

## EDUCATION

- 2022 - present **P.h.D in Astronomy**, *University of Manitoba, Department of Physics and Astronomy.*  
As a PhD candidate in Astrophysics at the University of Manitoba, my research focuses on advancing the understanding of pulsar wind nebulae (PWNe) through a multi-messenger approach combining optical integral field spectroscopy and gravitational-wave data analysis. Using SITELE observations from the Canada-France-Hawaii Telescope, my work investigates long-standing problems such as the “missing shell” in young supernova remnants like the Crab Nebula, while also modeling their plasma properties, progenitor characteristics, and evolutionary stages. In parallel, I contribute to the LIGO Scientific Collaboration by conducting searches for continuous gravitational waves from isolated neutron stars and PWNe candidates, aiming to uncover hidden pulsars and constrain neutron star interior physics. I currently have **two papers in preparation for submission (one in November, and the second in December) and expect at least two additional first-author publications before completion of my PhD, alongside multiple LIGO collaboration papers.**
- 2020 - 2022 **M.Sc in Astronomy**, *Federal University of Rio de Janeiro, Valongo Observatory.*  
During my Master's degree in Astrophysics, my research focused on understanding the role of stellar winds and ionizing flux from hydrogen-deficient Wolf-Rayet ([WR]) central stars of planetary nebulae (CSPNe). Using detailed atmosphere models from the CMFGEN code, I performed a differential analysis of [WR] stars across a range of temperatures and mass-loss rates, comparing them to blackbody and plane-parallel (TMAP) approximations. This work quantified how stellar winds modify the ionizing photon output—particularly for He II—revealing significant attenuation effects for cooler stars ( $T \leq 100$  kK). Through photoionization simulations with the CLOUDY code, I evaluated the impact of these ionizing sources on nebular emission-line ratios for several [WR]-type planetary nebulae (e.g., NGC 5315, NGC 6905, NGC 2867, NGC 40, and BD+303639). The results demonstrated that adopting [WR] atmosphere models provides substantially improved agreement with observations for cooler objects, highlighting the importance of stellar wind effects in nebular modeling. This research has led to a publication currently in submission.
- 2016 - 2019 **B.Sc in Physics**, *Rio de Janeiro State University, Department of Physics.*  
For my undergraduate thesis in Physics, conducted in collaboration with the Brazilian National Observatory (ON), I investigated the chemical composition and nucleosynthesis processes in the binary system HD 15096, a strong candidate for a barium dwarf star. Barium stars are chemically peculiar systems enriched in elements produced via the slow neutron-capture (s-) process, resulting from mass transfer during the companion's Asymptotic Giant Branch (AGB) phase. Using high-resolution spectroscopic analysis, I determined the abundance pattern of HD 15096 and compared it to other known barium dwarfs, confirming enhanced s-process element abundances. I also derived the [s/Fe] and [hs/l s] indices to constrain nucleosynthesis and mass-transfer models in AGB stars. This work contributed to the broader study “High-Resolution Spectroscopic Analysis of Four Unevolved Barium Stars” and provided observational insight into the chemical evolution and enrichment mechanisms of binary systems.

## SCHOLARSHIPS & AWARDS

- 2024 **Faculty of Graduate Studies Travel Award** – Project: Using CFHT's SITELE to probe the long-sought shell in the Crab Nebula, Supervisor: Dr.Samar Safi-Harb (University of Manitoba)

- 2020 - 2022 **CAPES graduate scholarship for Master's students** – Project: Ionizing Flux of [WR] stars, Supervisor: Dr.Wagner Luiz Ferreira Marcolino (Federal University of Rio de Janeiro)
- 2019 **Honorable Mention** – For a talk on Barium Dwarf stars undergrad research, Supervisor: Dr.Claudio B. Pereira (National Observatory - ON)
- 2019 **Honorable Mention** – For a talk on Barium Dwarf stars undergrad research, Supervisor: Dr.Claudio B. Pereira (National Observatory - ON)
- 2017 - 2019 **CNPQ undergraduate fellowship for Scientific initiation** – Project: Barium Dwarf stars, Supervisor: Dr.Claudio B. Pereira (National Observatory - ON)

## PUBLICATIONS

- **Using CFHT's SITELLE to probe the long-sought shell in the Crab nebula, *da Conceição, L. V., et al. 2025, ApJ., (in prep).***
- **Ionizing Radiation of [WR] Stars: Atmospheres and photoionization models, *da Conceição, L. V., et al. 2025, OJA., (in prep).***
- **Directional Search for Persistent Gravitational Waves: Results from the First Part of LIGO-Virgo-KAGRA's Fourth Observing Run, *Several including da Conceição, L. V., et al. 2025, (in prep).***
- **GW250114: Testing Hawking's Area Law and the Kerr Nature of Black Holes, *Several including da Conceição, L. V., et al. 2025, (submitted).***
- **Upper Limits on the Isotropic Gravitational-Wave Background from the first part of LIGO, Virgo, and KAGRA's fourth Observing Run, *Several including da Conceição, L. V., et al. 2025, (submitted).***
- **All-sky search for long-duration gravitational-wave transients in the first part of the fourth LIGO-Virgo-KAGRA Observing run, *Several including da Conceição, L. V., et al. 2025, (submitted).***
- **High-resolution Spectroscopic Analysis of Four Unevolved Barium Stars, *Roriz, M. P., Holanda, N., da Conceição, L. V., et al. 2024a, AJ, 167, 184, doi: 10.3847/1538-3881/ad29f2, (Published).***
- **Searches for Continuous Gravitational Waves from Supernova Remnants in the first part of LIGO-Virgo-KAGRA Fourth Observing run, *Several including da Conceição, L. V.\*, et al., (in prep).***
- **A SITELLE view of a unique and rare system: an energetic and fast-moving pulsar rejuvenating an old supernova remnant, *da Conceição, L. V.\*, et al., (in prep).***

## INTERNATIONAL COLLABORATIONS

- 2024 - **LIGO-VIRGO-KRAGRA COLLABORATION** – Continuous Gravitational Waves Group  
Present
- 2024 - **SITELLE/CFHT CANADA - AUSTRALIA COLLABORATION** – IFU Spectroscopy  
Present Studies of Pulsar Wind Nebulae

## ACCEPTED PROPOSALS

- 2024 - **A SITELLE view of a unique and rare system: an energetic and fast-moving pulsar rejuvenating an old supernova remnant** - CFHT 9.78 Hours Program 25ac20/2024B  
Principal Investigator

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## PRESENTATIONS, CONFERENCES AND WORKSHOPS

- December 2024 **Physics & Astronomy Graduate Student Association (PAGSA) Colloquium**  
*University of Manitoba – Talk: Using CFHT’s SITELLE to probe the long-sought shell in the Crab Nebula*
- June 2024 **Continuous gravitational waves and neutron stars workshop**  
*Hannover, Germany – Workshop: Listener*
- June 2024 **Supernova Remnants III: An Odyssey in Space after Stellar Death**  
*Chania, Crete - Greece – Poster plus 1 min talk: Using CFHT’s SITELLE to probe the long-sought shell in the Crab Nebula*
- September 2023 **7th Advanced School: Multi-messenger astrophysics: gravitational waves, photons, and astroparticles**  
*Instituto Nacional de Ciencias Espaciais - Online – Workshop: Listener*
- August 2023 **WITP Summer School and Symposium 2023**  
*University of Manitoba – talk: Ionizing flux of [WR] stars*
- Mar 2021 **Asymmetrical Post-main-sequence Nebulae: The Shaping of Stellar Outflows**  
*Consejo superior de investigación científica, Granada, Spain, virtual meeting – ePoster: Ionizing flux of [WR] stars*
- June 2021 **XLIV Annual Meeting of the Brazilian Astronomical Society**  
*Brazilian Astronomical Society, virtual meeting – Poster: Ionizing flux of [WR] stars*
- May 2021 **Chemical abundances in gaseous nebulae: from the Milky Way to the Early Universe**  
*University of Paraíba Valley, virtual event - Virtual Workshop*
- February 2021 **Unsolved problems in red giants and supergiants**  
*International Astronomical Union, virtual meeting*
- July 2019 **Scientific and Technological Initiation Journey of the National Observatory (JI-CON)**  
*National Observatory, Rio de Janeiro, Brazil –talk: Barium Dwarf Stars*
- July 2018 **Scientific and Technological Initiation Journey of the National Observatory (JI-CON)**  
*National Observatory, Rio de Janeiro, Brazil –talk: Barium Dwarf Stars*

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## SUPERVISORY EXPERIENCE

- October 2025-Present **Tavleen Kainth - University of Manitoba**  
*co-supervisor - Honours Thesis on Neutron Stars*
- Summer 2024 **Amilia Petryk - University of Manitoba**  
*co-supervisor - undergraduate research project on supernova remnant RCW 86 (summer research)*

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## TEACHING EXPERIENCE

- September 2023–Present **Teaching Assistant, University of Manitoba, ASTRO 1810 - Introduction to Astronomy: The Magnificent Universe**  
*As a Teaching Assistant at the University of Manitoba, I supported both the instructional and administrative aspects of the course. My responsibilities included assisting students during laboratory experiments, ensuring safety and comprehension of experimental procedures, and teaching key course concepts in lab and tutorial settings. I graded assignments, lab reports, and exams, providing constructive feedback to enhance learning outcomes. Additionally, I monitored student engagement during in-class and observational field activities, posted grades, and contributed to the overall organization and delivery of the course.*
- January 2024–Present **Teaching Assistant, University of Manitoba, ASTRO 1830 - The Life in the Universe**  
*As a Teaching Assistant for ASTRO 1830 – Introductory Astronomy, I graded assignments, maintained accurate grade records, and assisted the professor to invigilate during exam applications.*
- September 2023–Present **Teaching Assistant, University of Manitoba, PHYS 1018 - The Mechanics of Nature**  
*As a Teaching Assistant for PHYS 1018 – Introductory Physics, I graded assignments, maintained accurate grade records, and supported students' learning by assisting during class tutorials. My role involved clarifying key physics concepts, providing feedback to improve student performance, and contributing to the smooth delivery of the course.*

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## OUTREACH & SERVICE

- July 2023 **Local Organizing Committee Member/Volunteer - Women in Physics Canada Conference (WIPC), University of Manitoba**  
*As a volunteer at the WIPC, I assisted with guiding the attending through the campus, reception, and contributed to the organizing committee.*
- May 2023 **Volunteer, University of Manitoba, Science Rendezvous - Lockhart Planetarium**  
*As a volunteer at the Lockhart Planetarium, I delivered an outreach presentation to the general public on the Fermi Paradox, introducing fundamental concepts of astrophysics and the search for extraterrestrial life. This experience allowed me to engage diverse audiences, communicate complex scientific ideas in an accessible way, and contribute to the university's public education initiatives.*

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## RESEARCH & SOFT SKILLS

- Programming PYTHON, MATLAB, SQL, SLURM, GIT, UNIX, HIGH-PERFORMANCE COMPUTING (GREX)
- Pipelines & Codes BRUTIFULS, LUCI, ORBS, BDS, IRAF
- Techniques SLIT AND IFU SPECTROSCOPY, SPECTRAL SYNTHESIS, PHOTOIONIZATION MODELLING,
- Dayly Tools LATEX, CLOUDY, TOPCAT, SIMBAD, SPREADSHEETS

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## LANGUAGES SKILLS

- Portuguese Native

<b>English</b>	Fluent
<b>Spanish</b>	Upper Intermediate
<b>French</b>	Beginner
<b>Norwegian</b>	Beginner