




# Shawn Ray

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## EDUCATION

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### Master's of Science in Astrophysics

City University of New York (CUNY) – Graduate Center | New York, New York

Expected May 2026

GPA: 3.93

### Bachelor's of Science in Physics

Oklahoma State University | Stillwater, Oklahoma

Dec 2023

Major GPA: 3.50

## PUBLICATIONS

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### Refereed

Barry McKernan; K.E. Saavik Ford; Harrison E. Cook; Vera Delfavero; Emily McPike; Kaila Nathaniel Jake Postiglione, **Shawn Ray** and Richard O'Shaughnessy (Sept. 2025). "McFACTS I: Testing the LVK AGN channel with Monte Carlo For AGN Channel Testing Simulation (McFACTS)". In: *The Astrophysical Journal* 990.217, p. 17. URL: [doi.org/10.3847/1538-4357/adf114](https://doi.org/10.3847/1538-4357/adf114).

Vera Delfavero; K.E. Saavik Ford; Barry McKernan; Harrison E. Cook; Emily McPike; Kaila Nathaniel Jake Postiglione, **Shawn Ray** and Richard O'Shaughnessy (Aug. 2025). "McFACTS III: Compact Binary Mergers from Active Galactic Nucleus Disks over an Entire Synthetic Universe". In: *The Astrophysical Journal* 989.67, p. 12. URL: [doi.org/10.3847/1538-4357/ade4c1](https://doi.org/10.3847/1538-4357/ade4c1).

### Non-Refereed

Harrison E. Cook; Barry McKernan; K.E. Saavik Ford ; Vera Delfavero; Kaila Nathaniel; Jake Postiglione **Shawn Ray**, Emily McPike and Richard O'Shaughnessy (Nov. 2024). "McFACTS II: Mass Ratio–Effective Spin Relationship of Black Hole Mergers in the AGN Channel". In: *arXiv* 2411.10590. URL: [doi.org/10.48550/arXiv.2411.10590](https://doi.org/10.48550/arXiv.2411.10590).

V. Delfavero; **S. Ray**; H. E. Cook; K. Nathaniel; B. McKernan; K. E. S. Ford; J. Postiglione, E. McPike and R. O'Shaughnessy (Nov. 2024). "Prospects for the formation of GW231123 from the AGN channel". In: *arXiv* 2508.13412. URL: [doi.org/10.48550/arXiv.2508.13412](https://doi.org/10.48550/arXiv.2508.13412).

### In-Prep

**Shawn Ray**, Keefe Mitman; Emily McPike; Barry McKernan and K.E. Saavik Ford (Oct. 2025). "Prospects for the formation of GW231123 from the AGN channel". In: *arXiv* 2508.13412. URL: [doi.org/10.48550/arXiv.2508.13412](https://doi.org/10.48550/arXiv.2508.13412).

## RESEARCH EXPERIENCE

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### Graduate Research Assistant

CUNY Graduate Center | New York, New York

Jun 2024 – Present

- Upgraded the Python based McFACTS code, an open-source software for modeling binary black hole mergers within active galactic nuclei (AGN), through the implementation of a Numerical Relativity Surrogate model
- Improved McFACTS algorithms to generate more physically accurate descriptions of post-merger black hole spins
- Reviewed and revised documentation for McFACTS to facilitate a successful public release

### Maximizing Student Potential Intern

NASA Jet Propulsion Laboratory | Pasadena, California

2023

- Developed Python based galaxy simulations to better understand the identification process for spectral interlopers found in Euclid telescope simulated data catalog
- Successfully generated a power spectra of simulated Euclid telescope observations to identify baryonic acoustic oscillations peaks

## Dunlap Institute Astronomical Instrumentation Summer School Student

2023

University of Toronto | Toronto, Ontario, Canada

- Learned the basics of astrophysics instrumentation through hands on lab sessions and lectures, covering major sections of the EM spectrum such as radio, infrared, optical, and gamma-rays

## Undergraduate Astrophysics Researcher

Jan 2022 – May 2023

Oklahoma State University | Stillwater, Oklahoma

- Analyzed Gamma-ray Burst (GRB) data from the Fermi Gamma-ray Space Telescope to help create a standard relationship between a GRB's total energy and distance using T90 durations
- Assisted in the grant writing process and acquiring funding for future departmental astrophysics projects
- Contributed to the revival OSU's Mendenhall Observatory

## Hardware Developer

2022

IBM | Durham, North Carolina

- Developed Python GUI for more efficient interaction with Power Line Disruption (PLD) testing equipment
- Learned common PLD testing methods and effects of RF emissions on IBM data servers
- Presented weekly updates to Electromagnetic Compatibility group meetings

## Undergraduate Electrical Engineering Researcher

Aug 2021 – July 2022

OSU Department of Electrical Engineering | Stillwater, Oklahoma

- Helped found the first Cube Satellite program in Oklahoma
- Supported in systems development life cycle processes for both CubeSat and ground station operations
- Led collaborative weekly meetings to maintain efficient progress and brainstorm project expansion

## Stanford Undergraduate Research Fellow

2021

Stanford University | Virtual

- Performed 3D modeling simulations to analyze the motion and forces of a drone grasping device
- Practiced presentation and communication techniques with a final poster report and analysis

## Undergraduate Mechanical Engineering Researcher

Jan 2019 – May 2021

OSU Department of Mechanical and Aerospace Engineering | Stillwater, Oklahoma

- Tested electrical and mechanical properties of artificial muscles to better determine applications within soft exoskeletons for use in rehabilitation
- Presented findings in numerous conferences and developed excellent scientific communication skills

## Chief Designer

Sep 2017 – May 2018

OSU Micro-g NExT Space Cowboys | Stillwater, Oklahoma

- Led lifecycle development for a mechanical device to seal potential micrometeorite breaches on the hull of the International Space Station during extra-vehicular activities
- Collaborated in proposal writing and outreach events focused on bringing more students into STEM
- Successfully presented to NASA engineers and former astronauts at the Neutral Buoyancy Laboratory

## TECHNICAL SKILLS

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**Languages:** Python, HTML, CSS, C/C++, Java

**Developer Tools:** Git, VS Code,  $\text{\LaTeX}$ , Visual Studio, Jupyter Notebook

**Libraries:** Astropy, SciPy, Pandas, NumPy, Matplotlib, Nbodykit

## AWARDS/FELLOWSHIPS

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CUNY GC BrainE Blitz Lightning Competition: McFACTS findings – 2nd Place 2025

Oklahoma State University Physics Department – Best Undergraduate Researcher 2023

AISES Lighting the Pathway Fellow – Academic honor supporting future Indigenous faculty 2021 – 2023

McNair Research Scholar – Academic honor 2019 – 2023

OK-LSAMP Research Scholar – Academic honor 2019 – 2023

Cobell Scholar – Academic scholarship supporting Indigenous students 2018 – 2023

## PRESENTATIONS

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### Invited Talks

CUNY Astrofest: McFACTS findings	Sep 2025
Harvard CfA – Lars Hernquist Group Meeting: McFACTS findings	Aug 2025
AstroOnTap: Upcoming T-Coronae Borealis nova	Sep 2024
AMNH Astro Summer Camp: K-12 talk on the solar system and black holes	Jul 2024
Stanford SURF Scholar Lightning Talks	Aug 2021

### Conference Talks

Dynamix Conference: McFACTS findings	Jun 2025
OK-LSAMP Symposium: T90 GRB findings	Sep 2023
NCUR Research Conference: T90 GRB findings	Mar 2023
NCUR Research Conference 2020 [Cancelled due to COVID-19]: Artificial muscle findings	Mar 2020
OK-LSAMP Symposium: Artificial muscle findings	Oct 2019

### Conference Posters

OK-LSAMP Symposium	Oct 2020
Oklahoma Research Day	Mar 2020
Emerging Researchers National (ERN) Conference	Feb 2020
Louis Stokes Midwest Regional Center of Excellence (LSMRCE) Annual Conference	Oct 2019
American Indian Science and Engineering Society (AISES) National Conference	Oct 2019
OK-LSAMP Symposium	Oct 2019
McNair Gallery of Engagement	Jul 2019

## OUTREACH

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<b>Secretary</b>	Sep 2022 – Dec 2023
Oklahoma State University Chapter of Society of Physics Students (SPS)	
<ul style="list-style-type: none"><li>Planned student events such as star-watching parties and outreach physics demos.</li><li>Collaborated in discussions and preparations for the 2023 International Physics Tournament.</li></ul>	
<b>Vice President</b>	Aug 2018 – Dec 2023
Oklahoma State University Chapter of American Indian Science and Engineering Society (AISES)	
<ul style="list-style-type: none"><li>Scheduled general meetings involving guest presenters from outside companies, institutions, and student support services around campus.</li></ul>	
<b>Vice President</b>	Sep 2020 – Dec 2023
Society for the Advancement of Chicano's and Native Americans in Science (SACNAS)	
<ul style="list-style-type: none"><li>Ran science demo outreach events, general meetings, and organizational recruiting for the Oklahoma State area.</li></ul>	