

Benjamin Scully

 Benjamin Scully |  b.scully@mail.utoronto.ca |  250-368-7850

EDUCATION

University of British Columbia

2020 - 2025

BSc - Combined Honours in Physics and Astronomy

with Distinction; Co-operative Education Program

PUBLICATIONS

1. **Scully, B.**, Matzner, C. D., & Yalinewich, A., Observability of flashes from ejecta crashes in aspherical supernovae, with application to SN 2008D. *MNRAS*.
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 Dugget 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. *Submitted to CQG* arXiv: [2409.02831](https://arxiv.org/abs/2409.02831) (Sep. 2024)

RESEARCH EXPERIENCE

Undergraduate Honours Thesis - *UBC*

Sep 2024 - Present

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

- Modelling Axion Quark Nugget dark matter model emission spectrum in JWST and Euclid bands to test observation potential
- Bridging technical details of modern telescopes with theoretical modelling in Python to compare predictions to real-world capabilities
- Will communicate work multiple times in oral and written media by the project conclusion in May 2025

Undergraduate Research Assistant - *TRIUMF*

May - Aug 2024

Supervised by Dr. Jason Holt

- Used nuclear theory to probe physics beyond the standard model in the field of quark mixing
- Implemented a new quantum operator in the group-wide code base and identified other necessary improvements
- Selected papers and collaborated across theory groups to achieve results

Undergraduate Research Assistant - *TRIUMF*

Sep 2023 - May 2024

Supervised by Dr. Katherine Pachal

- Prepared and developed fast scintillator detector paddles for the DarkLight experiment
- Improved mechanical design and assembled scintillators, detector architecture, and wiring for the set-up
- Developed and conducted data analysis to achieve sub-200 picosecond time resolution
- Simulated particle interactions to confirm theoretical expectations

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
- Worked with large data sets to directly improve identification capabilities of the classifier

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 findings to observed events
- Independently implemented aspherical supernovae in C++ hydrodynamics simulation despite having no prior experience with the language or object oriented design
- Achieved novel conclusions on observables and wrote a paper which was published in MNRAS.

PRESENTATIONS AND TALKS

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

POSTERS

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

AWARDS AND GRANTS

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

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

- Physics and astronomy competition for high-school students
- 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

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

Canadian Astroparticle Physics Summer School (CAPSS)

May 2023

Week long summer program at Queens University and SNOLAB

French Immersion Dual Dogwood highschool diploma

Jun 2020

Double degree acknowledging achieved French fluency through Late French Immersion

NON-ACADEMIC WORK EXPERIENCE

Lifeguard & Swim Instructor – City of Rossland

2019 - 2021

Meat shop Cleaner and Cashier – Ferraro Foods

2017 - 2019

LANGUAGES

Fluent: English, French – **Learning:** Spanish (B1), German (A1)