MAURA SHEA

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EDUCATION

Georgia State University
Doctor of Philosophy in Astronomy. 2027
Master of Science in Physics with a concentration in Astronomy. 2023

Wellesley College
Bachelor of Arts in Astrophysics. Minor in Jazz Music. 2020

RESEARCH EXPERIENCE

Graduate Research Assistant August 2021 - Present
Georgia State University *Prof. Mike Crenshaw*

- Analyze the outflow, rotational, and tidal flow kinematics of the AGN NGC 7319 (in Stephan's Quintet) using optical and near-IR spectroscopic data. Investigate the influence of AGN in compact galaxy groups.
- Observe sources using the 3.5-meter telescope at the Apache Point Observatory via in-person (9 half nights) and remote (>30 half nights) observing runs. Reduce data using IRAF. Analyze data using Python and IDL.

Research Observer January 2018 - March 2020
Wellesley College Whitin Observatory *Prof. Kim McLeod*

- Operated Whitin Observatory's 0.6- and 0.7- meter research telescopes to observe transiting exoplanet candidates.
- Used differential photometry to generate light curves of exoplanet candidates for KELT & TESS Follow Up Networks.

Student Researcher September 2019 - December 2019
Wellesley College *Prof. Richard French*

- Reconstructed ring features in Saturn's A and B Rings that were caused by resonances from three of Saturn's moons: Janus, Epimetheus, and Mimas. Analyzed occultation data from the *Cassini* VIMS, UVIS, and RSS instruments.

REU Student Researcher June 2019 - August 2019
University of Birmingham, England *Dr. Conor Mow-Lowry*

- Developed instrumentation to improve the Laser Interferometer Gravitational-Wave Observatory's (LIGO) sensitivity in low frequencies through an actively controlled seismic isolation system.
- Designed a system of seismic detection instruments on a platform controlled via actuators. Created system controls to suppress ground motion (to the limit of instrument noise) through an active control loop of the system.

REU Student Researcher June 2018 - August 2018
MIT Haystack Observatory *Dr. Vincent Fish, Dr. Kazu Akiyama*

- Modeled the potential benefits of adding space-based telescopes to the Event Horizon Telescope to optimize its resolution for observing fainter and more distant sources.
- Used the eht-imaging library, SMILi software, and two-line element sets of orbits to create models of UV plane coverage and reconstruct model images of black holes with very small angular shadow diameters.

REU Student Researcher May 2017 - July 2017
Haverford College *Prof. Daniel Grin*

- Modeled the matter power spectrum for varying levels of density fluctuations in the early Universe.
- Generated matter power spectra using axionCAMB (Code for Anisotropies in the Microwave Background). Computed multi-variable integrals and Bessel functions in Python.

SELECTED PUBLICATIONS

M.K. Shea, D.M. Crenshaw, T.C. Fisher, M. Revalski, J. Falcone, B. Meena, Z. Chapman, J. Tutterow, M. Davis, and K. Patel (2025). *An Analysis of AGN Feedback in the Compact Galaxy Group Stephan's Quintet.* Submitted to ApJ.

J. Falcone, D.M. Crenshaw, T.C. Fisher, B. Meena, M. Revalski, **M.K. Shea**, R.A. Riffel, Z. Chapman, N. Ferree, J. Tutterow, and M. Davis (2024, August). *An Analysis of AGN-Driven Outflows in the Seyfert 1 Galaxy NGC 3227.* The Astrophysical Journal, Volume 971, Issue 1.

V. Fish, **M.K. Shea**, and K. Akiyama (2020, January). *Imaging Black Holes and Jets with a VLBI Array Including Multiple Space-Based Telescopes.* Advances in Space Research, Volume 65, Issue 2.

PRESENTATIONS

Talks

Probing AGN Feedback in a Compact Galaxy Group: The Case of Stephan's Quintet and NGC 7319. (2024, September). Presentation at the Young Astronomers on Galactic Nuclei Conference, Como, Italy.

Kinematic Maps of the Ionized Gas in Stephan's Quintet and its Active Galaxy NGC 7319. (2023, June). Presentation at the AGN Winds on the Chesapeake Conference, Easton, Maryland.

Studying Isocurvature Fluctuations through Galaxy Surveys. (2017, October). Presentation at the KECK Northeast Astronomy Consortium Conference, Hamilton, New York.

Posters

Probing AGN Feeding & Feedback in a Compact Galaxy Group: The Case of Stephan's Quintet and NGC 7319. (2024, January). iPoster session presented at the 243rd American Astronomical Society Meeting, New Orleans, Louisiana. **Chambliss Award Winning Poster.**

Ionized Gas Flows in the Compact Galaxy Group Stephan's Quintet and its Active Galaxy NGC 7319. (2023, January). iPoster session presented at the 241st American Astronomical Society Meeting, Seattle, Washington.

Improving LIGO's Sensitivity Through an Actively Controlled Seismic Isolation System. (2020, January). Poster session presented at the 235th American Astronomical Society Meeting, Honolulu, Hawai'i.

Black Hole Imaging with Space-Based Telescopes. (2019, January). Poster session presented at the 233rd American Astronomical Society Meeting, Seattle, Washington.

Black Hole Imaging with Space-Based Telescopes. (2018, September). Poster session presented at the KECK Northeast Astronomy Consortium Conference, Middlebury, Vermont.

Outreach Talks

Supermassive Influence: How Black Holes Shape their Galaxy. (2025, March). Tellus Symposium: Astronomy at All Scales, Tellus Science Museum, Cartersville, GA.

Stephan's Quintet: Rotation & Outflows & Tidal Flows, Oh My! (2025, January). One Minute Colloquium, Georgia State University, Atlanta, GA.

AGN Feedback in Stephan's Quintet. (2024, July). "Galaxies to Gluons" Summer lunch talk series, Georgia State University, Atlanta, GA.

Ancient Astronomy Part I: Greek and Mesopotamian Astronomy - How Mythology Became a Science. (2024, June). Astronomy on Tap Lecture at Three Taverns, Decatur, GA.

Stephan's Quintet: Rotation & Outflows & Tidal Flows, Oh My! (2024, February). One Minute Colloquium, Georgia State University, Atlanta, GA.

All about the James Webb Space Telescope. (2023, December). Public Lecture at the Wendell Free Library, Wendell, Massachusetts.

Understanding Images from the James Webb Space Telescope. (2022, December). Public Lecture at the New Salem Public Library, New Salem, Massachusetts.

OUTREACH & SERVICE

Undergraduate Research Committee February 2023 - Present

Georgia State University

- Thoroughly review and assess >370 REU applications each year for the summer program and select recipients for internal fellowships.
- Plan and execute weekly professional development seminars for the GSU Astronomy & Physics REU students and local summer students. Topics include: scientific writing; giving compelling presentations; panels on graduate school and careers; etc. Organize weekly faculty lunch talks so the students can develop a breadth of understanding of different research areas. Mentor students in my research group.

Astronomy Peer Advising Leaders (AstroPAL) August 2023 - Present

Georgia State University

- Serve as a mentor for a younger graduate student in the AstroPAL program. President (August 2024 - present).
- Organize (and lead some) focus groups on topics of concern for young graduate students, such as: mental health; time management; website development; fellowship applications; qualifying exams preparation; etc.

Women in Physics January 2023 - June 2025

Georgia State University

- Serve as Vice President for the GSU branch of Women in Physics (September 2023 - June 2025).
- Coordinate events to educate undergraduate women and minorities in physics within GSU. Examples include coffee hours with colloquium speakers, social events, and panels on applying to internships and graduate school.
- Attended the Conference for Undergraduate Women in Physics to serve as a mentor and panelist ("How to get Involved in Undergraduate Research"; "Maintaing Work-Life Balance") at in-person (Auburn University, 2023; Georgia Institute of Technology, 2024) and virtual CUWiP.

Diversity, Equity, and Inclusion Taskforce January 2024 - Present

Georgia State University

- Serve as a confidential space for department members to voice concerns and advocate for necessary changes.
- Organized colloquia addressing topics such as Sexual Harassment Training and Conflict Resolution.
- Create social media posts to bring awareness to and celebrate minorities in Astronomy.

Whitin Observatory Public Night Volunteer January 2017 - March 2020

Wellesley College Whitin Observatory

- Assist at the monthly Whitin Observatory Public Nights. Open the telescopes to visitors, showing the Moon, planets, star clusters, and deep space objects. Discuss relevant scientific and historical facts for each object.
- Plan and execute space-themed educational activities for a broad range of ages and scientific knowledge. Answer general astronomy questions.

TEACHING

Graduate Teaching Assistant August 2021 - Present

Georgia State University

- Teach lab sections of 24 students each for the introductory Astronomy courses, *ASTR 1010: Astronomy of the Solar System* (7 sections total) and *ASTR 1020: Stellar and Galactic Astronomy* (7 sections total). Taught both in-person and online lab sections.

- Serve as TA for the hybrid course *ASTR 1000: Introduction to the Universe.* Monitor the online section to answer questions and encourage participation. Grade quizzes. Lecture for two classes.
- Guest lecture for two classes of *ASTR 1020.*

Physics Grader January 2018 - May 2019
Wellesley College Physics Department
- Correct problem sets for 15 to 25 students. Graded for *Fundamentals of Electricity, Magnetism, and Optics*; *Principles and Applications of Mechanics*; and *Intermediate Mechanics.* Provide insights to improve problem-solving techniques.

Night Assistant September 2017 - December 2017
Wellesley College Whitin Observatory
- Operated the historic 6" and 12" Clark refracting telescopes to introductory astronomy class students to observe the Moon, Planets, and Deep Sky objects. Taught constellations and administered constellation quizzes.

HONORS & AWARDS

Chambliss Astronomy Achievement Award	2024
NSF GRFP - Honorable Mention	2023
NASA Massachusetts Space Grant	2017-2019

WORKSHOPS

Future Faculty Workshop, *Northeastern University.*	2024
Effective Astronomy Visualizations for Research, Outreach, and Learning, *241st AAS Meeting.*	2023
Hands-on Machine Learning for Astronomers, *235th AAS Meeting.*	2020
Using Python and Astropy for Astronomical Data Analysis, *233rd AAS Meeting.*	2019

TECHNICAL STRENGTHS

Python	Experience with numpy, scipy, astropy, sklearn, matplotlib, pandas
Other Languages	IDL, Java, basic JavaScript
Software & Tools	LaTeX, IRAF, AstroImageJ, SAOImage DS9, Maxim DL, SkyX, TOPCAT

OBSERVING EXPERIENCE

3.5-m Astrophysical Research Consortium Telescope January 2022 - Present
Apache Point Observatory, New Mexico
- 9 in-person nights, >30 remote nights. Long-slit spectrograph observations of galaxies.

1.5-m and 0.9-m Small and Moderate Aperture Research Telescope System February 2025 - March 2025
Cerro Tololo Inter-American Observatory, Chile
- 12 nights (1.5-m). Echelle spectrograph observations of stars and galaxies.
- 3 nights (0.9-m). Photometric observations of stars.

0.7-m Planewave Telescope January 2018 - March 2020
Whitin Observatory, Massachusetts
- ∼40 nights. Photometric observations, including supernovae, asteroids, and exoplanet host candidates.

6- and 12-inch Historic Telescopes January 2017 - March 2020
Whitin Observatory, Massachusetts
- ∼50 nights. Eye piece observing of the Moon, planets, and Deep Sky objects.