Shannon Bowes

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Education

University of Toronto **Sep. 2024 – Present**
PhD student in Astronomy & Astrophysics *Toronto, Canada*

Mount Allison University **Sep. 2020 – May 2024**
BSc Honours in Physics, Minors in Mathematics and Astronomy *Sackville, NB, Canada*
First Class Honours with Distinction

Research Experience

University of Toronto **Sep. 2024 – Present**
Research Assistant, supervised by Prof. Chris Matzner *Toronto, Canada*

- Investigating the role of thermal feedback in massive star formation, specifically in proto-globular cluster starburst sites, to develop approximate solutions to the radiative transfer equation

Mount Allison University **May 2023 – May 2024**
Research Assistant, supervised by Prof. Catherine Lovekin *Sackville, NB, Canada*

- Analysed the binarity and pulsation of an eclipsing binary system, λ Scorpii, constraining physical parameters with a focus on convective core overshoot; completed pulsation analysis of spectroscopic binary ω Eridani

Canadian Institute for Theoretical Astrophysics (CITA) **May – August 2022**
Summer Undergraduate Research Fellow, supervised by Prof. Peter Martin *Toronto, Canada*

- Developed calculation and wrote a modular pipeline in Python to perform on varying dust and ISRF models and locations of cirrus; found that polarization of scattered light from Galactic cirrus can be used as a new diagnostic test to further constrain models of both interstellar dust and radiation fields

Mount Allison University **May – August 2021**
Research Assistant, supervised by Prof. Catherine Lovekin *Remote*

- Studied how convection and pulsation cause the effects observed by Cepheid variable stars with multiple modes and varying amplitudes

Publication

Bowes & Martin, "Diagnostics from polarization of scattered optical light from Galactic infrared cirrus", 2023, ApJ, 959, 40.

Teaching

Stars and Galaxies (AST 201) Teaching Assistant **UofT, Jan. 2025 – Apr. 2025**

- I teach students how to observe using SeeStar telescopes during nighttime observing tutorials and proofread homework assignments for scientific accuracy.

The Sun and Its Neighbours (AST 101) Teaching Assistant **UofT, Sep. 2024 – Dec. 2024**

- I held weekly office hours, conducted oral quizzes, did marking, and invigilated exams.

Physics for Life Sciences Teaching Assistant **MtA, Jan. 2024 – Apr. 2024**

- As In-class TA, I was responsible for answering questions, marking, and recording grades on an online learning platform.

Varma Scholar Teaching Intern **MtA, Sep. 2023 – Apr. 2024**

- As Varma Scholar, I was responsible for providing a service to the MtA Physics department through leadership of physics-related events and teaching. Included giving lectures, public speaking, and planning and hosting events throughout the year

Observatory Assistant **MtA, Sep. 2022 – Apr. 2024**

- As the only student Gemini Observatory Assistant at Mount Allison, I educated the public on objects being viewed during open observing nights and private group events spanning a range of ages. I was also responsible for helping with operating and maintaining the Observatory, including repairing the telescopes and upkeep of other equipment

General Physics I Teaching Assistant **MtA, Sep. – Dec. 2023**

- As In-class TA, I was responsible for answering questions, especially related to in-class assigned questions.

General Physics II Teaching Assistant **MtA, Jan. – Apr. 2023**

- As Lab TA, I was responsible for aiding students with experiments by answering questions about theory, helping with demonstrations, and marking lab reports independently

Calculus II Teaching Assistant **MtA, Jan. – Apr. 2022**

- As Tutorial TA, I was responsible for leading tutorials independently, answering students questions, establishing and following a grading scheme, and marking assignments

Awards

Faculty of Arts & Science Top (FAST) Doctoral Award *($104,000 over 4 years)* **2024 – Present**

- Entrance award for a top incoming domestic student

Mary And Ron Martin Graduate Fellowship In Astrophysics *($1,000)* **2024**

Bell Scholar *($44,000 over 4 years)* **2020 – 2024**

- Awarded the Bell Family Achievement Award, one of the highest and most prestigious awards for undergraduate students at Mount Allison University; Bell Scholars balance academic excellence with extracurricular and community involvement

Varma Scholar *($1,600)* **2023 – 2024**

- Prestigious award conferred on one senior Mount Allison Physics student each year, to honour and recognize their achievement in academics and enthusiastic participation in the promotion of Physics

Donald G. MacGregor Scholarship *($4,600)* **2023**

- Awarded annually to a deserving student majoring or honouring in Physics entering their third or final year, based on the recommendation of the Mount Allison Physics Department

NSERC USRA Award (MtA Independent Student Research Grant) *($8,000)* **2023**

Varma Academic Enhancement Award *($200)* **2022**

- Awarded to the student with the highest overall GPA at the end of their second year of a Mount Allison Physics program

Donald Arthur Anderson Prize in Physics *($500)* **2022**

Presentations & Public Speaking

Atlantic Undergraduate Physics and Astronomy Conference (AUPAC 2024) **Feb. 2024**

- Won Science Communication Award for this talk

Canadian Undergraduate Physics Conference (CUPC 2023) **Oct. 2023**

General Physics I Lecture **Sep. 2023**

- Instructed a class of 78 students on waves and the Doppler effect

Mount Allison Summer Undergraduate Research Fair 2023 **Sep. 2023**

Eastern Association for Stellar Astrophysics Meeting **Apr. 2023**

Mount Allison Summer Undergraduate Research Fair 2022 **Sep. 2022**

Canadian Institute for Theoretical Astrophysics SURF Presentations 2022 **Aug. 2022**

Leadership & Extracurricular

GASA Course and Qualifiying Exam Committee **Oct. 2024 – Present**

Committee Member *University of Toronto*

- Responsible for monitoring how graduate students in the Astronomy and Astrophysics department are as an ensemble are progressing with their courses, how well the course offerings are meeting student needs, and connect with the department to help inform course planning for future years.

Atlantic Undergraduate Physics and Astronomy Conference (AUPAC 2024) **Aug. 2023 – Feb. 2024**

Co-Chair *Mount Allison University*

- Led a team of students in planning and organizing the annual AUPAC conference; I invite speakers, manage the budget, organize the graduate school fair, and set up student research talk sessions

MtA Physics Society **Sep. 2022 – May 2024**

Co-President *Mount Allison University*

- Led the Physics Society Executive team by delegating tasks, running meetings, planning events, fundraising, ordering and selling merchandise
- Previously held positions as VP Communications, Underclassmen Representative

Engage Program **Nov. 2023 – Jan. 2024**

Volunteer

- I volunteered with the Engage Program weekly to assist with introductory computer programming activities for middle school students in Sackville, NB; I work directly with the students to guide them through the activities
- Taught similar activities outside the program to the Tantramar Girls Empowerment Camp

Physics Department Student Representative **Sep. 2021 – Apr. 2024**

Fourth Year Representative *Mount Allison University*

- I represented my fellow fourth year students and am responsible for voicing their concerns to the faculty at the monthly Physics Department meetings; I also provide feedback on courses
- Previously held positions as Third Year Representative, Second Year Representative

Academic Mentor **Sep. 2021 – Apr. 2022**

Residence Executive *Mount Allison University*

- As in-residence Academic Mentor, I planned and executed 18 academic events for the 145 students of my residence, including organizing and teaching help sessions, hosting professors for salons, and providing resources

Women in Science Club **Sep. 2020 – Apr. 2021**

Physics Representative *Mount Allison University*

- Responsible for outreach both within university and local public schools; ran virtual events during the pandemic

Technical Skills

Language: Python

Software & Packages: PHysics Of Eclipsing BinariEs (PHOEBE), Modules for Experiments in Stellar Astrophysics (MESA), GYRE (a stellar oscillation code), Hierarchical Equal Area isoLatitude Pixelation (HEALPix), emcee (Markov Chain Monte Carlo methods), Lightkurve (for Kepler and TESS data analysis)

Applications: LaTeX, Word, Excel, Powerpoint

Soft skills: Organized, detail-oriented, problem-solving, public speaking, scientific writing, team member

Selected Workshops and Special Programs

Canadian Astroparticle Summer School (CAPSS 2023) **May 2023**

- An intensive week-long undergraduate school hosted at Queen's University and SNOLAB that introduced students to the current topics in the field of astroparticle physics
- Participated in lectures and hands-on activities in particle physics, detector development, neutrino physics, dark matter astrophysics theory and cosmology

Peer Pedagogy Training **Jan. 2022**

- Learned methodology and best practices for peer teaching as an undergraduate Teaching Assistant at Mount Allison University

ACENET (Digital Research Alliance of Canada) Basics Workshops **May 2021**

- Attended Introduction to High Performance Computing (HPC), Introduction to Linux, Introduction to Shell Scripting, and Job Scheduling with Slurm sessions

Seeds of Change Sexual Violence Prevention Training **Sep. 2021**

- Underwent bystander skills training with the intention to transform cultures of sexual violence