

Monserrat Martínez-Marín

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Education

Swinburne University Of Technology

PhD candidate in Astronomy

Melbourne

Dec 2020 - now

University of Concepcion

Master Degree in Astronomy

Concepcion

Mar 2018 - Jan 2020

University of Concepcion

Bachelor of Astronomy

Concepcion

Mar 2012 - Dec 2017

Technical Skills

Programming

Python, C++, R, Tensorflow, Pytorch, PyTorch Geometric

Software

Ds9, Topcat, Galfit, Fast++, CIGALE, Imfit, slinefit

Drawing & Typesetting

Photoshop, Office, L^AT_EX

Languages

Spanish(Native), English B2

Work Experience

Graduate Research

- **Analysis of emission lines in massive galaxies at redshift between $3 < z < 4$ research project.**
 - Analyze KMOS and MOSFIRE spectra to find the nature of the broad emission lines.
 - Test the sample by measuring its bolometric luminosity, the AGN contribution with CIGALE, and the Hbeta and [OIII]5007 emission line ratios for the Mass excitation diagram, revealing that all galaxies in the sample show an AGN contribution.
 - Calculated the AGN fraction for different stellar mass ranges for galaxies within the redshift range of $3 < z < 4$, uncovering a high AGN fraction in specific ranges.
- **Star formation history reconstruction machine learning research project**
 - Design a Hybrid machine learning architecture with an Autoencoder to reduce the dimensionality of SFHs. Use the resulting latent space to train a supervised neural network to learn this compressed representation directly from the fluxes data. Finally, the learned representation is passed on to the decoder to recover the SFH.
 - We use SFHs calculated with Prospect from a sample of 230,000 galaxies and the photometry from the GAMA survey, which is consistent with 20 photometric bands from far-UV to far-IR.
- **Genetic algorithm Machine learning research project**
 - Conducted a phylogenetic analysis of galaxies in the Coma cluster and the field.
 - Contrastive analysis of galaxies in different density environments, linking chemical content of galaxies with their stellar mass, metallicity and star formation within their evolutionary phylogenetic tree.
- **Metacomputing applied to Astronomy research Project**
 - Conducted a free-of-charge metacomputing project with applications in astronomy.
 - Utilized bonus computing to apply a hierarchical clustering algorithm to disentangle the stellar populations in the globular cluster NGC 2808.

Undergraduate Research

- **Transfer Learning Machine learning project**

Developed machine learning architectures to automatically classify galaxies based on their morphology, including the application of transfer learning from the CANDELS field to the CLASH survey for classifying galaxies in different photometric bands.

Teaching / Consultant

- Mentor Science + Science Extension Program, The University of Technology Sydney, guide to inspire HSC students to undertake UTS Science degrees and shape STEM professionals of the future, May 2024.
- PHY10002 teaching-Lab demonstration and report marking, Swinburne University of technology, Semester I Hawthorn 2023.
- Extragalactic Astronomy-Teaching Assistant and report marking, Astronomy Department, University of Concepcion 2018-2019
- Scientific Consultant-Fraternidad School, Lomas Coloradas. Explora program CONICYT 2019
- Mathematics and physics Consultant-Physics and Mathematics Department, Centro de apoyo Académico (CAA), University of Concepcion 2016-2019
- Linear Algebra-Teaching Assistant-Lab demonstration and report marking, Physics and Mathematics Department, University of Concepcion 2015-2016

Outreach

- **Swinburne Astro Tours:** 3D experience to learn about the Universe. Astro Tour guide and coordinator. January, 2023- Now.
- **Cosmic Giants: Unraveling the Mysteries of Pulsars & Active Galactic Nuclei.** ARC Centre of Excellence for Gravitational Wave Discovery (OzGrav)- Public Talk, Swinburne University of Technology, Melbourne, Australia. September 6th, 2024.
- **Queers in sci-fi,** Explaining the Science behind the gayest episode of Star-Trek, discussion panel member, The Motley Bauhaus, Melbourne Australia, 21 Jul 2023.
- **Astronomy videos series Udec:** Script co-writer and voice actor. 10 episode series about the universe in Spanish. April 2022, AstroUdec YouTube Channel.
- **Equipo de divulgación Astronomía (EDA):** Udec student organization to bring science to Chilean classrooms in a workshop format. Member, guide and workshop content creator. 2016-2020
- **5ta Cumbre de educación y difusión de Astronomía.** Presentation, 25 Septiembre 2019, Temuco, Chile.

Outreach experience

- **Swinburne Astro Tours:** 3D experience to learn about the Universe. Astro Tour guide and coordinator. January, 2023- Now.
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- **5ta Cumbre de educación y difusión de Astronomía.** "Astronomía Mapuche" Presentation, 25 Septiembre 2019, Temuco, Chile.

Awards and Honors

July, 2024	Grant: “ASA ECR Symposium Series 2024 -Grant”	CSIRO- Sydney, Australia
June, 2024	Grant: “IAU General Assembly 2024 -Grant”	Cape Town, South Africa
Dec. 2023	Award: “Director’s Outstanding Achievement Award”, Center of Astrophysics and Supercomputing, Swinburne University of Technology	Melbourne, Australia
June, 2023	Award: “Best Sparkler”, Astro3D Science Meeting	Western Australia
Dec. 2020-2024	Scholarship: “ARC Laureate Fellowships”, FL180100060	Melbourne
Mar. 2018-2019	Scholarship: “Graduate Scholarship ”, Fondo ALMA-CONICYT 2017 31170002	Concep- cion

International Academic Conferences

Presentation / Attendance

Several Cities

- Observing and Simulating Galaxy Evolution in the Era of JWST, Ascona, Switzerland. 18-23 August,2024-**Presentation**
- XXXII IAU General Assembly 2024- S394-9 IAUS 394: All-inclusive AGN & S 391-6 IAUS 391: The first chapters of our cosmic history with JWST-**Presentations**.
- ”CSIRO Colloquium series”, Marsfield site, Sydney. 3rd July, 2024 - **Colloquium**.
- ESO-Galaxy transformation across space and time, Australian Academy of Science, Canberra. 4-8 September, **2023-Presentation**
- ASA ASM, Macquarie University, Sydney. 3-7 July, 2023-**Presentation**
- Astro3D Science Meeting, Fremantle, Western Australia. 30 May–1 June 2023-**Sparkler**
- Early Disk-IAU meeting, Kualalumpur, Malaysia. 6-10 Feb, 2023-**Poster**
- Second JWST Master Class, Melbourne-Swinburne University, Hawthorn Campus. 30 Nov-2 Dec 2022-**Presentation**
- ASA Harley Wood School of Astronomy, Tasmania, Australia.July 2022-**Attendance**. [\[Link\]](#)
- LARIM :XVI Latin American Regional IAU Meeting, Antofagasta, Chile. Dec 2019-**Presentation**.
- VIII Encuentro de investigación de estudiantes de postgrado University of Bio-Bio, Concepcion, Chile. Nov 2019-**Presentation**
- Big Data Astronomy Workshop: ”The engineering behind astronomical data analysis” University of Concepcion, Concepcion. 2019-**Presentation**
- The Galactic Bulge at the crossroads (GBX2018) Pucón, Chile. December 10-14, 2018-**Attendance**. [\[Link\]](#)
- Summer School in Theoretical Physics UACH January 17 - 23, 2018, Valdivia, Chile.-**Attendance**. [\[Link\]](#)
- Galaxy Groups and Clusters II: Laboratories to study galaxy evolution, La Serena, Chile. October 23-26, 2017-**Attendance**. [\[Link\]](#)

References

Prof. Karl Glazebrook

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