

Rujuta A. Purohit

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Observational astrophysicist. Interests include active galactic nuclei, black hole seeds, galaxy evolution, galaxy clusters, and large-scale structure of the Universe.

EDUCATION

Boston University, Boston, MA **Sept 2024-Present**

Graduate student in Astronomy

Advisor: Professor Elizabeth Blanton

Dartmouth College, Hanover, NH **June 2024**

Magna cum laude, with high honors in Physics and Astronomy; Sigma Xi Scientific Honor Society GPA: 3.92/4.0

Thesis: Active galactic nuclei and intermediate-mass black holes in dwarf galaxies in the Boötes field

Advisor: Professor Ryan C. Hickox

University of Cape Town, Cape Town, South Africa **Jan - Mar 2023**

Dartmouth-sponsored foreign study program at UCT and the South African Astronomical Observatory.

Completed coursework related to research methods in astronomy, observational techniques, and using the 1.0m and 1.9m telescopes at Sutherland.

RESEARCH APPOINTMENTS

Black Holes and Galaxies Research Group, Dartmouth College, Hanover, NH **Sept 2021 - Present**

Research Assistant, Presidential Scholar – Advisor: Professor Ryan C. Hickox

- Analyzing archival data from SDSS, Chandra to identify AGNs in nearby low-mass galaxies.
- Studying the AGN candidacy of low-mass galaxies using X-ray & infrared luminosities, SED template fitting, and spectral analysis.

CIERA Research Experience for Undergraduates, Northwestern University, Evanston, IL **June - Aug 2023**

Summer student – Advisors: Dr Giacomo Fragione and Professor Frederic A. Rasio

- Analyzed the rates and properties of binary black hole mergers in dense stellar clusters with a prominent runaway effect.
- Used Northwestern's high-performance computer, Quest, to run simulations modeling stellar clusters and black hole mergers.
- Produced several deliverables including a draft research note, [website](#), and poster.
- Completed various activities as part of the REU such as Python coding workshops, GitHub training, and peer reviewing research notes.

Exoplanets and Heliospheres Research Group, Dartmouth College, Hanover, NH **March - Sept 2021**

Women in Science Project Intern – Advisor: Dr Hans Mueller

- Studied the dynamical evolution of planetary systems of red dwarfs through numerical simulations of the orbits of exoplanets (e.g., GJ 436b) with evaporating atmospheres.
- Created numerical simulations of stellar winds interacting with the interstellar medium in C++.

AWARDS & HONORS

1. Gazzaniga Family Science Award (2024) – given to one graduating senior across all sciences at the College for exemplary scientific accomplishments.
2. Physics and Astronomy Faculty Prize in memory of Francis W. Sears (2024) – awarded to a graduating senior for significant contributions to the Department and unusual achievement as an undergraduate.
3. AAS Publication Support Fund (100%) for undergraduate student author (2024).
4. Frances L. Town Scientific Prize in Physics (2022) - conferred by the Department of Physics and Astronomy to one meritorious and deserving student at the end of the sophomore year.
5. Dean's List: Rufus Choate Scholar (2022-2023, 2023-2024), Third Honor Group (2020-2021, 2021-2022).
6. James O. Freedman Presidential Scholar (2022-2023).
7. Kaminsky Undergraduate Research Grant (Summer 2023).

PUBLICATIONS (FIRST AUTHOR)

1. "X-ray and multi-wavelength observations of AGNs in dwarf galaxies in the Boötes field", **Purohit, Rujuta A.**; Hickox, Ryan; Petter, Grayson C., 2024, **submitted to MNRAS**.
2. "Binary black hole mergers and intermediate-mass black holes in dense star clusters with stellar runaways", **Purohit, Rujuta A.**; Fragione, Giacomo; Rasio, Frederic A.; Hickox, Ryan C.; Petter, Grayson C., 2024, *the Astronomical Journal* 167 191, doi: [10.3847/1538-3881/ad3103](#).

OBSERVING EXPERIENCE

South African Astronomical Observatory, Sutherland, South Africa **Feb 2023**

- 6 nights of observing experience at the SAAO 1.0 m + SHOC, SAAO 1.0m Lesedi + Mookodi, and SAAO 1.9m telescopes.

MDM Observatory, Kitt Peak, AZ **Dec 2021**

- 5 nights of observing experience at MDM Observatory using the 2.4m Hiltner and the 1.3m McGraw-Hill telescopes.
- Developed a novel data reduction pipeline and used various analysis tools to study stellar spectra.

SELECTED TALKS

1. Friday Lunch Astronomy Talks (FLAT) at Durham University, Durham, UK “Formation of IMBHs and detecting them using X-rays and gravitational waves” - March 2024
2. IMBH 2023: The Dawn of a Revolutionary Era, San Pedro, Belize “Gravitational wave signatures of runaway intermediate-mass black holes” – December 2023.
3. Galactic Frontiers: Dwarf Galaxies in the Local Volume and Beyond 2023, Flatiron Institute, New York City, NY “X-ray and multi-wavelength analysis of dwarf galaxies in the Boötes field” – July 2023.
4. New England Regional Quasars and AGN Meeting (NERQUAM) 2023, University of Rhode Island, Kingston, RI : “AGN in dwarf galaxies in the Boötes field” – May 2023.

TEACHING EXPERIENCE

Teaching Fellow, Boston University, Boston MA **Sept 2024 - Present**
Graduate teaching fellow for AS 105 Alien Worlds

Teaching Assistant & Learning Fellow, Dartmouth College, Hanover, NH **Sept 2021 - March 2024**
Assisted in the following classes: Astronomy 25: Galaxies and Cosmology (Winter 2024), Astronomy 74/174: Astrophysics (Fall 2023), Physics 4: Introductory Physics II (Spring 2023), Physics 13: Introductory Physics I (Fall 2021, Winter 2022, Fall 2022), Astronomy 19: Habitable Planets (Spring 2022).

VOLUNTEER WORK & OUTREACH

Boston University Prison Teaching Initiative, Boston, MA **September 2024 - Present**
Teach algebra at a medium-security prison once a week.

Science Club for Girls, Cambridge, MA **September 2024 - Present**

JJudson B. Coit Observatory, Boston, MA **September 2024 - Present**

Sexual Violence Prevention Project - Facilitator, Hanover, NH **July 2023 - Dec 2023**
Completed training in facilitating sexual violence workshops and led discussions with incoming freshmen.

Willing Hands, NH-VT
Planted, cared for, and harvested fresh produce as part of the food reclamation projects to combat food insecurity.

Akshar Learning Center - Volunteer Teacher, Nagpur, India **Mar 2018 - Jul 2020**
Taught remedial lessons in Math, Science, and English to 4th - 7th graders.

SKILLS & INTERESTS

Languages: English, Hindi (native), Marathi (native), Sanskrit (professional fluency)
(Computer) Languages: Python, Mathematica, MATLAB, PyRAF, HTML/CSS/JS
Visualization software: SAOImageds9, ImageJ, XQuartz, GIMP