Murdock Aubry

email | (705) 994 - 3636 | GitHub | Linkedin | Website

Education

University of Toronto **June 2024 (Expected)**

H.B.Sc. Mathematics and Physics Specialist

Coursework: Machine learning, Deep learning, numerical analysis, optimization, nonlinear mechanics, computational physics, practical physics, real analysis, complex analysis, PDEs, linear algebra, probability, statistical analysis, topology, differential geometry, quantum mechanics, quantum information, classical mechanics, electromagnetism.

Experience

Research Assistant · **University of Toronto** **April 2023 - Present**

Currently conducting research on mathematical computational methods, with a large focus placed on numerical integration, differentiation, and numerical solvers of differential equations. A large focus is placed on implementing Fortran code for these solvers. Supervised by Professor James Bremer from the department of mathematics. This work has lead to a preprint.

Research Assistant · **University of Toronto** **September 2023 - Present**

Working in collaboration with a CERN research team of graduating students at U of T focussed on optimizing machine learning algorithms to determine the sensitivity of the DUNE detector to detect tau neutrinos. This project is supervised by Professro Nikolina Ilic in the physics departement in the form of a research course. See here for up to date progress.

Teaching Assistant · **University of Toronto** **September 2023 - Present**

I am a teaching assistant for MAT244, a second year course in ordinary differential equations. The position involves grading, exam invigilation, and running three weekly tutorials, each containing over 50 students.

Tutor · **Forest Hill Tutoring** **September 2023 - Present**

High school math and physics tutoring, largely focused on helping grade 11 and 12 IB students. Develop comprehensive lesson plans, incorporating relevant curriculum materials, practice exercises, and interactive teaching methods to engage students and reinforce understanding.

Civil Engineering Assistant · **SKYGRiD** **April 2022 - October 2022**

Worked on a 57 storey building in downtown Toronto, assisting the senior and assistant supervisors. Independently managed construction and renovation of small townhouse in downtown Toronto. Worked alongside mechanical, civil, and electrical engineers throughout entire construction process.

Academia

Preprint. The Levin approach to the numerical calculation of phase functions. Murdock Aubry, James Bremer. PDF

CUMC Talk 2023. The Adaptive Levin Method.

Online Course. Deep Learning With PyTorch: Image Segmentation. Certificate, Code

Technical Skills

Languages. Python, Fortran, R, HTML, CSS, Bootstrap, Bash, Mathemcatica, MATLAB, LaTeX.

Packages. PyTorch, TensorFlow, Numpy, Scipy, Pandas.

Software. AutoCAD, macOS, GitHub, Final Cut, Adobe.