SARAH VILLANOVA BORGES

PhD Candidate, Dept. of Physics and Astronomy, University of Wisconsin-Milwaukee

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EDUCATION

University of Wisconsin-Milwaukee (UWM), USA *Jan 2021 – Present*
PhD Candidate in Physics, expected defense date: April 2026
Thesis: "Constraining Common Envelope Evolution Simulations with Observations"

Aeronautics Institute of Technology (ITA), Brazil *Mar 2017 – Dec 2018*
Master of Science in Physics
Thesis: "Emission Models of Soft Gamma-Ray Repeaters/Anomalous X-Ray Pulsars Described as White Dwarfs"

Aeronautics Institute of Technology (ITA), Brazil *Mar 2012 – Dec 2017*
Bachelor's in Aeronautical Engineering, with a Minor in Physical Engineering

OTHER RESEARCH EXPERIENCES

European Southern Observatory (ESO) - Chile *Mar 2019 - Jul 2019*
Visiting Graduate Student

National Institute for Space Research (INPE) - Brazil *Aug 2014 - Feb 2017*
Undergraduate research

PEER-REVIEWED PUBLICATIONS

Link to papers/proceedings:

`https://ui.adsabs.harvard.edu/public-libraries/kCHzGCK3QomwgLiAwaa5nQ`

– **Borges, S.V.** et al. "An White-Dwarf accreting model for the anomalous X-ray Pulsar 4U 0142+61", ApJ, 2020.

– This paper was featured in a AAS author series interview on Feb 12th, 2021:

`https://www.youtube.com/watch?v=JPqG7-ifE_k&t=13s`

– Valsan, V., **Borges, S.V.** et al. "Envelope ejection and the transition to homologous expansion in common-envelope events", MNRAS, 526, 5365 (2023)

SUBMITTED PAPERS

– **Borges, S.V.** "A correlation between the final separation and mass ratio from Common Envelope simulations". Submitted to ApJ.

CLOSE TO SUBMISSION

– **Borges, S.V.** & P. Chang "Evolution of the Morphology of the Ejected Envelope after Common Envelope". In preparation (expected submission December 2025)

– M. Malheiro, **Borges, S.V.**, et al., "Double White Dwarf Mergers as Progenitors of Long-Period Transients". In preparation (expected submission January 2026).

CONFERENCE PROCEEDINGS

– **Borges, S.V.** et al. "Can the anomalous X-ray pulsar 4U 0142+61 be described as an accreting white dwarf?". The Fifteenth Marcel Grossmann Meeting on General Relativity, 2022

– **Borges, S.V.** "A study of the infrared emission of SGR/AXPs in a disk scenario and its implications for their origin". The Sixteenth Marcel Grossmann Meeting on General Relativity, 2023

SELECTED CONFERENCES

- Oral Presentation, N-body Shop Excellence Conference 2025, Milwaukee, Wisconsin, USA, Aug 2025. "A Correlation Between the Final Separation and Mass Ratio from Common Envelope Simulations"
- Oral Presentation, Rise_Time 2024, Purdue, Indiana, USA, Aug 2024. "Planetary Nebulae shaping during Common Envelope".
- Oral Presentation, XVII Marcel Grossman Meeting, Online, Jul 2024. "Estimating the optical/infrared magnitudes of ultra-slow radio pulsars as white dwarfs".
- Oral Presentation, 32nd Midwest Relativity Meeting, Rochester, Michigan, USA Oct 2022."Do magnetars have a disk? An X-rays/Infrared correlation for Soft-Gamma Ray Repeaters and Anomalous X-ray Pulsars".
- Oral Presentation, XVI Marcel Grossman Meeting, Online, Jul 2021. "A study of the infrared emission of SGR/AXPs in a disk scenario and its implications for their origin".
- Oral Presentation, XV Marcel Grossman Meeting, Rome, Italy, Jul 2018. "Can the anomalous X-ray pulsar 4U 0142+61 be described as an accreting white dwarf?".
- Oral Presentation, XLII Brazilian Astronomical Society meeting, São Paulo, Brazil, Jul 2018. "Can the anomalous X-ray pulsar 4U 0142+61 be described as an accreting white dwarf?".
- Poster Presentation, XV Hadron Physics meeting, São José dos Campos, Brazil, Sep 2021. "Can the anomalous X-ray pulsar 4U 0142+61 be described as an accreting white dwarf?".
- Poster Presentation, XLIII Brazilian Astronomical Society meeting, São Paulo, Brazil, Sep 2019. "Can the infrared emission of all Soft Gamma-Ray Repeaters and Anomalous X-ray Pulsars be explained by an irradiated disk?".
- Poster Presentation, XLI Brazilian Astronomical Society , São Paulo, Brazil, Sep 2017. "Can Soft Gamma-Ray Repeaters and Anomalous X-Ray Pulsars be described as white dwarfs?".
- Poster Presentation, Seminar for Undergraduate Research (SICINPE), São José dos Campos, Brazil, July 2015. "Search for an observational corroboration of the WD dwarf pulsar model for the Soft Gamma-Ray Repeaters and Anomalous X-Ray Pulsars".

SEMINARS

- **ESO, Chile**, Jul 11th 2019: "Can the infrared emission of all Soft Gamma-Ray Repeaters and Anomalous X-ray Pulsars be explained by an irradiated disk?"
- **INPE, Brazil**, Aug 4th 2020: "A Magnetic White Dwarf Accretion Model for the Anomalous X-Ray Pulsar 4U 0142+61"
- **UWM, USA**, Nov 4th 2022: "Do magnetars have a disk? An X-ray/Infrared correlation for Soft-Gamma Ray Repeaters and Anomalous X-ray Pulsars"

SUMMER SCHOOLS AND WORKSHOPS

- GROWTH Astronomy School 2020 – August 17–21, 2021 – Online
- N-Body Workshop – June 27 – July 1, 2022 – Flatiron Institute, USA
- MESA Summer School – August 8–12, 2022 – UC Santa Barbara, USA
- CyberInfrastructure Comprehensive, Applied and Tangible Summer School (CIberCATSS) – May 30 – July 14, 2023 – UW Milwaukee, USA

- TARDIS Summer School – July 28 – August 1, 2025 – Michigan State University, USA

SCHOLARSHIPS AND FELLOWSHIPS

- Spring 2023/2024 – Victor Vega Scholarship, USA (UWM)
- Summer 2022 – David Lichtman Memorial Fellowship, USA (UWM)
- Mar 2017 – Jul 2018 – Graduate scholarship from Coordination for the Improvement of Higher Education Personnel, Brazil (CAPES)
- Dec 2016 – Feb 2017 – Undergraduate Scholarship from Foundation for Research Support of the State of São Paulo, Brazil (FAPESP)
- Aug 2014 – Nov 2016 – Undergraduate Scholarship from National Institute for Space Research / Institutional Scholarship Program, Brazil (PIBIC/INPE/CNPq)

TEACHING EXPERIENCE

Graduate Teaching Assistant – UWM

- Spring 2021 – ASTRON 104 (Astronomy Laboratory) – Grader
- Spring 2021 – PHYSICS 422 (Electricity and Magnetism II) – Grader
- Fall 2021 / Fall 2022 / Spring 2023 – PHYSICS 120 (Non-calculus Mechanics) – Discussion Sections
- Spring 2022 – PHYSICS 122 (Non-calculus Electricity and Magnetism) – Discussion Sections
- Fall 2025 – PHYSICS 143 (Calculus-based Electricity and Magnetism) – Laboratory

OTHER PROFESSIONAL EXPERIENCE

Brazilian Air Force *Jan 2012 - Nov 2012*

Completed mandatory military service as part of ITA's first-year undergraduate program.

OUTREACH

Women in STEM – ITA, Brazil *Mar 2016 – Oct 2017*

A partnership between ITA and Johnson & Johnson to inspire young girls to pursue STEM careers. As a member, I helped at engineering workshops and gave science talks at local high schools.

Coffeeshop Astrophysics *2021 – Present*

Monthly public talks by UWM physics graduate students at a local coffee shop. As a regular speaker, I co-presented the following talks:

- "Explosions in the Universe: from Supernovae to Gravitational Waves" (Dec 18, 2021)
- "The Secrets of Neutron Stars" (Apr 23, 2022)
- "How Do Stars Float? Great Questions from Kids You Might Not Know the Answer To" (Sept 24, 2022)
- "The Science of Science Fiction" (May 6, 2023)
- "Ancient Astronomy" (Sept 23, 2023)
- "The Last 10 Years of Astrophysics" (May 11, 2024)
- "Galaxies: From Cradle to Grave" (Sept 28, 2024)
- "Auroras: Cosmic Light Show" (Mar 29, 2025)

Recordings of most talks are available on the Coffeeshop Astrophysics YouTube channel:
`https://www.youtube.com/@coffeeshopastrophysics4696`

Coffeeshop Astrophysics was featured in the American Physical Society website in 2024:
`https://www.aps.org/apsnews/2024/06/coffeeshop-astrophysics`