Seth R. Flaxman

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Current Position

Department of Mathematics, Imperial College London **2017-**
Lecturer (equivalent to assistant professor in the USA) in Machine Learning and Big Data Analytics in the Statistics section of the Department of Mathematics and Data Science Institute.

Co-organizer of AI@Imperial Network and the Machine Learning Initiative (www.imperial.ac.uk/machine-learning).

Academic Positions and Education

Department of Statistics, University of Oxford **2015-2017**
Postdoc in machine learning and computational statistics with Yee Whye Teh.
Junior research fellow in computer science at Jesus College (2016-2017).

Carnegie Mellon University, Pittsburgh, PA, USA **2011-2015**
PhD in machine learning and public policy, Machine Learning Department, School of Computer Science and H. J. Heinz III College.

Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland **2009-2010**
Graduate studies in computer science.

Harvard University, Cambridge, MA, USA **2004-2008**
BA *Magna Cum Laude*, computer science and mathematics.

Industry and Public Sector Experience

Vision Loss Expert Group, Cambridge, UK, 2015-17.
Statistical analysis for world-wide estimates of vision impairment, in partnership with World Health Organization.

Microsoft Research, New York City, Summer 2013
Summer internship in computational social science group. Mentor: Sharad Goel.

World Health Organization, Geneva, Switzerland, 2010-2011
Full-time researcher in Information, Evidence and Research cluster, Mortality and Burden of Disease unit. Statistical modeling and methodological development for public health statistics.

Organisation for International Co-operation and Development, Paris, France, Fall 2009
Consulting work for creation of interactive gender index.

Refereed Publications

Flaxman, SR, Bourne RRA, Resnikoff S, Ackland P, et al. “Global causes of blindness and distance vision impairment 1990–2020: a systematic review and meta-analysis.” *The Lancet Global Health* 6, no. 12 (2017).

Bourne, Rupert RA, Flaxman SR, Braithwaite T, Cicinelli MV et al. "Magnitude, temporal trends, and projections of the global prevalence of blindness and distance and near vision impairment: a systematic review and meta-analysis." *The Lancet Global Health* 5, no. 9 (2017).

S Bhatt, E Cameron, SR Flaxman, DJ Weiss, DL Smith, PW Gething, “Improved prediction accuracy

for disease risk mapping using Gaussian Process stacked generalization." *Royal Society Interface* (2017). https://arxiv.org/abs/1612.03278

Charles Loeffler and Seth Flaxman, "Is Gun Violence Contagious?" *Journal of Quantitative Criminology* (2017). https://arxiv.org/abs/1611.06713

H. Law, D. Sutherland, D. Sejdinovic, S. Flaxman, "Bayesian Approaches to Distribution Regression," AISTATS 2018.

G. Abbati, A. Tosi, M. Osborne, S. Flaxman, "AdaGeo: Adaptive Geometric Learning for Optimization and Sampling," AISTATS 2018.

Seth Flaxman, Yee Whye Teh, and Dino Sedjdinovic. "Poisson intensity estimation with reproducing kernels." *AISTATS*, Fort Lauderdale, 2017, **selected for oral presentation**. Journal version: *Electronic Journal of Statistics,* Vol. 11 (2017) 5081-5104. https://arxiv.org/abs/1610.08623

Bryce Goodman and Seth Flaxman, "European Union regulations on algorithmic decision-making and a 'right to explanation.' " *AI Magazine,* 38, no. 3 (2017): 50-57.

Q. Zhang, S. Filippi, S. Flaxman, and D. Sejdinovic, "Feature-to-Feature Regression for a Two-Step Conditional Independence Test." *Conference on Uncertainty in Artificial Intelligence* (UAI) 2017.

Seth Flaxman, Dino Sejdinovic, John P. Cunningham, and Sarah Filippi, "Bayesian Learning of Kernel Embeddings." *Conference on Uncertainty in Artificial Intelligence* (UAI) 2016, **selected for plenary presentation.**

W. Herlands, A. Wilson, H. Nickisch, S. Flaxman, D. Neill, W. van Panhuis, E. Xing, "Scalable Gaussian Processes for Characterizing Multidimensional Change Surfaces," *AISTATS* 2016.

Seth Flaxman, Sharad Goel, and Justin M. Rao, "Filter Bubbles, Echo Chambers, and Online News Consumption." *Public Opinion Quarterly*, March 2016. http://sethrf.com/files/bubbles.pdf

Seth Flaxman, Daniel Neill, and Alex Smola. "Gaussian Processes for Independence Tests with non-iid Data in Causal Inference," *ACM Transactions on Intelligent Systems and Technology (TIST),* 7(2):22, 2016.

Seth Flaxman**,** Andrew Wilson, Daniel Neill, Hannes Nickisch, and Alex Smola. "Fast Kronecker Inference in Gaussian Processes with non-Gaussian Likelihoods." *International Conference on Machine Learning 2015*.

Seth Flaxman**,** Yu-Xiang Wang, and Alex Smola. "Who supported Obama in 2012? Ecological inference through distribution regression." *KDD 2015*. **Best student paper award.**

M. Mascarenhas, S. Flaxman (co-first authors), T. Boerma, S. Vanderpoel, G. Stevens. "National, regional and global trends in infertility prevalence since 1990: a systematic analysis of 277 health surveys," *PLoS Medicine*, 9(12), 2012.

G. Stevens, S. Flaxman, E. Brunskill, M. Mascarenhas, C. Mathers, M. Finucane. "Global and regional hearing impairment prevalence: an analysis of 42 studies in 29 countries." *The European Journal of Public Health*, 2011.

S. Flaxman, J. Huang, J. Stephenson, and X. Comtesse. "CityRank: a dynamic tool for exploring and generating city indicators." *Information Design Journal*. 17:3, January 2010.

K. Corcoran, S. Flaxman, M. Neyer, P. Scherpelz, C. Weidert, and R. Libeskind-Hadas.

"Approximation Algorithms for Traffic Grooming in WDM Rings," *IEEE International Conference on Communications* 2009.

Contributing Author to Large-Scale Global Burden of Disease Collaboration

R. A. Bourne, et al. "Number of People Blind or Visually Impaired by Glaucoma Worldwide and in World Regions 1990 – 2010: A Meta-Analysis." PLoS ONE 11(10): e0162229. doi:10.1371/journal.pone.0162229

G. A. Stevens, et al. "Trends and mortality effects of vitamin A deficiency in children in 138 low-income and middle-income countries between 1991 and 2013: a pooled analysis of population-based surveys." The Lancet Global Health, 3 (9), e528-e536, September 2015.

J. B. Jonas, et al. "Visual Impairment and Blindness Due to Macular Diseases Globally: A Systematic Review and Meta-Analysis." *American Journal of Ophthalmology* Volume 158, Issue 4, Pages 808–815, October 2014.

Vision Loss Expert Group of the Global Burden of Disease Study, "Global Issues" section consisting of 7 separate articles, *British Journal of Ophthalmology*, May 2014, 98(5).

N. J. Kassebaum, et al. "A systematic analysis of global anemia burden from 1990 to 2010." *Blood*. January 2014, 123 (5) 615-624.

R. Bourne, et al. "Causes of vision loss worldwide, 1990—2010: a systematic analysis." *The Lancet Global Health*, 11 November 2013.

G.A. Stevens, et al. "Global Prevalence of Vision Impairment and Blindness: Magnitude and Temporal Trends, 1990-2010." *Ophthalmology* (2013).

G.A. Stevens, et al. "Global, regional, and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995–2011: a systematic analysis of population-representative data," *The Lancet Global Health* (2013), 1(1): 16-25

I. Olofin, et al. "Associations of Suboptimal Growth with All-Cause and Cause-Specific Mortality in Children under Five Years: A Pooled Analysis of Ten Prospective Studies." *PLoS ONE*. (2013). 8(5): e64636.

US Burden of Disease Collaborators, "The State of US Health, 1990-2010: Burden of Diseases, Injuries, and Risk Factors," *JAMA*. (2013) 310(6):591-608.

C. McDonald, et al. "The effect of multiple anthropometric deficits on child mortality: meta-analysis of individual data in ten prospective studies from developing countries," *American Journal of Clinical Nutrition*, 2013.

Vos, Theo, et al. "Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010," *The Lancet* 380.9859 (2013).

Murray, Christopher JL, et al. "Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010," *The Lancet* 380.9859 (2013).

Lim, Stephen S., et al. "A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010," *The Lancet* 380.9859 (2013).

G. Stevens, et al. “Trends in mild, moderate, and severe stunting and underweight, and progress towards MDG 1 in 141 developing countries: a systematic analysis of population representative data,” *The Lancet*, 2012.

In Preparation
A. Hu and S. Flaxman, “Multimodal Sentiment Analysis To Explore the Structure of Emotions.”

J-F Ton, S. Flaxman, D. Sejdinovic, S. Bhatt, “Spatial Mapping with Gaussian Processes and Nonstationary Fourier Features,” under review at *Spatial Statistics*.

Grants and Awards

Parliamentary Academic Fellowship funded by Economic and Social Research Council Impact Acceleration Account at Imperial College London (£19,821).

“Kernel Glitches” team leader with Charles Loeffler (University of Pennsylvania): winner in 9 out of 20 categories (total award: $135,000) in US National Institute of Justice Real-Time Crime Forecasting Challenge.

Engineering and Physical Sciences Research Council (UK) Network on Computational Statistics and Machine Learning Award for Postdoctoral Research Assistant Collaboration (£2,000) for “Probabilistic geometric tensor metrics for optimization and sampling,” with Alessandra Tosi.

Best student paper award ($3,000) for “Who supported Obama in 2012? Ecological inference through distribution regression,” KDD 2015.

Suresh Konda Award Winner ($1,500) for Heinz College first paper, “Correlates of Homicide: New Space/Time Interaction Tests for Spatiotemporal Point Processes,” 2013.

United States National Defense Science and Engineering Graduate Fellowship (declined, 2010).

EPFL departmental fellowship for doctoral studies in computer science, 2009-2010.

Teaching

Imperial College London
Instructor for M5MS11 Statistics for Extreme Events, module for MSc in Statistics, Winter 2018. Tutorials (advising) for 7 undergraduates in mathematics and 2 MSc students in statistics.

University of Oxford
Instructor for Statistical Machine Learning (master’s level), Department of Statistics, Winter 2017. Academic advising (eight students) for grad students in computer science, Jesus College, 2016-17. Thesis supervision (five students) for the MSc in Applied Statistics, 2016 and 2017.

Carnegie Mellon University
Head TA for Introduction to Machine Learning (master’s level), School of Computer Science, Spring 2014. TA for Decision Analysis and Multi-Criteria Decision Making (master’s level), Heinz College, Fall 2013. TA for Programming R for Analytics (master’s level), Heinz College, Fall 2013.

Presentations

Invited Talks
“Fine-grained spatiotemporal forecasting of crime,” Fairness Transparency Privacy seminar, Alan Turing Institute, Dec. 2017.

“Kernel methods for spatiotemporal learning with public policy applications,” Geospatial Seminar series, University College London, Dec. 2017.

“Kernel methods for spatiotemporal learning with public policy applications,” Statistics Seminar series, Department of Mathematical Sciences, University of Bath, Nov. 2017.

“Filter Bubbles, Echo Chambers, and Online News Consumption,” World Economic Forum’s Global Future Council on Economic Growth and Social Inclusion, London, July 2017.

“Kernel methods for spatiotemporal learning with public policy applications,” Department of Statistics, University of California, Berkeley, Jan. 2017.

“On #agony and #ecstasy: Potential and pitfalls of linguistic sentiment analysis,” Institute for Language, Cognition and Computation Seminar, University of Edinburgh, Nov. 2016.

“Scalable Gaussian Processes with Kronecker methods and random Fourier features,” School of Computer Science & Statistics, Trinity College Dublin, Oct. 2016.

“Machine Learning in Space and Time.” Computational Neuroscience Seminar, Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland, Sept. 2015.

“Gaussian processes and kernel embeddings for small area forecasting, causal inference, and ecological inference in space and time.” Department of Statistics, University of Oxford, March 2015.

“On #agony and #ecstasy: Potential and pitfalls of linguistic sentiment analysis.” Microsoft Research lunchtime seminar, NYC, Oct. 2014.

Conferences
"Ecological inference with distribution regression: kernel methods to model voting patterns in US presidential elections with individual-level demographic data", Royal Statistical Society 2017, Glasgow.

“Poisson intensity estimation with reproducing kernels”, AISTATS 2017, Fort Lauderdale, USA.

“Bayesian Learning of Kernel Embeddings.” Conference on Uncertainty in Artificial Intelligence (UAI) 2016 plenary presentation, July 2016, Jersey City, NJ, USA.

Joint Statistical Meetings. “Large-scale Gaussian Processes for Spatiotemporal Modeling of Notifiable Disease Reports” as part of the “Small Area Estimation: New Methods and Applications to Epidemiology” panel (co-organizer). Aug. 2015, Seattle.

International Conference on Machine Learning. “Fast Kronecker Inference in Gaussian Processes with non-Gaussian Likelihoods.” July 2015, Lille, France.

Joint Statistical Meetings, “Kernel Space-Time Interaction Tests for Identifying Leading Indicators of Crime.” Predictive Policing panel. Aug. 2014, Boston.

Spatial Statistics 2013. “New tests for space-time interaction in spatio-temporal point processes.” June 2013, Columbus, Ohio.

Workshops
“Poisson intensity estimation with reproducing kernels,” 3rd UCL Workshop on the Theory of Big Data, June 2017, London.

“Filter Bubbles, Echo Chambers, and Online News Consumption,” Royal Society workshop on Filter

bubbles and the effects of increased online personalization, Royal Society, London, July 2017.

'European Union regulations on algorithmic decision-making and a "right to explanation" ' Workshop on Human Interpretability, International Conference on Machine Learning, June 2016, NYC.

CAOSS 2012: Workshop on Computational and Online Social Science. Oral presentation. "A caution against convenient data: assessing bias in psychological studies of online data." Oct. 2012, Columbia University, NYC.

OECD-UNESCO International Workshop on "Gender Equality and Progress in Societies," presented work on my.genderindex.org tool. March 2010, Paris.

Campus Talks
"Kernel methods for spatiotemporal learning with public policy applications," Statistics Seminar, Department of Mathematics, Nov. 2017, Imperial College London.

"Ecological inference with distribution regression: fast kernel methods to infer voting behavior in the 2012 and 2016 US elections with individual level demographic data," Second Oxford-Man Institute Machine Learning Workshop, Feb. 2017, Oxford.

"Filter bubbles, echo chambers, and online news consumption: evidence from a large-scale study of user browsing behavior." Oxford Internet Institute seminar, Feb. 2016, Oxford.

"Who supported Obama in 2012? Distribution regression with kernel methods and Gaussian processes." Computational statistics and machine learning seminar, Nov. 2015, Oxford.

"A caution against convenient data: assessing bias in psychology studies based on online data." Machine Learning and the Social Sciences seminar series. Feb. 2013, Carnegie Mellon University.

Meetings
Nutrition Impact Model Study (NIMS) meeting on the online dissemination of country estimates of child nutritional status using data visualization tools. June 2011, World Health Organization Headquarters, Geneva.

Child Health Epidemiology Reference Group (CHERG) meeting: presented on development of child nutrition and growth database. March 2011, London.

Service

Conferences and Workshops
Organizer of Explainability in Machine Learning Challenge (with FICO, Google, Oxford, Berkeley, and MIT), http://www.explainable.ml

Workflow co-chair for International Conference on Machine Learning (ICML) 2017.

Co-organizer of "Small Area Estimation: New Methods and Applications to Epidemiology" topic-contributed panel at Joint Statistical Meetings, Seattle, August 2015.

Program committee member, Learning and privacy with incomplete data and weak supervision workshop at Neural Information Processing Systems (NIPS), Montreal, December 2015.

Committee member, Workshop on Causality: Large-scale Experiment Design and Inference of Causal Mechanisms, NIPS 2013.

Peer Review
IOVS (2017), *Journalism (2017),* IJCAI (2016), AISTATS (2016-18), *Royal Society Open Science* (2015), NIPS (2015-17), ICML (2015-17), *PLOS One* (2015), *Journal of Communication* (2014), *AI Magazine* (2014), *Statistics and Public Policy* (2014), Neural Connectomics Workshop at ECML (2014), *International Journal of Forecasting* (2013).

Outreach
Main academic contributor for Oxford Sparks animation targeted at high school students, "What is machine learning?" https://www.youtube.com/watch?v=f_uwKZIAeM0

Campus Seminars
Co-organizer of computational statistics and machine learning seminar series, Department of Statistics, Oxford, 2016-17.

Co-organizer of Bayesian machine learning reading group, Department of Statistics, Oxford, 2015-16.

Student Organizer, CMU Machine Learning and Social Sciences Seminar Series, 2012-2014.

Additional Academic Affiliations

Visiting Scholar, Department of Statistics, Columbia University, 2014-2015.

Research Assistant, Media and Design Lab, Ecole Polytechnique Fédérale de Lausanne, 2008-2009.

Student Visitor, Computer Science department, Hebrew University of Jerusalem, Summer 2007.

Skills

In-depth knowledge of Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS), National Health and Nutrition Examination Survey (NHANES), American Community Survey (ACS), UK Census Microdata, and Health Survey for England (HSE).

Programming languages: R, matlab, python, C/C++, Stan, Stata, Fortran, Perl, Julia, Java, ML.

Languages: advanced in Yiddish and French, intermediate in Hebrew.