

JACK DINSMORE

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Education

Sept 2018–June 2022 Massachusetts Institute of Technology
GPA: 5.0/5.0
B.S. in Physics; Minors in Astronomy and Mathematics; Concentration in Music
Major advisor: Tracy Slatyer

Research Experience

- June 2021–
 - Can asteroid density profiles be extracted from changes in angular velocity induced by tidal torques during Earth flybys? I proposed and investigated this question in a class (12.420: Planetary Science) in the fall of 2020, and am currently following it up with more detailed research by deriving the equations of motion, building an asteroid simulation, and fitting the simulation to simulated data. The class was taught by Prof. Julien de Wit (MIT), and he is this project's research advisor, though the work is entirely my own and I act with almost no direction. *20 hours per week.*
- Sept 2020–
 - Could millisecond pulsars produce the Galactic Center Excess? I analyze models for the Galactic Center Excess from the literature with my advisor Prof. Tracy Slatyer (MIT), helping to resolve conflicts and highlight common attributes between different models. I perform this investigation and discuss results on a weekly basis with my advisor, and am writing a paper which will soon be submitted for publication. *20 hours per week.*
- Summer 2020
 - Can the variability of unresolved stellar clusters be used to determine the clusters' age? I investigated this question in an REU group led by Prof. Joshua Pepper (Lehigh University) with a graduate and undergraduate student. I extracted the variations of unresolved stellar clusters from TESS (Transiting Exoplanet Survey Satellite) data and compared them to data obtained from more sensitive telescopes in which the clusters are resolved. Publication is expected within a year. *40 hours per week.*
- Fall 2019
 - Can machine learning algorithms improve analysis speed of Large Hadron Collider data? Under Prof. Phil Harris (MIT) and graduate student Jeffery Krupa, I timed standard machine learning algorithms on different hardware types, then built tens of models to perform a specific regression required in the High Level Trigger and timed them. I also built a server to time and demonstrate the ability to regress on data sent from client machines [2]. *40 hours per week.*

- Summer 2018 • What thermodynamic properties do black holes in an expanding spacetime and low temperature solids have in common? Working with Prof. Jennie Traschen (UMass Amherst), I found a feature of interest in a black hole theoretical model which she had asked me make plots for. She identified the feature and connected the feature to a classical property of low temperature solids, which provided the seed for Ref. [1]. *5 hours per week.*

Publications, Peer Reviewed

2. Jeffrey Krupa et al. GPU coprocessors as a service for deep learning inference in high energy physics. *Mach. Learn. Sci. Tech.*, 2(3):035005, 2021 (Further authors are not listed because there are 16; I am fourth.)
1. Jack Dinsmore, Patrick Draper, David Kastor, Yue Qiu, and Jennie Traschen. Schottky Anomaly of deSitter Black Holes. *Class. Quant. Grav.*, 37(5):054001, 2020

Presentations

- Aug 2021 • Concluding research presentation to PRISM, an MIT undergraduate research conference, for my research on the Galactic Center Excess.
- Aug 2020 • Final research presentation to conclude my REU at Lehigh University to REU faculty, students, and members of the public.

Undergraduate Awards & Honors

- Sept 2021 • Best pendulum experiment in Experimental Physics (8.13) section as ranked by section leader Prof. Phil Harris (MIT).
- May 2020 • Accepted at competitive REU program at Lehigh University. See research with Prof. Pepper above.
- Jan 2019 • Fourth place in MIT Pokerbots competition (award shared among three other group members). For Pokerbots, competitors write a program that automatically places bets in a simulated game of Texas hold 'em. Programs written by different competitors play against each other and are ranked by amount of winnings at the end of the month.

Teaching experience

- Spring 2019 • Problem set grader for Physics I (8.012) under Prof. Phil Harris. *4 hours per week.*
- SAT Math section teacher for MIT ATI, a student organization that tutors local high school students on SAT prep. I designed and taught six one-hour lessons over the semester, each taught to three distinct classes of students. *7 hours per week.*
- Fall 2018 • SAT Math section teacher for MIT ATI. *7 hours per week.*

Community Activities

- Feb–Dec 2021 • Chief copy editor for *The Tech*, MIT’s student newspaper. *3 hours per week.*
- Jan–Mar 2020 • Build chief for Next Big Thing (Project canceled due to COVID-19). Next Big Thing was a medieval castle built temporarily in my dorm’s courtyard to attract first-years to the dorm. I advised in the design and orchestrated the construction budget. *3 hours per week.*
- Spring 2020 • Cellist for MIT Chamber music society (audition required). *6 hours per week.*
- Spring & Fall 2019 • Cellist for MIT Symphonic Orchestra (audition required). Music, especially orchestral music, requires significant communication between musicians both while performing and during rehearsals, which is why I list it as a community activity. *6 hours per week.*
- Build assistant in Next Haunt, an escape room designed, built, and haunted by students for Halloween. *1 hour per week.*
- Fall 2018 • Cellist for MIT Symphonic Orchestra (audition required). *6 hours per week.*

Individual Projects

- 2021 • [Personal Website](#) (HTML, Javascript). `jack-dinsmore.github.io`
- [Throrgan](#): A program to read notated music and compile it into an audio file. (Rust)
- *The Fifth Empire*: a sci-fi novel.
- 2020 • [Poetron](#): A Discord chat bot that reads users messages, finds text that conform to various poetic meters, and repeats them with line breaks to match the meter. (Python)
- [Vokdh](#): A word processor, dictionary, and translator for the spoken language *Fi Tobair* which I created. (C++)
- [My father’s professional website](#) (HTML). `people.umass.edu/dinsmore`
- 2019 • Astra: A space-themed, colony-building video game with a 3D engine I built. (C++)
- 2018 • Sidera: A maritime role playing video game with a 3D engine I built. (C++)
- 2017 • Azimuth: A space-themed, hyper-realistic fighter simulator with a 3D engine I built. (C++)