

# Jack Dinsmore

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## Links

Github: [jack-dinsmore](#)  
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## Skills

### PRIMARY LANGUAGES

Python, C++, Rust

### OS

Linux, Windows

### OTHER SKILLS

Mathematica, Java, C, Bash,  
 $\LaTeX$ , Tensorflow, Git, HTML,  
DirectX, OpenGL, Google Cloud  
Matplotlib, Microsoft Office,  
various Python data analysis tools

### INTERESTS

CUDA, Javascript, Web  
development, Cryptography  
Game development

## Education

### MIT '22

Major: Physics  
Minors: Astronomy, Math  
GPA (unweighted): 5.0/5.0  
Avg. workload: 60 hrs / week

### HIGH SCHOOL '18

Amherst Regional High School  
GPA (unweighted): 3.998/4.0  
Student rep. to school committee

## Coursework

### PHYSICS & ASTRO

Quantum Physics I, II, III  
Quantum Field Theory (Grad)  
Classical Mechanics I, II, II  
Statistical Physics I, II  
Experimental Physics I, II  
General Relativity (Grad)  
The Early Universe

### MATH & CS

Real & Complex Analysis  
Algebra I  
Probability  
Mathematics for CS  
Intro to Algorithms  
Intro to Data Science

## Research Experience

### 2021– Tidal Torque Reveals Asteroid Shape and Density (MIT)

I consider an asteroid on close flyby to a planet and derive the changes in flyby observables induced by tidal forces. I am currently analyzing the effectiveness of an algorithm to fit an asteroid shape and density model to flyby data. — *Simulation, Modeling, MCMCs* | [C](#), [C++](#), [Python](#), [Mathematica](#)

### 2020– Modeling the Galactic Center Excess (MIT)

We contrast millisecond pulsar explanations for the Galactic Center Excess found in the literature. — *Data analysis, Simulation, Plotting* | [Python](#), [C++](#), [Mathematica](#)

### 2020– Ensemble Photometry on Open Clusters (Lehigh U)

We develop an algorithm to extract error-corrected luminosity fluctuations from large images of unresolved open clusters in the TESS catalog. — *Data analysis & cleaning* | [Python](#), [Database queries](#)

### 2019–20 Machine Learning & Big Data (MIT) [ML: Sci. Tech.](#)

We design a GPU-implemented neural network to reconstruct events in the Large Hadron Collider CMS experiment, and determine that it is faster than the nominal CPU-implemented regression algorithm. — *ML, Large collaborations* | [C++](#), [Python](#), [Bash](#)

### 2017–18 Black Hole Thermodynamics (UMass Amherst) [CQG](#)

We demonstrate that the heat capacity of a Schwarzschild-de Sitter black hole exhibits an extremum at low temperature analogous to the classical Schottky anomaly, which occurs in low-temperature two-state systems. — *Mathematics, Interdisciplinary research* | [Python](#)

## Personal Projects

### 2021– Throrgan

A customizable music compiler that reads custom-formatted text files describing how a piece of music should be played, and produces a wav-formatted recording of the piece. — *Mathematics, High performance* | [Rust](#)

### 2020–21 Vokdh

A word processor specifically designed for the conlang “Fi Tobair” that I created. It contains many features, including a searchable and editable dictionary and mousing over a word to see its translation. — *UI, Memory optimization* | [C++](#), [Windows Graphics API](#)

### 2020–21 Poetron

A discord bot that repeats any messages that conform to a poetic meter with line breaks in the correct places. — *Web apps* | [Python](#)

### 2014– Computer Games

Several, mostly space-themed 3D video games I wrote in high school to learn C++. They are incomplete and unoptimized, but constitute thousands of lines of code and graphics engines I wrote myself. — *Graphics, High performance* | [C++](#), [Python](#), [OpenGL](#)