

MATTHEW JAMES JOHNSON

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CURRENT POSITION **Harvard School of Engineering and Applied Sciences** 2014 – present
Harvard Medical School

Postdoctoral fellow working with Prof. Ryan Adams and the Harvard Intelligent Probabilistic Systems (HIPS) group as well as Prof. Sandeep Robert Datta's neurobiology lab.

EDUCATION **Massachusetts Institute of Technology** 2010 – 2014
Ph.D. in Electrical Engineering and Computer Science Cambridge, MA

Thesis: Bayesian Time Series Models and Scalable Inference

Advisor: Alan S. Willsky

Committee: Ryan P. Adams (Harvard), David Blei (Princeton), Tommi Jaakkola (MIT)

Studied machine learning, Bayesian models and inference, optimization, signal processing, information theory, control, probability, and statistics. Coursework in analytical classical mechanics, general relativity, quantum complexity theory, and symbolic programming.

GPA: 5.0 / 5.0

Massachusetts Institute of Technology 2008 – 2010
S.M. in Electrical Engineering and Computer Science Cambridge, MA

Thesis: Bayesian Nonparametric Learning with semi-Markovian Dynamics

GPA: 5.0 / 5.0

University of California at Berkeley 2004 – 2008
B.S. (Honors) in Electrical Engineering and Computer Sciences Berkeley, CA

Graduated with Highest Honors (summa cum laude)

GPA: 3.97 / 4.0

PREPRINTS **Matthew J. Johnson**, David Duvenaud, Alexander B. Wiltschko, Sandeep R. Datta, Ryan P. Adams. *Structured VAEs: Composing Probabilistic Graphical Models and Variational Autoencoders*. arxiv.org/abs/1603.06277 [†]

Matthew J. Johnson*, Elaine Angelino*, Ryan P. Adams. *Patterns of Scalable Bayesian Inference*. arxiv.org/abs/1602.05221 (* authors contributed equally)

Ardavan Saeedi, Matthew Hoffman, **Matthew J. Johnson**, Ryan P. Adams. *The Segmented iHMM: A Simple, Efficient Hierarchical Infinite HMM*. arxiv.org/abs/1602.06349

SELECTED PUBLICATIONS Scott W. Linderman, **Matthew J. Johnson**, Matthew W. Wilson, Zhe Chen. *A Bayesian nonparametric approach for uncovering rat hippocampal population codes during spatial navigation*. Journal of Neuroscience Methods, 2016.

Matthew J. Johnson*, Scott W. Linderman*, Ryan P. Adams. *Dependent Multinomial Models Made Easy: Stick Breaking with the Pólya-gamma Augmentation*. Neural Information Processing Systems (NIPS), 2015. (* authors contributed equally)

Alexander B. Wiltschko, **Matthew J. Johnson**, Giuliano Iurilli, Ralph E. Peterson, Jesse M. Katon, Stan L. Pashkovski, Victoria E. Abaira, Ryan P. Adams, Sandeep Robert Datta. *Mapping Sub-Second Structure in Mouse Behavior*. Neuron, 2015.[†]

Matthew J. Johnson, Alan S. Willsky. *Stochastic Variational Inference for Bayesian Time Series Models*. International Conference on Machine Learning (ICML), June 2014.

Matthew J. Johnson. *Bayesian Time Series Models and Scalable Inference*. PhD Thesis, May 2014.

Matthew J. Johnson, James Saunderson, and Alan S. Willsky. *Analyzing Hogwild Parallel Gaussian Gibbs Sampling*. Neural Information Processing Systems (NIPS), December 2013.

Matthew J. Johnson and Alan S. Willsky. *Bayesian Nonparametric Hidden semi-Markov Models*. Journal of Machine Learning Research (JMLR), 14:673-701, February 2013.

INDUSTRY **Behavioral phenotyping at Biogen** 2015 – Present
Project cofounder and modeling lead Cambridge, MA
Developing and deploying high-throughput behavioral phenotyping pipeline to accelerate drug development and testing in mice. Applying our methods[†] at scale to depth video of freely-behaving mice, we uncover a grammar and vocabulary of mouse body language, and chart the effects of pharmaceuticals with unprecedented sensitivity.

Firefly BioWorks 2012 – 2013
Consultant Cambridge, MA
Prototyped interactive visualizations for exploring biomedical research literature using probabilistic topic models and D3.js.

Massive Health (acquired by Jawbone) Summer 2012
Consultant Telecommuted to San Francisco, CA
Built a prototype to estimate heart rate from video in real-time using wavelet techniques.

D.E. Shaw & Co. Summer 2008
Quantitative Analyst Intern New York City
Applied statistical modeling in high-frequency quantitative finance.

TEACHING Selected anonymous teaching evaluations at www.mit.edu/~mattjj/evaluations.shtml.

Algorithms for Inference Fall 2009
With Profs. Gregory Wornell and William Freeman — web.mit.edu/6.438 MIT
Graduate course in statistical inference with probabilistic graphical models.

Probability and Random Processes (head TA) Fall 2007
With Prof. Martin Wainwright — inst.eecs.berkeley.edu/~ee126/fa07 UC Berkeley
Introductory topics in probability. First undergraduate TA for the course.

Machine Structures Spring 2007 and Spring 2008
With Dr. Daniel D. Garcia — inst.eecs.berkeley.edu/~cs61c/sp08 UC Berkeley
Introductory topics in computer architecture, operating systems, and low-level programming. Received highest ever TA ratings for the course.

AWARDS /
HONORS National Science Foundation Graduate Research Fellowship 2008
Mathworks Graduate Fellowship, MIT 2008
EECS Departmental Citation, UC Berkeley 2008
University Medal Finalist, UC Berkeley 2008
Outstanding GSI Award 2007-2008, UC Berkeley
EECS Honors Degree Program, UC Berkeley 2007
Vodafone-US Foundation Undergraduate Fellowship 2007
Edward Frank Kraft Scholarship Award, UC Berkeley 2004
Eta Kappa Nu National (HKN) and Tau Beta Pi (TBP) Honor Societies

PROFESSIONAL
SERVICE Reviewer for Neural Information Processing Systems (NIPS) 2015
Reviewer for Neural Information Processing Systems (NIPS) 2014
Reviewer for the International Conference on Machine Learning (ICML) 2013
Reviewer for Neural Information Processing Systems (NIPS) 2013
Reviewer for Artificial Intelligence and Statistics (AISTATS) 2013
Reviewer for IEEE Transactions of Pattern Analysis and Machine Learning (TPAMI) 2012
Reviewer for Artificial Intelligence and Statistics (AISTATS) 2011
Reviewer for International Joint Conference on Artificial Intelligence (IJCAI) 2011
LIDS Student Committee 2011 – 2012
MIT Machine Learning Tea Organizer 2009 – 2011
LIDS Seminar Liaison 2009 – 2010