MICHAEL ASTWOOD

MASTWOOD.GITHUB.IO   MRASTWOO@UWATERLOO.CA

Education

University of Waterloo - 2021
BSc Honours. Mathematical Physics
Pure Mathematics Minor
Astrophysics Specialization

Westwood Collegiate - 2017
International Baccalaureate Diploma
Graduated with Honours
CAP Physics Exam Scholarship
UWaterloo Merit Scholarship

Programming

Scientific Computing
- **MATLAB**
  CasADI, Optimization Toolkit, Parallelization Toolkit
- **Python**
  GEKKO, FEniCS, Pandas
- **R Statistical Computing**

General Programming
- **C#**
  NET, XNA, Monogame
- **JavaScript**
  NodeJS, Express, Cheerio, Request, DiscordJS
- **Java, Arduino**
- **HTML, CSS, XML, Markdown**

Outreach

- **UWaterloo Science Ambassador**
  Representing mathematical physics as one of three ambassadors to incoming applicants and first year students at open houses and outreach events
- **Director, Physics Interconnected**
  Coordinated marketing and developed the structure of the mentoring service in Fall 2018
- **Creative Director, Science Society**
  Designed marketing materials for science society events at UWaterloo during Summer 2018

Professional Experience

Shum Microscale Fluid Mechanics Group
Research Assistant - May 2020 to Present
Supervised by Dr. Henry Shum
- Researching applications of geometric control theory to microscale fluid mechanics

Perimeter Institute for Theoretical Physics
Research Assistant - September 2019 to Present
Supervised by Dr. William Donnelly
- Investigating BRST-like symmetries in 2D Yang-Mills theories
- Readings in topological quantum field theory and string theory

Ingalls Quantitative Cell Biology Group
Research Assistant (NSERC USRA) - May 2019 to September 2019
Supervised by Dr. Brian Ingalls and Nate Braniff
- Completed research project on optimal experimental design theory, developing and testing stochastic models of biological systems

iGEM UWaterloo Mathematics and Modeling
Team Lead. February 2018 to Present
- Developed differential equation models related to fluid mechanics, geochemistry and plant biology, and chemical engineering
- Oversaw completion of multiple projects in synthetic biology

Posters and Presentations

An Optimal Experimental Design Software Package for Nonlinear Models in Biology
Co-Authored Conference Poster (SIAM OP2020)

Engineering Herbicide Tolerance in Rhizobia
Conference Poster, Talk (iGEM 2019 Competition)
Talk (oGEM 2019, Best Visuals Award)
Conference Poster (BioTEC 2019)

Characterization of Optimal Experimental Designs and Parameter Estimation Methods for a Genetic Toggle-Switch
Conference Poster (Canadian Undergrad Math Conference 2019)
Talk (UW Department of Applied Mathematics)

Dynamic Optogenetic Control of Co-Cultures
Conference Poster, Talk (iGEM 2018 Competition)

Projects

Advanced Quantum Theory Independent Study
- Independent study of course by Dr. Tobias Osborne on many particle quantum mechanics. Completed March 2020

Geonomaly - CSA SpaceApps | Won 1st Place Nationally
- Developed algorithm for detecting anomalous signals in geomagnetic data using modern techniques from signal processing