

Aaron Fisher

Statistics & Machine Learning Researcher
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Education

- 2016 **PhD in Biostatistics**, *Johns Hopkins Bloomberg School of Public Health*, Baltimore, MD.
Advisors: Vadim Zipunnikov & Brian Caffo
Dissertation: Methods for High Dimensional Analysis, Multiple Testing, and Visual Exploration
- 2010 **BA in Economics**, *University of Rochester*, Rochester, NY.
Summa cum laude

Professional Experience

- 2019-Present **Principal Statistician**, *Takeda Pharmaceuticals, Statistics and Quantitative Sciences*, Boston, MA.
Analysis of wearable devices in early-stage clinical trials (with Dmitri Volfson)
- 2016-2019 **Postdoctoral Research Fellow**, *Harvard T.H. Chan School of Public Health, Dept of Biostatistics*, Boston, MA.
Advisors: Francesca Dominici & Cynthia Rudin
- 2016 **Statistical Consultant**, *Pfizer*, Boston, MA.
Analysis of wearable devices and temperature probes in human sleep studies
- 2010 **Intern Analyst**, *Structured Decisions Corporation*, Newton, MA.
Background research project for a linear programming application

Academic Papers

- Submitted **A. J. Fisher** (2020). Treatment effect bias from sample snooping: blinding outcomes is neither necessary nor sufficient. ([link](#).)
- Peer-Reviewed Publications **A. J. Fisher**, E. H. Kennedy (2020). Visually Communicating and Teaching Intuition for Influence Functions. *The American Statistician*. ([link](#).)
- A. J. Fisher**, C. Rudin, F. Dominici (2019). All Models are Wrong, but Many are Useful: Learning a Variable's Importance by Studying an Entire Class of Prediction Models Simultaneously. *The Journal of Machine Learning Research*. ([paper link](#); [169 citations](#) as of July 16, 2020, including citations to previous arXiv versions)
- A. J. Fisher**, M. Rosenblum (2018). Stochastic Optimization of Adaptive Enrichment Designs for two Subpopulations. *Journal of Biopharmaceutical Statistics*. ([link](#).)

T. Qian, E. Colantuoni, **A. J. Fisher**, M. Rosenblum, for the Alzheimer's Disease Neuroimaging Initiative (2017). Sensitivity of adaptive enrichment trial designs to accrual rates, time to outcome measurement, and prognostic variables. *Contemporary Clinical Trials Communications*. ([link](#).)

Y. Webb-Vargas, S. Chen, **A. J. Fisher**, A. Mejia, Y. Xu, C. Crainiceanu, B. Caffo, M. A. Lindquist (2017). Big Data and Neuroimaging. *Statistics in Biosciences*. ([link](#).)

R. Y. Coley, **A. J. Fisher**, M. Mamawala, H. B. Carter, K. J. Pienta, S. L. Zeger (2017). A Bayesian Hierarchical Model for Prediction of Latent Health States from Multiple Data Sources with Application to Active Surveillance of Prostate Cancer. *Biometrics*. ([link](#).)

M. Rosenblum, T. Qian, Y. Du, H. Qiu, **A. J. Fisher** (2016). Multiple Testing Procedures for Adaptive Enrichment Designs: Combining Group Sequential and Reallocation Approaches. *Biostatistics*. ([link](#).)

A. J. Fisher, B. Caffo, B. Schwartz, V. Zipunnikov (2016). Fast, Exact Bootstrap Principal Component Analysis for $p > 1$ million. *Journal of the American Statistical Association* TM. ([link](#).)

A. J. Fisher, G. B. Anderson, R. Peng, J. Leek (2014). A randomized trial in a massive online open course shows people don't know what a statistically significant relationship looks like, but they can learn. *PeerJ*. ([link](#); 10,610 unique visitors as of July 16, 2020.)

Technical **A. J. Fisher**, R. Y. Coley, S. L. Zeger (2015). Fast Out-of-Sample Predictions for Bayesian Hierarchical Models of Latent Health States. ([link](#).)
Reports

A. J. Fisher, H. Jaffee, M. Rosenblum (2014). interAdapt – An Interactive Tool for Designing and Evaluating Randomized Trials with Adaptive Enrollment Criteria. ([link](#).)

Awards and Scholarships

2016 **Margaret Merrell Award (co-winner with Amanda Mejia)**: Departmental award recognizing outstanding research by a Biostatistics doctoral student ([link](#)).

2014 **June B. Culley Award**: Honors outstanding achievement by a Biostatistics student on his or her school-wide oral examination paper ([link](#)).

2012-2015 **Doctoral Training Grant in Environmental Biostatistics**: Provides funding for at least three years.

2006-2010 **Undergraduate Awards**: Phi Beta Kappa; John Dows Mairs Prize (University of Rochester Economics Dept); Omicron Delta Epsilon International Honor Society for Economics; Theta Chi Long, Walter, Ott Award; Theta Chi Valentine H. Zahn Fund.

Software

- bootSVD** (23,000 downloads as of July 16, 2020) an R package for implementing fast, exact bootstrap principal component analysis and singular value decompositions for high dimensional data (i.e. > 1 million covariates). Matrices too large for memory can be entered as class `ff` objects, with contents stored on disk ([CRAN link](#); [GitHub link](#)).
- ggBrain** An R package for beautiful brain image figures with ggplot. This packages allows color to be mapped to both (1) tissue intensities of the template image, and (2) values of a voxel-wise test statistic ([GitHub link](#)).
- interAdapt** An interactive tool for designing and evaluating randomized trials with adaptive enrollment criteria ([Shiny App link](#); [CRAN link](#); [Github link](#)).

Skills

- Statistics & Machine Learning Causal inference, matrix decompositions, regression in a RKHS, Bayesian regression trees, random forests, neural networks, finite sample bounds, adaptive clinical trials, non-convex quadratic programming, functional data analysis
- Computing R package development, git, Python, PyTorch, MATLAB, Stata, shell scripting, \LaTeX

Reviewer

Journal of the American Statistical Association (1); Journal of Machine Learning Research (1); Journal of Computational and Graphical Statistics (1); Computational Statistics and Data Science (1); Risk Analysis (2).

Teaching

Co-Instructor

- 2015 Statistical Reasoning I and II: My role included teaching independently for 13 hours of lectures (*MPH Level Course, JHSPH Summer Institute of Epidemiology and Biostatistics*)

Guest Lecturer

- 2013 Essentials of Probability and Statistical Inference I-II (*Biostatistics ScM Level, JHSPH*)

Lab Lecturer with Content Design

- 2012-2014 Essentials of Probability and Statistical Inference I-IV: Designed and administered a weekly 1-hour lab lecture. In the second year of this course, we reduced this lab to a 1-hour session every two weeks. (*Biostatistics ScM Level, JHSPH*)

Lab Lecturer without Content Design

- 2014-2015 Statistical Methods in Public Health II: Administered approximately 16 hours of lab lecture in each year of the course. (*MPH Level, JHSPH*)

Educational Presentations

- 2013-2015 JHU Biostatistics Journal Club: I have given talks on high dimensional asymptotics, adaptive clinical trials, and the Bayesian Bootstrap
- 2013-2015 JHU Biostatistics Computing Club: I have given talks on environments in R, and on \LaTeX

General TA Roles

- 2014-2015 Statistical Methods in Public Health I and IV (*MPH Level, JHSPH*)
- 2012 Statistical Reasoning I and II, (*MPH Level, JHSPH Summer Institute of Epidemiology and Biostatistics*)

Conference Presentations

- 2018 “Model Class Reliance: Variable Importance when all Models are Wrong, but *Many* are Useful.” JSM, Vancouver. *Contributed Speed Talk & Poster.*
- 2018 “Model Class Reliance: Variable Importance when all Models are Wrong, but *Many* are Useful.” Conference on Statistical Learning and Data Science / Nonparametric Statistics, New York City, NY. *Invited Talk.*
- 2018 “Model Class Reliance: Variable Importance when all Models are Wrong, but *Many* are Useful.” Atlantic Causal Inference Conference, Pittsburgh, PA. *Contributed Poster.*
- 2018 “Model Class Reliance: Variable Importance when all Models are Wrong, but *Many* are Useful.” Harvard Chan Poster Day, Boston, MA. *Contributed Poster.*
- 2016 “Optimizing Adaptive Enrichment Designs.” JSM, Chicago IL. *Contributed Poster.*
- 2015 “A Randomized Trial in a Massive Online Open Course Shows People Don’t Know What a Statistically Significant Relationship Looks Like, but They Can Learn.” JSM, Seattle WA. *Contributed Speed Session & Poster.*
- 2015 “Fast Exact Bootstrap Principal Component Analysis for $p > 1$ million.” ENAR, Miami, FL. *Contributed Talk.*
- 2014 “Fast, Exact Bootstrap Principal Component Analysis for $p > 1$ Million.” 4th Annual Hopkins Imaging Conference ([link](#)). Baltimore, MD, *Invited Short Talk & Poster.*
- 2014 “Fast Exact Bootstrap Principal Component Analysis for $p > 1$ million: Leveraging Low-Dimensional Structure Across High-Dimensional Bootstrap Samples.” JSM, Boston, MA. *Contributed Speed Session & Poster.*
- 2014 “People Can’t See Statistical Significance: A Massive Randomized Trial on the Visual Perception of Relationships.” ENAR Spring Meeting, Baltimore, MD, *Contributed Talk.*

Other Leadership & Service Roles

- 2020 Compiled list of educational resources for the Takeda Machine Learning and Artificial Intelligence Community of Practice.
- 2017 Invited panel member for HSPH Biostatistics departmental discussion on preparing for the job market

- 2016 Organizer for HSPH Biostatistics faculty panel on preparing for the job market
- 2015 Volunteer with Thread: Thread is a mentorship and tutoring program that enrolls underperforming high school students who face significant barriers outside of the classroom.
- 2015 Facilitator at JHU Data Science Hackathon: Assisted a team through the process of scraping web data and building a shiny app (3-day event)
- 2014-2015 JHU Biostatistics Meat Chili Champion
- 2013-2014 JHU Biostatistics Vegetarian Chili Champion
- 2012-2013 Co-organizer of JHU Biostatistics Computing Club, with Prasad Patil ([speaker schedule link](#))

Last updated: July 18, 2020