

Dev Khullar

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Education

B.Sc. Mathematics September 2023 - Present
University of Lethbridge, Lethbridge, AB, Canada 3.82/4.00 GPA

Non-Refereed Publications

[1] **Khullar, D.**, Hunt, Q., Tetarenko, A. J., Bosch-Cabot, P., et al (in preparation). *Observational Constraints on the Ejection Mechanism of X-ray Binaries in Spiral Galaxies: A Case of NGC 3627*. (to be submitted to Astrophysical Journal Letters)

Research & Employment

Astrophysics Research Assistant April 2025 - Present
Supervisor: Drs. [Qiana Hunt](#) and [Alexandra Tetarenko](#)
University of Lethbridge, Lethbridge, AB, Canada

- Performed X-ray binary identification in nearby galaxies to study the formation and evolution of compact objects. [[scientific analysis](#)]
- Developed code for photometric analysis of galaxies with the James Webb Space Telescope. This code has now been merged into [XRBID](#) – a python library for X-ray binary identification with the Chandra X-ray Observatory, the Hubble Space Telescope and the James Webb Space Telescope. This code is now helping Dr. Hunt in their [primary research work](#).
- Currently preparing a first author publication on our results with key [PHANGS](#) collaborators that is to be submitted to the Astrophysical Journal Letters.

Machine Learning Researcher September 2025 - December 2025
Supervisor: Dr. Corina Birghila
University of Lethbridge, Lethbridge, AB, Canada

- Implemented reinforcement learning algorithms from research papers and from the text *Reinforcement Learning: An Introduction* by Barto and Sutton (2018) to test their limitations. [[code](#)]
- Presented my research findings at the Reinforcement Learning seminar at the University of Lethbridge.

Mathematics Research Assistant October 2024 - December 2024
Supervisor: [Dr. Sean Fitzpatrick](#)
University of Lethbridge, Lethbridge, AB, Canada

- Completed a term project in differential forms and differential geometry to show the generalization of Stokes' Theorem. Also presented applications of differential forms to Maxwell's Equations. [[report](#)]

University Tutor September 2024 - April 2025
Accessible Learning Centre, University of Lethbridge, Lethbridge, AB, Canada
• Provided tutoring lessons to undergraduate students with disabilities in Linear Algebra, Calculus I & II and Introduction to Computer Science.

Statistics Teaching Assistant September 2024 - December 2024
University of Lethbridge, Lethbridge, AB, Canada
• Undergraduate marker for homework assignments and computational assignments for Statistics 1770 - Introduction to Probability and Statistics.

Astrophysics Research Assistant May 2024 - September 2024
Supervisor: [Dr. Alexandra Tetarenko](#)
University of Lethbridge, Lethbridge, AB, Canada
• Analyzed archival and new radio observations of an X-ray binary in the core of a globular cluster using the Very Large Array to determine the true origins of that X-ray binary. [[scientific analysis](#)] [[report](#)]
• Contributions from this research are going to be included in a future peer-reviewed paper that I will co-author.

Scholarships, Awards & Recognitions

As of May 2025, collectively received ~**CA\$19,500** in competitive scholarships. Additionally, I have been on the Dean's Honour List in 3/4 completed semesters at ULethbridge. I was also honoured with the recognition of a 2024/2025 Shining Student, which recognizes exceptional students at the University of Lethbridge for their academic achievements and community involvement.

University of Lethbridge Scholarship (CA\$600)	2025
Myrtle Ruth Bodie Mathematics Scholarship (CA\$1000)	2025
Chinook Summer Research Award (CA\$6000 × 2)	2024, 2025
Dean's Honour List	Fall 2023 - Fall 2024
Student's Union Quality Initiatives Scholarship (CA\$1000×2)	2024, 2025
ULethbridge Shining Student	2024
International Continuing Award (CA\$1000)	2024
International Student Memorial Scholarship (CA\$700)	2024
International Entrance Award (CA\$1000)	2023
Board of Governors' Admission Scholarship (CA\$1000)	2023

Poster Presentations

<i>University of Lethbridge Summer Research Showcase</i>	August 2025
<i>Astrophysics Undergraduate Research Mini-Symposium</i>	September 2024
<i>University of Lethbridge Summer Research Showcase</i>	August 2024

Open Source Software

XRBID – a python library for X-ray binary identification with the Chandra X-ray Observatory, the Hubble Space Telescope and the James Webb Space Telescope.

StarFinder – an open source game that I developed for outreach where the player has to detect the optimal amount of stars in an astronomical image. This game has been displayed at multiple events at ULethbridge, including high school visits, Math fair and ULethbridge Open House (See Outreach).

euler_lagrange_solver – python code that symbolically solves the Euler-Lagrange equations for any coordinate.

Outreach

<i>University of Lethbridge Observatory Team Member</i>	October 2024 - Present
• Member of a team working on building an observatory at the University of Lethbridge for local and university outreach along with use for undergraduate classes. • Secured a ULethbridge Arts and Science grant worth CA\$5,000 and purchased 3 telescopes for this project.	

<i>University of Lethbridge Open House Volunteer</i>	October 2024 & 2025
• Volunteered with the Department of Physics and Astronomy at the University of Lethbridge Open House. • Facilitated lab tours of the Physics faculty premises, highlighting the various ongoing cutting-edge research happening in the Dept. of Physics and Astronomy to prospective students and their families. • Engaged with the prospective students, highlighting student life experience and undergraduate research opportunities.	

<i>High School Visits, ULethbridge</i>	December 2024, May 2025, July 2025
• Led presentations on the astrophysical research that is being conducted in our research group along with the future careers possible studying astronomy during high school visits from Lethbridge, AB.	

<i>ULethbridge Rebranding Volunteer</i>	December 2024, May 2025, July 2025
• Represented the Department of Physics and Astronomy for ULethbridge's recent rebranding [see video] along with showing the cutting-edge telescope equipment available at ULethbridge.	

<i>InnovateHER Workshop, ULethbridge</i>	July 2025
• Presented a workshop to middle school students on astronomical tools used by astronomers using the example of the galaxy IC 5332. This was done to show them the possibilities of work	
• Secured MacBooks from ULethbridge for all the participants.	
<i>Physics and Astronomy Workshop Series Presenter, ULethbridge</i>	July 2025
• Presented a workshop on advanced Python programming. [resources]	
• Led a workshop on using SAOImage DS9, a data visualization tool for astronomy, and performing point source identification in astronomical images of galaxies. [Recording (Passcode: H0A%Q8RC)] [resources]	
<i>Vera C. Rubin Observatory Watch Party Volunteer</i>	June 2025
• Facilitated the organization and management of Alberta's only official watch party for the Vera C. Rubin Observatory's First look.	
<i>University of Lethbridge Math Fair Coordinator</i>	February 2024 & 2025, December 2025
Pacific Institute for the Mathematical Sciences (PIMS)	
• Engaged with the local Lethbridge community through various interactive Mathematics based games, events and puzzles (e.g. Fractals, Hanoi Tower, etc) for K-12 students, aimed at fostering their interest in Mathematics.	
<i>Undergraduate Astronomy Observing Field Trip Volunteer</i>	November 2024
• Assisted in facilitating Dr. Alexandra Tetarenko's Astronomy 2020 Observing Field Trip.	
• Assisted with the following activities during this event: observing through a remote telescope at a local observatory, a Planetarium session and outdoors observing session aimed at looking various astronomical objects (e.g. stars, globular clusters and planets).	
<i>University of Lethbridge Open House Volunteer</i>	October 2024
• Volunteered with the Department of Physics and Astronomy at the University of Lethbridge Open House.	
• Facilitated lab tours of the Physics faculty premises, highlighting the various ongoing cutting-edge research happening in the Dept. of Physics and Astronomy to prospective students and their families.	
• Engaged with the prospective students, highlighting student life experience and undergraduate research opportunities.	
<i>Let's Talk Science Space Week Volunteer</i>	August 2024
• Demonstrated Space based activities (e.g. building toy rockets, viewing constellations, etc.) to grade school students to foster their interest in Astronomy and Space and provided hands-on, interactive sessions to build those rockets.	

Media

Shining Student: I was interviewed by the University of Lethbridge for my academic achievements and community involvement.

Hobbies: Amateur Astronomy | Reading | Hiking | Gardening | Coding