Michael Astwood

mastwood101@gmail.com · +1 (204) 797-1337
Waterloo, Ontario, Canada

SKILLS

- **Programming**
  Python, Tensorflow, Pytorch, Gekko, Scipy, Anaconda, Scikit-Learn, MATLAB, CasADi, Mathematica, R, Javascript, NodeJS, C++, C#
- **Software**
  LaTeX, Adobe Creative Suite, Blender3D, GROMACS

EXPERIENCE

- **Brock University Dept. of Physics**
  Research Assistant - BUFA Explore Grant
  Researched spacetimes with multiple histories and time travel. Performed computations in Mathematica.
  May 2021 - September 2021
- **iGEM Waterloo**
  Team Lead - Mathematics and Modelling
  Lead an undergraduate research group in synthetic biology. Performed FEM simulations with FeNiCS and MD simulations with GROMACS. Won multiple awards and medals at annual iGEM Conference.
  February 2018 - January 2021
- **Univ. of Waterloo Dept. of Applied Math**
  Research Assistant - MURA Grant
  Conducted research in geometric control theory and microscopic fluid mechanics. Used Mathematica and Python to solve differential equations and optimization problems.
  May 2020 - September 2020
- **Univ. of Waterloo Dept. of Applied Math**
  Research Assistant - NSERC USRA Grant
  Researched optimal experimental design theory. Used MATLAB to simulate stochastic processes and perform statistical optimization.
  May 2019 - September 2019

AWARDS & RECOGNITION

- **Gold Medal, Best in Category**
  iGEM Competition *2020*
- **National Champion**
  CSA Spaceapps Challenge *2019*
- **Undergraduate Student Research Award**
  NSERC *2019*

EDUCATION

- **M.Sc. Mathematics**
  Wilfrid Laurier University, Waterloo, Ontario
  Concentration in Geometry and Analysis
  Expected Graduation August 2022
- **B.Sc. Honours Mathematical Physics**
  University of Waterloo, Waterloo, Ontario
  Minors in Pure Mathematics, Astrophysics
  Graduated with Distinction, June 2021
- **International Baccalaureate Diploma**
  Westwood Collegiate, Winnipeg, Manitoba
  Graduated with Distinction, June 2017

PROJECTS

- **A CNN Approach to Gravitational Wave Signal Detection**
  Replicated and improved on machine learning model from PhysRevD.103.024040. Added Bayesian component to network design. PHYS490 Final Project. Scored a grade of 100%.
  Pytorch, BLiTZ, Tensorflow *2021*
- **Geonomaly**
  Used advanced signal processing techniques such as the Hilbert-Huang Transform and Short-Time Fourier Transform to detect anomalies in geomagnetic data. Won best in category nationally at CSA Spaceapps 2019.
  Python, PyHHT *2019*

SCHOLARLY WORK

- **NLoed: A Python package for nonlinear optimal experimental design in systems biology** N. Braniff, T. Pearce, Z. Lu, M. Astwood, W. S. R. Forrest, C. Receno, B. Ingalls, bioRxiv: 2021.06.03.446189; doi: 10.1101/2021.06.03.446189. In Review. 2021
- **Born Geometry and Relative Locality**.
  Bachelor's Thesis in the field of complex geometry and theoretical physics. Supervised by Dr. Ruxandra Moraru. 2021
- **Remote Control of Particles in Microhydrodynamic Suspensions**.
  Conference poster and presentation at CUPC2020. Manuscript in preparation. 2020-Present