Colin B. Fogarty

Operations Research and Statistics Group
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ACADEMIC APPOINTMENT

2016- Assistant Professor (tenure-track), Operations Research and Statistics Group, Sloan School of Management, Massachusetts Institute of Technology

EDUCATION

2011-2016 Ph.D., Statistics, The Wharton School, University of Pennsylvania
Dissertation title: *Modern Optimization in Observational Studies*
Advisor: Professor Dylan S. Small

2007-2011 A.B., *magna cum laude*, Statistics, Harvard University

TEACHING

2016- Operations Research and Statistics Group, Sloan School of Management, MIT
15.087: Engineering Statistics and Data Science, Summer 2017, 2018
15.075: Statistical Thinking and Data Analysis, Spring 2017, 2018
15.S15: Readings in Statistics, Fall 2016, 2017

2014 Department of Statistics, The Wharton School, University of Pennsylvania
STAT 101: Introductory Business Statistics, Summer 2014

DOCTORAL ADVISING

- Peter Cohen, Operations Research Center, Massachusetts Institute of Technology, expected to graduate in 2022.

PUBLICATIONS (⋆ denotes alphabetical ordering)

- Fogarty, C. (2019+). Studentized sensitivity analysis for the sample average treatment effect in paired observational studies. *Journal of the American Statistical Association*, to appear.

⋆ Fogarty, C. and Hasegawa, R. (2019). Extended sensitivity analysis for heterogeneous unmeasured confounding with an application to sibling studies of returns to education. *Annals of Applied Statistics*, 13 (2) 767-796.

- Sharifi-Malvajerdi, S., Zhu, F., Fogarty, C., Fay, M., Fairhurst, R., Flegg, J., Stepniewska, K., and Small, D. (2019). Malaria parasite clearance rate regression: An R software package for a Bayesian hierarchical regression model. *Malaria Journal*, 18:4.

- Fogarty, C. (2018). Regression-assisted inference for the average treatment effect in paired experiments. *Biometrika*, 105 (4), 994-1000.

- Fogarty, C. (2018). On mitigating the analytical limitations of finely stratified experiments. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*, 80, 1035-1056.
- Fogarty, C., Shi, P., Mikkelsen, M., and Small, D. (2017). Randomization inference and sensitivity analysis for composite null hypotheses with binary outcomes in matched observational studies. *Journal of the American Statistical Association*, 112 (517), 321-331.
- Fogarty, C. and Small, D. (2016). Sensitivity analysis for multiple comparisons in matched observational studies through quadratically constrained linear programming. *Journal of the American Statistical Association*, 111 (516), 1820-1830.
- Fogarty, C., Mikkelsen, M., Gaieski, D., and Small, D. (2016). Discrete optimization for interpretable study populations and randomization inference in an observational study of severe sepsis mortality. *Journal of the American Statistical Association*, 111 (514), 447-458.
- Fogarty, C., Small, D., and Gastwirth, J. (2016). Discussion of 'Perils and potentials of self-selected entry to epidemiological studies and surveys' by Niels Keiding and Thomas A. Louis. *Journal of the Royal Statistical Society, Series A*, 179 (2), 357-358.
- Fogarty, C., Fay, M., Flegg, J., Stepniewska, K., Fairhurst, R., and Small, D. (2015). Bayesian hierarchical regression on clearance rates in the presence of "lag" and "tail" phases with an application to malaria parasites. *Biometrics*, 71, 751-759.
- Fogarty, C. and Small, D. (2014). Equivalence testing for functional data with an application to comparing pulmonary function devices. *Annals of Applied Statistics*, 8 (4), 2002-2026.

SUBMITTED PAPERS

- Cohen, P., Olson, M., and Fogarty, C. Multivariate one-sided testing in matched observational studies as an adversarial game. *Revision submitted to Biometrika*.
- Fogarty, C. Testing weak nulls in matched observational studies. *Submitted*.
- Fogarty, C., Lee, K., Kelz, R., and Keele, L. Biased encouragements and heterogeneous effects in an instrumental variable study of emergency general surgical outcomes. *Submitted*.
- Heng, S., Kang, H, Small, D. and Fogarty, C. An aberrant rank approach to increasing power from observational studies. *Submitted*.
- Keele, L., Small, D., Hsu, J., and Fogarty, C. Patterns of effects and sensitivity analysis for differences-in-differences. *Submitted*.

PAPERS IN PREPARATION

- Cohen, P. and Fogarty, C. Bootstrap prepivoting in finite population causal inference.
- Fogarty, C. Prepivoted permutation tests.
- Fogarty, C. Near sufficiency and a role for regression adjustment in matched observational studies with hidden bias.

RESEARCH INTERESTS

causal inference • design and analysis of observational studies • sensitivity analysis • equivalence testing • robust permutation tests

CONFERENCE PRESENTATIONS AND INVITED TALKS

- *Testing Weak Nulls in Paired Observational Studies* ■ Wharton Statistics Seminar, Sep 2019 ■ Chicago Booth Econometrics and Statistics Seminar, Oct 2019
- *Near Sufficiency and Conditional Inference in Matched Observational Studies* ■ Atlantic Causal Inference Conference, May 2019
- *Bootstrap Prepivoting in Finite Population Causal Inference* ■ UC Berkeley Causal Inference Group, Apr 2019. ■ INFORMS, Oct 2019
- *Studentized Sensitivity Analysis in Paired Observational Studies* ■ INFORMS, Oct 2017 ■ University of Wisconsin at Madison Statistics Seminar, Nov 2017 ■ MIT Political Methodology Seminar, Nov 2017 ■ CMStatistics, Dec 2017 ■ Atlantic Causal Inference Conference, May 2018 ■ Joint Statistical Meetings, Aug 2018 ■ Harvard Health Care Policy Seminar, Nov 2018 ■ Brown ICERM, Jan 2019
- *Improved Inference in Paired Experiments* ■ MIT Econometrics Lunch Seminar, May 2017 ■ Joint Statistical Meetings, Aug 2017
- *Modern Optimization in Observational Studies* ■ MIT Operations Research Center Seminar, Nov 2016 ■ MIT Health Services Innovation Seminar, April 2018.
- *Leveraging Multiple Outcomes in Matched Observational Studies* ■ University of Chicago Statistics Seminar, Jan 2016 ■ Stanford Statistics Seminar, Jan 2016 ■ Yale Biostatistics Seminar, Jan 2016 ■ MIT Sloan Operations Research and Statistics Seminar, Jan 2016 ■ Boston University Statistics Seminar, Jan 2016 ■ USC Marshall Data Sciences and Operations Seminar, Jan 2016 ■ UC Irvine Statistics Seminar, Jan 2016 ■ University of Minnesota Statistics Seminar, Feb 2016 ■ Rutgers Statistics Seminar, Feb 2016 ■ Joint Statistical Meetings, Aug 2016 ■ Columbia Decision, Risk, and Operations Seminar, Oct 2016 ■ INFORMS, Nov 2016
- *Inference and Sensitivity Analysis for Composite Null Hypotheses with Binary Outcomes in Matched Observational Studies* ■ Joint Statistical Meetings, Aug 2015
- *The Impact of Balance on Match-Based Causal Inference* ■ Joint Statistical Meetings, Aug 2014

AWARDS

– Biometrics Early-Stage Investigator Award, 2018
Awarded by the Biometrics Section of the American Statistical Association for the paper "Studentized sensitivity analysis for the sample average treatment effect in paired observational studies."

– Tom R. Ten Have Award, 2017
Awarded at the 2017 Atlantic Causal Inference Conference for "exceptionally creative or skillful research on causal inference " for the papers "On mitigating the analytical limitations of finely stratified experiments" and "Regression-assisted inference for the average treatment effect in paired experiments."

- Statistics in Epidemiology Young Investigator Award, 2016
  Awarded by the American Statistical Association section on Statistics in Epidemiology for the paper "Sensitivity analysis for multiple comparisons in matched observational studies through quadratically constrained linear programming. "

- J. Parker Bursk Memorial Award, Sep 2015
  Awarded by the Statistics Department at the Wharton School for excellence in research.

- Donald S. Murray Award, Sep 2015
  Awarded by the Statistics Department at the Wharton School for excellence in teaching.

- Winkelman Fellowship, 2013-2016
  Given to rising 3^{rd} *year doctoral students who have shown substantial academic job potential across all departments at Wharton.*