



# Benjamin Scully

 Benjamin Scully |  b.scully [at] mail.utoronto.ca

## EDUCATION

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### University of Toronto

2025 - Current

*PhD - Astronomy and Astrophysics*

### University of British Columbia

2020 - 2025

*BSc - Combined Honours in Physics and Astronomy*

with Distinction; Co-operative Education Program

## PUBLICATIONS

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1. **Scully, B.**, Matzner, C. D., & Yalinewich, A., Observability of flashes from ejecta crashes in aspherical supernovae, with application to SN 2008D. *MNRAS*: [10.1093/mnras/stad2360](https://doi.org/10.1093/mnras/stad2360) arXiv: [2307.15859](https://arxiv.org/abs/2307.15859) (Aug. 2023).
2. Sekatchev, M., Liang, X., Majidi, F., **Scully, B.**, Waerbeke, L. V., & Zhitnitsky, A., The Glow of Axion Quark Nugget Dark Matter: (III) the Mysteries of the Milky Way UV Background. *Submitted to JCAP*, arXiv: [2504.15382](https://arxiv.org/abs/2504.15382) (Apr. 2025)
3. Soni, S., et al. incl. **Scully, B.** LIGO Detector Characterization in the first half of the fourth Observing run. *CQG*: [10.1088/1361-6382/adc4b6](https://doi.org/10.1088/1361-6382/adc4b6) arXiv: [2409.02831](https://arxiv.org/abs/2409.02831) (Sep. 2024)

## RESEARCH EXPERIENCE

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### Graduate Research Assistant - *UofT*

Oct 2025 - Present

*Supervised by Dr. Marten Van Kirkwijk*

- Using interstellar scintillometry to analyze Green Bank Telescope observations of the Crab pulsar to reveal mechanism for poorly understood emissions.

### Undergraduate Honours Thesis - *UBC*

Sep 2024 - Jul 2025

*Supervised by Dr. Ludovic Van Waerbeke & Dr. Ariel Zhitnitsky*

- Modeling Axion Quark Nugget dark matter model emission spectrum in JWST and Euclid bands to test observation potential.
- Found that the Axion Quark Nugget signal is theoretically detectable with component separation techniques.

### Undergraduate Research Assistant - *TRIUMF*

May - Aug 2024

*Supervised by Dr. Jason Holt*

- Implemented a new quantum operator in the group-wide code base and identified other necessary improvements in the field of quark mixing.

### Undergraduate Research Assistant - *TRIUMF*

Sep 2023 - May 2024

*Supervised by Dr. Katherine Pachal*

- Improved mechanical design and assembled scintillators, detector architecture, and wiring of fast scintillator detector paddles for the DarkLight experiment.
- My work helped achieve sub-200 picosecond time resolution.

### Undergraduate Research Assistant - *LIGO UBC*

May - Aug 2023

*Supervised by Dr. Jess McIver*

- Studied signal vs glitch classification in LIGO/Virgo detectors to improve gravitational wave detection capabilities.
- Developed machine learning, dimensional reduction, and visualization techniques in Python with *KERAS & TensorFlow* to identify gaps in classifier performance.

#### Undergraduate Research Assistant - *University of Toronto*

*May - Aug 2022*

*Supervised by Dr. Christopher D. Matzner*

- Studied observability of circumstellar ejecta collisions from aspherical supernovae and compared my simulations to observed events.
- Achieved novel conclusions on observables and wrote a paper which was published in MNRAS.

### PRESENTATIONS AND TALKS

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|---|-----------------|
| 1. <b>Undergraduate Thesis</b>  | <i>Apr 2025</i> |
| <i>Axion Quark Nugget Glow: Observing dark matter in modern telescopes</i>                    |                 |
| 2. <b>CUPC 2024 Undergraduate Talk</b>  | <i>Oct 2024</i> |
| <i>Standard Model Mixology: Exploring Quark Mixing Through Nuclear Theory</i>                 |                 |
| 3. <b>TRIUMF Science Week “Science Pitch” (Honourable Mention)</b>                            | <i>Jul 2024</i> |
| <i>Up is Down: Ab-Initio Approaches to Superaligned Beta Decay to Test for New Physics</i>    |                 |
| 4. <b>UBC Summer-student Astronomy Colloquium</b>   | <i>Aug 2023</i> |
| <i>Semi-supervised clustering of LIGO-Virgo signals to improve GSpyNetTree classification</i> |                 |

### POSTERS

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|---|-----------------|
| 1. <b>TRIUMF Co-op Poster Presentations</b>   | <i>Aug 2024</i> |
| <i>Standard Model Mixology: Exploring Quark Mixing Through Nuclear Theory</i>           |                 |
| 2. <b>TRIUMF Co-op Poster Presentations</b>   | <i>Apr 2024</i> |
| <i>DarkLight Fast Scintillator Trigger Detector Development</i>                         |                 |
| 3. <b>UofT Dunlap SURP Poster Presentation (Honourable Mention)</b>                     | <i>Aug 2022</i> |
| <i>Do circumstellar collisions make observable transients in aspherical supernovae?</i> |                 |

### AWARDS AND GRANTS

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**Faculty of Arts & Science Top (FAST) Doctoral Award** – (\$180 000 over 4 years) *2025-Present*

- Entrance award for a top incoming domestic student

**Paul Sykes Scholarship in Astronomy** – (\$1 200) *2024*

- Scholarship made on the recommendation of the Department of Physics and Astronomy

**Dante Ciccone Memorial Scholarship in Astronomy** – (\$1 575) *2024*

- Scholarships totaling \$3,150 for graduate or undergraduate students studying astronomy

**Dean of Science Scholarship** – (\$280) *2024*

- Recognizes UBC students for service to faculty and fellow students

**Canadian Institute for Nuclear Physics URS** – (\$11 500) *2024*

**NSERC USRA** – (\$11 000) *2023*

**Charles and Jane Banks Scholarship** – (\$270) *2022*

- Awarded on the recommendation of the Faculty to worthy and deserving students

**NSERC USRA** – (\$9 600) *2022*

**Dean’s Scholar** – UBC *2021-2025*

- Awarded to students with an average of  $\geq 90\%$  the previous Winter Session

## OUTREACH AND SERVICE

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**Astrotours Logistics Coordinator (UofT Astronomy Graduates)** *Oct 2025 - Present*

- Support co-directors in planning astrotours events. Stand in for any absent astrotours chairs.

**Mediation Committee (UofT Astronomy Graduates)** *Oct 2025 - Present*

- Acts to mediate disputes within the department. Advocates for a fair graduate stipend annually.

**UBC PHAS EDI Committee** *May 2024 - May 2025*

- Member of the UBC Physics Department's Equity Diversity and Inclusion committee with the goal of providing guidance on policy changes, and inspiring new initiatives
- My responsibilities center around establishing professional development and effective resources for members of the community.

**Girl Guide Physics Activities** *Jan 2024 - Apr 2025*

- Taught interactive physics activities to Girl Guide groups of ages 5-12.
- Activities included LED circuits, spaghetti towers, and instruction about general relativity

**UBC Physics Olympics** *Mar 2023 - Mar 2025*

- Formulated rules, designed and ran pre-build competition in 2024 and currently for 2025
- Ran vacuum pump pre-build competition and Quizzics (Physics Quiz) competition in 2023

**UBC Canadian Undergraduate Physics Conference Organizer** *Jan - Oct 2024*

- Acted as external coordinator in the organization of CUPC at UBC for the Fall of 2024.
- Handled all aspects of securement, and organization of all nineteen keynote and panellist speakers
- Additionally managed catering and sponsorship details, and judged student presentations

**UBC Faraday show** *Nov 2023*

- Annual science lecture to introduce Physics to younger generations
- Presented to over 300 members of the public

## SKILLS

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**Programming:** Python (TensorFlow, Astropy), C++, ROOT, Java, Matlab

**Applications:** GitHub, Linux terminal, LaTeX, MadGraph, SolidWorks, Microsoft Office

**Other:** Object oriented design, Data collection & analysis, Computing clusters, Scientific writing, Delicate materials handling, Physical construction/assembly

**Attributes:** Detail oriented, Communication, Public speaking, Teamwork, Empathy

## WORKSHOPS AND SPECIAL PROGRAMS

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

**French Immersion Dual Dogwood highschool diploma** *Jun 2020*

## NON-ACADEMIC WORK EXPERIENCE

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**Lifeguard & Swim Instructor** – City of Rossland *2019 - 2021*

**Meat shop Cleaner and Cashier** – Ferraro Foods *2017 - 2019*

## LANGUAGES

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**Fluent:** English, French – **Learning:** Spanish (B1)