Eric Crawford

PhD Candidate in Machine Learning
McGill University, Montreal, Quebec, Canada
eric.crawford@mail.mcgill.ca | e2crawfo.github.io | e2crawfo

Education

Candidate for PhD, Computer Science — *Montreal, Quebec, Canada*
McGill University / Mila — *2014-Present*
- Cumulative GPA: 4.0/4.0
- Member of Reasoning and Learning Lab

Master of Mathematics, Computer Science — *Waterloo, Ontario, Canada*
University of Waterloo — *2012-2014*
- Cumulative GPA: 91.80%
- Member of Computational Neuroscience Research Group

Bachelor of Mathematics, Honors Computer Science, Co-op, CogSci Option — *Waterloo, Ontario, Canada*
University of Waterloo — *2007-2012*
- Cumulative GPA: 88.07%
- Dean's Honors List with Distinction

Publications

Conference / Journal Articles

- **Crawford, E.**, and Pineau, J. (2020). Exploiting Spatial Invariance for Scalable Unsupervised Object Tracking. *AAAI*.
- **Crawford, E.**, and Pineau, J. (2019). Spatially Invariant Unsupervised Object Detection with Convolutional Neural Networks. *AAAI*.
- Dong, Y, Shen, Y., **Crawford, E.**, van Hoof, H., and Cheung, J.C.K. (2018). BanditSum: Extractive Summarization as a Contextual Bandit. *EMNLP*.
- Kroger, B., **Crawford, E.**, Bekolay, T., and Eliasmith, C. (2016). Modeling interactions between speech production and perception: speech error detection at semantic and phonological levels and the inner speech loop. *Frontiers in Computational Neuroscience*.
- **Crawford, E.**, Gingerich, M., and Eliasmith, C. (2015). Biologically plausible, human-scale knowledge representation. *Cognitive science*.
- **Crawford, E.**, Gingerich, M., and Eliasmith, C. (2013). Biologically plausible, human-scale knowledge representation. *Conference of the Cognitive Science Society.*

Workshops and Preprints

- **Crawford, E.**, and Pineau, J. (2020). Learning 3D Object-Oriented World Models from Unlabeled Videos. *ICML Workshop on Object-Oriented Learning.* **Outstanding Paper Award.**
- **Crawford, E.**, and Pineau, J. (2019). Spatially Invariant, Label-free Object Detection. *NeurIPS Workshop on Perception as Generative Reasoning.* **Spotlight.**
- Venkattaramanujam, S., **Crawford, E.**, Doan, T., and Precup, D. (2019). Self-supervised Learning of Distance Functions for Goal-Conditioned Reinforcement Learning. *arXiv preprint arXiv:1907.02998.*
- **Crawford, E.**, and Pineau, J. (2018). Spatially Invariant Attend, Infer, Repeat. *NeurIPS Workshop on Modeling the Physical World.*
- **Crawford, E.**, Rabusseau, G. and Pineau, J. (2017). Sequential Coordination of Deep Models for Learning Visual Arithmetic. *arXiv preprint arXiv:1809.04988.*
- Voelker, A., **Crawford, E.**, and Eliasmith, C. (2014). Learning large-scale heteroassociative memories in spiking neurons. *Unconventional Computation and Natural Computation.*

Theses

- **Crawford, E.** (2015). Biologically plausible, human-scale knowledge representation. Master of Mathematics Thesis, University of Waterloo.

Software

- **Crawford, E.** (2013-2015). MPI backend for the Nengo neural simulator. *https://github.com/nengo/nengo-mpi.*
- **Crawford, E.** (2010-2015). Contributions to Nengo neural simulator core library. *https://github.com/nengo/nengo.*

Awards & Scholarships

Alexander Graham Bell Canada Graduate Scholarship - Doctoral - $70,000 - NSERC *2016/09-2018/08*
David R. Cheriton Graduate Scholarship - $20,000 - University of Waterloo *2012/09-2014/08*
Alexander Graham Bell Canada Graduate Scholarship - Masters - $17,000 - NSERC *2012/09-2013/08*
President's Graduate Scholarship - $10,000 - University of Waterloo *2012/09-2013/08*
Ontario Graduate Scholarship - $15,000 (Declined) - Gov. of Ontario *2012/09-2013/08*
Computational Neuroscience Summer Program - $4,000 - University of Pennsylvania *2011/05-2011/07*
Undergraduate Student Research Award - $4,500 - NSERC *2011/01-2011/04*
Undergraduate Student Research Award - $4,500 - NSERC *2010/01-2010/04*
Industrial Undergraduate Student Research Award - $4,500 - NSERC *2008/09-2008/12*
President's Scholarship - $2,000 - University of Waterloo *2007/09-2007/12*

Experience

Machine Learning Consultant *San Francisco, California, USA*
Persona Identities Inc. *2019*
- Developed cloud-based deep learning capabilities for document verification using TensorFlow and Google Cloud.
- Designed and implemented deep computer vision solutions enabling new forms of document verification.
- Performed extensive model selection and hyperparameter tuning in the pursuit of an optimal tradeoff between inference speed, precision and recall.

Teaching Assistant *Montreal, Quebec, Canada*
School of Computer Science, McGill University *2014-2016*
- Implemented game-playing platform for AI course project, ran tournament involving hundreds of submitted agents.
- Held office hours, marked papers, gave tutorials.

Teaching Assistant *Waterloo, Ontario, Canada*
Department of Computer Science, University of Waterloo *2012-2014*
- Held office hours, marked papers, gave tutorials.

Lead Developer *Waterloo, Ontario, Canada*
Computational Neuroscience Research Group, University of Waterloo *2010-2014*
- Designed and implemented CUDA and MPI backends for the Nengo neural simulation package.
- Reduced network simulation times by several orders of magnitude using high-performance clusters, allowing networks containing hundreds of thousands of neurons to be simulated in real-time.

Research Assistant *Philadelphia, Pennsylvania, USA*
Department of Otorhinolaryngology, University of Pennsylvania *2011*
- Implemented computational methods for identifying neural receptive fields based on neurophysiological data.

Developer *Waterloo, Ontario, Canada*
Acronym Software *2009*
- Implemented UI features for wood and masonry engineering software in C++ and C#.

Skills

PyTorch, TensorFlow, OpenCV, Python, scikit-learn, Linux, C, C++, CUDA, MPI, LaTeX, Git, Java, Scheme