee, K., and Keele, L. (2021) Biased encouragements and heterogeneous effects in an instrumental variable study of emergency general surgical outcomes. *Journal of the American Statistical Association*, to appear.
3. Lee, K., and Small, D. S. (2019). Estimating the malaria attributable fever fraction accounting for parasites being killed by fever and measurement error. *Journal of the American Statistical Association*, 114(525), 79-92.
4. Heo, S., Nori-Sarma, A., Lee, K., Benmarhnia, T., Dominici, F., and Bell, M. L. (2019). The use of a quasi-experimental study on the mortality effect of a heat wave warning system in South Korea. *International Journal of Environmental Research and Public Health*, 16(12), 2245.
5. Lee, K., Lorch S. A., and Small, D. S. (2019). Sensitivity analyses for average treatment effect when outcome is censored by death in instrumental variable models. *Statistics in Medicine*, 38(13), 2303-2316.
6. Rose, E.B., Lee, K., Roy, J. A., Small, D. S., Ross, M. E., Castillo-Neyra, R., and Levy, M. Z. (2018). Risk maps for cities: Incorporating streets into geostatistical models. *Spatial and Spatio-temporal Epidemiology*, 27, 47–59.
7. Lee, K., Small, D. S., and Rosenbaum, P. R. (2018). A powerful approach to the study of moderate effect modification in observational studies. *Biometrics*, 74(4), 1161–1170.
8. Lee, K., Small, D. S., Hsu, J. Y., Silver, J. H. and Rosenbaum, P. R. (2018). Discovering effect modification in an observational study of surgical mortality at hospitals with superior nursing. *Journal of the Royal Statistical Society, Series A*, 181(2), 535–546.

### Submitted papers

- Lee, K. and Dominici, F. Accounting for recall bias in case-control studies: a causal inference approach.
- Lee, K., Bhattacharya, B. B., Qin, J., and Small, D. S. Nonparametric inference for treatment effects in instrumental variable models.
- Lee, K., Bargagli-Stoffi, F. J. and Dominici, F. Causal rule ensemble: Interpretable inference of heterogeneous treatment effects in observational studies.

## **Working papers**

- Lee, K. and Dominici, F. Sensitivity analysis for recall and unmeasured confounding biases in matched case-control studies.
- Lee, K. and Zubizarreta, J. R. Inference for overlapping matched samples: Methods and applications.
- Lee, K., Bhattacharya, B. B., and Small, D. S. A nonparametric likelihood approach to two-component mixture models.

## **Grants**

### **Grants as Principal Investigator**

- “Developing Interpretable Causal Inference Methods Based on Discovering Heterogeneous Treatment Effects,” the National Research Foundation of Korea (NRF) grant funded by the Korea government (MSIT), 2021-2024.
- “Development of a novel risk-set matching method for revealing causal mechanisms of COPD progression using CT,” Samsung Medical Center (SMC) & Sungkyunkwan University (SKKU), 2020-2022.

## **Presentations**

- Department of Statistics, Korea University, Seoul, Republic of Korea (Nov. 2020)
- Research Institute of Applied Statistics, Sungkyunkwan University, Seoul, Republic of Korea (Oct. 2020)
- Department of Statistics, Ehwa Womans University (Causal Inference Workshop), Seoul, Republic of Korea (Aug. 2020)
- Statistical Meeting held by the Korean Statistical Society, Asan, Republic of Korea (Jul. 2020)
- Joint Statistical Meeting, Denver, CO (Jul. 2019)
- Harvard Biostatistics Lightning Talks, Boston, MA (May. 2019)
- Harvard Data Science Initiative Conference, Boston, MA (Oct. 2018)
- Joint Statistical Meeting, Vancouver, Canada (Aug. 2018)

- Michelle L. Bell's Research Group, Yale University (Jun. 2018)
- European Causal Inference Meeting (EuroCIM), University of Florence, Florence, Italy (Apr. 2018)
- Michelle L. Bell's Research Group, Yale University (Mar. 2018)
- Harvard National Studies on Air Pollution and Health (NSAPH) Meeting, Harvard University (Mar. 2018)
- Harvard Biostatistics Seminar, Boston, MA (Feb. 2017)
- Joint Statistical Meeting, Chicago, IL (Aug. 2016)
- Atlantic Causal Inference Conference, New York University, New York, NY (May, 2016)
- World Malaria Day Symposium, "Global Malaria: The International Centers of Excellence", Johns Hopkins Bloomberg School of Public Health, Baltimore, MD (Apr. 2016)
- Joint Statistical Meeting, Seattle, WA (Aug. 2015)
- Atlantic Causal Inference Conference, University of Pennsylvania, Philadelphia, PA (May, 2015)
- Atlantic Causal Inference Conference, Brown University, Providence, RI (May, 2014)

## Advising

### Master Students

- Sodam Park, Department of Statistics, Sungkyunkwan University, expected to graduate in 2022.
- Sungyeon Ha, Department of Statistics, Sungkyunkwan University, expected to graduate in 2022.
- Youngryeol Kim, Department of Statistics, Sungkyunkwan University, expected to graduate in 2022.
- Nayeon Kwon, Department of Statistics, Sungkyunkwan University, expected to graduate in 2022.
- Insun Lee, Department of Statistics, Sungkyunkwan University, expected to graduate in 2022.

## Teaching Experience

Spring 2021	<b>Instructor</b> , Department of Statistics, Sungkyunkwan University Course: STA5031 (Design and Analysis of Experiments)
Spring 2021	<b>Instructor</b> , Department of Statistics, Sungkyunkwan University Course: STA3011 (Introduction to Biostatistics)
Fall 2020	<b>Instructor</b> , Department of Statistics, Sungkyunkwan University Course: STA5021 (Modern Statistical Methods)

Fall 2020	<b>Instructor</b> , Department of Statistics, Sungkyunkwan University Course: STA3010 (Introduction to Nonparametric Statistics)
Spring 2020	<b>Instructor</b> , Department of Statistics, Sungkyunkwan University Course: STA5031 (Design and Analysis of Experiments)
Fall 2015	<b>Teaching Assistant</b> , Department of Statistics, University of Pennsylvania. Course: Stat102 (Introduction to Business Statistics)
Spring 2015	<b>Recitation Instructor</b> , The Wharton School, University of Pennsylvania. Course: Stat111 (Introduction to Statistics)
Spring 2014	<b>Recitation Instructor</b> , Department of Mathematics, University of Pennsylvania. Course: Math240 (Calculus III)
Fall 2013	<b>Teaching Assistant</b> , Department of Mathematics, University of Pennsylvania. Course: Math312 (Linear Algebra)

## Research and Professional Experience

2014 - 2017	<b>Research Assistant</b> , Michael Z. Levy and Dylan S. Small
2010 - 2012	<b>Military Service</b> , South Korea

## Referee Service

Air Quality, Atmosphere & Health, International Journal of Biostatistics, Journal of Causal Inference, Journal of the American Statistical Association, Journal of the Royal Statistical Society: Series A, Journal of the Royal Statistical Society: Series C, Statistics in Medicine.

## References

**Professor Dylan S. Small**, Department of Statistics, The Wharton School, University of Pennsylvania, 400 Jon M. Huntsman Hall, Philadelphia, PA 19104. Ph.:(215)-573-5241. E-mail: ds-small@wharton.upenn.edu

**Professor Paul R. Rosenbaum**, Department of Statistics, The Wharton School, University of Pennsylvania, 400 Jon M. Huntsman Hall, Philadelphia, PA 19104. Ph.:(215)-898-3120. E-mail: rosenbap@wharton.upenn.edu

**Professor Francesca Dominici**, Department of Biostatistics, Harvard T.H. Chan School of Public Health, 655 Huntington Avenue, Boston, MA 02115. Ph.:(617)-432-4908. E-mail: fdominic@hsph.harvard.edu