

WILLIAM B. FEDUS
University of Montreal
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EDUCATION

University of Montreal September 2020 (Expected)
Doctor of Philosophy in Computer Science
Montreal, QC
Deep learning with Yoshua Bengio and Hugo Larochelle

University of California, San Diego June 2016
Masters of Science in Physics, 3.9/4.0
La Jolla, CA
Deep learning with David Meyer (Math) and Garrison Cottrell (CSE)

Massachusetts Institute of Technology June 2010
Bachelors of Science, Physics, 4.7/5.0
Cambridge, MA

University of Cambridge, Robinson College June 2009
Physics (Junior Year)
Cambridge, England

RESEARCH AND EXPERIENCE

Montreal Institute of Learning Algorithms at UdeM September 2017 – Present
Graduate Student Researcher, Montreal, QC

- Co-advised by Yoshua Bengio and Hugo Larochelle researching generative models for model-based reinforcement learning and planning algorithms.

Google Brain December 2016 - August 2017
Software Engineering and Research Intern, Mountain View, CA

- Research to extend Generative Adversarial Networks (GAN) to natural language processing tasks by using a discriminator to set rewards in order to train a generative model in a reinforcement learning environment.
- Researching convergence of modern GAN-variants in the regime of a very low dimensional data manifold.

Google Research, Accelerated Sciences June 2016 - December 2016
Software Engineering and Research Intern, Mountain View, CA

- Coupled recurrent neural network connectivity into fully convolutional semantic segmentation architectures for semantic segmentation in microscopy video.
- Designed novel spatiotemporal 3D convolutional models with temporal dilation in order to operate and use information over very long time series.

Zillow Group Summer 2015
Data Scientist Intern, Seattle, WA

- Utilized deep convolutional neural networks for home value assessment based on images and developed a recurrent neural architecture employing LSTMs to process sequences and sets of images.
- Improved their existing home valuation algorithm, the Zestimate, via this approach.

Garrison Cottrell Group at UCSD October 2015 – Present
Graduate Student Researcher, La Jolla, CA

- Deep learning research, focusing on recurrent neural network architectures utilizing attentional models.

David Meyer Group at UCSD June 2014 – Present
Graduate Student Researcher, La Jolla, CA

- Researching new form of topological data analysis, persistent homology, used to better understand higher dimensional data and determine fundamental relationships of dataset structure in a domain.

Compact Muon Solenoid (CMS) Experiment at CERN April 2013– June 2014
Graduate Student Researcher, La Jolla, CA

- Redesigned and improved late-iteration seeding algorithms for track reconstruction for CMS
- This research demonstrated the feasibility and efficacy of a new and more efficient approach. The seeding algorithm, which is responsible for generating tracks, was implemented in CMS fall 2013 and led to a speedup in the entire track reconstruction process while maintaining an equal efficiency of finding charged particle tracks

Fidelity Management and Research Company August 2010 – March 2013
Global Equity Research Associate, Boston, MA

- Equity analyst responsible for buy and sell recommendations of \$200M-20B companies to the fund managers using a combination of fundamental and quantitative techniques. Top firm performance within the firm for my sector.
- Developed internal proprietary valuation software for valuation of Explorer and Producer oil and gas companies.

MIT Dark Matter Detection (DMTPC Group) June 2007 – June 2010
Undergraduate Student Researcher, Cambridge, MA

- Designed and optimized our working prototype by analyzing calibration data and devising new mechanical systems for gas flow.
- Researched physically motivated classification algorithms to improve DMTPC's sensitivity to incident dark matter directionality.

Fidelity Management and Research Company Summer 2008 & 2009
Global Equity Research Associate Intern, Boston, MA

- Analyzed the impact of global telecom non-SMS mobile data adoption and completed an investment breakdown of the water industry. Correctly identified top performing and worst performing equities within my assigned sector.

MIT Earth and Atmospheric Sciences Summer 2007
Undergraduate Student Researcher, Cambridge, MA

- Developed & tested nine atmospheric science experiments now used in the curricula at MIT and five other universities.

COMPUTER SKILLS

TensorFlow, Python, Pytorch, Matlab, R, Machine Learning, Parallel Computing, Scientific Linux. Experience with C++, OpenMP, MPI, CUDA, Theano, Torch and Caffe.

PUBLICATIONS AND PRESENTATIONS

- [1] A. Goyal, P. Brakel, W. Fedus, T. Lillicrap, S. Levine, H. Larochelle, Y. Bengio. Recall Traces: Backtracking Models for Efficient Reinforcement Learning. *(In review at) ICML, 2018.*
- [2] V. Thomas*, E. Bengio*, W. Fedus*, J. Pondard, P. Beaudoin, H. Larochelle, J. Pineau, D. Precup, Y. Bengio. Disentangling the independently controllable factors of variation by interacting with the world. *NIPS Workshop, 2017.*
- [3] W. Fedus*, M. Rosca*, B. Lakshminarayanan, A. M. Dai, S. Mohamed, I. Goodfellow. Many Paths to Equilibrium: GANs Do Not Need to Decrease a Divergence At Every Step. *ICLR, 2018.*
- [4] W. Fedus, I. Goodfellow, A. M. Dai. MaskGAN: Better Text Generation via Filling in the _____. *ICLR, 2018.*
- [5] E. Christiansen, S. Yang, D. Ando#, A. Javaherian#, G. Skibinski#, S. Lipnick#, E. Mount†, A. O’Neil†, K. Shah†, A. K. Lee†, P. Goyal†, W. Fedus†, R. Poplin†, A. Esteva, L. Rubin, P. Nelson*, S. Finkbeiner* . In Silico Labeling. *(Accepted to) Cell Journal, 2018.*
- [6] W. Fedus, M. Gartner, A. Georges, D. A. Meyer, D. Rideout. Persistent Homology for Mobile Phone Data Analysis. *Netmob 2015 Conference at MIT, 2015.*
- [7] J.P. Lopez, S. Ahlen, J. Battat, T. Caldwell, M. Chernicoff, C. Deaconu, D. Dujmic, A. Dushkin, W. Fedus, P. Fisher, F. Golub, S. Henderson, A. Inglis, A. Kaboth, G. Kohse, L. Kirsch, R. Lanza, A. Lee, J. Monroe, H. Ouyang, T. Sahin, G. Sciolla, N. Skvorodnev, H. Tomita, H. Wellenstein, I. Wolfe, R. Yamamoto, H. Yegoryan. Background Rejection in the DMTPC Dark Matter Search Using Charge Signals. *Proceedings of the DPF-2011 Conference, 2011.*
- [8] S. Ahlen, J. B. R. Battat, T. Caldwell, C. Deaconu, D. Dujmic, W. Fedus, P. Fisher, F. Golub, S. Henderson, A. Inglis, A. Kaboth, G. Kohse, R. Lanza, A. Lee, J. Lopez, J. Monroe, T. Sahin, G. Sciolla, N. Skvorodnev, H. Tomita, H. Wellenstein, I. Wolfe, R. Yamamoto, H. Yegoryan. First Dark Matter Search Results from a Surface Run of the 10-L DMTPC Directional Dark Matter Detector. *Physics Letters B, 695 (124), 2011.*
- [9] J.B.R. Battat, S. Ahlen, T. Caldwell, C. Deaconu, D. Dujmic, W. Fedus, P. Fisher, F. Golub, S. Henderson, A. Inglis, A. Kaboth, G. Kohse, R. Lanza, A. Lee, J. Lopez, J. Monroe, T. Sahin, G. Sciolla, N. Skvorodnev, H. Tomita, H. Wellenstein, I. Wolfe, R. Yamamoto, H. Yegoryan. DMTPC: Dark matter detection with directional sensitivity. *International Journal of Modern Physics A, 25:1-51,2010.*
- [10] W. Fedus. Reconstructing Nuclear Recoil Tracks in the Dark Matter Time Projection Chamber. *Senior Undergraduate Thesis, 2010.*
- [11] S. Ahlen et al. The case for a directional dark matter detector and the status of current experimental efforts. *International Journal of Modern Physics A, 25(1), 2010.*

ACHIEVEMENTS AND HONORS

- Amazon Web Services Research Grant for \$7500
- Temporal Dynamics of Learning Center (TDLC) Small Grant for \$2000
- Frontiers of Innovation Scholars Program (FISP) Fellowship for \$25000
- UCSD Physics Excellence Grant for \$15000
- UCSD SHORE Recruiting Award
- SMART Grant, Maine State Scholarship, ACT Grant at MIT
- 5th-Place Quantum Quandaries Event at National Science Olympiad
- National Society of Scholars

TEACHING

- UCSD CSE 253, Head TA of Graduate Neural Networks. Professor Garrison Cottrell, Winter 2015.
- UCSD CSE 190, Undergraduate Neural Networks. Professor Garrison Cottrell, Fall 2015.
- UCSD CSE 150, Artificial Intelligence. Professor Garrison Cottrell, Spring 2015.
- UCSD CSE 150, Artificial Intelligence. Professor Lawrence Saul, Winter 2014.
- UCSD PHYS 2B, Electricity and Magnetism. Professor Ivan Schuller, Fall 2014.
- High School and Undergraduate tutor for Physics, Math and Computer Science, 2014-Present.
- UCSD Young Physicists Program (YPP), outreach program to junior high and high school students.