




Shawn Ray

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EDUCATION

Master's of Science in Astrophysics

Expected May 2026

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

Working Thesis - *Spinning and Kicking Remnants: Considering Surrogate Models for McFACTS Merger Dynamics*

Bachelor's of Science in Physics

Dec 2023

Oklahoma State University | Stillwater, Oklahoma

PUBLICATIONS

First Authored

Shawn Ray, Keefe Mitman; Emily McPike; Barry McKernan and K.E. Saavik Ford (Jan. 2026). “Spinning and Kicking New Remnants: Considering Surrogate Models for McFACTS Merger Dynamics”. In: *The Astrophysical Journal*, *In Prep*.

Co-Authored

Vera Delfavero; **Shawn Ray**; Harry E. Cook; Kaila Nathaniel; Barry McKernan; K. E. Saavik Ford; Jake Postiglione, Emily McPike and Richard O’Shaughnessy (Aug. 2025). “Prospects for the formation of GW231123 from the AGN channel”. In: *Physical Review Letters*, *In Review* 2508.13412. URL: doi.org/10.48550/arXiv.2508.13412.

Harrison E. Cook; Barry McKernan; K.E. Saavik Ford ; Vera Delfavero; Kaila Nathaniel; Jake Postiglione **Shawn Ray**, Emily McPike and Richard O’Shaughnessy (Oct. 2025). “McFACTS II: Mass Ratio–Effective Spin Relationship of Black Hole Mergers in the AGN Channel”. In: *The Astrophysical Journal* 993.2, p. 19. URL: doi.org/10.3847/1538-4357/adfd56.

Vera Delfavero; K.E. Saavik Ford; Barry McKernan; Harrison E. Cook; Emily McPike; Kaila Nathaniel Jake Postiglione, **Shawn Ray** and Richard O’Shaughnessy (Oct. 2024). “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.

Barry McKernan; K.E. Saavik Ford; Harrison E. Cook; Vera Delfavero; Emily McPike; Kaila Nathaniel Jake Postiglione, **Shawn Ray** and Richard O’Shaughnessy (Oct. 2024). “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.

RESEARCH EXPERIENCE

Graduate Research Assistant

Jun 2024 – Present

CUNY Graduate Center | New York, New York

- 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 to generate more physically accurate descriptions of post-merger black hole spins
- Improved McFACTS algorithms through OOP codebase updates, unit testing, and dependency management
- Reviewed and revised documentation for McFACTS to facilitate a successful public release

Maximizing Student Potential Intern

May 2023 - Aug 2023

NASA Jet Propulsion Laboratory | Pasadena, California

- Developed Python based galaxy simulations to improve spectral interloper identification in Euclid telescope simulated data catalog
- Generated power spectra of simulated Euclid telescope observations to identify baryonic acoustic oscillations peaks

Undergraduate Astrophysics Researcher

Jan 2022 – May 2023

Oklahoma State University | Stillwater, Oklahoma

- Analyzed Fermi Gamma-ray Space Telescope Gamma-ray Burst (GRB) data 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

Hardware Developer (Co-op)

May 2022 - Aug 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

Undergraduate Electrical Engineering Researcher

Aug 2021 – July 2022

OSU Department of Electrical Engineering | Stillwater, Oklahoma

- Founder of 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

May 2021 - Jun 2021

Stanford University | Virtual

- Performed 3D modeling simulations to analyze the motion and forces of a drone grasping device

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

SUMMER SCHOOLS

Dunlap Institute Astronomical Instrumentation Summer School Student

Aug 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

PRESENTATIONS

Invited Talks

LISA Consortium Monday Call: McFACTS findings	Dec 2025
Columbia Astronomy Pizza Lunch: McFACTS findings (postponed due to personal emergency)	Nov 2025
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

American Astronomical Society (AAS): McFACTS findings	Jan 2026
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

Gravitational Wave Physics and Astronomy Workshop 2025 (GWPAW)	Dec 2025
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

AWARDS/FELLOWSHIPS

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 (\$2.5k/yr) – Academic honor	2019 – 2023
OK-LSAMP Research Scholar (\$2.5k/yr) – Academic honor	2019 – 2023
Cobell Scholar – Academic scholarship supporting Indigenous students (\$5k/yr)	2018 – 2023

OUTREACH

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

TECHNICAL SKILLS

Proficiencies: Python, HTML, CSS, C/C++, Java

Developer Tools: Git, VS Code, L^AT_EX, Visual Studio, Jupyter Notebook, Mathematica

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

HOBBIES ^_^

Jewelry Designer/Creator, Baking, Cooking, Reading Sci-Fi, Crocheting, Hiking