ZACHARY KNUTSON

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EDUCATION

University of Florida August 2022 - Present
Pursuing B.S in Astrophysics & B.S in Physics

GPA: 3.97
Selected Coursework: Mathematical Methods for Physics, Observational Techniques in Astronomy, Astronomy & Astrophysics I & II, Computational Linear Algebra

Eastern Florida State College June 2021 - May 2022
29 Credits - Dual Enrollment

Selected Coursework: Ordinary Differential Equations, Calculus I-III

RESEARCH EXPERIENCE

Undergraduate Researcher October 2022 - Present
Department of Astrophysics UF

- Utilizing Python code TORMAC to generate model grids of simulated time domain data of a 3D ensemble of dust clouds illuminated by a central continuum source, taking into account radiative transfer effects.
- Interpreting TORMAC results by comparing simulated to observed time domain data qualitatively through visual inspection and quantitatively through Markov chain Monte Carlo analysis.
- Optimizing TORMAC primarily through vectorization, pre-computation, and implementing multiple new algorithms to substantially reduce computational cost/increase model grid density.
- Interfacing with UF research computing resources to allow greater parallelization of TORMAC.

RESEARCH INTERESTS

Computer Simulations & Modeling	Developing novel code, optimization, & visualization
High Energy Astrophysics	Inflows / outflows, accretion, radiative transfer
Observational Astrophysics	Time domain astronomy, data reduction & analysis

Currently seeking diverse research experiences to support a future career in Astrophysics

AWARDS

CLAS Scholars Award *($3000)* Spring 2023

- Awarded by the College of Liberal Arts and Sciences (CLAS) to 25 undergraduate students to pursue their proposed research for the 2023-2024 academic year.
- I wrote a 2-page proposal with advice from my mentor which was submitted for review by the astronomy department and the college.
- Only 3 students were nominated by the UF Astronomy Department to the college.
- Award includes an additional research expenses allowance of up to $1000.

TECHNICAL SKILLS

Programming Languages	Python, Java, MATLAB, Javascript, C++, Bash, LaTeX
Selected Python Packages	Matplotlib, Pandas, Numpy, Scipy, Numba
Computing Tools	Overleaf, SSH, Git/GitHub, Pycharm
Operating Systems	Linux, Windows

EXTRACURRICULAR ACTIVITIES & OUTREACH

Women in Astronomy & Astrophysics Mentorship Program September 2023 - Present
Mentor

- Fulfilling a key role as a mentor by guiding and supporting a first-year student, providing tailored advice, resources, and networking opportunities.
- Developing a deeper understanding of women's issues in astronomy through workshops and Q&As.

UF Campus Teaching Observatory January 2023 - Present
Volunteer

- Educating 50+ community members per week on celestial objects of interest to foster interest in STEM at all ages.
- Assisting in the setup, alignment, slewing, and stowing of telescopes.

Astronomy & Astrophysics Society UF September 2022 - Present
Member

- Engaging with students university-wide and the Gainesville community through outreach events such as UF's Homecoming Parade, presentations at local elementary schools, and a Women in STEM Day event.

FIRST Robotics Competition (FRC) September 2018 - May 2022
Chief Executive Officer

- Served as a founding member of a robotics team of 50+ students that competes in FRC, a national program dedicated to allowing students to strategize and build robots based on engineering principles.
- Directed the design, production, and programming of a 120lb, refrigerator-sized robot over eight weeks by leading a team of 20+ people.