

# Andrew Berger

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## Education

2012 - 2016 **BA Math; BA Physics**, *University of California, Berkeley*, Berkeley, CA.  
2008 - 2012 *James Logan High School*, Union City, CA

## Skills

Mathematics analysis (real, complex), algebra (linear, abstract, boolean), logic, computability theory ...  
Physics quantum mechanics, statistical mechanics, classical mechanics, electrodynamics ...  
Machine Monte Carlo techniques, deep learning, energy based models, Markov fields, Bayesian  
Learning statistics, parameter estimation methods, variational inference ...  
Technologies Scientific Python, Java, emacs, Unix, git, docker, L<sup>A</sup>T<sub>E</sub>X, Tensorflow, MongoDB, Redis, Kafka, Jenkins. ...

## Research Experience

9/16 - 10/17 **Research Scientist**, *Howard Hughes Medical Institute*, Ashburn, VA.  
Developed spike inference techniques for fluorescence microscopy using state of the art machine learning techniques. Work with Srinu Turaga.  
Summer 2016 **Janelia Undergraduate Scholar**, *Howard Hughes Medical Institute*, Ashburn, VA.  
Developed reconstruction methods for novel kilohertz compressive-sensing two-photon microscope. Project with Kaspar Podgorski and Srinu Turaga.  
2013 - 2016 **Research Assistant**, *Redwood Center for Theoretical Neuroscience*, Berkeley, CA.  
Developed novel Hamiltonian Monte Carlo sampling algorithm, submitted paper (under review, available on arXiv), gave talk at international SciCADE conference, released open-source Python implementation. Regularly attended journal clubs, seminars and talks. Twice awarded Berkeley Physics Undergraduate Research Scholarship for student research.  
Summer 2015 **Research Assistant**, *Center for the Neural Basis of Cognition*, Pittsburgh, PA.  
REU at Carnegie Mellon University. Worked with Professor Tai Sing Lee developing biologically plausible neural models for stereo vision. Developed *brio*, a neural network library which supports arbitrary network topologies and user-specified local learning rules. Conducted review of neural theory literature with emphasis on biological plausibility.

## Industry Experience

10/17 - 8/18 **Co-founder and lead everything**, *Stealth startup*, Boston, MA.  
Co-founded and led a machine learning startup. As the only full-time founder, I wore every hat and built all aspects of the company: models, software architecture, data infrastructure, devops, sysops. Took the company from a fragile proof-of-concept to production ready models, real-time data feeds and stable systems. As the solo architect, I was able to weave tight abstractions through the code base and set a precedent for high code quality. I placed a heavy emphasis on finding and carefully building the right abstractions - having very limited time, doing things right the first time was the only way I could effectively multiplex my efforts. Put on ice after failing to meet performance targets by an internally imposed deadline.

Summer 2014 **Data Science Intern**, *Dwellaware*, San Francisco, CA.

Second data scientist at early stage startup building a housing recommendation platform. Developed infrastructure and helped set product vision. Projects ranged from statistical modeling and analysis to GIS to data processing and management. Developed state-of-the-art imputation library for robust inference of missing data. Built a scripting system for orchestrating database updates. Designed and implemented prototype recommendation engine for properties. Implemented several robust and scalable algorithms for pre-processing geospatial data.

Summer 2013 **Bioinformatics Research Intern**, *Biomatica*, Berkeley, CA.

Researched supervised models for predicting chemical toxicity. Developed a chemical fingerprinting algorithm for embedding chemical data in a vector space, and a library for associated data management. Evaluated effectiveness of elastic lasso regression and linear dimensionality reduction.

## Invited conferences and workshops

2015 *International Conference on Scientific Computation and Differential Equations (SciCADE)*, Potsdam, Germany

2016 *SAMSI Theory of Neural Networks Workshop*, Rayleigh-Durham, NC

## Publications

2015 A Berger, M Mudigonda, MR Deweese, J Sohl-Dickstein. A Markov Jump process for more efficient Hamiltonian Monte Carlo. *Under Review, preprint at arXiv:1509.03808*

## Awards and Honors

Spring 2014 Berkeley Physics Undergraduate Research Scholarship, *Minimum Probability Flow and the critical Lenz-Ising model*

Fall 2015 Berkeley Physics Undergraduate Research Scholarship, *A Markov jump process for more efficient Hamiltonian Monte Carlo*