CHAUNCEY TANNER MURPHEY

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I'm a second-year master's student at Stony Brook University interested in the fields of time-domain astronomy, supernovae observations, and transients. I would like to use surveys like LSST, ZTF, Pan-STARRS/YSE, ASAS-SN and/or others to see what more we can learn from supernovae, either by what they seem to have in common or how they differ.

EDUCATION

MA   Stony Brook University, Physics   May 2023
        GPA: 3.95/4.00
        Thesis: "Rapid Mass Function Cosmology with LIGO O3a/b Data"
        Advisor: Will Farr
        Advanced Graduate Certificate in Data and Computational Science

BS   University of Illinois at Urbana-Champaign, Astronomy   May 2020
        GPA: 3.17/4.00
        Thesis: Rates and Detectability of Naked-Eye Milky-Way Supernovae
        Advisor: Brian Fields
        Minors in Physics, Computer Engineering

RESEARCH EXPERIENCE

Flatiron Institute, New York, New York   2022-
Guest Researcher, Gravitational Wave Group, Center for Computational Astrophysics
- Project: Rapidly estimating cosmological parameters using data from LIGO O3a/O3b
- Collaborated in multiple weekly group meetings with other faculty and postdocs
- Attended multiple workshops for transient and gravitational wave astrophysics

Stony Brook University, Stony Brook, New York   2022-
Graduate Student Researcher, Gravitational Wave Group
- Joint project with Flatiron Institute: rapid mass function cosmology
- Used Bayesian statistical analysis to estimate cosmological parameters with errors on par with official LIGO estimates, but with orders of magnitude less computing power

Illinois Center for Advanced Study of the Universe, Urbana, Illinois   2018-2021
Undergraduate Researcher
- Modeled distributions of supernovae in the Milky Way, focusing on their visibility from Earth and the discrepancy between estimated rates and lack of recorded events
- Paper culminating research published into *Monthly Notices of the Royal Astronomical Society* and covered in an article in *Popular Science*

Journal Publications

Murphey, C. T., Hogan, J. W., Fields, B. D., Narayan, G. S., "Witnessing history: sky distribution, detectability, and rates of naked-eye Milky Way supernovae," Monthly Notices of the Royal Astronomical Society, Volume 507, Issue 1, October 2021, Pages 927–943, https://doi.org/10.1093/mnras/stab2182

Other Papers

Strader, J., et al., "The Plane's The Thing: The Case for Wide-Fast-Deep Coverage of the Galactic Plane and Bulge," 2018, https://arxiv.org/abs/1811.12433v1

PRESENTATIONS, CONFERENCES AND WORKSHOPS

Presented:

"Witnessing History: Rates and Detectability of Naked-Eye Milky Way Supernovae," Undergraduate Research Symposium, University of Illinois, March 2019.

"Witnessing History: Rates and Detectability of Naked-Eye Milky Way Supernovae," AstroFest, University of Illinois, April 2019. Joint presentation with Jacob Hogan.

"Supernovae in the Milky Way," Boom! A Workshop on Explosive Transients with LSST, University of Illinois, July 2022.

Attended:

LIGO Open Data Workshop, Flatiron Institute, June 2022

COURSEWORK

Stony Brook University (Graduate)
Physics: Stars, Cosmology, Dark Universe, Astrostatistics, Computational Physics
Computing: Data and Computational Science, Scientific Programming in C++
Other: Communicating Science

University of Illinois (Undergraduate)
Physics: Classical Mechanics I & II, Quantum Physics I, Relativity & Math Apps.
Astronomy: Stellar Astrophysics, Computing in Astronomy, Nuclear & Particle Astrophysics (Graduate Level), Astronomical Techniques, Galaxies & the Universe
Mathematics: Calculus I-III, Differential Equations, Applied Linear Algebra, Probability with Engineering Applications

Computing: Intro to Sci. Computing, Intro to Computing, Intro to Electronics, Computer Systems and Programming, Data Science & Engineering, Digital Systems
Other: General Chemistry, Macroeconomics, Spanish in the Professions

COMPUTING SKILLS

Programming:
> *Python:* NumPy, SciPy, matplotlib, pandas, AstroPy, seaborn, h5py, PyMC, ArviZ, TensorFlow, NLTK, scikit-learn, Aesara, Theano
> *Other languages:* LaTeX, Julia, C++, C, SQL, MATLAB, Assembly, MongoDB, SystemVerilog, Markdown

Software: VS Code, Jupyter, Linux, Zsh, Bash, SolidWorks

OUTREACH EXPERIENCE

LabEscape, Urbana, IL   2018-2020
- Worked at a physics-based escape room run by the UIUC physics department as a science outreach program, servicing clientele between 8 and 70 years old
- Started customers off by teaching via demonstrations various physics topics like eddy currents and polarization before leading them into the escape room
- Ended each run by explaining the physics behind the puzzles which included refraction, infrared light, lasers, diffraction, and thermochromic materials
- Attended local farmers markets to advertise the room while performing additional demonstrations involving liquid nitrogen and thermal cameras

Robobrawl, Urbana, IL   2016-2020
- Built a 30-lb "battlebot" for UIUC's annual robotics competition held during the Engineering College's main outreach event: Engineering Open House (EOH)
- Competed on team as well as helped organize and run the competition
- Most popular exhibit at EOH, showcasing to all ages the wonders of engineering

LEADERSHIP EXPERIENCE

Robobrawl, Urbana, IL   2017-2020
Pit Coordinator
- Oversaw registration of teams for international combat robotics competition
- Responsible for safety of 32 teams inside pit area while competition was underway
- Ensured competitors were ready to fight in their scheduled matches

Combat Robot Builder
- Part of 6-person team that designed and built 30lb combat robots ("battlebots")
- Assisted in design and modeling of robots inside SolidWorks CAD
- Assembled the robots in months leading up to competitions
- Competed in Robobrawl, UIUC's international combat robotics competition

OTHER

Interests/Hobbies: Playing soccer and baseball, data analysis of Major League Baseball, watching many different sports, reading hard sci-fi books, stargazing

Other Projects:

Used Markov Chain-Monte Carlo to fit a power law to the main sequence line of a Hertzsprung-Russell diagram made from a sample of GAIA DR3 data
https://github.com/ctmurphey/H-R-Analysis

Compared how various Machine Learning algorithms can predict which Major League Baseball players become Hall of Famers
https://github.com/tannermurphey/ML-BaseballHoF

Various smaller baseball-related projects, including comparing similar divisional races and breaking down team win-loss records by opponent
https://github.com/ctmurphey/baseball

Created an array of guitar effects pedals on an Altera DE-2 Development Board using SystemVerilog
https://github.com/jsamarth/GuitarPedalBoard

REFERENCES

Dr. Will Farr, Professor
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Dr. Gautham Narayan, Professor
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