

SEAN CONDON

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EDUCATION

Massachusetts Institute of Technology
Candidate for Bachelor of Science
Major in Physics – Minor in Computer Science

Aug 2017 - Expected 2021
Cambridge, MA
GPA: 4.8/5.0

RESEARCH EXPERIENCE

Large Hadron Collider Research Group - *Research Intern* - Remote *May 2020 - Sept 2020*

- Developed machine learning algorithms to detect particles with 15% greater accuracy than older methods.
- Optimized boosted decision tree models in Python using CatBoost and scikit-learn to have high signal detection efficiency with low enough latency to operate at LHCb's data output rate of 40 TBit/s.
- Published the CUDA code to implement my best performing models onto clusters of 1000s of GPUs.

LIGO Laboratory MIT - *Research Intern* - Cambridge, MA *Jan 2019 - Jan 2020*

- Developed a convolutional neural network to detect gravitational wave signals in noisy time series data.
- The model was trained on Google Cloud using the TensorFlow library in Python, and showed computational speeds 100x faster than traditional detection algorithms at similar accuracy.
- Detection, which was previously done on 800 CPU cores, could now be done in real-time on a single GPU.

Laboratoire d'Astrophysique de Marseille - *Research Intern* - France *June 2018 - Aug 2018*

- Characterized 3 new extrasolar planets by combined analysis of 340 stellar spectra in Python.
- Deduced most likely exoplanet parameters with a Markov Chain Monte Carlo algorithm.
- Analysis of datasets involved standard Python toolkit - scipy, numpy, matplotlib, pandas, scikit-learn.

TECHNICAL SKILLS

Software	Python (pandas, matplotlib, numpy, scipy), C++, SQL, CUDA, Swift, Linux, git
ML / AI	PyTorch, TensorFlow, scikit-learn, Google Cloud Compute
Math Courses	Linear Algebra, Probability, Statistics, Matrix Methods for Deep Learning

WORK EXPERIENCE

Learn Ventures / AmideTech - *Machine Learning Engineer* - Remote *Sept 2020 - Present*

- Developed machine learning and simulation approaches to computationally design 1000s of novel proteins.
- Used PyTorch models and NAMD simulations to optimize proteins for certain properties in-silico (stability, binding affinity, etc), and then verify those properties by synthesizing the proteins in lab.

Tomorrow.io - *Software Engineer* - Boston, MA *Jan 2020 - Feb 2020*

- Implemented machine learning to incorporate unconventional data sources into rainfall estimates.
- Analyzing signal strength changes between cellphone towers with an LSTM improved accuracy and resolution of rainfall predictions by 5%, especially in areas with few ground-based weather stations.

PUBLICATIONS & PRESENTATIONS

Convolutional Neural Networks as a Detection Algorithm for Binary Black Hole Mergers
Publication in preparation - Cambridge, MA *Aug 2019 - Present*

Machine Learning for Gravitational Wave Science
Presentation - LIGO Laboratory MIT, Cambridge, MA *Aug 2019*