

Education

College of William & Mary

B.Sc. Physics and Mathematics
Monroe Scholar
Anticipated May 2023
GPA: 4.0/4.0

Thomas Jefferson High School for Science and Technology

Quantum Optics Specialization
2016-2019
GPA: 4.42/4.0

Courses & Extracurriculars

General Relativity **PHYS 786**
Intro to Quantum Computing **MATH 410**
Electricity & Magnetism I **PHYS 401**
Differential Geometry **MATH 317**
Quantum I/II **PHYS 313/314**
Elementary Analysis **MATH 311**
Abstract Algebra **MATH 307**
Classical Mechanics I/II **PHYS 208/303**
Differential Equations **MATH 302**
Mathematical Physics **PHYS 301**
Experimental Atomic Physics **PHYS 251**
Data Structures **CSCI 241**
Relativistic Electrodynamics
Astronomy & Astrophysics I/II

Treasurer of W&M Chapter of the Society of Physics Students:

Educational and social outreach for students and community members

Skills

Programming + Markup Languages

Python • Java • C++ • HTML/CSS •
Mathematica • MATLAB

Software Tools + Environments

Linux • Mac OS • MS Office Suite •
LaTeX • Fusion 360

Hardware Tools

Woodworking • Machining • Raspberry Pi • Arduino • Software Defined Radio

Hobbies

Woodworker • Violinist • Tennis • Oud •
Amateur Astronomy

Research & Work Experience

Emergent theories of quantum gravity

2020 to Present

Goal: explore diffeomorphism invariant models of composite gravity
Present responsibilities: determine whether a latticized diffeomorphism invariant scalar field theory can give rise to an emergent theory of quantum gravity

Novel dark-ground imaging w/ atom chip

2019 to Present

Goal: demonstrate a new method for diffractive dark-ground imaging where secondary image is generated by reflection of signal for use in Dr. Seth Aubin's work in atomic interferometry
Theory: developed theoretical relations between subject radius, illuminating beam angle, and distance to atom chip and relative intensity of secondary image
Computation: built a C++ ray-tracing simulation using OpenCV library to aid in rough experimental design
Experiment & Results: designed and implemented an experimental set-up. Imaged secondary dark-ground images and demonstrated agreement with theory for distance/intensity relation

Wavefunction and quantum weak measurement

2018 to 2019

Goal: recover wavefunction using quantum weak measurement of a many-photon system, extending work of Dr. Jeff Lundeen (unaffiliated)
Method: project was self-motivated and self-conducted, without professional mentorship. Introduced alteration to Dr. Lundeen's weak measurement procedure to overlap adjacent measurements

TJREVERB satellite development team

2016 to 2019

Goal: demonstrate efficacy of the Iridium Constellation for low earth orbit communications through development of satellite via NASA's CubeSat Launch Initiative
Software Communications Lead: responsible for non-payload communications via APRS. Developed standard communications and telemetry downlink protocols. Conducted first tests with Iridium. Aided in early ground-station implementation and atmospheric balloon tests
Systems Engineer: part of a small team responsible for developing systems architecture and flight software. Resident expert in our electronic power system
Webmaster: responsible for web outreach between 2017 and 2018

TJ Physics Team & outreach

2016 to 2020

TJPhO: worked on inaugural TJ Physics Olympiad on post-AP material
Officer: conducted lectures on topics ranging from AP Physics material to classical field theory. Worked at biennial USA Science & Engineering Festival. Organized trips to APS March Meetings

Williamsburg Officer of Elections

November 2020

Fairfax Collegiate tutor

Summer 2019

Honors & Awards

Monroe Scholarship	2019	USAPhO National Semifinalist	2018
AFSA Scholarship	2019	NASA VAST's Summer Scholar	2018
HackTJ Best Hardware Hack	2019	JUMP Lab Recipient	2017