Carlton M. Downey

Contact Information	Machine Learning Department Carnegie Mellon University 5000 Forbes Avenue Pittsburgh, PA, 15213 USA	*Cell:* (+1) 412 304 6034 *E-mail:* cmdowney@cs.cmu.edu *Website:* www.cs.cmu.edu/∼cmdowney/

Citizenship New Zealand, Australia

Research Interests Machine Learning, Optimization, Recurrent Neural Networks, Kernel Methods, Spectral Algorithms, Graph Theory, Dynamical Systems, Manifold Embeddings.

Education

Carnegie Mellon University, Pittsburgh, PA, USA

Ph.D. Machine Learning **2011 -**
- Advisers: Associate Professor Geoffrey Gordon
             Professor Stephen Fienberg
- Thesis Title: Preditive State Recurrent Neural Networks
- GPA: 3.93/4.33

Victoria University of Wellington, Wellington, New Zealand

M.Sc. Computer Science **2010 - 2011**
- Adviser: Professor Mengjie Zhang
- Thesis Title: Explorations in Parallel Linear Genetic Programming
- GPA: 4.0/4

B.Sc. Computer Science, Mathematics, **2006 - 2010**
- GPA: 9.31/10
- Major GPA 9.50/10

Industry Experience

Google, New York, New York

Software R&D Intern **2017**
- Speaker Diarization (Who Spoke What When)

Google, Mountain View, California

Software R&D Intern **2016**
- Keyword Expansion for Ad placement on the Google Display+ Network.

Google, Mountain View, California

Software R&D Intern **2014 - 2015**
- Manifold Embeddings for Wifi-based Indoor SLAM (Simulatenous Localization And Mapping).

Innaworks, Wellington, New Zealand

Software R&D Intern **2007 - 2008**
- Developed a library for the Alchemo Java ME (J2ME) to BREW, iPhone, Android, Flash and Windows Mobile Cross Compiler translator.

SELECTED
PUBLICATIONS

C. Downey*, K. Choromanski*, and B. Boots. Initialization Matters: Orthogonal Predictive State Recurrent Neural Networks. Proceedings of the International Conference on Learning representations (ICLR). 2018.

A. Hefny, C. Downey, G. Gordon. An Efficient, Expressive and Local Minima-free Method for Learning Controlled Dynamical Systems. Association for the Advancement of Artificial Intelligence (AAAI). 2018.

Q. Wang, C. Downey, L. Wan, P. A. Mansfield, I. L. Moreno. Speaker Diarization with LSTM. International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2018. 2018.

C. Downey, A. Hefny, B. Li, B. Boots, and G. Gordon, Predictive State Recurrent Neural Networks, Proceedings of Neural Information Processing Sysmtes (NIPS) 2017

A. Hefny, C. Downey and G. Gordon, *Supervised Learning for Dynamical System Learning.* Proceedings of Neural Information Processing Sysmtes (NIPS) 2015

S. Reddi, A. Hefny, C. Downey, A. Dubey, S. Sra, *Large-scale randomized-coordinate descent methods with non-separable linear constraints.* UAI 2015

C. Downey, M. Zhang, and J. Liu. *"Parallel linear genetic programming for multi-class classification"*. Genetic Programming and Evolvable Machines, 2012. Special issue on selected papers from the 2011 European conference on genetic programming.

C. Downey, M. Zhang. *"Caching for Parallel Linear Genetic Programming"*. Proceedings of Genetic and Evolutionary Computation Conference (GECCO) Companion. 2011.

C. Downey and M. Zhang. *"Execution Trace Caching for Linear Genetic Programming"*. Proceeding of the Congress on Evolutionary Computation (CEC). New Orleans, USA, 2011.

C. Downey, M. Zhang. *"Parallel Linear Genetic Programming"*. Proceedings of the 14th European Conference on Genetic Programming (EuroGP). 2011. **(Nominated for the Best Paper Award)**.

C. Downey and S. Sanner. *"Temporal Difference Bayesian Model Averaging: A Bayesian Perspective on Adapting Lambda"*. In Proceedings of the 27th International Conference on Machine Learning (ICML-10). Haifa, Israel, 2010.

C .Downey, M. Zhang, W. Browne. *"New Crossover Operators in Linear Genetic Programming for Multiclass Object Classification"*. Proceedings of Genetic and Evolutionary Computation Conference (GECCO). Portland, USA, 2010.

C. Downey, M. Zhang. *"Multiclass Object Classification for Computer Vision using Linear Genetic Programming"*. Proceeding of the 24th International Conference on Image and Vision Computing New Zealand. Wellington, 2009.

AWARDS	**Victoria University of Wellington**

VUW Masters Scholarship, **2010**
- Tuition Waiver and $15,000/year Stipend

PGSA award, **2010**
- Top TA in School of Computer Science

VUW Graduate Award, **2009**
- Tuition Waiver, Senior Year.

Unlimited Potential Award, **2008**
- Top third year CS student

VUW School Leavers Scholarship, **2006**
- Tuition Waiver, freshman/sophomore year

TEACHING
EXPERIENCE

Carnegie Mellon University, Pittsburgh, PA, USA

Teaching Assistant **2013 - 2014**
- 10-601: Introduction to Machine Learning 1
- 10-701: Introduction to Machine Learning 2

Victoria University of Wellington, Wellington, New Zealand

Teaching Assistant **2007 - 2011**
- COMP 261: Algorithms and Data Structures
- COMP 303: Design and Analysis of Algorithms
- COMP 307: Introduction to Artificial Intelligence
- COMP 202: Formal Methods of Computer Science
- COMP 205: Software Design and Engineering
- COMP 103: Introduction to Data Structures and Algorithms
- SWEN 102: Introduction to Software Modelling
- COMP 102: Introduction to Computer Program Design

RESEARCH
EXPERIENCE

Australian National Universty, Canberra, AUS

Research Assistant **2009 - 2010**
- Scott Sanner
- Reinforcement Learning. Worked on a bayesian approach to dynamically adapting the λ value in TD(λ) methods.

Victoria University of Wellington, Wellington, NZ

Research Assistant **2008 - 2009**
- Mengjie Zhang
- Genetic Programming for Classification. Worked on new ways of mapping program output to class labels.

SERVICE
- Admissions Committee, CMU **2012 - 2014**
  - Admissions committee for PhD in Machine Learning at CMU.
- Social Committee, CMU **2012 - 2013**
  - Organised social events for CMU graduate students.

INTERESTS Badminton, Ultimate Frisbee, Ballroom Dance