

Maithra (Maithreyi) Raghu

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Education

Cornell University PhD Computer Science, Advisor: Jon Kleinberg	New York Aug. 2014 – 2020
University of Cambridge (Trinity College) Masters in Mathematics (MMath)	Cambridge, UK Oct. 2013 – June 2014
University of Cambridge (Trinity College) BA Mathematics, First Class Honours.	Cambridge, UK Oct. 2010 – June 2013

Research and Professional Experiences

Google Brain Team with Quoc Le, Samy Bengio Representational insights into deep neural networks and applications to healthcare.	Research Associate August 2018 – present
Google Brain Team with Quoc Le, Samy Bengio and Jascha Sohl-Dickstein Working on experiments and theory to provide greater understanding and interpretability in deep neural networks.	Research Resident January 2016 – August 2018
UC Berkeley, Simons Institute Foundations of Deep Learning Program Invited participant for summer program on foundations and frontiers of deep learning.	Visiting Student May 2019 – August 2019
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 January 2016 – January 2017
Google Research, 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

Forbes 30 Under 30 (Science) Named on global list of most impactful leaders and scientists for work on studying representations of deep neural networks and applications to medicine.	2019
MIT EECS Rising Stars 2018 Invited participant in workshop at MIT for top female graduate students in EECS	2018

Cornell PhD McMullen Fellowship Awarded to excellent incoming graduate students.	2014 — 2015
Trinity College Cambridge Senior Scholarship Awarded for outstanding results in University of Cambridge Part II Examinations.	2013
China Girls Maths Olympiad: Bronze Medal One of a team of four representing United Kingdom at an international Olympiad.	2010
British Mathematical Olympiad: Gold Medal Top (nationally) twenty and top ten, 2009, 2010	2009 — 2010

Publications

Rapid Learning or Feature Reuse? Understanding the Effectiveness of MAML Aniruddh Raghu*, Maithra Raghu*, Samy Bengio, Oriol Vinyals International Conference on Learning Representations (ICLR) 2020	2020
Transfusion: Understanding Transfer Learning for Medical Imaging Maithra Raghu*, Chiyuan Zhang*, Jon Kleinberg, Samy Bengio Neural Information Processing Systems (NeurIPS) 2019	2019
The Algorithmic Automation Problem: Prediction, Triage and Human Effort Maithra Raghu, Katy Blumer, Greg Corrado, Jon Kleinberg, Ziad Obermeyer, Sendhil Mullainathan Preprint	2019
Direct Uncertainty Prediction for Medical Second Opinions Maithra Raghu*, Katy Blumer*, Rory Sayres, Ziad Obermeyer, Sendhil Mullainathan, Jon Kleinberg International Conference on Machine Learning (ICML) 2019	2019
Insights on Representational Similarity in Neural Networks with CCA Ari Morcos*, Maithra Raghu*, Jascha Sohl-Dickstein, Samy Bengio Neural Information Processing Systems (NeurIPS) 2018	2018
Adversarial Spheres J Gilmer, L Metz, F Faghri, S Schoenholz, Maithra Raghu, M Wattenberg, I Goodfellow International Conference on Learning Representations (ICLR) Workshop 2018	2018
Can Deep Reinforcement Learning Solve Erdos-Selfridge-Spencer Games? Maithra Raghu, Alexander Irpan, Jacob Andreas, Robert Kleinberg, Quoc V. Le, Jon Kleinberg International Conference on Machine Learning (ICML) 2019	2018
SVCCA for Deep Learning Dynamics and Interpretability Maithra Raghu, Justin Gilmer, Jason Yosinski, Jascha Sohl-Dickstein Neural Information Processing Systems (NeurIPS) 2017	2017
On the expressive power of deep neural networks Maithra Raghu, Ben Poole, Jon Kleinberg, Surya Ganguli, Jascha Sohl-Dickstein International Conference on Machine Learning (ICML) 2017. Also appeared in NeurIPS Interpretable Machine Learning Workshop 2016, Women in Machine Learning (WiML) 2016 Oral.	2017
Explaining the Learning Dynamics of Direct Feedback Alignment Justin Gilmer, Colin Raffel, Sam Schoenholz, Maithra Raghu, Jascha Sohl-Dickstein International Conference on Learning Representations (ICLR) Workshop 2017	2017
Exponential expressivity in deep neural networks through transient chaos B Poole, S Lahiri, M Raghu, J Sohl-Dickstein, S Ganguli Neural Information Processing Systems (NeurIPS) 2016	2016
Linear Additive Markov Processes Ravi Kumar, Maithra Raghu, Tamas Sarlos, Andrew Tomkins (alphabetical order) WWW 2017	2016

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

Maithra Raghu 2013
Awarded the Cambridge Rouse Ball Essay prize. Dissertation (Trinity College)

Invited Talks

TEDx New York	Date TBD
AI and Interpretability	
NVIDIA GTC	2020
Artificial and Human Intelligence in Healthcare	
Workshop on Theory of Deep Learning, IAS Princeton	2019
Understanding Transfer Learning for Medical Imaging	
Artificial Intelligence, O'Reilly Media	2019
Artificial And Human Intelligence in Healthcare	
DeepMind	2019
Insights on Deep Representations and Applications to Healthcare	
OpenAI	2019
Insights on Deep Representations and Applications to Healthcare	
Frontiers of Deep Learning, Simons Institute UC Berkeley	2019
Understanding Transfer Learning with Applications to Medicine	
HealthAI, Stanford	2019
Artificial And Human Intelligence in Healthcare	
REWORK: Deep Learning Summit, San Francisco	2019
Direct Uncertainty Prediction for Medical Second Opinions	
TTIC: Young Researchers Seminar	2018
Insights on Deep Representations and Applications to Healthcare	
REWORK: Deep Learning in Healthcare Summit	2018
Direct Uncertainty Prediction for Medical Second Opinions	
Simons Institute	2018
Insights from Deep Representations	
Facebook AI Research	2018
Insights from Deep Representations with Applications to Healthcare	
UMass Amherst	2018
Insights from Deep Representations	
Institute of Advanced Study, Princeton	2017
Understanding Generalization in Reinforcement Learning	
Columbia University	2017
Understanding Generalization in Reinforcement Learning	
OpenAI	2017
Analyzing and Interpreting Deep Representations	
Harvard University	2017
Analyzing and Interpreting Deep Representations	

Massachusetts Institute of Technology	2017
Neural Network Learning Dynamics	
REWORK: Deep Learning Summit	2017
Neural Network Learning Dynamics	
World Wide Web Conference	2017
Modelling Sequential Data with Linear Additive Markov Processes	
DeepMind	2016
Better interpretability for deep networks.	
Women in Machine Learning (WiML)	2016
On the Expressive Power of Deep Neural Networks	
New York University	2016
On the Expressive Power of 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

Program Co-Chair

National Academy of Sciences Colloquium: Science of Deep Learning	2019
Invited to be one of five organizers for colloquium at National Academy of Sciences on The Science of Deep Learning. Invited leading researchers, policy makers and representatives from different government bodies to convene and discuss the advances and important challenges for AI and Deep Learning.	
ICML Workshop: Deep Phenomena	2019
Co-located with ICML, this workshop focused on identifying and systematically understanding counterintuitive properties exhibited by deep neural networks.	
NeurIPS Workshop: Deep Learning: Bridging Theory and Practice	2017
Co-organized NIPS workshop looking at a systematic exploration of phenomena observed with deep neural networks, attended by over one thousand researchers.	
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.	

Program Committees and Peer Review

Neural Information Processing Systems (NeurIPS)	2019
International Conference on Machine Learning (ICML)	2019
International Conference on Learning Representations Workshop (ICLR)	2019
Neural Information Processing Systems (NeurIPS)	2018
Conference on Learning Theory (COLT)	2018
International Conference on Machine Learning (ICML)	2018

International Conference on Learning Representations Workshop (ICLR)	2018
International Conference on Learning Representations (ICLR)	2018
NeurIPS Workshop Deep Learning: Bridging Theory and Practice	2017
Women in Machine Learning (WiML)	2017
Neural Information Processing Systems (NeurIPS)	2017
International Conference on Machine Learning (ICML)	2017
International Conference on Learning Representations (ICLR)	2017
Neural Information Processing Systems (NeurIPS)	2016
Women in Machine Learning	2015

Press Coverage

Quanta: The Foundations of Neural Networks
 Forbes 30 Under 30 (Science)
 Podcast on Talking Machines
 WIRED: Interpreting Deep Neural Networks
 Quartz: Principled tools to study deep learning
 Northstar Science Film Festival
 Washington Post: Algorithmic Team Selection and Diversity

Misc.

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