

# ericjonas

inverse problems and machine learning for science

## about

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## programming

Python (numpy)  
C++11 (Boost)  
VHDL  
Matlab, Java,  
Javascript

## interests

### Computational acquisition and understanding of neural and biomedical signals.

Inverse problems and compressive sensing. Sparse and low-rank signal recovery for microscopy, chemical sensing, and graph analysis. Nonparametric Bayesian modeling, inference in structured models, Markov-chain Monte Carlo techniques, architectures for probabilistic inference, high-throughput data acquisition for neuroscience, incorporation of prior information in underconstrained problems, nonlinear signal processing, point processes and sequence data.

## education

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|------|---|--------------------|
| 2013 | <b>Ph.D.</b> in Brain And Cognitive Sciences<br><i>Stochastic Architectures for Probabilistic Computation</i><br>Advisors: Matthew Wilson and Josh Tenenbaum          | MIT, Cambridge, MA |
| 2009 | <b>M.Eng.</b> Electrical Engineering And Computer Science<br><i>Real-time analog acquisition of electrophysiological signals with Soma</i><br>Advisor: Matthew Wilson | MIT, Cambridge, MA |
| 2005 | <b>B.Sc.</b> Electrical Engineering and Computer Science<br>Focus on low-level systems architecture and digital signal processing                                     | MIT, Cambridge, MA |
| 2003 | <b>B.Sc.</b> Brain and Cognitive Sciences<br>Systems level neuroscience, learning and memory  | MIT, Cambridge, MA |

## experience

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|----------------------|---|----------------------------|
| Aug 2014 - Present   | <b>UC Berkeley EECS</b> Berkeley, CA<br><i>Research in applications of scalable compressive sensing, inverse problems, and biomedical signal acquisition. Neural data analysis. Working with other researchers in optics, biomedical engineering, and clinical medicine.</i>  | Postdoc with Ben Recht     |
| Dec 2012- April 2014 | <b>Salesforce.com</b> San Francisco, CA<br><i>Lead the scientific and engineering team from Prior Knowledge following the acquisition by Salesforce.com, working with customers, product managers, and engineers to develop a predictive platform.</i>  | Chief Predictive Scientist |
| Aug 2011- Dec 2012   | <b>Prior Knowledge, Inc.</b> San Francisco, CA<br><i>Oversaw the development, launch, deployment and scaling of Veritable, the world's first predictive database. Managed a team of six engineers, raised funding, worked with early customers. Designed and implemented core back-end inference engine, TARDIS, and lead team that scaled it to billions of data points.</i> | Founder and CEO            |
| Sept 2003- Dec 2009  | <b>Wilson Lab, PILM, BCS, MIT</b> Cambridge, MA<br><i>Ph.D. Candidate with successful completion of qualifying examinations. Mixed-signal hardware/software design, experiment design, data analysis for high-throughput neuroscience using tetrode arrays in awake, behaving animals.</i>  | Graduate student           |

## publications

### papers and preprints

“Flare prediction using photospheric and coronal image data”

Eric Jonas, Monica G Bobra, Vaishaal Shankar, J Todd Hoeksema, Benjamin Recht  
arXiv preprint arXiv:1708.01323 (Aug. 2017). <https://arxiv.org/abs/1708.01323>

“Could a Neuroscientist understand a Microprocessor? ”

Eric Jonas, Konrad Kording  
PLOS Computational Biology (Jan. 2017). 10.1371/journal.pcbi.1005268

“Discovering Neural Types and Circuits via Connectomics ”

Eric Jonas, Konrad Kording  
eLife (Apr. 2015). 10.7554/eLife.04250

“3D imaging in volumetric scattering media using phase-space measurements”

Hsiou-Yuan Liu, Eric Jonas, Lei Tian, Jingshan Zhong, Benjamin Recht, Laura Waller  
Optics Express 23.11 (May 2015). 10.1364/OE.23.014461

“Building fast Bayesian computing machines out of intentionally stochastic parts”

Eric Jonas, Vikash Mansinghka, Josh Tenenbaum  
arXiv (2014). <http://arxiv.org/abs/1402.4914>

### peer-reviewed conferences/proceedings

“Occupy the Cloud: Distributed Computing for the 99%”

Eric Jonas, Qifan Pu, Shivaram Venkataraman, Ion Stoica, Benjamin Recht  
*Proceedings of the Eighth ACM Symposium on Cloud Computing*, 2017, Santa Clara, CA, USA

“Kernel Latent Space Models for understanding neural connectomes”

Eric Jonas, Srinivasa Turaga  
COSYNE 2016, 2016

“Scaling Nonparametric Bayesian Inference via Subsample-Annealing”

Fritz Obermeyer, Jonathan Glidden, Eric Jonas  
*AISTATS 2014*, 2013

“Cross-categorization : A method for discovering multiple overlapping clusterings”

Vikash Mansinghka, Eric Jonas, Cap Petschulat, Beau Cronin, Pat Shafto, Josh Tenenbaum  
*NIPS Workshop of Nonparametric Bayesian Statistics*, 2009

“Exact and Approximate Sampling by Systematic Stochastic Search”

Vikash Mansinghka, Dan Roy, Eric Jonas, Josh Tenenbaum  
*Proceedings of the 12th International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2009

### patents

Combinational Stochastic Logic

V. K. Mansinghka, E. M. Jonas  
US Application No. 12/397,754; Pub. No. US 2009/0228238 A1, March 4, 2009

Stereoscopic Wide Field of View Imaging System

E.F. Prechtel, R.J. Sedwick, E.M. Jonas  
US 7982777, July 19, 2011

Configurable Circuitry for Solving Stochastic Problems

E. M. Jonas, V. K. Mansinghka  
US Application No. 13/032,054; Pub. No. US 2011/0208676 A1, Feb 22, 2011

### research reports

# Stochastic Digital Circuits for Probabilistic Inference

Vikash Mansinghka, Eric Jonas, Josh Tenenbaum

*Technical Report 2008-069, 2008*

## Press

2017.01.21	<b>Tests suggest the methods of neuroscience are left wanting</b>	The Economist
2016.08.23	<b>What Donkey Kong can tell us about how to study the brain</b>	Science News
2016.06.02	<b>Can Neuroscience Understand Donkey Kong, Let Alone a Brain?</b>	The Atlantic
2012.11.23	<b>Salesforce to predict the future with Prior Knowledge</b>	Venture Beat
2012.07.02	<b>Prior Knowledge wants to be your data Oracle</b>	GigaOM
2012.09.11	<b>Prior Knowledge builds a predictive database for developers</b>	TechCrunch
2013.08.11	<b>Prior Knowledge becomes Salesforce skunk works project</b>	TechCrunch

## Awards

Sept 2015	<b>DARPA Rising recipient</b>	Nominated by Matthew Hepburn of the Biological Technology Office
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## Invited Talks

September 2015	<b>Smarter Measurement via Computation</b>	DARPA Rising Session, St. Louis, MO
Jan 2015	<b>Can a Neuroscientist Fix a Computer? Reverse-engineering man-made computation for big-data neuroscience</b>	Kavli Futures Symposium: Towards a Taxonomy of Cortical Computations
May 2014	<b>Discovering structure with Connectomics</b>	2014 Workshop on Algorithms for Modern Massive Data Sets

## Speaking (non-academic)

Nov 2013	<b>How will Predictive Analytics Change Sales</b>	Dreamforce 2013
July 2013	<b>Discovering Structure with Latent Variable Models</b>	PyData Boston 2013
Sept 2012	<b>Prior Knowledge and the Predictive Database</b>	TechCrunch Disrupt 2012
May 2012	<b>Peter Thiel's Startup School on Deep Thought</b>	CS183 at Stanford