

# David R. Miller

PHD CANDIDATE - UNIVERSITY OF BRITISH COLUMBIA

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## Education

### University of British Columbia

Vancouver, BC, Canada

#### PHD, ASTRONOMY

2022–Present

*Supervisors:* Dr. Jeremy Heyl and Dr. Harvey Richer (1944–2023)

*Thesis:* Probing Stellar Evolution With White Dwarfs in Open Clusters

Expected Completion: Spring 2027

### University of British Columbia

Vancouver, BC, Canada

#### MSc, ASTRONOMY

2020–2022

*Supervisor:* Dr. Harvey Richer (1944–2023)

*Thesis:* [The White Dwarf Initial-Final Mass Relation: Ultramassive White Dwarfs Ejected from Young Open Star Clusters](#)

### Simon Fraser University

Burnaby, BC, Canada

#### BSc, PHYSICS HONOURS (WITH DISTINCTION)

2016–2020

*Supervisor:* Dr. Levon Pogosian

*Thesis:* [Dark Sector Cosmic Fluid Interactions as a Solution to the Observed Disagreement in Measurements of the Hubble Expansion Rate](#)

## Awards

**UBC Four Year Fellowship (4YF)**, \$98,000

2023–2027

**President's Academic Excellence Initiative PhD Award**, \$4,800

2022–2026

**Dunlap Institute Summer Undergraduate Research Program Fellowship (SURP)**, \$9,500

2019

**NSERC Undergraduate Student Research Award (USRA)**, \$5,250

2018

**Ken Caple College Transfer Entrance Scholarship**, \$3,500

2016

## Publications

### First-Author Publications (4)

1. **Miller, D. R.**, Heyl, J., and Tremblay, P-E. Investigating the Observational Progenitor Mass Gap in the White Dwarf Initial-Final Mass Relation. I. Cluster Census and Characterization of the First White Dwarfs in the Gap. 2026, *ApJ*, accepted.
2. **Miller, D. R.**, Caiazzo, I., Heyl, J., et al. [The White Dwarf Initial-Final Mass Relation from Open Clusters in Gaia DR3](#). 2026, *ApJ*, 996:69.
3. **Miller, D. R.**, Caiazzo, I., Heyl, J. et al. [An Extremely Massive White Dwarf Escaped From the Hyades Star Cluster](#). 2023, *ApJL*, 956:L41.
4. **Miller, D. R.**, Caiazzo, I., Heyl, J. et al. [The Ultramassive White Dwarfs of the Alpha Persei Cluster](#). 2022, *ApJL*, 926:L24.

### Co-Author Publications (7)

1. Jadhav, V. V., Kroupa, P., **Miller, D. R.**, Sahu, S., and Franktisek, D. The white dwarf population of open

clusters and their tidal tails: Tracers of contamination and stellar interactions. 2026, *A&A*, accepted.

2. Yan, H., **Miller, D. R.**, Zhao, J., Guo, J., and Li, C. Escaped White Dwarf Candidates from Open Clusters. 2026, *ApJ*, accepted.
3. Yan, H., Wang, L., **Miller, D. R.**, et al. [Searching for White Dwarf Candidates Formed Through Binary Evolution in Star Clusters](#). 2026, *ApJ*, 999:167.
4. Cristea, A. A., Caiazzo, I., Cunningham, T., Raymond, J. C., Vennes, S., Kawka, A., Desai, A., **Miller, D. R.**, et al. [A half ring of ionized circumstellar material trapped in the magnetosphere of a white dwarf merger remnant: A new class of white dwarf merger remnants with X-ray emission](#). 2026, *A&A*, 706, A188.
5. Côté, P., et al. (including **Miller, D. R.**). [The CASTOR mission](#). 2025, *JATIS*, 11(4).
6. Richer, H. B., Caiazzo, I., Du, H., Grondin, S., Hegarty, J., Heyl, J., Kerr, R., **Miller, D. R.**, and Thiele, S. [Massive White Dwarfs in Young Star Clusters](#). 2021, *ApJ*, 912:165. (Author order alphabetical after the first two)
7. Tzanavaris, P., Gallagher, S. C., Ali, S., **Miller, D. R.**, Puntinga, S., and Johnson, K. E. [Cosmic Pathways for Compact Groups in the Milli-Millennium Simulation](#). 2019, *ApJ*, 871:242.

## Unpublished Work

1. Heyl, J., Caiazzo, I., Richer, H., and **Miller, D. R.**. [Reconstructing Nearby Young Clusters with Gaia EDR3](#). *arXiv pre-prints* arXiv:2110.04296.

## Select Talks and Presentations

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|                   |                                                           |                  |            |
|-------------------|-----------------------------------------------------------|------------------|------------|
| Halifax, Canada   | <b>CASCA (Canadian Astronomical Society) 2025</b>         | Contributed Talk | June 2025  |
| Burnaby, Canada   | <b>Cosmology Seminar</b> , Simon Fraser University        | Invited Talk     | March 2025 |
| Barcelona, Spain  | <b>23<sup>rd</sup> European White Dwarf Workshop</b>      | Contributed Talk | July 2024  |
| Padova, Italy     | <b>EAS (European Astronomical Society) 2024</b>           | e-Poster         | July 2024  |
| Toronto, Canada   | <b>CASCA 2024: Harvey Richer Special Memorial Session</b> | Invited Talk     | June 2024  |
| Loon Lake, Canada | <b>Astronomy Retreat</b> , University of British Columbia | Contributed Talk | March 2024 |
| Vancouver, Canada | <b>Astronomy Seminar</b> , University of British Columbia | Invited Talk     | Oct. 2022  |
| Tübingen, Germany | <b>22<sup>nd</sup> European White Dwarf Workshop</b>      | Contributed Talk | Aug. 2022  |

## Observing Programs as Principle Investigator

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*Principle investigator on 12 successful Gemini and CFHT observing programs, totaling 68.1 awarded hours.*

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|------------------------|------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Gemini</b>          | <i>Expanding the high-mass end of the cluster white dwarf initial-final mass relation</i>                                                | 2026 |
| <b>Co-PI: HST, tbh</b> | <i>Hidden in Plain Sight? Unraveling the Potential Merger Histories of Ultra-Massive White Dwarfs in the Initial-Final Mass Relation</i> | 2026 |
| <b>Gemini, tbd</b>     | <i>Tracing contamination and stellar interactions in the white dwarf populations of open clusters and their tidal tails</i>              | 2026 |
| <b>CFHT</b>            | <i>Probing the mass gap in the white dwarf initial-final mass relation with the rich intermediate-aged open cluster NGC 2360</i>         | 2026 |
| <b>Gemini</b>          | <i>Probing Accelerated Cooling and Formation in a White Dwarf Binary from a Young Open Cluster</i>                                       | 2026 |
| <b>CFHT</b>            | <i>Probing the white dwarf initial-final mass relation mass gap in intermediate age open clusters with CFHT MegaCam</i>                  | 2025 |
| <b>Gemini</b>          | <i>Probing Non-Monotonic Trends in the Open Cluster White Dwarf Initial-Final Mass Relation</i>                                          | 2025 |
| <b>Gemini</b>          | <i>Developing the White Dwarf Initial-Final Mass Relation by Advancing the Survey of High-Mass White Dwarfs in Open Star Clusters</i>    | 2024 |
| <b>Gemini</b>          | <i>Improving the Census of High-Mass White Dwarfs in Open Star Clusters</i>                                                              | 2024 |
| <b>Gemini</b>          | <i>High Mass White Dwarf Escapees From Clusters</i>                                                                                      | 2023 |
| <b>Gemini</b>          | <i>An Extremely Massive White Dwarf Member of the vdB-Hagen 99 Cluster</i>                                                               | 2022 |
| <b>Gemini</b>          | <i>An Ultramassive White Dwarf Escaped From the Hyades Cluster</i>                                                                       | 2021 |
| <b>Gemini</b>          | <i>Reconstructing Nearby Young Clusters with Gaia EDR3: Two White Dwarfs Escaped from Alpha Per</i>                                      | 2021 |
| <b>Gemini</b>          | <i>Spectroscopy of Massive White Dwarfs in Extended Survey Around Young Clusters</i>                                                     | 2021 |

## Teaching

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*Note: At the direction of my supervisor, I did not take on additional TA roles after 2023, as they were no longer expected following the award of a graduate fellowship. However, I was specifically requested to TA the graduate stellar astronomy course in 2026, a biennial offering, reflecting my role as the department's leading graduate student in stellar astrophysics.*

|                                                                                                                                      |           |
|--------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Astro 508: Stellar Astronomy</b> , TA                                                                                             | 2026      |
| Sole TA for this graduate course. Duties include holding office hours, supporting student learning, and managing grading.            |           |
| <b>Astro 310: The Solar System</b> , Head Tutorial TA                                                                                | 2022–2023 |
| Oversaw tutorials, managed the course gradebook, held office hours, and revised tutorial materials now used in subsequent offerings. |           |
| <b>Astro 311: Stars and Galaxies</b> , Tutorial TA                                                                                   | 2023      |
| <b>Astro 102: Intro to Stars and Galaxies</b> , Tutorial TA                                                                          | 2022      |
| <b>Phys 131: Energy and Waves</b> , Tutorial TA                                                                                      | 2021      |
| <b>Astro 101: Introduction to the Solar System</b> , Tutorial TA                                                                     | 2020–2021 |
| Ran and supported tutorials, held office hours, and marked coursework.                                                               |           |

## Academic Service

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### Member

Canada

#### CASTOR SCIENCE TEAM - STELLAR ASTROPHYSICS WORKING GROUP

2022–present

- Contributed to the science case development for the Cosmological Advanced Survey Telescope for Optical and uv Research (CASTOR), which is a proposed Canadian-led UV-optical space telescope.

### Member

University of British Columbia

#### PHYSICS & ASTRONOMY GRADUATE STUDENT ASSOCIATION

2020–present

- Participated in meetings and contributed feedback on matters affecting graduate students in the department.

### Volunteer

Vancouver, BC, Canada

#### TESTING GRAVITY

2019, 2025

- Supported logistics for an international conference on testing the laws of gravity, including registration desk support, managing Zoom sessions, and equipment operation.

### Sole Organizer

University of British Columbia

#### COMPACT OBJECT JOURNAL CLUB

2021–2024

- Organized and led weekly meetings, scheduled speakers, managed Zoom for remote attendees, and facilitated discussions.

### Problem Setter and Judge

University of British Columbia

#### HIGH-ENERGY ASTROPHYSICS OLYMPIAD

2022

- Wrote questions for and judged a competitive physics Olympiad for upper division astronomy students.

### Member

Simon Fraser University

#### PHYSICS UNDERGRADUATE STUDENT ASSOCIATION

2016–2020

- Attended regular meetings and provided input to enhance the undergraduate physics student experience.

## Public Outreach

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### Speaker

Vancouver, BC, Canada

#### SCIENCE RENDEZVOUS – UNIVERSITY OF BRITISH COLUMBIA

2026

- Delivered a public science talk on stellar evolution as part of Science Rendezvous, a Canada-wide free family science festival.

### Volunteer

Vancouver, BC, Canada

#### ASTRONOMY ON TAP – UNIVERSITY OF BRITISH COLUMBIA

2024–present

- Helped coordinate the launch of the new UBC chapter of Astronomy on Tap, along with answering astronomy questions from participants.

### Volunteer

Toronto, ON, Canada

#### ASTRONOMY ON TAP – UNIVERSITY OF TORONTO

2019

- Supported event coordination and interacted with attendees to answer astronomy related questions.

### Volunteer

University of Western Ontario

#### CRONYN OBSERVATORY

2018

- Guided visitors and answered astronomy questions during public telescope viewing nights.

## Professional Development

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### Participant

*Virtual*

#### SUMMER SCHOOL IN STATISTICS FOR ASTRONOMERS – PENN STATE CENTER FOR ASTROSTATISTICS AND ASTROINFORMATICS

2026

- Summer school on statistical methods for astronomical research, covering statistical inference, regression and model selection, resampling methods, Bayesian data analysis, MCMC, nested sampling, time series analysis, spatial statistics, and machine learning, with training conducted in R.

### International Data Rights Holder

*Canada*

#### LEGACY SURVEY OF SPACE AND TIME (LSST) ON THE RUBIN OBSERVATORY

2025–present

- Listed among those with provisional LSST data rights through Canada's in-kind contribution program, pending final data rights agreement.

### Attendee

*Vancouver, BC, Canada*

#### ML4ASTRO WORKSHOP - ICML 2025

2025

- Workshop on machine learning in astrophysics, covering foundation models, simulation-based inference, anomaly detection, and the integration of AI into scientific workflows.

### Attendee

*Vancouver, BC, Canada*

#### TESTING GRAVITY PRE-CONFERENCE SCHOOL

2025

- Review lectures and background material in gravitation and cosmology ahead of the Testing Gravity conference.

### Participant

*Montreal, QC, Canada*

#### CRAQ SUMMER SCHOOL ON *Space Astronomy*

2023

- Covered Canadian capabilities in space-based astronomy, satellite operations, and mission and instrumentation development.

### Attendee

*Vancouver, BC, Canada*

#### TESTING GRAVITY PRE-CONFERENCE SCHOOL

2019

- Background lectures on cosmology and gravitation held prior to the Testing Gravity conference.

### Participant

*Montreal, QC, Canada*

#### CRAQ SUMMER SCHOOL ON *Large-Scale Astrophysics*

2018

- Focused on galaxy formation and evolution, galaxy clusters, and the use of large-scale structures as cosmological tools.