

Curriculum Vitae for
Jonathan J Hunt

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Research Experience

10/2019-ongoing	Staff Research Scientist	Twitter
12/2016-09/2019	Senior Research Scientist	Google DeepMind
10/2014-01/12/2016	Research Scientist	Google DeepMind
09/2013-09/2014	Scientist	Brain Corporation
05/2012-09/2013	Scientific Programmer	Brain Corporation
05/2012-2016	Adjunct Researcher	Queensland Brain Institute, University of Queensland
06/2011-05/2012	Postdoctoral Research Fellow	Queensland Brain Institute, University of Queensland
2003-2006 Summers and part-time	Research Assistant	Massey University

Education

PhD	2007-2011
University of Queensland, Australia	
Title	Natural scenes and the development of the visual cortex
Supervisors	Prof. Geoffrey J Goodhill and Prof. Jason Mattingley
Bachelor of Science (Honours, 1st class)	2003-2006
Massey University, New Zealand	
Major	Mathematical Physics
Project Title	Polysaccharide sequence reconstruction from digest patterns
Supervisor	A/Prof. Martin Williams

Publications and talks

Full-text publications (including conference, workshop papers and preprints)¹

Mirza, M., Jaegle, A., **Hunt, J.J.**, Guez, A., Tunyasuvunakool, S., Muldal, A., Weber, T., Karkus, P., Racanire, S., Buesing, L., Lillicrap, T., Heess, N. (2020) Physically Embedded Planning Problems: New Challenges for Reinforcement Learning. *Arxiv preprint*

Barreto, A., Borsa, D., Hou, S., Comanici, G., Aygun, E., Hamel, P., Toyama, D., **Hunt, J.J.**, Mourad, S., Silver, D., Precup, D. (2019) The Option Keyboard: Combining Skills in Reinforcement Learning. *Neural Information Processing Systems*

Hunt, J.J., Barreto, A., Lillicrap, T.P., Heess, N. (2019) Composing Entropic Policies using Divergence Correction. *International Conference on Machine Learning*

Hunt, J.J., Barreto, A., Lillicrap, T.P., Heess, N. (2018) Entropic Policy Composition with Generalized Policy Improvement and Divergence Correction *NIPS 2018 Deep Reinforcement Learning Workshop*

Hunt, J.J., Barreto, A., Lillicrap, T.P., Heess, N. (2018) Entropic Policy Composition with Generalized Policy Improvement and Successor Features. *NIPS Infer2Control Workshop*

Barreto, A., Dabney W., Munos, R., **Hunt, J.J.**, Schaul, T. Silver, D., van Hasselt, H. (2017) Successor Features for Transfer in Reinforcement Learning *Neural Information Processing Systems*

Barreto, A., Dabney W., Munos, R., **Hunt, J.J.**, Schaul, T. Silver, D., van Hasselt, H. (2017) Transfer in Reinforcement Learning with Successor Features and Generalised Policy Improvement *ICML LifeLong Learning Workshop*

Rae, J.*, **Hunt, J.J.***, Danihelka, I., Harley, T., Senior, A., Wayne, G., Graves, A. Lillicrap, T.P. (2016) Scaling Memory-Augmented Neural Networks with Sparse Reads and Writes. *Neural Information Processing Systems*

Dulac-Arnold G., Evans R., van Hasselt H., Sunehag P., Lillicrap T.P., **Hunt J.J.**, Mann T., Weber T., Degris T., Coppin B. (2016) Deep Reinforcement Learning in Large Discrete Action Spaces. *Arxiv preprint*

¹ Full texts of all publications are available on my website <https://me.net.nz>

- Lillicrap, T.P.*, **Hunt, J.J.***, Pritzel, A., Heess, N., Erez, T., Tassa, Y., Silver, D., Wierstra, D. (2016) Continuous control with deep reinforcement learning *International Conference on Learning Representations*
- Heess N.*, **Hunt, J.J.***, Lillicrap, T.P., Silver, D. (2015) Memory-based control with recurrent neural networks. *NIPS Deep Reinforcement Learning Workshop*
- Hughes, N., **Hunt, J.J.**, Sengpiel, F., Ibbotson, M., Goodhill, G.J. (2014) Stripe-rearing changes multiple aspects of the structure of primary visual cortex. *NeuroImage*. 95:305-319
- Hunt, J.J.**, Dayan, P., Goodhill, G.J. (2013) Receptive field development with abnormal visual input can be explained by sparse coding. *PloS Computational Biology*. 9:e1003005
- Hunt, J.J.**, Mattingley, J., Goodhill, G.J. (2011) Randomly oriented edge arrangements dominate naturalistic arrangements in binocular rivalry. *Vision Research*. 64:49-55
- Hunt, J.J.**, Ibbotson, M., Goodhill, G.J. Sparse coding on the spot: spontaneous retinal waves suffice for orientation selectivity. *Neural Computation*. 24:2422-33
- Forbes, E.M.*, **Hunt, J.J.***, Goodhill, G.J. (2011) The combinatorics of neurite self-avoidance. *Neural Computation*. 23:2746-2769
- Hunt, J.J.**, Bosking, W., Goodhill, G.J. (2011). Statistical structure of lateral connections in the primary visual cortex. *Neural Systems & Circuits*. 1:3
- Hunt, J.J.***, Giacomantonio, C.E.*, Tang, H., Mortimer, D., Jaffer, S., Vorobyov, V., Erickson, G., Sengpiel, F., Goodhill, G.J. (2009). Natural scene statistics and the structure of orientation maps in the visual cortex. *Neuroimage*. 47:157-172
- Hunt, J.J.**, Cameron, R.G., Williams, M.A.K. (2006) On the simulation of enzymatic digest patterns: the fragmentation of oligomeric and polymeric galacturonides by endopolygalacturonase II. *Biochimica et Biophysica Acta*. 1760:1696-1703
- * equal contributions
- Conference presentations
- Hunt, J.J.**, Dayan, P., Goodhill, G.J. Sparse coding model of binocular receptive field development reproduces changes in abnormal rearing. *Cosyne 2012*, Salt Lake City USA.
- Hughes, N., **Hunt, J.J.**, Cloherty, S.L., Ibbotson, M.R., Sengpiel, F., Goodhill, G.J. (1/2013) *6th Australian Workshop on Computational Neuroscience*, Melbourne, Australia
- Hunt, J.J.**, Ibbotson, M., Goodhill, G.J. (11/2012) An efficient coding model of mostly spot-like visual input: oriented receptive fields can still dominate. *Society for Neuroscience*, New Orleans.
- Hunt, J.J.** Dayan, P., Goodhill, G.J. (11/2012) A simple unsupervised learning model is a good predictor of receptive field changes in abnormal rearing conditions. *Society for Neuroscience*, New Orleans.
- Hughes, N., **Hunt, J.J.**, Cloherty, S.L., Ibbotson, M.R., Sengpiel, F., Goodhill, G.J. (9/2012) Gaussian process methods for evaluating visual map changes following abnormal visual input. *Queensland Brain Institute 4th Brain Plasticity Symposium*
- Hunt, J.J.** Dayan, P., Goodhill, G.J. (9/2011) Coding with two eyes: an unsupervised learning model of binocular receptive field development. *Queensland Brain Institute-Munich Centre for Neurosciences Symposium*, Queensland Brain Institute, Brisbane, Australia
- Hunt, J.J.**, Mattingley, J.M., Goodhill, G.J. (9/2010) Emphasizing entropic edges: entropic edge arrangements dominate visual perception. *Brain Plasticity Symposium*, Queensland Brain Institute, Brisbane, Australia.
- Hunt, J.J.**, Giacomantonio, C.E., Tang, H., Mortimer, D., Jaffer, S., Vorobyov, V., Erickson, G., Sengpiel, F., Goodhill, G.J. (11/2008) Abnormal visual input during development does not alter the co-circularity statistics of orientation maps in visual cortex. *Society for Neuroscience*, Washington DC.
- Hunt, J.J.**, Giacomantonio, C.E., Tang, H., Mortimer, D., Jaffer, S., Vorobyov, V., Erickson, G., Sengpiel, F., Goodhill, G.J. (9/2008) Co-circularity statistics in cat primary visual cortex are not driven by visual input. *Brain Plasticity Symposium*, Brisbane, Australia.

Hunt, J.J., Smith, D.H., Mortimer, D., Giacomantonio, C.E., Tang, H., Ericksson, G., Sengpiel, F., Goodhill, G.J. (7/2007) The influence of natural image scene statistics on the structure of orientation maps. *Vision Down Under*, Cairns, Australia.

Demonstrations

Hunt, J.J., O'Connor, P. (12/2013) A mobile development platform for adaptive machine learning and neuromorphic computing in robotics. *Neural Information Processing Systems*, Lake Tahoe, CA, USA.

Patents

Hunt, J.J., Sinyavskiy, O. (Filed 2013, Granted 2016) Apparatus and methods for developing parallel networks using a general purpose programming language. US Patent 9390369

Sinyavskiy, O., **Hunt, J.J.** (Filed 2013, Granted 2016) Multithreaded apparatus and methods for implementing parallel networks.

Hunt, J.J., Sinyavskiy, O., Kimball, R.H., Hall, E.M., Levin, J.A., Bender, P., Canoy, Canoy, M-D.N. (Filed 2011, Granted 2016) Apparatus and methods for developing parallel networks using a general purpose programming language. US Patent 20160217370

Hunt, J.J., Sinyavskiy, O. (Filed 2013, Granted 2015) Spiking neuron classifier apparatus and methods using conditionally independent subsets. US Patent 9195934

Talks

Challenges in Recommender Systems (10/20) *Oxford University (online)*

Transfer and generalisation in RL (07/18) *Brain Corporation, San Diego, USA*

Transfer and generalisation in RL (07/18) *Intel AI, San Diego, USA*

Deep Reinforcement Learning for Robotic Control (03/18) *Human Brain Project Workshop on Cognitive Systems for Non-Specialists* Technical University Munich, Garching, Germany

Reinforcement Learning in Continuous Action Spaces (04/17) *Nantes Machine Learning Meetup* Nantes, France.

Does your brain use JPEG? Image representations in the visual cortex (9/2011) *School of Chemical and Physical Sciences, Victoria University, New Zealand.*

Does your brain use JPEG? Image representations in the visual cortex (9/2011) *Institute of Fundamental Sciences Lecture Series, Massey University, New Zealand.*

Statistical machine translation (2009) *Maths journal club, University of Queensland, Australia.*

Cryptographically secure random number generators (2009) *Maths journal club, University of Queensland, Australia.*

Moore's law meets neuroscience (2009) *Barcamp Brisbane, Australia*

Mapping the brain: understanding the layout of the visual cortex (10/2007) *Institute of Fundamental Sciences Lecture Series, Massey University, New Zealand.*

Continuing education

2009	Okinawa Computational Neuroscience Summer School	3 week course
2009	Apple Xcode Tools Workshop	2 day course
2008	Kioloa Machine Learning Summer School	2 week course

Supervision

2012-2016	Co-supervision (20%) of Nick Hughes	PhD	Neural Plasticity via Visual Cortical Maps
2011	Co-supervised Nick Hughes	Mathematics honours project	Gaussian process estimators of orientation preference maps
2010/11	Co-supervised Elizabeth Forbes	Summer research project	Combinatorics of Dscam1
2008	Co-supervised Tim Lamberton	3rd year project	Position-angle dependence of orientation preferences in primary visual cortex

Teaching

2011, 2010	Guest lecturer	lec-	MATH3104	Mathematical Biology	University of Queensland
2010	Tutor		MECH3750	Engineering Analysis II	University of Queensland
2010	Tutor		HRSS3100	Research Methodology	University of Queensland
2009	Tutor		STAT2202	Probability Models	University of Queensland
2008	Tutor		MATH3104	Mathematical Biology	University of Queensland
2008, 2007	Tutor/Guest lecturer		MATH2200	Scientific computing	University of Queensland
2005	Private tutor			High school physics	New Zealand
2004	Lab demonstrator		124.101/2	Physics	Massey University

Non-research Employment

IT

8/2008-9/2010 part time	System administrator Responsible for the setup, operation and user training of the high performance computing facility.	Queensland Brain Institute
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Other

2005 part time	Residential advisor Responsible for, and first point of contact to 60 international students.	Massey University Halls of Residence
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Professional Activities

2020	Lecturer for Code First Girls Data Science Course
2011	Administrative assistant for the Australian Course in Advanced Neuroscience

Peer review

Reviewer for International Conference on Learning Representations (2016-21)
 Reviewer for Association for the Advancement of Artificial Intelligence (2018)
 Reviewer for Neural Information Processing Systems (2012-20)
 Reviewer for International Conference on Machine Learning (2017-19)
 Reviewer for NeurIPS Reproducibility Challenge (2019)
 Ad-hoc review for INFORMS Journal on Computing (2020)
 Ad-hoc review for Scientific Reports (2018)
 Ad-hoc review for Journal of Process Control (2018)
 Several ad-hoc reviews for Network: Computation in Neural Systems (2008-12)
 Ad-hoc review for PLoS Computational Biology (with Geoff Goodhill) (2007)