

# Ray Bai

416 Blockley Hall  
423 Guardian Drive  
Philadelphia, PA 19104

Cell: (617) 953-3266  
Email: [Ray.Bai@pennmedicine.upenn.edu](mailto:Ray.Bai@pennmedicine.upenn.edu)  
Homepage: <http://www.raybai.net>

## Research Interests

Bayesian methodology and theory, scalable algorithms for high-dimensional data, functional and longitudinal data analysis, nonparametric/semiparametric models, statistical applications for electronic health records (EHR), observational health, and environmental data

## Professional Experience

- 2018- Postdoctoral Researcher, Perelman School of Medicine, University of Pennsylvania  
Supervisors: Yong Chen and Mary Boland
- 2014-2018 Graduate School Fellow, Department of Statistics, University of Florida
- 2012-2014 Systems Engineer, General Dynamics Mission Systems
- 2010-2012 Teaching Assistant, Department of Mathematics & Statistics, UMass Amherst
- 2007-2010 Business Analyst, State Street Bank & Trust

## Education

- 2014-2018 PhD in Statistics, University of Florida  
Dissertation: Bayesian High-Dimensional Models With Scale-Mixture Shrinkage Priors  
Advisor: Malay Ghosh
- 2014-2016 Master of Statistics, University of Florida  
Advisor: Nikolay Bliznyuk
- 2010-2012 MS in Applied Mathematics, University of Massachusetts Amherst
- 2003-2007 BA in Economics and Government, Cornell University

## Honors and Awards

- Student Paper Competition Award, Section on Bayesian Statistical Science, Joint Statistical Meetings, January 2018
- Anderson Scholars Faculty Honoree, University of Florida, November 2016
- Graduate School Fellowship, University of Florida, August 2014-August 2018
- Residential First-Year Experience Student Choice Award, University of Massachusetts, March 2011

## Professional Society Memberships

American Statistical Association, International Society for Bayesian Analysis, International Biometric Society

## Publications

\* = co-first author

† = alphabetical order

### Submissions and Working Papers

1. **Bai, R.**, Boland, M. R., and Chen, Y. (2020+). Fast algorithms and theory for high-dimensional Bayesian varying coefficient models. *Journal of the American Statistical Association*, invited revision. arXiv:1907.06477.
2. Deshpande, S. K., **Bai, R.**, Balocchi, C., and Starling, J. E. (2020+). VC-BART: Bayesian trees for varying coefficients. *Submitted*. arXiv:2003.06416.
3. **Bai, R.**, Lin, L., Boland, M. R., and Chen, Y. (2020+). A robust Bayesian Copas selection model for detecting and correcting publication bias. *Working paper*.

### Refereed Papers

4. **Bai, R.\***, Moran, G. E.\*, Antonelli, J. L.\*, Chen, Y., and Boland, M. R. (2020). Spike-and-slab group lassos for grouped regression and sparse generalized additive models. *Journal of the American Statistical Association*, conditionally accepted.
5. **Bai, R.** and Ghosh, M. (2019). On the beta prime prior for scale parameters in high-dimensional Bayesian regression models. *Statistica Sinica*, in press.
6. **Bai, R.** and Ghosh, M. (2019). Large-scale multiple hypothesis testing with the normal-beta prime prior. *Statistics*, **53**: 1210-1233.
7. **Bai, R.** and Ghosh, M. (2018). High-dimensional multivariate posterior consistency under global-local shrinkage priors. *Journal of Multivariate Analysis*, **167**: 157-170.
8. Duerr, I., Merrill, H. R., Wang, C., **Bai, R.**, Boyer, M. J., Dukes, M. D., and Bliznyuk, N. (2018). Forecasting urban water demand with statistical and machine learning methods using large space-time data. *Environmental Modelling and Software*, **102**: 29-38.

### Works in Progress

**Bai, R.** and Jeong, S. (2020+). Convergence rates and adaptive procedures for nonparametric regression in the overdispersed exponential family.

**Bai, R.**, Ročková, V., and George, E. I. (2020+). Spike-and-slab meets lasso: A review of the spike-and-slab lasso.

† **Bai, R.** and Qin, Q. (2020+). Analysis of MCMC algorithms for Gaussian process regression with automatic relevance determination kernels.

**Bai, R.** (2020+). Bayesian sparse additive models with the overdispersed exponential family.

## Teaching Experience

### *University of Pennsylvania*

Guest lecturer for GCB533: Statistics for Genomics and Biomedical Informatics, December 2019

### *University of Florida*

Instructor for STA 3024: Introduction to Statistics II, Spring 2016

Lab Instructor for STA 2023: Introduction to Statistics I, Fall 2015

### *University of Massachusetts Amherst*

Teaching Assistant for STAT 240: Introduction to Statistics, Spring 2012

Teaching Assistant for MATH 121: Linear Methods and Probability for Business, Fall 2010, Spring 2011, Fall 2011

## Presentations

### *Invited Talks*

1. Seminar, School of Mathematical and Statistical Sciences, Arizona State University, January 2020
2. Seminar, Department of Statistics, Florida State University, January 2020
3. Seminar, Department of Mathematics & Statistics, San Diego State University, January 2020
4. Seminar, Department of Statistics, University of California, Santa Cruz, January 2020
5. Seminar, Department of Statistics, University of South Carolina, January 2020
6. Statistics Student Seminar, University of Florida, April 2019
7. Invited talk, Department of Biostatistics, Epidemiology, and Informatics, University of Pennsylvania, March 2018

### *Contributed Talks*

1. Joint Statistical Meetings, Denver, CO, July 2019
2. Joint Statistical Meetings, Vancouver, BC, Canada, July 2018
3. Statistics Student Seminar, University of Florida, March 2018
4. Statistics Student Seminar, University of Florida, October 2017

### *Contributed Conference Posters*

1. Bayes Comp 2020, Gainesville, FL, January 2020
2. DBEI and CCEB Research Day, University of Pennsylvania, March 2019
3. O-Bayes 2017 Meeting, Austin, TX, December 2017

## Academic Service

Reviewer for *Annals of the Brazilian Academy of Sciences* (1), *Computational Statistics & Data Analysis* (1), *Journal of Statistical Planning and Inference* (1), *Scandinavian Journal of Statistics* (1)

Judge for 2020 SBSS Student Paper Competition

## Departmental Service

Organizer of Student Seminar Series, Department of Statistics, University of Florida, Fall 2016-Spring 2017

Review session leader for Basic Qualifying Exam in Numerical Analysis, University of Massachusetts Amherst, January 2012

## Computer Skills

R, C/C++, Python, MATLAB, Octave, Julia, JAGS, WinBUGS, Windows, Linux

Last updated: March 28, 2020