

## Research Interests

### Machine Learning and Deep Learning

Experiments and theory to provide interpretability to deep architectures which guide principled architectural innovations .

## Education

### Cornell University and Google Brain

PhD. in Computer Science

New York and Mountain View, USA

Aug. 2014 — present

### University of Cambridge (Trinity College)

BA and Masters in Mathematics. First Class Honours

Cambridge, UK

Oct. 2010 — June 2014

## Research and Industry Experiences

### UC Berkeley, Simons Institute

Foundations of Machine Learning Workshop

Invited participant for workshop on better understanding fundamentals of machine learning.

Visiting Student

January 2017 – June 2017

### Stanford University

with Surya Ganguli

Understanding fundamentals of deep neural networks and connections to neuroscience

Visiting Researcher

June 2016 –

### Google Inc., Brain Team

with Jascha Sohl-Dickstein and Ian Goodfellow

Working on experiments and theory to provide greater understanding and interpretability in deep neural networks.

Research Resident

January 2016 – present

### Google Inc., Strategic Technologies

with Andrew Tomkins, Ravi Kumar and Tamas Sarlos

Predicting user trails (website visits, song listens, location checkins) with Markov models and LSTMs

Research Intern

May 2015 – August 2015

### Brown University

with Eli Upfal

Developed and analysed a random sampling procedure that could greatly reduce the amount of metadata storage required during garbage collection in flash memory.

Visiting Researcher

July 2013 – September 2013

### Tata Institute of Fundamental Research

with C.S. Rajan

Scholarship student at summer school aimed at exposing students to advanced mathematics. Studied Galois Theory and Elliptic Curves.

Visiting Scholar

June 2012 – August 2012

## Selected Awards

### HHMI Janelia Visiting Scholarship

Awarded on merit of research in deep neural networks, to facilitate participation in workshop in Machine Learning.

2016

### Cornell PhD McMullen Fellowship

Awarded to excellent incoming graduate students.

2014 — 2015

### Rouse Ball Essay Prize

Awarded for excellent dissertation essay on properties of Random Walks on Graphs.

2013

<b>Trinity College Cambridge Senior Scholarship</b>	2013
Awarded for outstanding results in University of Cambridge Part II Examinations.	
<b>China Girls Maths Olympiad</b>	2010
One of a team of four representing United Kingdom at an international Olympiad.	
<b>British Mathematical Olympiad: Gold Medals</b>	2009 — 2010
Top (nationally) twenty and top ten, 2009, 2010	

## Publications

### On the expressive power of deep neural networks

Maithra Raghu, Ben Poole, Jon Kleinberg, Surya Ganguli, Jascha Sohl-Dickstein 2016  
 In submission to ICLR 2017. Also appeared in Janelia Workshop in Machine Learning and Computer Vision, BayLearn 2016, Research@Google, NIPS Interpretable Machine Learning Workshop 2016, Women in Machine Learning (WiML) 2016.

### Exponential expressivity in deep neural networks through transient chaos

B Poole, S Lahiri, M Raghu, J Sohl-Dickstein, S Ganguli 2016  
 In Neural Information Processing Systems (NIPS) 2016

### Analysis of Location Trails with Markov Models and LSTMs

with Tamas Sarlos, Ravi Kumar and Andrew Tomkins (*in submission*) 2016  
 In submission.

### Team Performance with Test Scores

Jon Kleinberg, Maithra Raghu (alphabetical order) 2015  
 In Economics and Computation (EC) 2015. Invited for submission to the journal ACM Transactions on Economics and Computation (TEAC).

### Random Walks on Graphs

Dissertation (Trinity College)

Maithra Raghu 2013  
 Entered and won Cambridge Rouse Ball Essay prize.

## Invited Talks

### NIPS Workshop: Women in Machine Learning (WiML) 2016

Presenting research on neural network expressivity

### New York University 2016

Towards a better theoretical foundation for Deep Neural Networks

### Northstar Science Film Panel for Arrival 2016

Success of modern methods of machine translation, and women in STEM

### Janelia Workshop on Machine Learning and Computer Vision 2016

Interpreting results from Deep Neural Architectures

### Economics and Computation 2015

Evaluating Team Performance with Tests

## Professional Activities

### Workshop Organization

#### Women in Machine Learning (WiML) Organizer 2015

Co-located with NIPS, this workshop brings together hundreds of leading women and men machine learning researchers, and displays top peer-reviewed results in Machine Learning by female researchers. Organizers are vetted by leading women ML researchers.

## Peer Review

<b>International Conference on Learning Representations (ICLR)</b>	2017
<b>Neural Information Processing Systems (NIPS)</b>	2016
<b>Women in Machine Learning</b>	2015

## Misc.

<b>Ask Me Anything Reddit (r/machinelearning)</b>	2016
with the Google Brain Team, answering questions on Machine Learning and Deep Learning, and academia and industry	
<b>Cambridge University Mathematics Society</b>	2013 – 2014
<b>United Kingdom Mathematics Trust, Senior Mentor</b>	2010 – 2012
Mentored talented students for the national mathematical olympiads	