

# Paroma Varma

## Curriculum Vitae

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### Research Interests

Weak Supervision, Machine Learning, Programming Languages

### Education

- Doctor of Philosophy**, *Electrical Engineering*, Stanford University, Stanford, CA.  
2017 **Master of Science**, *Electrical Engineering*, Stanford University, Stanford, CA.  
2015 **Bachelor of Science**, *Electrical Engineering and Computer Science*, University of California at Berkeley, Berkeley, CA.

### Fellowships and Awards

National Science Foundation Graduate Research Fellowship  
Stanford Graduate Research Fellowship  
Arthur M. Hopkin Award for High Academic Achievement  
Outstanding Course Development and Teaching Award

### Research Projects

#### Coral: Enriching Statistical Models with Static Analysis

- A weak supervision framework to efficiently label and video training data given small set of user-defined heuristics
- Perform static analysis on user-defined functions to enrich generative model with dependency information about heuristics

#### Socratic Learning: Finding Latent Subsets in Training Data

- Automatically correct for latent subsets in training data that affect weak supervision source behavior
- Utilize the disagreement between generative and discriminative models to identify latent subsets

#### Babble Labble: Learning from Natural Language Explanations

- Use natural language explanations for why crowd workers provide the label they do as a higher form of supervision
- Parse explanations into executable functions to generate high-quality labels for training data

#### Previous Work: Computational Imaging

- Explored phase retrieval via partial coherence illumination and digital holography
- Adapted proximal algorithms for 3D blind deconvolution applied to microscopy

## Teaching and Mentoring Experience

### TA for EE16A, Designing Devices and Systems

- Helped develop course material and lab-based projects for pilot offering of the class
- Taught weekly sections and labs, designed homework and discussion problems

### TA for EE20N, Signals and Systems

- Taught weekly sections and labs

### EECS Peer Advisor

- Held weekly drop-in hours for academic and policy advising

## Industry Experience

### Tablet and Netbooks Group Intern, Intel Corporation

- Developed algorithm to adjust camera's colorspace to better represent true color values
- Created internal testing tool to analyze image colors from tablet cameras

### Business Intelligence Intern, GAP Inc.

- Used Selenium and Cucumber for automated testing of web-based reporting software (Microstrategy)
- Wrote scripts to solve issue regarding Microstrategy reports timing out

## Abstracts, Presentations, and Publications

- 2017 P. Varma, B. He, P. Bajaj, N. Khandwala, C. Ré. Inferring Generative Model Structure with Static Analysis. *NIPS 2017*
- 2017 B. Hancock, P. Varma, S. Wang, P. Liang, C. Ré. Babble Labble: Learning from Natural Language Explanations. *DEMO NIPS 2017*
- 2017 V. Chen, P. Varma, M. Fiterau, J. Priest, C. Ré. Automated Training Set Generation for Aortic Valve Classification. *ML4H-NIPS 2017*
- 2017 V. Chen, P. Varma, M. Fiterau, J. Priest, C. Ré. Generating Training Labels for Cardiac Phase-Contrast MRI Images. *MED-NIPS 2017*
- 2017 P. Varma, D. Iter, C. De Sa, C. Ré. Flipper: A Systematic Approach to Debugging Training Sets. *HILDA 2017*
- 2016 P. Varma, R. Yu, D. Iter, C. De Sa, C. Ré. Socratic Learning: Correcting Misspecified Generative Models using Discriminative Models. *arXiv, FILM-NIPS 2016*
- 2016 P. Varma, G. Wetzstein. Efficient 3D Deconvolution Microscopy with Proximal Algorithms. *Imaging and Applied Optics Congress*
- 2015 J. Zhong, L. Tian, P. Varma, L. Waller. Nonlinear Optimization Algorithm for Partially Coherent Phase Retrieval and Source Recovery. *IEEE Transactions on Computational Imaging*
- 2015 J. Zhong, P. Varma, L. Tian, L. Waller. Source Shape Estimation in Partially Coherent Phase Imaging with Defocused Intensity. *Imaging and Applied Optics Congress, Arlington, Virginia*

- 2015 Z. Phillips, G. Gunjala, P. Varma, J. Zhong, L. Waller. Design of a Domed LED Illuminator for High-Angle Computational Illumination. *Imaging and Applied Optics Congress*, Arlington, Virginia
- 2015 L. Waller, L. Tian, J. Zhong, P. Varma. Phase Microscopy and 3D Imaging with Partially Coherent Light. *OSA Technical Digest (online)*
- 2014 M. Haller, P. Varma, T. Noto, R.T. Knight, A.Y. Shestyuk, B. Voytek. Automated "Spectral Fingerprinting" of Electrophysiological Oscillations. *Society for Neuroscience*, Washington DC
- 2014 P. Varma, D. Shuldman, L. Waller. Improving Depth Resolution in Digital Holography through Blind Deconvolution. *National Science Foundation REU*, UC Berkeley
- 2014 M. Haller, P. Varma, L.M. Rosenberg, N.E. Crone, E.F. Chang, J. Parvizi, R.T. Knight, A.Y. Shestyuk. Temporally Sustained Activity in Lateral Prefrontal Cortex Supports Decision Making. *International Conference on Cognitive Neuroscience*, Brisbane, Australia
- 2014 M. Haller, L.M. Rosenberg, P. Varma, N.E. Crone, E.F. Chang, J. Parvizi, R.T. Knight, A.Y. Shestyuk. High Gamma Duration in Human Prefrontal Cortex Predicts Decision Time. *International Neuropsychological Society*, Jerusalem, Israel