

Peter Anderson

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April 2018

- EDUCATION**
- PhD Candidate, Computer Science* Feb 2015 – submitted Apr 2018
Australian National University Canberra, Australia
Supervisor: Dr Stephen Gould
Thesis Title: *Vision and Language Learning: From Image Captioning and Visual Question Answering towards Embodied Agents*
- Bachelor of Computer Engineering* Mar 2009 – Dec 2012
University of New South Wales Sydney, Australia
1st class Honours and University Medal
- Bachelor of Commerce (Finance and Economics)* Mar 2000 – Dec 2004
University of Sydney Sydney, Australia
1st class Honours and University Medal
- RESEARCH INTERESTS** Computer Vision, Deep Learning, Natural Language Processing, Robotics
- PROFESSIONAL EXPERIENCE**
- Research Intern, advised by Lei Zhang and Xiaodong He* Apr 2017 – Jun 2017
Deep Learning Technology Center, Microsoft Research, Seattle, USA
- Developed a bottom-up and top-down visual attention mechanism that more naturally focuses on objects when solving vision and language problems.
 - Achieved state-of-the-art results for automatic image captioning on MS COCO.
 - Achieved 1st place in the 2017 Visual Question Answering Challenge at CVPR.
- PhD Research, advised by Stephen Gould* Feb 2015 – Apr 2018
Australian National University, Canberra, Australia
- Machine learning research focusing on projects combining visual and linguistic understanding, including generating and evaluating image descriptions, visual question answering (VQA), and vision-and-language navigation (VLN).
 - Researcher with the Australian Centre for Robotic Vision (ACRV).
- Robotic Software Engineer* Feb 2014 – Feb 2015
Sabre Autonomous Solutions, Sydney, Australia
- Development of an autonomous grit-blasting robot from a university prototype into a reliable commercial product.
 - Reduced planning time by 75%, decreased missed surfaces on complex objects by 80%, and implemented an algorithm to identify CAD models in depth maps.
- Startup Founder* Jan 2013 – Feb 2014
FrameFish, Sydney, Australia
- Developed web-based virtual try-on software for glasses and sunglasses. Successfully deployed the application as a subscription service used by online retailers.

Undergraduate Thesis Jul 2011 – Nov 2012
UNSW RoboCup Soccer Team (rUNSWift), Sydney, Australia

- Devised approaches to vision and localization for soccer-playing humanoid robots.
- rUNSWift placed 3rd out of 27 teams in the 2012 RoboCup Soccer Standard Platform League, scoring more goals during competition than any other team.

Academic Tutor Jul 2009 – Nov 2011
University of Sydney / University of New South Wales, Sydney, Australia

- Tutored 6–8 undergraduate corporate finance classes per week at the University of Sydney. Responsibilities included marking assignments and exams.
- Teaching assistant for the UNSW undergraduate engineering design course.

Research Intern Nov 2011 – Feb 2012
CSIRO Wireless Networking Lab, Sydney, Australia

- Prototyped Kalman filters to fuse data from an inertial sensor with an indoor wireless positioning system.

Equities Research Associate Jan 2005 – Mar 2009
Credit Suisse, Sydney, Australia

- Developed financial models, valuations, earnings forecasts and detailed research reports and recommendations for institutional investors.

**CONFERENCE
PUBLICATIONS**
[Google Scholar](#)

- [1] 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
- [2] **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**)
- [3] **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**)
- [4] 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
- [5] **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
- [7] 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
- [8] **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

- [9] **Peter Anderson** and Bernhard Hengst. *Fast Monocular Visual Compass for a Computationally Limited Robot*, in Proceedings of the RoboCup International Symposium, 2013 (Oral Presentation)
- [10] **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**)
- [11] 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

GRANTS

Facebook ParlAI Research Award (funded \$20,000), Sep 2017

INVITED TALKS

Visual Understanding in Natural Language, presented at Georgia Institute of Technology, University of Toronto and Microsoft Research (Seattle), Nov–Dec 2017

Challenge Winner Talk, Visual Question Answering Challenge Workshop, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Jun 2017

Guided Open Vocabulary Image Captioning with Constrained Beam Search, Australian Centre for Visual Technologies (ACVT), University of Adelaide, Nov 2016

SPICE: Semantic Propositional Image Caption Evaluation, Australian Centre for Robotic Vision (ACRV) Science Day, Queensland University of Technology, Aug 2016

A Practical Introduction to Deep Learning with Caffe, Deep Learning Workshop at Australasian Joint Conference on Artificial Intelligence (AI) / Australasian Conference on Robotics and Automation (ACRA), Dec 2015

PROFESSIONAL ACTIVITIES

Organizer of the ECCV 2018 workshop on *Visual Learning and Embodied Agents in Simulation Environments*

Organizer of the RSS 2018 workshop on *New Benchmarks, Metrics, and Competitions for Robotic Learning*

Speaker at the ACL 2018 tutorial on *Connecting Language and Vision to Actions*

Reviewer for CVPR 2018, ECCV 2018, IEEE Transactions on Image Processing 2017

TECHNICAL SKILLS

Languages: C, C++, Java, Python, AVR Assembler, SQL, VHDL, Verilog, MATLAB, Javascript, HTML, CSS, Actionscript

Tools / Libraries: PyTorch, Caffe, OpenCV, Point Cloud Library (PCL), Qt, OpenGL, OGRE 3D, Git, CMake, Latex

HONOURS & AWARDS

ANU Three Minute Thesis (3MT) Finalist	2017
ANU Australian Postgraduate Award (APA)	2015–2018
ANU Research Supplementary Scholarship	2015–2018
CiSRA Extreme Imaging Competition, Runner Up	2013
Best Paper Finalist, RoboCup International Symposium	2012
1st class Honours and University Medal in Computer Engineering, UNSW	2012
Undergraduate Performance Award (2nd overall in School of CSE), UNSW	2012

Faculty of Engineering Dean's Award, UNSW	2011 & 2012
UNSW Endeavour Exchange Scholarship to University of Colorado	2011
1st class Honours and University Medal in Finance, University of Sydney	2004
Joye Prize for 1st in Finance Honours, University of Sydney	2004
Finance Honours Scholarship, University of Sydney	2004