

Aaron Trowbridge

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Education

Syracuse University

Sep 2015 – May 2021

- B.S. in Physics, with distinction (3.6 GPA); B.S. in Mathematics (3.8 GPA)
- Masters in Physics (unfinished - one semester as GTA) (4.0 GPA), coursework: Quantum Field Theory I; Lie groups, Lie algebras, and Representation Theory

Experience

Private Tutor

Mar 2021 – Present

- Subjects include: physics, statistics, calculus, and programming in python

Teaching Assistant (Syracuse Physics Department)

Jan 2019 – May 2021

- One semester as graduate TA for introductory mechanics, under Prof. Walter Freeman.
- Four semesters as undergraduate TA, for astronomy, mechanics, electromagnetism, and computational physics.

Research Assistant (Syracuse Physics Department)

- Lattice quantum gravity group, under Prof. Jack Laiho May 2020 – May 2021
- Plourde Research Lab (superconducting quantum devices), under Prof. Britton Plourde May 2018 – Dec 2020

Research & Projects

Personal Website and Blog

- Learning about static web development, including HTML, CSS, Markdown, Liquid, and (just a little) JavaScript.
- I have written blog posts about mathematical methods in quantum field theory and quantitative finance, as well as other topics, and plan on writing more about data science and machine learning in near future.

Gauge Theory and Topological Quantum Gravity

- As a final project for my QFT course I gave a talk on the theoretical aspects of quantizing gravity – discussing the graviton propagator, gauge theory, topological field theory, and Chern-Simons gravity.

Monte Carlo Methods for the Ising Model and Lattice Quantum Gravity

- Worked with the lattice gravity group to develop, implement, and test a novel rejection free variant of the Metropolis algorithm.
- A recorded talk can be found on youtube by clicking [here](#) and a github repo can be found [here](#).

Classical Simulation of a Quantum Computer

- As final project for a quantum information course, I implemented a custom quantum programming language and virtual quantum processor in Julia. A github repo can be found [here](#).

Barnes-Hut Tree Algorithm for Gravitational n -body Simulation

- Implemented, in Julia, this $O(n \log n)$ tree-based approximation scheme. Code found [here](#).

Numerical Methods for Quantum Mechanics

- Under the supervision of Prof. Walter Freeman, I implemented and experimented with three methods for simulating quantum mechanical systems and solving the Schrödinger equation. Code found [here](#).

Additional Information

Programming Languages: Julia, Python, C, C++, Haskell, Bash, Git, HTML, CSS, Markdown, L^AT_EX

Operating Systems: Linux (Arch, Manjaro i3), MacOS, Windows 10, Arduino

Hobbies: Reading, Chess, Snowboarding, Surfing, Skateboarding, Horseback Riding, Hiking