

Arthur Alencastro Puls

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RESEARCH EXPERIENCE

- 2022 - 2025: Postdoc in the research cluster ELEMENTS¹ at Goethe University Frankfurt.
 - Worked in the group of Prof. Dr. Camilla Juul Hansen, leading a study on the heavy r-process elements Os, Ir, and Pt, plus Hf in the CERES survey.
 - Collaborated in other two projects of the CERES survey that resulted in papers.
 - Secured time at the Nordic Optical Telescope for a follow-up project.
 - Support lecturer, teaching a few classes on stellar spectroscopy, stellar evolution, minor bodies of the solar system, cosmology, and observation techniques to undergraduate and postgraduate students.
 - Became a member of 4MOST and CO5BOLD.
- 2019 - 2023: PhD candidate, Australian National University:
 - Combined high-resolution spectroscopy, asteroseismology from *Kepler*, and dynamics from *Gaia* in the context of Galactic Archaeology.
 - Submitted three proposals for 8 metre class telescopes (success rate: 100%), resulting in 70 hours of observing time.
 - Carried out (remote) observations in Subaru Telescope (instrument: HDS) for three nights. Observations with ESPRESSO/VLT carried out in service mode as Principal Investigator.
 - Built a pipeline in Python to make the spectroscopic analysis less time-consuming (partially published, see technical production section.)
 - Written a Python routine to convert 6D *Gaia* observations to Galactocentric cartesian coordinates, with support for parallelisation (unpublished).
- 2017 - 2018: MSc candidate, Federal University of Rio Grande do Sul:
 - Analysis of Fluorine and CNO abundances in Red Giants and cool main-sequence stars using high-resolution near-infrared spectra from NIRSPEC/Keck.
 - Developed a manual procedure for data reduction of problematic infrared spectra.
 - Took part in remote observations at the SOAR Telescope, as Co-I of the UFRGS Open Clusters Survey.
- 2014 - 2016: Undergraduate research, Federal University of Rio Grande do Sul:
 - Chemical analysis of eight Red Giants in the globular cluster NGC 6366 using optical spectra from UVES/VLT.

¹ <https://elements.science/>

FORMAL EDUCATION

- 2019 - 2023: PhD, Research School of Astronomy and Astrophysics, Australian National University.
Phd Thesis: [Investigating the Relationship Between Chemical Abundance Ratios and Ages in Red Giant Stars](#).
Supervisory panel: Dr. David Yong (chair), Dr. Luca Casagrande, Dr. Jorge Melendez (external).
- 2017 - 2018: Master of Physics (area of expertise: Astrophysics), Federal University of (UFRGS), Brazil.
MSc Thesis: [Unveiling fluorine abundances in the Milky Way](#).
Supervisor: Dr. Alan Alves Brito.
- 2013 - 2016: Bachelor of Physics (emphasis: Astrophysics), Federal University of Rio Grande do Sul (UFRGS), Brazil.
BSc Thesis (in Portuguese): Chemical analysis of the globular cluster NGC 6366 with high-resolution spectroscopy.
Supervisor: Dr. Alan Alves Brito.
- 2002 - 2008: Bachelor of Communication Studies (emphasis: Journalism), Federal University of Rio Grande do Sul (UFRGS), Brazil.

RESEARCH AND SUPERVISION INTERESTS

- Constraining stellar nucleosynthesis through detailed chemical abundances.
- The chemical evolution of the Milky Way, and the evolution of the periodic table of the elements through cosmic time.
- Stellar pulsations in solar-like oscillators, and their applications to Galactic Archaeology.
- Milky Way dynamics, using *Gaia*, in the context of Galactic Archaeology.
- Development of computational methods and tools to optimise data analysis.

LIST OF PUBLICATIONS

Please see the document AAP_Publication_list.pdf.

PUBLISHED TECHNICAL PRODUCTION AND ACHIEVEMENTS

- 2021: Xiru, a Python wrapper for MOOG: <https://github.com/arthur-puls/xiru>
- 2018: Honourable mention - Poster session 'The Galaxy and the Interstellar Medium', XLII Annual Meeting of the Brazilian Astronomical Society.
- 2016: Highlight in the Stellar Astrophysics and Star Clusters session of the XXVIII UFRGS' Undergraduate Research Exhibition ('Salão de Iniciação Científica').

PROFESSIONAL DEVELOPMENT

- 2023: i-process Nucleosynthesis School. Limassol, Cyprus, 2023.
- 2021: 16th Summer School in Statistics for Astronomers. Center for Astrostatistics at The Pennsylvania State University, United States of America.
- 2020: Research visit to the Monash Centre for Astrophysics, Monash University, Australia (2 weeks). Collaboration with A/Prof. Amanda Karakas and Dr. Lorenzo Spina.
- 2019: 8th La Plata International School - Pulsations Along Stellar Evolution. La Plata National University (UNLP), Argentina.
- 2019: Research visit to the Stellar Astrophysics Centre, Aarhus University, Denmark (5 weeks). Collaboration with the group led by Dr. Victor Silva Aguirre.
- 2018: 18th IAG-USP Advanced School on Astrophysics - GMT: Science and Instrumentation. University of São Paulo (USP), Brazil.
- 2017: 2nd Physics School of the Extreme South (Efesul). Federal University of Rio Grande (FURG), Brazil.
- 2017: 3rd Winter School of the Valongo Observatory. Federal University of Rio de Janeiro (UFRJ), Brazil.
- 2014 - 2016: Undergraduate Research ('Iniciação Científica'): high-resolution spectroscopy and stellar chemical abundances. Supervisor: Dr. Alan Alves Brito.
- 2013 - 2015: Participant in the UFRGS outreach program 'Educative Itinerant Observatory' ('Observatório Educativo Itinerante'). Supervisors: Dr. Daniela Borges Pavani, Dr. Alan Alves Brito.

PRESENTATIONS AND CONFERENCES

- 2024: IAUS 395, Paraty, Brazil.
 - Poster: Probing chemical clocks in red giant stars.
- 2024: Nuclear Physics in Astrophysics XI (NPA-XI), Dresden, Germany.
 - Contributed talk: Probing the third r-process peak with high-resolution spectra.
- 2024: ECR Astronuclear School on ELEMENTS, Frankfurt am Main, Germany.
 - Lecture: Chemical abundances from stellar spectra.
- 2024: ELEMENTS Annual Conference, Frankfurt am Main, Germany.
 - Contributed talk: Probing the heavy end of the Periodic Table with CERES.
- 2023: Metal Production and Distribution in a Hierarchical Universe – II (ESO – METALS 2023), Santiago, Chile.
 - Contributed talk: Investigating the sources of r-process nucleosynthesis with Hf, Os and Ir

- 2023: ELEMENTS Annual Conference, Bad Nauheim, Germany.
 - Contributed talk: Probing the origin of r-process elements with Hafnium
- 2023: ii-process Nucleosynthesis Workshop & School, Limassol, Cyprus.
 - Contributed talk: Investigating the i-process in C-normal stars.
- 2022: UFRGS Astronomy Department Seminar, Porto Alegre, Brazil (Online).
 - Seminar: Detailed chrono-chemo-dynamics of seven metal-poor red giants from Kepler.
- 2021: Federal University of Santa Catarina (UFSC), Brazil (Online).
 - Seminar: Detailed chrono-chemo-dynamics of seven metal-poor red giants from Kepler.
- 2021: ASTRO3D ECR Astronomers in Australia Seminar Series.
 - Seminar: Unusual Stars in The Kepler Field: Chemical Analysis and Fundamental Parameters ([video](#)).
- 2021: Precision Spectroscopy 2021 - Stellar connections: from Galaxy evolution to exoplanets.
 - Contributed talk: Unusual Stars in The Kepler Field: Chemical Analysis and Fundamental Parameters.
- 2019: Aarhus University, Denmark.
 - Seminar: Fluorine Abundances in the Galactic Disc.
- 2018: UFRGS' Physics Week - 10th Graduate Exhibition.
 - Talk: Unveiling fluorine abundances in the Galactic Disc.
- 2018: 52nd Annual Meeting of the Brazilian Astronomical Society.
 - Poster: Unveiling fluorine abundances in the Galactic Disc.
- 2017: UFRGS' Physics Week - 9th Graduate Exhibition.
 - Talk: Chemical analysis of eight giant stars of the globular cluster NGC 6366.
- 2017: 51st Annual Meeting of the Brazilian Astronomical Society.
 - Poster: Chemical analysis of eight giant stars of the globular cluster NGC 6366.
- 2016: 50th Annual Meeting of the Brazilian Astronomical Society.
 - Poster: Studying the Sun: a theoretical-observational didactic approach for the study of sunspots in basic education.
 - Poster: First Chemical Abundance Analysis with High Resolution Spectroscopy of the Globular Cluster NGC 6366.
- 2014: 3rd National Symposium of Education in Astronomy (SNEA).
 - Poster: Astronomical Games.