

# Peter Anderson

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| EDUCATION          | <b>Australian National University (ANU)</b><br><i>PhD, Computer Science</i><br>Advisor: Prof. Stephen Gould<br>Thesis: <i>Vision and Language Learning: From Image Captioning and Visual Question Answering towards Embodied Agents</i> | Canberra, Australia<br>Feb 2015 – Apr 2018 |
|                    | <b>University of New South Wales (UNSW)</b><br><i>Bachelor of Computer Engineering</i><br>1st class Honors and University Medal<br>(Spring 2011 exchange to University of Colorado, Boulder, USA)                                       | Sydney, Australia<br>Mar 2009 – Dec 2012   |
|                    | <b>University of Sydney (USYD)</b><br><i>Bachelor of Commerce (Finance and Economics)</i><br>1st class Honors and University Medal  | Sydney, Australia<br>Mar 2000 – Dec 2004   |
| RESEARCH INTERESTS | Computer Vision, Deep Learning, Natural Language Processing, Robotics   |  |
| HONORS & AWARDS    | <b>Outstanding Reviewer Award, CVPR</b> (Among the top 0.9% of reviewers)   | 2019                                       |
|                    | <b>Outstanding Reviewer Award, NeurIPS</b> (Among the top 3.6% of reviewers)  | 2018                                       |
|                    | <b>Facebook ParLAI Research Award</b> (1 of 7 awards)   | 2017                                       |
|                    | <b>Winner, Visual Question Answering Challenge, CVPR</b><br>(1st out of 24 teams from ~26 institutions and ~8 countries)  | 2017                                       |
|                    | <b>ANU Finalist, Three Minute Thesis (3MT)</b><br>(Among the top 12 PhD thesis presenters from all ~20 research schools at ANU)<br>[Video: Non-technical 3MT talk]  | 2017                                       |
|                    | <b>Australian Postgraduate Award (APA), ANU</b> (PhD Scholarship)   | 2015–2018                                  |
|                    | <b>Research Supplementary Scholarship, ANU</b> (PhD Scholarship)  | 2015–2018                                  |
|                    | <b>Runner Up, CiSRA Extreme Imaging Competition</b><br>(For computer vision research on soccer robots with extremely limited resources)   | 2013                                       |
|                    | <b>3rd Place, RoboCup SPL</b> using the Aldebaran Nao humanoid robot<br>(3rd place and most goals scored out of 25 autonomous robot soccer teams from ~17 countries)<br>[Video: rUNSWift 3rd place play-off]                            | 2012                                       |
|                    | <b>Best Paper Finalist, RoboCup International Symposium</b><br>(Selection Rate: $3/64 = 4.7\%$ , for one of 4 papers from my undergraduate honors thesis)   | 2012                                       |
|                    | <b>1st class Honors and University Medal in Computer Eng, UNSW</b><br>(Highest weighted average mark for 5 years in Bachelor of Computer Engineering)   | 2012                                       |
|                    | <b>Undergraduate Performance Award, UNSW</b><br>(2nd out of ~170 4th year students in the School of Computer Science and Engineering)   | 2012                                       |
|                    | <b>Faculty of Engineering Dean's Award, UNSW</b><br>(Awarded to Engineering students with a minimum High Distinction average)   | 2011-2012                                  |
|                    | <b>UNSW Endeavour Exchange Scholarship</b><br>(Funding for a six month exchange to the University of Colorado, Boulder)   | 2011                                       |

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| <b>1st class Honors and University Medal in Finance, USYD</b><br>(Top student graduating with a major in Finance) | 2004 |
| <b>Joye Prize for 1st in Finance Honors, USYD</b>   | 2004 |
| <b>Finance Honors Scholarship, USYD</b> (Honors Year Scholarship)   | 2004 |

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| <b>PROFESSIONAL<br/>EXPERIENCE</b> | <b>School of Interactive Computing, Georgia Tech</b>  | Atlanta, USA        |
|                                    | <i>Research Scientist</i> , with Devi Parikh and Dhruv Batra  | Jul 2018 – current  |
|                                    | <ul style="list-style-type: none"> <li>Focusing on the intersection of vision and language with embodied agents.</li> </ul>   |                     |
|                                    | <b>Department of Computing, Macquarie University</b>  | Sydney, Australia   |
|                                    | <i>Research Fellow</i> , with Mark Johnson  | Apr 2018 – Jul 2018 |
|                                    | <ul style="list-style-type: none"> <li>Extending image captioning models to understand more visual concepts.</li> </ul>   |                     |
|                                    | <b>Deep Learning Technology Center, Microsoft Research</b>  | Seattle, USA        |
|                                    | <i>Research Intern</i> , with Lei Zhang and Xiaodong He   | Apr 2017 – Jun 2017 |
|                                    | <ul style="list-style-type: none"> <li>Developed bottom-up and top-down visual attention [9], now the de facto framework for a variety of vision and language tasks.</li> </ul> |                     |
|                                    | <b>Sabre Autonomous Solutions</b>   | Sydney, Australia   |
|                                    | <i>Robotic Software Engineer</i>  | Feb 2014 – Feb 2015 |
|                                    | <ul style="list-style-type: none"> <li>Advanced an autonomous grit-blasting robot from university prototype to commercial product.</li> </ul>                                   |                     |
|                                    | <b>FrameFish</b>  | Sydney, Australia   |
|                                    | <i>Founder</i>  | Jan 2013 – Feb 2014 |
|                                    | <ul style="list-style-type: none"> <li>Developed &amp; commercialized virtual try-on technology for glasses &amp; sunglasses.</li> </ul>  |                     |
|                                    | <b>Wireless Networking Lab, CSIRO</b>   | Sydney, Australia   |
|                                    | <i>Research Intern</i>  | Nov 2011 – Feb 2012 |
|                                    | <ul style="list-style-type: none"> <li>Prototyped filters to fuse an inertial sensor with a wireless positioning system.</li> </ul>   |                     |
|                                    | <b>Equities Research, Credit Suisse</b>   | Sydney, Australia   |
|                                    | <i>Associate</i>  | Jan 2005 – Mar 2009 |
|                                    | <ul style="list-style-type: none"> <li>Sell-side analyst covering Australian financials including commercial banks, investment banks and diversified financials.</li> </ul>     |                     |

## LATEST PREPRINTS

- [20] **Peter Anderson\***, Ayush Shrivastava\*, Devi Parikh, Dhruv Batra and Stefan Lee. *Chasing Ghosts: Instruction Following as Bayesian State Tracking*, arXiv preprint 1907.02022, 2019
- [19] Yuankai Qi, Qi Wu, **Peter Anderson**, Marco Liu, Chunhua Shen and Anton van den Hengel. *RERERE: Remote Embodied Referring Expressions in Real indoor Environments*, arXiv preprint 1904.10151, 2019
- [18] **Peter Anderson**, Angel Chang, Devendra Singh Chaplot, Alexey Dosovitskiy, Saurabh Gupta, Vladlen Koltun, Jana Kosecka, Jitendra Malik, Roozbeh Motlaghi, Manolis Savva and Amir R. Zamir. *On Evaluation of Embodied Navigation Agents*, arXiv preprint 1807.06757, 2018
- [17] Sanyam Agarwal, Devi Parikh, Dhruv Batra, **Peter Anderson** and Stefan Lee. *Visual Landmark Selection for Generating Grounded and Interpretable Navigation Instructions*, in CVPR workshop on Deep Learning for Semantic Visual Navigation, 2019

- [16] Harsh Agrawal\*, Karan Desai\*, Yufei Wang, Xinlei Chen, Rishabh Jain, Mark Johnson, Dhruv Batra, Devi Parikh, Stefan Lee and **Peter Anderson**. *nocaps: novel object captioning at scale*, in International Conference on Computer Vision (ICCV), 2019
- [15] Huda Alamri, Vincent Cartillier, Abhishek Das, Jue Wang, Anoop Cherian, Irfan Essa, Dhruv Batra, Tim K. Marks, Chiori Hori, **Peter Anderson**, Stefan Lee and Devi Parikh. *Audio-Visual Scene-Aware Dialog*, in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2019
- [14] Ashwin Kalyan, **Peter Anderson**, Stefan Lee and Dhruv Batra. *Trainable Decoding of Sets of Sequences for Neural Sequence Models*, in International Conference on Machine Learning (ICML), 2019
- [13] **Peter Anderson**, Stephen Gould and Mark Johnson. *Partially-Supervised Image Captioning*, in Advances in Neural Information Processing Systems (NeurIPS), 2018
- [12] Paria Jamshid Lou, **Peter Anderson** and Mark Johnson. *Disfluency Detection using Auto-Correlational Neural Networks*, in Conference on Empirical Methods in Natural Language Processing (EMNLP), 2018
- [11] Mark Johnson, **Peter Anderson**, Mark Dras and Mark Steedman. *Predicting accuracy on large datasets from smaller pilot data*, in Proceedings of the Annual Meeting of the Association for Computational Linguistics (ACL), 2018  
(**Oral Presentation**)
- [10] **Peter Anderson**, Qi Wu, Damien Teney, Jake Bruce, Mark Johnson, Niko Sünderhauf, Ian Reid, Stephen Gould and Anton van den Hengel. *Vision-and-Language Navigation: Interpreting visually-grounded navigation instructions in real environments*, in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018  
(**Spotlight Presentation; Selection Rate: 294/3309 = 8.9%**) [Video]
- [9] **Peter Anderson**, Xiaodong He, Chris Buehler, Damien Teney, Mark Johnson, Stephen Gould and Lei Zhang. *Bottom-Up and Top-Down Attention for Image Captioning and Visual Question Answering*, in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018  
(**Oral Presentation; Selection Rate: 70/3309 = 2.1%**) [Video]
- [8] Damien Teney, **Peter Anderson**, Xiaodong He and Anton van den Hengel. *Tips and Tricks for Visual Question Answering: Learnings from the 2017 Challenge*, in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018
- [7] **Peter Anderson**, Basura Fernando, Mark Johnson and Stephen Gould. *Guided Open Vocabulary Image Captioning with Constrained Beam Search*, in Conference on Empirical Methods in Natural Language Processing (EMNLP), 2017
- [6] **Peter Anderson**, Basura Fernando, Mark Johnson and Stephen Gould. *SPICE: Semantic Propositional Image Caption Evaluation*, in Proceedings of the European Conference on Computer Vision (ECCV), 2016
- [5] Basura Fernando, **Peter Anderson**, Marcus Hutter and Stephen Gould. *Discriminative Hierarchical Rank Pooling for Activity Recognition*, in Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016
- [4] **Peter Anderson**, Youssef Hunter and Bernhard Hengst. *An ICP Inspired Inverse Sensor Model with Unknown Data Association*, in Proceedings of the IEEE International Conference on Robotics and Automation (ICRA), 2013

- [3] **Peter Anderson** and Bernhard Hengst. *Fast Monocular Visual Compass for a Computationally Limited Robot*, in Proceedings of the RoboCup International Symposium, 2013  
(**Oral Presentation**)
- [2] Sean Harris, **Peter Anderson**, Belinda Teh, Youssef Hunter, Roger Liu, Bernhard Hengst, Ritwik Roy, Sam Li and Carl Chatfield. *RoboCup Standard Platform League – rUNSWift 2012 Innovations*, in Proceedings of the Australasian Conference on Robotics and Automation (ACRA), 2012
- [1] **Peter Anderson**, Yongki Yusmanthia, Bernhard Hengst, and Arcot Sowmya. *Robot Localisation using Natural Landmarks*, in Proceedings of the RoboCup International Symposium, 2012  
(**Oral Presentation, Best Paper Finalist: Selection Rate: 3/64 = 4.7%**)

\*denotes equal contribution

## INVITED TALKS

*Both Sides Now: Generating and Understanding Visually-Grounded Language*

Allen Institute for Artificial Intelligence (AI2), Seattle, USA      Apr 2019

Microsoft Research, Redmond, USA      Apr 2019

*Vision and language: attention, navigation, and making it work ‘in the wild’*

Vision and Language Seminar, ACVT, University of Adelaide, Aus.      Jul 2018

Visual Question Answering Challenge Workshop      CVPR 2018

*Language and Vision using Deep Neural Nets*

CLaS-CCD Research Colloquium, Macquarie University, Sydney, Aus.      Jun 2018

*Visual Understanding in Natural Language*

University of Toronto, Toronto, CA      Dec 2017

Microsoft Research, Redmond, USA      Dec 2017

Georgia Tech, Atlanta, USA      Nov 2017

*VQA Challenge Winner Talk*

Visual Question Answering Challenge Workshop      CVPR 2017

*Guided Open Vocabulary Image Captioning with Constrained Beam Search*

ACVT, University of Adelaide, Adelaide, Australia      Nov 2016

*SPICE: Semantic Propositional Image Caption Evaluation*

ACRV Science Day, Queensland Uni. of Technology, Brisbane, Aus.      Aug 2016

*A Practical Introduction to Deep Learning with Caffe*

Deep Learning Workshop      AI/ACRA 2015

## TEACHING

CS 7643 Deep Learning (Georgia Tech) - 3 guest lectures      Spring 2019

CS 4476 Intro. to Computer Vision (Georgia Tech) - 4 guest lectures      Fall 2018

CS 7643 Deep Learning (Georgia Tech) - 3 guest lectures      Fall 2018

## ADVISING

*Advised on individual projects at Georgia Tech:*

PhD students: Harsh Agarwal [16], Prithviraj Ammanabrolu, Meera Hahn

Interns: Karan Desai [16], Ayush Shrivastava [20], Sanyam Agarwal [17]

Undergrads (CS 8903 Special Problems): Arda Pekis, Vineet Vinayak

**PROFESSIONAL ACTIVITIES**    *Area Chair:* NeurIPS 2019

*Reviewer:* CoRL 2019, CoNLL 2019, EMNLP 2019, ICCV 2019, IROS 2019, ICRA 2019, ICML 2019, ICLR 2019, NeurIPS 2018, CVPR 2018-19, ECCV 2018

*Workshop organization:*

|  |              |
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| Visual Question Answering and Dialog Workshop                  | CVPR 2019    |
| Habitat Embodied Agents Workshop                               | CVPR 2019    |
| Visually-Grounded Interaction and Language (ViGIL)             | NeurIPS 2018 |
| Visual Learning and Embodied Agents in Simulation Environments | ECCV 2018    |
| New Benchmarks, Metrics, and Competitions for Robotic Learning | RSS 2018     |

*Panelist at Workshops:*

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| Visual Question Answering Challenge Workshop | CVPR 2018 |
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*Tutorials:*

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| Connecting Language and Vision to Actions | ACL 2018 |
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**REFEREES**

Prof. Devi Parikh, Georgia Tech/Facebook AI Research (parikh@gatech.edu)  
Prof. Dhruv Batra, Georgia Tech/Facebook AI Research (dbatra@gatech.edu)  
Prof. Stephen Gould, ANU (stephen.gould@anu.edu.au)  
Prof. Mark Johnson, Macquarie University (mark.johnson@mq.edu.au)  
Prof. Anton van den Hengel, Uni. of Adelaide (anton.vandenhengel@adelaide.edu.au)