Talia M. O'Shea

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Education

University of Wisconsin-Madison, Ph.D. candidate in Astronomy, in progress — Aug 2023 – Present

- NSF Graduate Research Fellow

University of Wisconsin-Madison, M.S. in Astronomy — Aug 2023 – May 2025

Wellesley College, B.A. in Astrophysics (Honors) and History — Sept 2019 – May 2023

- Summa Cum Laude
- Honors Thesis: *The influence of dynamical friction on measurements of galaxy cluster size*

Publications

O'Shea T.M., Heinz S., Soares-Furtado M., Igo Z., Merloni A., *Shooting for the stars: Jet-mode feedback and AGN jet deceleration from stellar mass-loading*. Under review at ApJ.

O'Shea T.M., Borrow J., O'Neil S., Vogelsberger M., *Dynamical friction and measurements of the splashback radius in galaxy clusters*. Under review at OJAp.

Research Experience

Mass-loading in AGN jet simulations, PI Dr. Sebastian Heinz; UW-Madison — Aug 2023 - Present

Developing simulations of mass-loading in AGN jets using unstructured moving-mesh code Arepo.

Dynamical friction in galaxy clusters, PI Dr. Mark Vogelsberger; MIT — May 2022 - Aug 2023

Worked with Dr. Josh Borrow, simulating galaxy cluster dynamics using initial data from IllustrisTNG, to quantify the impact of dynamical friction on measurements of galaxy cluster splashback radii.

Low-energy electron production, PIs Dr. James Battat, Dr. Chris Arumainayagam; Wellesley College — Jan 2021 - Oct 2022

Developed, ran, and analyzed simulations using Geant4-DNA to understand production of low-energy electrons in water radiolysis processes, as well as by cosmic rays in ice grains with dense molecular clouds.

Microtubule polymerization, PI Dr. Jennifer Ross; UMass-Amherst — Summer 2018, 2019

Earned place in competitive internship program. Independently performed experiments on the effects of cross-linker concentration on microtubule polymerization. Performed imaging with TIRF microscope and analyzed results. *Summer 2019*: led team of high-school students in conducting experiments.

Presentations

Midwest Magnetic Fields Workshop, *Contributed Talk*, "Shooting for the stars: Jet-mode feedback and AGN jet deceleration from stellar mass-loading," July 2025.

University of Maryland, *Invited Talk*, "Dynamical friction and measurements of galaxy cluster size," November 2024.

University of Pennsylvania, *Invited Seminar*, "Dynamical friction and measurements of galaxy cluster size," October 2023.

Wellesley College Ruhlman Conference, *Contributed Talk*, "Dynamical friction in galaxy clusters," April 2023.

American Astronomical Society 240th Conference, *Contributed Talk*, "Low-energy (<20 eV) electrons in Geant4 Monte Carlo Simulations," Summer 2022.

Wellesley College Tanner Conference, *Co-Presenter, Invited Talk*, "On Becoming a Scientist: Finding Our Passion Through Wellesley's Summer Research Program," Fall 2021.

American Astronomical Society 238th Conference, *Virtual Contributed Talk*, "Investigating the relative importance of low-energy (<20 eV) electrons in astrochemistry via Monte Carlo simulations," Summer 2021.

Posters

American Astronomical Society 244th Conference, "The impact of main sequence stellar mass loading on AGN jet feedback," June 2024.

Beckman Symposium, "Dynamical friction has limited impact on galaxy cluster splashback radii," August 2023.

Wellesley College Science Center Summer Research Program, "Dynamical friction has limited impact on measurements of galaxy cluster size," Summer 2022.

Keck Northeast Astronomy Consortium, "Assessing the influence of dynamical friction on galaxy cluster splashback radius," Fall 2022.

Wellesley College Science Center Summer Research Program, "The role of low-energy (< 20 eV) electrons in radiation chemistry," Summer 2021, *Co-Presenter.*

Teaching Experience

Teaching Assistant, ASTRON 103 (Introductory Astronomy); UW-Madison — Sep 2023 – Dec 2023

Learning Assistant, PHYS 106 (Introductory Electromagnetism); Wellesley College — Sept 2021 – May 2023

Grader, Wellesley College Math and Physics Department — Jan 2020 – May 2023

Workshops

Code/Astro Workshop; Evanston, IL — Aug 2025

Delta Program Research Mentor Training; UW-Madison — May 2024

Mentoring Experience

Direct mentor to:

- Rachel G., UW-Madison undergraduate (Jan 2025 - Present)

Grants and Awards

Funding

National Science Foundation Graduate Research Fellow — Jun 2025 - Present

Wisconsin Space Grant Consortium Graduate Research Fellowship ($6,000$) — Apr 2025

Beckman Scholar, Arnold and Mabel Beckman Foundation ($21,000$) — 2021 - 2023

Massachusetts Space Grant ($5,000$) — 2022

National Merit Scholarship, Textron Corporation ($5,000$) — 2019 - 2023

Computing Time

National Science Foundation ACCESS "EXPLORE" Allocation PHY250213 — Jul 2025 - July 2026

Awards

Phyllis J. Fleming Prize, Wellesley College Physics Department — May 2023

Whiting Medal, Wellesley College Astronomy Department — November 2023

Service

Department Committees

Undergraduate Symposium Planning Committee; UW-Madison Astronomy Department — Apr 2025 - May 2025

Inclusive Excellence Committee Planning Task Force; UW-Madison Astronomy Department — Feb 2024 – June 2024

Pinanski Prize Committee Student Representative; Wellesley College — Apr 2023

Student Organizations

Peer Mentor Chair; UW-Madison Astronomy Department — Aug 2024 – Present

Running peer mentorship program for first-year graduate students.

Society of Physics Students; Wellesley College — Dec 2019 - May 2023

Served variously as Co-President, Secretary, Department Liaison, and first-year representative, to organize department events and build community. Represented student voices at department meetings.

Outreach

Universe in the Park, St. Croix Falls & Chippewa Falls WI — July 2025
Universe in the Park, Superior WI — Aug 2024

Traveling to WI state parks and giving a science talk as well as operating telescopes, aimed at local residents and campers.

Professional memberships

Phi Beta Kappa — May 2023 - Present

Sigma Xi Nominee — May 2023

American Astronomical Society — Oct 2021 - Present

Skills

Technical: Python, C, Unix, LaTeX, Arepo, Geant4

Languages: English, Mandarin (fluent; Massachusetts Seal of Biliteracy)

Citizenship: USA, Ireland