Benjamin Scully

 Benjamin Scully | ben13@student.ubc.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 (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, 2025. *Submitted to JCAP* arXiv: 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 (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 Superallowed 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

Paul Sykes Scholarship in Astronomy – (*$1 200*) *Dec 2024*
- Scholarship made on the recommendation of the Department of Physics and Astronomy

Dante Ciccone Memorial Scholarship in Astronomy – (*$1 575*) *Sep 2024*
- Scholarships totaling $3,150 for graduate or undergraduate students studying astronomy

Dean of Science Scholarship – (*$280*) *Sep 2024*
- Recognizes UBC students for service to faculty and fellow students

Canadian Institute for Nuclear Physics URS – (*$11 500*) *May 2024*
- Funded my work at TRIUMF with Dr. Jason Holt

NSERC USRA – (*$11 000*) *May 2023*
- Funded my work on LIGO/Virgo at UBC with Dr. Jess McIver

Charles and Jane Banks Scholarship – (*$270*) *Sep 2022*
- Awarded on the recommendation of the Faculty to worthy and deserving students

NSERC USRA – (*$9 690*) *May 2022*
- Funded my work at UofT with Dr. Christopher Matzner

Dean's Scholar – UBC *2021-2023*
- 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)