

Emily McPike

CURRICULUM VITAE

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Education

Master of Science in Astrophysics

City University of New York Graduate Center

Aug 2024 – May 2026

New York, New York

- Advisors: K. E. Saavik Ford & Barry McKernan
- Thesis: "McFACTS: Modeling EM counterparts for binary black hole mergers in the AGN channel"

Bachelor of Science in Physics

James Madison University

Aug 2020 – May 2024

Harrisonburg, Virginia

- Advisor: Anca Constantin
- Thesis: "Mid-Infrared Variability of Galaxies Surveyed for Water Megamaser Emission"
- Concentration: Fundamental Studies
- Minors: Astronomy, Computational Analytics, Honors, Mathematics

Publications

Co-Author

McKernan, B., ..., **Emily McPike** et al., McFACTS I: Testing the LVK AGN channel with Monte Carlo for AGN Channel Testing and Simulation (McFACTS). [In Prep]

Cook, H. E., ..., **Emily McPike** et al., McFACTS II: Mass Ratio-Effective Spin Relationship of Black Hole Mergers in the AGN Channel. [In Prep]

Delfavero, V., ..., **Emily McPike** et al., McFacts III: Compact binary mergers from AGN disks over an entire synthetic universe. [In Prep]

Computational Projects

Astrophysics of Compact Objects / Final Project

CUNY Graduate Center

Mar 2025 – Present

New York, New York

- Initialized a shearing box simulation in ATHENA++ (as in Secunda et al. 2024, 2025) for the optical temperature region of an AGN disk.

Computational Methods / Final Project

CUNY Graduate Center

Oct 2024 – Present

New York, New York

- Wrote Python code to explore the choice effects between linear and cubic interpolator functions.

Independent Study / Final Project

James Madison University Department of Mathematics & Statistics

Jan 2024 – May 2024

Harrisonburg, VA

- Wrote code in MATLAB and Python to simulate geodesics for n-gons of equal area to optimize energy between transformations.

Advanced Physics Laboratory I & II / Semester Project

James Madison University Department of Physics & Astronomy

Aug 2022 – Dec 2022

Harrisonburg, VA

- Built Python code to quantify and visualize how adhesiveness is compounded by both time and the deformation from manual compression of the bubbles within the foam sample.

Research Interests

I am an astrophysics graduate student applying computational methods to simulate multi-messenger probes of the active galactic nucleus (AGN) channel in LIGO-Virgo-KAGRA. I am excited by open questions regarding changing-look AGN and AGN variability, AGN structure, and multi-messenger astrophysics.

Selected Talks & Conference Posters

Selected Talks

"McFACTS: Modeling EM Counterparts for Binary Black Hole Mergers in the AGN Channel"

• DYNAMIX at University of Cambridge June 2025

"Mid-Infrared Variability of Galaxies Surveyed for Water Megamaser Emission"

• JMU Physics and Astronomy Symposium – Awarded 3rd Place for Best Talk May 2024

• JMU Chemistry and Biochemistry Summer REU Symposium Aug 2023

• JMU Physics and Astronomy Symposium May 2023

• JMU Chemistry and Biochemistry Summer REU Symposium Aug 2022

• JMU Physics and Astronomy Symposium Apr 2022

• Virginias Collegiate Honors Council Conference at Lynchburg University Mar 2022

Conference Posters

"Mid-Infrared Variability of Galaxies Surveyed for Water Megamaser Emission"

• JMU Honors College Symposium May 2024

• SPS Zone 4 Meeting at Virginia Tech Apr 2024

• APS Conference for Undergraduate Women in Physics at West Virginia University Jan 2024

• JMU Honors College Symposium Apr 2023

• National Conference on Undergraduate Research at University of Wisconsin Eau-Claire Apr 2023

• JMU Honors College Symposium Apr 2022

• JMU Chemistry and Biochemistry Summer REU Symposium Aug 2021

Professional Affiliations

LSST Discovery Alliance – AGN Variability Group Associate Member

American Astronomical Society

Sigma Pi Sigma

Society of Physics Students

Teaching Assistance

Classical Mechanics Aug 2023 – Dec 2023

James Madison University Harrisonburg, Virginia

• Assisted in an advanced mechanics course by grading homework and conducting homework help sessions in office hours.

Foundations of Programming for Physics Oct 2023 – Dec 2023

James Madison University Harrisonburg, Virginia

• Provided in-class assistance and held office hours for an Introduction to Python in Physics Course, focusing on teaching fundamental Python skills to physics students.

Introductory Physics I & II Aug 2022 – May 2023

James Madison University Harrisonburg, Virginia

• Graded assignments for both introductory calculus-based physics courses, covering topics such as kinematics, forces, electromagnetism, and optics.

Academic Leadership

CUNY GC Doctoral and Graduate Student Council <i>MS Astrophysics Representative Alternate</i>	Mar 2025 – Present
Astronomy Graduate Council <i>CUNY GC Representative</i>	Oct 2024 – Present
CUNY GC Graduate Student Council <i>MS Astrophysics Representative Alternate</i>	Oct 2024 – Present
CUNY Astro Student Union <i>Graduate Representative</i>	Aug 2024 – Present
JMU College of Science and Mathematics Student Council <i>Physics Representative, Math Representative</i>	Aug 2022 – May 2024
JMU President's Council <i>Women in Physics Representative, Society of Physics Students Representative</i>	May 2023 – May 2024
JMU Women in Physics <i>President</i>	May 2023 – May 2024
JMU Society of Physics Students <i>President</i>	May 2023 – May 2024
• Other roles held: Vice President (May 2022 – May 2023) & Secretary (Feb 2021 – May 2022)	

Scientific Outreach

Volunteering

Letters to a Pre-Scientist Pen Pal	Sep 2024 – Present
JMU MadiSTEM Workshop Leader	Mar 2022, Mar 2023, Mar 2024

Invited Public Science Talks

Astro on Tap: "The Dark (k)Night in Cosmic Voids" <i>Pete's Candy Store</i>	Dec 2024 New York, New York
Physics Club Seminar: "Careers in Physics" <i>CD Hylton High School</i>	April 2024 Woodbridge, Virginia
Science for Kids: "Exploring the Solar System with JMU Physics" <i>Massanutten Regional Library</i>	Mar 2024 Harrisonburg, Virginia
CHOICES: Choosing Physics at JMU <i>James Madison University</i>	Apr 2022, Apr 2023, Apr 2024 Harrisonburg, Virginia

Awards

JMU Physics & Astronomy Department Undergraduate Service Award • Awarded by faculty for substantial contributions in service to the JMU Physics & Astronomy department.	Apr 2024
Society of Physics Students Outstanding Service Award • Awarded for exemplary service via positive impact on an SPS chapter, a department, and the community.	Apr 2024
Dingledine-Bluestone Scholar • Awarded in-state tuition for four years; selected for exemplifying academic achievement and leadership.	Aug 2020

Skills

Programming	Python, Mathematica, MATLAB, SQL, HTML
Software	GitHub, LaTeX, MESA
Communication	English, Spanish (proficient)