

## Ramprasaath R. Selvaraju

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<b>Research Interests</b>	<i>Computer Vision, Interpretability, Reasoning, Vision and Language.</i> <i>I work on developing algorithms to make AI Interpretable, Transparent and Unbiased</i>
<b>Education</b>	<b>Georgia Institute of Technology, Atlanta</b> 2015 - 2020 <i>Ph.D in Computer Science</i> (Transferred from Virginia Tech in 2017) <b>Dissertation Title:</b> <i>Towards Interpretable, Transparent and Unbiased AI</i>
	<b>Birla Institute of Technology &amp; Science (BITS)-Pilani</b> 2010 - 2015 <i>Bachelor of Engineering (Honor) in Electrical and Electronics</i> <i>Master of Science (Honor) in Physics</i>
<b>Internships</b>	<b>Microsoft Research, Seattle</b> Summer 2019 <i>With Ece Kamar, Besmira Nushi and Eric Horvitz</i> Towards evaluating and encouraging human-like reasoning abilities in deep models.
	<b>Tesla Autopilot, Palo Alto</b> Spring 2019 <i>With Andrej Karpathy</i> Preventing failures of autonomous systems in case of rarely occurring scenarios.
	<b>Samsung Research America, Mountain View</b> Summer 2018 <i>With Yilin Shen and Hongxia Jia</i> Developing algorithms for grounding and unbiasing deep vision and language models.
	<b>Facebook, Menlo Park</b> Spring 2017 <i>With Peter Vajda and Devi Parikh</i> Developing a framework for interpreting and visualizing Facebook's deep models.
	<b>Virginia Tech, Blacksburg</b> Spring 2015 <i>With Devi Parikh</i> Building curious systems that ask natural language questions about an image.
	<b>Oxford University, Oxford</b> Fall 2014 <i>With Philip H.S Torr and Stephen Hicks</i> Developing interactive augmented reality system for visually impaired users.
	<b>Brown University, Providence</b> Summer 2013 <i>With Benjamin Kimia</i> Designing a vision-based navigation system to help visually impaired people navigate through indoor environments.
<b>Journal Articles</b>	<b>Grad-CAM: Visual Explanations from Deep Networks via Gradient-based Localization</b> <u>R.R. Selvaraju</u> , M. Cogswell, A. Das, R. Vedantam, D. Parikh, and D. Batra <i>International Journal of Computer Vision (IJCV), 2019.</i>

Conference  
Papers

**Taking a HINT: Leveraging Explanations to Make Vision & Language Models More Grounded**

R.R. Selvaraju, S. Lee, Y. Shen, H. Jia, S. Ghosh, L. Heck, D. Batra, and D. Parikh  
*International Conference on Computer Vision (ICCV)*, 2019.

**Trick or TReAT: Thematic Reinforcement for Artistic Typography**

P. Tendulkar, K. Krishna, R.R. Selvaraju and D. Parikh.  
*International Conference on Computational Creativity (ICCC)*, 2019.

**Choose Your Neuron: Incorporating Domain Knowledge into Deep Networks via Neuron Importance**

R.R. Selvaraju\*, P. Chattopadhyay\*, M. Elhoseini, T. Sharma, D. Batra, D. Parikh, and S. Lee  
*European Conference on Computer Vision (ECCV)*, 2018.

**Diverse Beam Search: Decoding Diverse Solutions from Neural Sequence Models**

A. Vijayakumar, M. Cogswell, R.R. Selvaraju, Q. Sun, S. Lee, D. Crandall, and D. Batra  
*Association for the Advancement of Artificial Intelligence (AAAI)*, 2018.

**Grad-CAM: Visual Explanations from Deep Networks via Gradient-based Localization**

R.R. Selvaraju, M. Cogswell, A. Das, R. Vedantam, D. Parikh, and D. Batra  
*International Conference on Computer Vision (ICCV)*, 2017.

**Counting Everyday Objects in Everyday Scenes**

P. Chattopadhyay, R. Vedantam, R.R. Selvaraju, D. Batra, and D. Parikh. *Computer Vision and Pattern Recognition (CVPR)*, 2017.

**The Semantic Paintbrush: Interactive 3D Mapping and Recognition in Large Outdoor Spaces**

M. Ondrej, V. Vineet, M. Lidegaard, R.R. Selvaraju, M. Niener, S. Golodetz, S. Hicks, P. Prez, S. Izadi, and P. Torr.  
*ACM Conference on Human Factors in Computing Systems (CHI)*, 2015.

**Automated Colorimetric Analysis in Paper-based Sensors**

S. Garg, R.R. Selvaraju, S. Kapur, and K. Rao  
*International Conference on Image Processing (ICIP)*, 2014.

Workshop  
Papers

**Taking a HINT: Leveraging Explanations to Make Vision & Language Models More Grounded**

R.R. Selvaraju, S. Lee, Y. Shen, H. Jia, S. Ghosh, D. Batra, and D. Parikh  
*ICLR'19 Workshop on Debug ML*.

**Grad-CAM: Why did you say that?**

R.R. Selvaraju, M. Cogswell, A. Das, R. Vedantam, D. Parikh, and D. Batra  
*NeurIPS'16 Workshop on Interpretable ML and CVPR'17 Workshop on Explainable Computer Vision*.

Preprints

**SQuINTing at VQA Models: Interrogating VQA Models with Sub-Questions**

R.R. Selvaraju, P. Tendulkar, D. Parikh, E. Horvitz, M. Ribeiro, B. Nushi, and E. Kamar  
*Under Review*.

Invited Talks	Understanding CNNs <i>Deep Learning Class at Georgia Tech</i>	Fall 18
	<b><i>Towards Interpretable, Transparent and Unbiased AI</i></b> <i>Microsoft AI Breakthroughs</i>	Fall 18
Teaching	<b><i>Data Structures and Algorithms</i></b> <i>Teaching Assistant</i>	<b>Fall 15 - Spring 16</b>
Technical Skills	<b>Languages :</b> Python, MATLAB, C++, HTML <b>Deep Learning Frameworks :</b> PyTorch, Tensorflow, Caffe, Torch	
Side Projects	Interpreting decisions from Deep RL agents trained for navigation	Fall 2019
	Weak supervision and Generative models for semantic segmentation	Spring 2018
	Exploring Curriculum Learning for deep models	Spring 2015
Relevant Courses	<ul style="list-style-type: none"> <li>Math Foundations of ML</li> <li>Adv. Computer Vision</li> <li>Adv. Machine Learning</li> <li>Deep Learning</li> <li>Optim. in High-dim</li> <li>Bayesian Statistics</li> <li>Prob. and Statistics</li> <li>Human Robot Interaction</li> <li>Linear Algebra</li> </ul>	
Reviewing	IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI) Computer Vision and Image Understanding (CVIU) Journal Computer Vision and Pattern Recognition (CVPR) Neural Information Processing Systems (NeurIPS) European Conference on Computer Vision (ECCV) IEEE International Conference on Computer Vision (ICCV)	2018 2019 2017, 2018, 2019, 2020 2016, 2017 2018 2017
Honors	<b>Finalist</b> , Adobe Fellowship	Fall 2018
	<b>Finalist</b> , Snap Fellowship	Fall 2018
Extra Curricular	<b>First Place</b> , Divisionals and Second, Mid-Atlantic Table-Tennis Championship <b>Represented Virginia Tech</b> , US-Canada National Table-Tennis Championship	2016 2016
References	Dr. Devi Parikh, Associate Professor, Georgia Tech - parikh@gatech.edu Dr. Dhruv Batra, Associate Professor, Georgia Tech - dbatra@gatech.edu Dr. Ece Kamar, Senior Researcher, Microsoft Research - eckamar@microsoft.com Dr. Stefan Lee, Assistant Professor, Oregon State University - leestef@oregonstate.edu Dr. Mohamed Elhoseiny, Research Scientist, Facebook Inc - elhoseiny@fb.com	