Michael Walters

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RESEARCH

SEPTEMBER 2016 – JANUARY 2017
Software Developer
CSE, Ottawa, ON

I programmed a hybrid neural net for anomaly detection. The language was primarily Python, using TensorFlow with a Postgres database.

MAY – SEPTEMBER 2016
Astrophysics Researcher
McMaster University, Hamilton, ON

I simulated a galactic disk portion using parallel SPH tree-code GASOLINE to investigate behavioural dependencies on certain factors, primarily resolution. I prepared and modified initial conditions for these runs, and wrote Python scripts for the subsequent analysis. Additionally, I ran the bulk of these runs on the high-performance computing cluster SHARCNET.

JANUARY – SEPTEMBER 2015
Hyper-Kamiokande R&D
TRIUMF, Vancouver, BC

As part of the T2K Canada group, I worked on the successor to the 2015 Nobel Prize-winning neutrino oscillation project SUPER-KAMIOKANDE. My primary work was to determine the timing resolution of three different flash analog-to-digital converter modules. This included acquiring and processing signal data, for which I used the CERN analysis toolkit ROOT.

SOFTWARE SKILLS

PRIMARY | C++, Bash, Linux, Python, MATLAB, Git, LaTeX

SECONDARY | Maple, SQL, Postgres, Geant4, ROOT

EXTRA-CURRICULAR

SEPTEMBER 2013 – MAY 2016
Undergraduate Physics Volunteer Tutor
McMaster University, Hamilton, ON

SEPTEMBER 2014 – MAY 2016
Undergraduate Physics Society Executive
McMaster University, Hamilton, ON

OCTOBER 2014
Girls in Science Volunteer
McMaster University, Hamilton, ON

EDUCATION

2012 – 2017 | **B.Sc. Hons. Physics (Co-op)**
McMaster University
Hamilton, ON

SELECT COURSEWORK

Quantum Computing
McMaster University, Hamilton, ON

Followed *An Introduction to Quantum Computing* by Kaye, Laflamme, and Mosca up to and including Shor's algorithm. Topics included classical/quantum circuit models, associated mathematical foundations (Dirac notation, tensor products, etc.), spectral theorem, Schmidt decomposition, superdense coding, quantum teleportation, phase kick-back, Deutsch-Jozsa algorithm, Simon's algorithm, QFTs, and eigenvalue estimation.

Quantum Mechanics
McMaster University, Hamilton, ON

Two courses. Griffiths' *Introduction to Quantum Mechanics* used with some supplementary material. More advanced topics included time-(in)dependent perturbation theory, WKB approximation, variational principle, addition of angular momenta, and the hydrogen atom.

Computational Physics
McMaster University, Hamilton, ON

Two courses, both in C++. More advanced topics included Jacobi diagonalization, molecular dynamics, 2D Ising model, Laplace's equation, eigenvalue estimation, and parallel computing.

Machine Learning
Stanford University, Stanford, CA, United States
Online | Certificate awarded November 6, 2016

An introductory course offered through Coursera. Covers machine learning fundamentals such as gradient descent, cost functions, logistic regression, neural networks, Support Vector Machines, unsupervised learning, dimensionality reduction, anomaly detection, and diagnostic considerations.

PUBLICATIONS

2016 | [Editor's Suggestion] M. B. Bennett *et al.* (24 authors). *Isospin mixing reveals* $^{30}P(p,\gamma)^{31}S$ *resonance influencing nova nucleosynthesis.* Phys. Rev. Lett. 116, 102502.