

**WILLIAM B. FEDUS**  
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## EDUCATION

*University of California, San Diego* April 2018 (Expected)  
Doctor of Philosophy in Physics  
Deep learning with David Meyer (Math) and Garrison Cottrell (CSE)

*Massachusetts Institute of Technology* June 2010  
Bachelors of Science, Physics

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

## RESEARCH AND EXPERIENCE

*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.

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

- Deep learning research, focusing on recurrent neural network architectures utilizing attentional models.
- NVIDIA GPU Hardware Grant awarded in October for a neural network translation model.

*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

Python, Lua, C++, Matlab, R, ROOT, OpenMP, MPI, Machine Learning/Data Mining, Parallel Computing, Scientific Linux

## PUBLICATIONS AND PRESENTATIONS

- Persistent Homology for Mobile Phone Data Analysis. *Netmob 2015 Conference at MIT*, 2015.
- Background Rejection in the DMTPC Dark Matter Search Using Charge Signals. *Proceedings of the DPF-2011 Conference*, 2011.
- First Dark Matter Search Results from a Surface Run of the 10-L DMTPC Directional Dark Matter Detector. *Physics Letters B*, 695 (124), 2011.
- DMTPC: Dark matter detection with directional sensitivity. *International Journal of Modern Physics A*, 25:1-51,2010.
- Reconstructing Nuclear Recoil Tracks in the Dark Matter Time Projection Chamber. *Senior Undergraduate Thesis*, 2010.
- 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

- Frontiers of Innovation Scholars Program (FISP) Fellowship
- UCSD Physics Excellence Grant
- UCSD SHORE Recruiting Award
- SMART Grant, Maine State Scholarship, ACT Grant at MIT
- 5<sup>th</sup>-Place Quantum Quandaries Event at National Science Olympiad
- National Society of Scholars, Golden Key International Honor Society

## TEACHING

- UCSD CSE 190, 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.