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Rodrigo Carvajal Pizarro

PhD student in Astronomy and Astrophysics at the Instituto de Astrofísica e Ciencias do Espaço (IA-FCUL), in the University of Lisbon, working on Radio Galaxies and on the implementation of Machine Learning tools to detect and study them in large-area radio surveys.

Education

Instruction

- 2019–Present **PhD. in Astronomy and Astrophysics**, *Faculdade de Ciências, Universidade de Lisboa*, Lisbon, Portugal
  Project: The First Radio Galaxies in the Universe. Supervisors: J. Afonso, I. Matute, H. Messias.
- 2016–2019 **MSc. in Astrophysics**, *Pontificia Universidad Católica de Chile*, Santiago, Chile
  Thesis: Stacking UV-selected Lyman-Break Galaxies in the ALMA Frontier Fields[1](Maximum distinction). Supervisor: F. E. Bauer.
- 2007–2014 **Licenciado en Ciencias (B.Sc. equivalent)**, *Universidad de Chile*, Santiago, Chile, *Astronomy (Distinction, no thesis required)*
  Courses taken in Physics, Astronomy and Atmospheric Sciences.

Prizes and Awards

- 2019 **PhD::SPACE Fellowship**, *Instituto de Astrofísica e Ciências do Espaço*, Lisbon, Portugal
  The Doctoral Network in Space Sciences (PhD::SPACE) is a program funded by the Fundação para a Ciência e a Tecnologia (MEC, Portugal) to support PhD Fellowships in Space Sciences, from astronomy and astrophysics to instrumentation.
- 2017 **Teaching Assistant Scholarship**, *Pontificia Universidad Católica de Chile*, Santiago, Chile
  This scholarship, awarded by the Pontificia Universidad Católica de Chile, grants students a full exemption from payment of tuition fees and provide a subsistence allowance to students who are beginning their studies.
- 2007–2010 **Beca Universidad de Chile**, *Universidad de Chile*, Santiago, Chile
  Beca Universidad de Chile is a benefit that covers tuition and annual fee of any undergraduate program for the official duration of studies.

Research Experience

- January 2019–October 2019 **Research Assistant**, *Institute of Astrophysics, Pontificia Universidad Católica de Chile (IA-PUC)*, Santiago, Chile

  Image and analyze ALMA data (Bands 3, 4, and 6) from sources located in Abell 2744 as part of the project "Hunting for redshifts of faint DSFGs in A2744" (PI: Bauer)

- August 2015–March 2019 **Research Assistant**, *Institute of Astrophysics, Pontificia Universidad Católica de Chile (IA-PUC)*, Santiago, Chile

  Use image enhancement techniques to improve the quality of ALMA observations and study objects with low signal-to-noise ratio but detected with other instruments. Work carried out as part of FONDECYT REGULAR project 1141218 'The Role of SMBHS in Galaxy Evolution' under the supervision of Prof. Franz Bauer and Jorge González, both from the Astrophysics Institute.

- January 2014–March 2015 **Research Assistant**, *Joint ALMA Observatory (JAO)*, Santiago, Chile

  Study Mars' atmosphere and produce profiles for temperature, wind speed and other atmospheric variables using data retrieved from ALMA observations. Work carried out under the supervision of Dr. Ruediger Kneissl and Dr. David Rabanus, both from JAO.

[1]Thesis text available at `https://repositorio.uc.cl/handle/11534/22335`

August 2013–October 2013 **Research Assistant**, *Departament of Astronomy (DAS), Universidad de Chile*, Santiago, Chile

- Study differences from the outer structures of lensing galaxies through the absorbed light of far quasars. Work carried out under the supervision of Prof. Sebastián López as part of FONDECYT project number 1100214.

March 2013–May 2013 **Research Assistant**, *Departament of Astronomy (DAS), Universidad de Chile*, Santiago, Chile

- Search quasars pairs at small distances over a catalogue of more than 100.000 objects (The SDSS-DR9 Quasar Catalog. Pâris et al. 2012). Work carried out under the supervision of Dr. Isabelle Pâris.

March 2012–July 2012 **Research Assistant**, *Departament of Astronomy (DAS), Universidad de Chile*, Santiago, Chile, Guided Research II

- Confirm the influence of thermal-broadening Doppler parameter in turbulent broadening in Intergalactic Medium. Adjust Voigt profiles to possible absorption lines for Magnesium and Iron transitions. Work carried out under the supervision of Prof. Sebastián López as part of FONDECYT project number 1100214.

May 2012–July 2012 **Research Assistant**, *Departament of Astronomy (DAS), Universidad de Chile*, Santiago, Chile

- Measure the correlation for the results of Voigt curve-fitting procedures in metallic species absorption lines. These lines are a product of a far quasar emission. Work was carried out together with Paula Sánchez (DAS/ESO) and under the supervision of Prof. Sebastián López.

August 2011–December 2011 **Research Assistant**, *Departament of Astronomy (DAS), Universidad de Chile*, Santiago, Chile, Guided Research I

- Determine the influence of thermal-broadening Doppler parameter in turbulent broadening in Intergalactic Medium. Work carried out under the supervision of Prof. Sebastián López.

January 2011 **Research Assistant**, *Departament of Astronomy (DAS), Universidad de Chile*, Santiago, Chile, Basic Tutorial Work

- Working in project "A study of the Molecular Properties of the Vela Molecular Ridge (Coud C)" searching possible structures (clumps) using data from Mopra Radio Telescope, part of the Australia Telescope National Facility (ANTF). Work carried out under the supervision of Dr. Nadia Lo as part of FONDECYT project number 1100221.

Observation Experience

- November 2022 **NIKA2 and EMIR instruments**, *30m Pico Veleta Radio Telescope*, IRAM, Spain, One-week observation run under pooled observations scheme.
- February 2013 **MagE instrument**, *6.5m Magellan-Clay Telescope*, LCO, Chile, One-night observation run under the supervision of Dr. Isabelle Pâris.

Teaching Experience

- March 2013–July 2013 **Universidad de Chile**, *Teaching Assistant FI1001. Introduction to Newtonian Physics*, Santiago, Chile, Department of Physics
  Professor: Sebastián López
- March 2013–July 2013 **Universidad de Chile**, *Teaching Assistant EI2001. Project Workshop*, Santiago, Chile, School of Engineering
  Professor: Sebastián López. Practical course intended to teach students how to characterize the CCD at the University Observatory.
- March 2012–July 2012 **Universidad de Chile**, *Teaching Assistant AS3004–AS758. Intergalactic Medium*, Santiago, Chile, Department of Astronomy
  Professor: Sebastián López
- 2010–2012 **Universidad de Chile**, *Teachers Aide MA2001. Multivariable Calculus*, Santiago, Chile, Department of Mathematical Engineering
  Professors: Marcelo Leseigneur, Felipe Célèry

Outreach

October 2021 **Festival Internacional de Ciência (FICA)**, Oeiras, Lisbon, Portugal

- Help visitors and answer questions about observatories in different wave-lengths as part of the activities in the stand of the Instituto de Astrofísica e Ciencias do Espaço.

Student Supervision

September 2022–February 2023 **Universidade de Lisboa**, *Co-supervision of third-year Bachelor student*, Faculdade de Ciências, Lisbon, Portugal

- As part of their formation, students of Licenciatura em Física (Bachelor in Physics) must work in a scientific project guided by members of the Faculty of Sciences. I helped the main supervisor (Israel Matute) guiding Joana Bagagem on the project "Connecting galaxies photometry with Super-Massive Black Hole (SMBH) properties: A machine learning approach".

July 2022 **Universidade de Lisboa**, *Co-supervision of high-school students*, Faculdade de Ciências, Lisbon, Portugal

- As part of one of the Summer activities of the Faculty of Sciences (Ser Cientista), researchers prepare projects that can be carried out by high-school students throughout one week of work. I helped, together with Henrique Miranda, the main supervisor (Ciro Pappalardo) guiding six students with the project "O FADO das Galáxias".

September 2021–February 2022 **Universidade de Lisboa**, *Co-supervision of third-year Bachelor student*, Faculdade de Ciências, Lisbon, Portugal

- As part of their formation, students of Licenciatura em Física (Bachelor in Physics) must work in a scientific project guided by members of the Faculty of Sciences. I helped the main supervisor (Israel Matute) guiding José Lopes on the project "Modelling Active Galactic Nuclei with Machine Learning".

September 2021–January 2022 **Universidade de Lisboa**, *Co-supervision of third-year Bachelor student*, Faculdade de Ciências, Lisbon, Portugal

- As part of their formation, students of Licenciatura em Física (Bachelor in Physics) must work in a scientific project guided by members of the Faculty of Sciences. I helped the main supervisor (Israel Matute) guiding Beatriz Resendes on the project "Identifying and characterizing AGN in next-generation radio surveys with machine learning".

July 2021 **Instituto de Astrofísica e Ciências do Espaço**, *Co-supervision of third-year Bachelor and Master students' Summer Internships*, Faculdade de Ciências - Universidade de Lisboa, Lisbon, Portugal

- Together with the main supervisor (Israel Matute) we guided four students (Jarno Sandrin, Pedro Ferreira, Pedro Rodrigues, Adriana Monteiro) on the project "Identifying and characterizing AGN in next-generation radio surveys using machine and deep learning", analysing, mainly with Machine Learning techniques, multi-wavelength catalogues of AGN located in one area of the Southern Sky in order to predict some of their properties.

July 2021 **Instituto de Astrofísica e Ciências do Espaço**, *Co-supervision of third-year Bachelor students' Summer Internships*, Faculdade de Ciências - Universidade de Lisboa, Lisbon, Portugal

- I helped the main supervisor (José Afonso) guiding four students (Ahmed Labib, Maria Eduarda Pimentel, Luis Barroso, João Rato) on the project "The 200: exploring the most active supermassive black holes in the first Gyr of the Universe", analysing, in general terms, multi-wavelength catalogues of AGN as a way to understand some of the properties and correlations they might hold.

September 2020–February 2021 **Universidade de Lisboa**, *Co-supervision of third-year Bachelor student*, Faculdade de Ciências, Lisbon, Portugal

- As part of their formation, students of Licenciatura em Física (Bachelor in Physics) must work in a scientific project guided by members of the Faculty of Sciences. I helped the main supervisor (Israel Matute) guiding Iara Tiago on the project "Understanding triggering Radio emission from AGNs (Machine Learning)".

July 2020 **Universidade de Lisboa**, *Co-supervision of third-year Bachelor student*, Faculdade de Ciências, Lisbon, Portugal

- As part of their formation, students of Licenciatura em Física (Bachelor in Physics) might work in a project related to Astrophysics or Science Communication. I helped the main supervisor (José Afonso) guiding Lara Piscarreta on studying radio and X-ray emission of high-redshift AGN.

Working Experience

October 2013–present **Tourist guide**, *Observatorio Astronómico Andino (OAA)*, Santiago, Chile

- Guide visitors (tourists) through the observatory. This includes showing them the main characteristics of the night sky and answer their questions referring to Astronomy and Astrophysics. This work could be done in both Spanish and English.

Referred Articles

- Humphrey, A., P. A. C. Cunha, A. Paulino-Afonso, S. Amarantidis, **R. Carvajal**, J. M. Gomes, I. Matute, and P. Papaderos. "**Improving machine learning-derived photometric redshifts and physical property estimates using unlabelled observations**". In: *MNRAS* 520.1 (Mar. 2023), pp. 305–313. DOI: 10.1093/mnras/stac3596. arXiv: 2212.02537 [astro-ph.GA].
- Miranda, H., C. Pappalardo, P. Papaderos, J. Afonso, I. Matute, C. Lobo, A. Paulino-Afonso, **R. Carvajal**, S. Lorenzoni, and D. Santos. "**An investigation of the star-forming main sequence considering the nebular continuum emission at low-z**". In: *A&A* 669, A16 (Jan. 2023), A16. DOI: 10.1051/0004-6361/202244390. arXiv: 2212.01293 [astro-ph.GA].
- **Carvajal**, **R.**, I. Matute, J. Afonso, S. Amarantidis, D. Barbosa, P. Cunha, and A. Humphrey. "**Exploring New Redshift Indicators for Radio-Powerful AGN**". In: *Galaxies* 9.4 (Oct. 2021), p. 86. DOI: 10.3390/galaxies9040086. arXiv: 2111.00778 [astro-ph.GA].
- Pappalardo, C., L. S. M. Cardoso, J. M. Gomes, P. Papaderos, J. Afonso, I. Breda, A. Humphrey, T. Scott, S. Amarantidis, I. Matute, **R. Carvajal**, S. Lorenzoni, P. Lagos, A. Paulino-Afonso, and H. Miranda. "**Self-consistent population spectral synthesis with FADO. II. Star formation history of galaxies in spectral synthesis methods**". In: *A&A* 651, A99 (July 2021), A99. DOI: 10.1051/0004-6361/202039792. arXiv: 2105.08082 [astro-ph.GA].
- **Carvajal**, **R.**, F. E. Bauer, R. J. Bouwens, P. A. Oesch, J. González-López, T. Anguita, M. Aravena, R. Demarco, L. Guaita, L. Infante, S. Kim, R. Kneissl, A. M. Koekemoer, H. Messias, E. Treister, E. Villard, A. Zitrin, and P. Troncoso. "**The ALMA Frontier Fields Survey. V. ALMA Stacking of Lyman-Break Galaxies in Abell 2744, Abell 370, Abell S1063, MACSJ0416.1-2403 and MACSJ1149.5+2223**". In: *A&A* 633, A160 (Jan. 2020), A160. DOI: 10.1051/0004-6361/201936260. arXiv: 1912.02916.
- González-López, J., F. E. Bauer, M. Aravena, N. Laporte, L. Bradley, M. Carrasco, **R. Carvajal**, R. Demarco, L. Infante, R. Kneissl, A. M. Koekemoer, A. M. Muñoz Arancibia, P. Troncoso, E. Villard, and A. Zitrin. "**The ALMA Frontier Fields Survey. III. 1.1 mm emission line identifications in Abell 2744, MACSJ 0416.1-2403, MACSJ 1149.5+2223, Abell 370, and Abell S1063**". In: *A&A* 608, A138 (Dec. 2017), A138. DOI: 10.1051/0004-6361/201730961. arXiv: 1704.03007.
- González-López, J., F. E. Bauer, C. Romero-Cañizales, R. Kneissl, E. Villard, **R. Carvajal**, S. Kim, N. Laporte, T. Anguita, M. Aravena, R. J. Bouwens, L. Bradley, M. Carrasco, R. Demarco, H. Ford, E. Ibar, L. Infante, H. Messias, A. M. Muñoz Arancibia, N. Nagar, N. Padilla, E. Treister, P. Troncoso, and A. Zitrin. "**The ALMA Frontier Fields Survey. I. 1.1 mm continuum detections in Abell 2744, MACS J0416.1-2403 and MACS J1149.5+2223**". In: *A&A* 597, A41 (Jan. 2017), A41. DOI: 10.1051/0004-6361/201628806. arXiv: 1607.03808.
- Laporte, N., F. E. Bauer, P. Troncoso-Iribarren, X. Huang, J. González-López, S. Kim, T. Anguita, M. Aravena, L. F. Barrientos, R. Bouwens, L. Bradley, G. Brammer, M. Carrasco, **R. Carvajal**, D. Coe, R. Demarco, R. S. Ellis, H. Ford, H. Francke, E. Ibar, L. Infante, R. Kneissl, A. M. Koekemoer, H. Messias, A. Muñoz Arancibia, N. Nagar, N. Padilla, R. Pelló, M. Postman, D. Quénard, C. Romero-Cañizales, E. Treister, E. Villard, W. Zheng, and A. Zitrin. "**The ALMA Frontier Fields Survey. II. Multiwavelength Photometric analysis of 1.1 mm continuum sources in Abell 2744, MACSJ0416.1-2403 and MACSJ1149.5+2223**". In: *A&A* 604, A132 (Aug. 2017), A132. DOI: 10.1051/0004-6361/201730628. arXiv: 1706.09605.

Contributed Talks

- November 2022 — **Ensemble Machine Learning for Radio Galaxy detections**, *SPARCS XI. 2022 meeting of the SKA Pathfinders Radio Continuum Surveys (SPARCS)*, IDIA - Inter-university Institute for Data Intensive Astronomy, South Africa
  R. Carvajal, I. Matute, J. Afonso, R. P. Norris, K. J. Luken, P. Sánchez-Sáez, P. Cunha, A. Humphrey, H. Messias, S. Amarantidis, D. Barbosa
- September 2022 — **Ensemble Machine Learning for the Extraction of High-Redshift Radio Galaxies**, *XXXII Encontro Nacional de Astronomia e Astrofísica (ENAA)*, Faculty of Sciences - University of Lisbon, Lisbon, Portugal
  R. Carvajal, I. Matute, J. Afonso, S. Amarantidis, D. Barbosa
- July 2022 — **Searching for High-z Radio Galaxy Detections with Ensemble Machine Learning**, *EMU International Virtual Meeting*, Evolutionary Map of the Universe - Online event
  R. Carvajal, I. Matute, J. Afonso, S. Amarantidis, D. Barbosa, P. Cunha, A. Humphrey
- February 2022 — **Prediction of distant Radio Galaxies candidates with Machine Learning**, *Jornadas Doutorais (Doctoral Day) from the Department of Physics*, Faculty of Sciences - University of Lisbon, Lisbon, Portugal
  R. Carvajal, J. Afonso, I. Matute, S. Amarantidis, D. Barbosa
- February 2022 — **High-redshift Radio Galaxies candidates prediction with ensemble Machine Learning.**, *SAZERAC SIPS: Learning the high-redshift Universe*, online event
  R. Carvajal, I. Matute, J. Afonso, S. Amarantidis, D. Barbosa, P. Cunha, A. Humphrey

January 2022 **Prediction of high-redshift Radio Galaxy candidates with ensemble Machine Learning.**, *XVII SOCHIAS Meeting. 2022 meeting of the Chilean Society of Astronomy*, online event, Chile
R. Carvajal, I. Matute, J. Afonso, S. Amarantidis, D. Barbosa, P. Cunha, A. Humphrey

November 2021 **Using ensemble Machine Learning to predict high-redshift Radio Galaxy detections.**, *SPARCS X 2021. 2021 meeting of the SKA Pathfinders Radio Continuum Surveys (SPARCS)*, online event, IDIA - Inter-university Institute for Data Intensive Astronomy. South Africa
R. Carvajal, I. Matute, J. Afonso, S. Amarantidis, D. Barbosa, P. Cunha, A. Humphrey

November 2021 **Obtaining High-redshift Radio Galaxy candidates with Machine Learning**, *Internal Workshop of the Intitute of Astrophysics and Space Sciences (IA-ON8)*, IA - University of Coimbra, Portugal
R. Carvajal, I. Matute, J. Afonso, S. Amarantidis, D. Barbosa, P. Cunha, A. Humphrey

October 2021 **Using a series of Machine Learning Models for the detection of high-redshift Radio Galaxy candidates**, *Debating the potential of Machine Learning in astronomical surveys*, IAP Colloquium, Institut d'Astrophysique de Paris, France
R. Carvajal, I. Matute, J. Afonso, S. Amarantidis, D. Barbosa, P. Cunha, A. Humphrey

August 2021 **Using Machine Learning to identify high-redshift Radio Galaxy candidates**, *50th Young European Radio Astronomers Conference*, online event, IRAM
R. Carvajal, J. Afonso, I. Matute, S. Amarantidis, D. Barbosa

March 2021 **Exploring new redshift indicators for radio-powerful AGNs**, *RGCW: A new window on the radio emission from galaxies, clusters and cosmic web*, online event, Italy
R. Carvajal, J. Afonso, I. Matute, S. Amarantidis, D. Barbosa

October 2020 **Searching for the earliest AGN in the radio sky**, *Internal Workshop of the Intitute of Astrophysics and Space Sciences (IA-ON7)*, online event, Porto, Portugal
R. Carvajal, J. Afonso, I. Matute, S. Amarantidis

March 2020 **The first Radio Galaxies in the Universe**, *Jornadas Doutorais (Doctoral Day) from the Department of Physics*, Faculty of Sciences - University of Lisbon, Lisbon, Portugal
R. Carvajal, J. Afonso, I. Matute, H., Messias, S. Amarantidis

December 2017 **Stacking in the ALMA Frontier Fields**, *Distant Galaxies from the Far South*, Bariloche, Argentina
R. Carvajal, F. E. Bauer, J. González-López, R. J. Bouwens, ALMA FF Team

Posters

July 2023 **Ensemble Machine Learning for the prediction of Radio AGN in multi-survey data**, *Encontro Ciência '23: Encontro com a Ciência e Tecnologia em Portugal*, Aveiro, Portugal
R. Carvajal, I. Matute, J. Afonso, R. P. Norris, K. J. Luken, P. Sánchez-Sáez, P. Cunha, A. Humphrey, H. Messias, S. Amarantidis, D. Barbosa, H. A. Cruz, H. Miranda, A. Paulino-Afonso, C. Pappalardo

February 2023 **Radio Galaxy prediction with multi-survey data and ensemble Machine Learning**, *Coordinated Surveys of the Southern Sky*, ESO, Garching, Germany
R. Carvajal, I. Matute, J. Afonso, R. P. Norris, K. J. Luken, P. Sánchez-Sáez, P. Cunha, A. Humphrey, H. Messias, S. Amarantidis, D. Barbosa, H. A. Cruz, H. Miranda, A. Paulino-Afonso, C. Pappalardo

September 2022 **Searching for Radio Galaxy detections with ensemble Machine Learning**, *VLA Sky Survey in the Multiwavelength Spotlight*, NRAO, Socorro, NM. U.S.A.
R. Carvajal, I. Matute, J. Afonso, S. Amarantidis, D. Barbosa

May 2022 **Radio Galaxy detection prediction with ensemble Machine Learning**, *International Conference on Machine Learning for Astrophysics - ML4Astro*, Catania, Italy
R. Carvajal, I. Matute, J. Afonso, S. Amarantidis, D. Barbosa

May 2022 **Finding high-redshift Radio Galaxies with Machine Learning**, *Encontro Ciência '22: Encontro com a Ciência e Tecnologia em Portugal*, Lisbon, Portugal
R. Carvajal, J. Afonso, I. Matute, S. Amarantidis, D. Barbosa

September 2021 **Detection of high-redshift Radio Galaxies using Machine Learning models**, *Encontro Nacional de Astronomia e Astrofísica*, online event, Portugal
R. Carvajal, J. Afonso, I. Matute, S. Amarantidis, D. Barbosa

June 2021 **Using Machine Learning to look for high-redshift Radio Galaxies**, *Encontro Ciência '21: Encontro com a Ciência e Tecnologia em Portugal*, Lisbon, Portugal
R. Carvajal, J. Afonso, I. Matute, S. Amarantidis, D. Barbosa

March 2021 **Exploring new redshift indicators for radio-powerful AGNs**, *A precursor view of the SKA Sky*, online event, The SKA Observatory
R. Carvajal, J. Afonso, I. Matute, S. Amarantidis, D. Barbosa

November 2020 **Mining the radio sky toward the earliest AGN**, *Encontro Ciência '20: Encontro com a Ciência e Tecnologia em Portugal*, Lisbon, Portugal
R. Carvajal, J. Afonso, I. Matute, S. Amarantidis

- September 2020 — **Mining the radio sky toward the earliest AGN**, *Encontro Nacional de Astronomia e Astrofísica*, online event, Portugal
  R. Carvajal, J. Afonso, I. Matute, S. Amarantidis
- March 2015 — **Mapping the winds on Mars. Test study (master project) for planetary atmospheric monitoring with ALMA**, *Ground and space observatories: a joint venture to planetary science*, Santiago, Chile
  R. Carvajal, R. Kneissl, D. Rabanus

Invited Talks or Seminars

- June 2021 — **Developing a ML pipeline to detect high-redshift Radio Galaxy candidates**, *Machine Learning in Astronomy Group - SPARCS*, Western Sydney University. Sydney, Australia
- May 2021 — **Explaining Machine Learning Models: SHAP**, *IA - Galaxies Machine Learning Club*, Porto, Portugal
- July 2020 — **Stacking UV-selected Lyman-Break Galaxies in the ALMA Frontier Fields**, *Instituto de Astrofísica e Ciências do Espaço*, Lisbon, Portugal
- June 2019 — **Stacking UV-selected Lyman-Break Galaxies in the ALMA Frontier Fields**, *ESO*, Santiago, Chile

Attendance to Meetings, Conferences, Schools, or Workshops

- May 2022 — **18th Synthesis Imaging Workshop**, Remote workshop, National Radio Astronomy Observatory. Socorro, NM. U.S.A.
- April-May 2022 — **SKilled, Innovative & Entrepreneurial Scientists**, Hybrid workshop, Instituto de Astrofísica e Ciências do Espaço. Coimbra, Portugal
- February 2022 — **SKA regional centre training event. Hands-on Containerization**, Online event, Science User Engagement (SUE) group of the SKA Regional Centre Steering Commitee
- December 2021 — **Cosmology in the Radio Sky: Prospects and Challenges in the Square Kilometre Array Observatory era**, Online course, Instituto de Astrofísica e Ciências do Espaço
- December 2020 — **Machine Learning in Science & Engineering**, Online event, Columbia University - Data Science Institute
- December 2020 — **SOCHIAS (Chilean Society of Astronomy) annual meeting**, Pucón, Chile
- November 2020 — **Exploiting Archives for Radio Astronomy in the SKA-era**, Lisbon, Portugal
- June 2020 — **European Astronomical Society Annual Meeting**, Leiden, Netherlands
- March 2019 — **ALMA Community Day (Cycle 7 Proposing Workshop)**, *ALMA Joint Observatory (JAO)*, Santiago, Chile
- January 2011 — **SOCHIAS (Chilean Society of Astronomy) annual meeting**, Santiago, Chile

Participation in Projects

- January 2022–June 2023 — **Finding Lyman-alpha emitters through machine learning (Encontrando emissores de Lyman-alpha através de aprendizagem máquina)**, *PTCRIS: EXPL/FIS-AST/1085/2021*, Funding: Fundação para a Ciência e a Tecnologia, Portugal
  P.I. A Paulino-Afonso

Memberships

- **Evolutionary Map of the Universe (EMU)**
- **Square Kilometre Array Observatory (SKAO)**, *Extragalactic Continuum Science Working Group*
- **SKA Pathfinders Radio Continuum Surveys Working Group (SPARCS)**

Service

- July 2022 — **Chair of KS8 session**, *EMU International Virtual Meeting*, Evolutionary Map of the Universe - Online event
- September 2022 - Present — **Co-organiser Journal Club discussions**, *Galaxies Research Group*, Instituto de Astrofísica e Ciencias do Espaço, Weekly meetings to discuss relevant articles and topics.

Technical Skills

Programming

- Python. Intermediate Level.
- C. Intermediate Level.
- Java. Intermediate Level.
- Matlab. Intermediate Level.
- LaTeX. Intermediate Level.
- Mathematica. Basic Level.
- Bash scripting. Basic Level.

Software Skills

- Common Astronomy Software Application (CASA) package. Intermediate Level.
- Tool for operations on catalogues and tables (TOPCAT). Intermediate Level.
- Gnuplot. Intermediate Level.
- ESO-MIDAS. Basic Level.
- Image Reduction and Analysis Facility (IRAF). Basic Level.
- The Atmospheric Radiative Transfer Simulator (ARTS). Basic Level.
- SAOImage DS9. Basic Level.
- EsoRex. Basic Level

Languages

- **Spanish.** Native speaker.
- **English.** IELTS Academic 7.5 (Good User).
- **Portuguese.** Basic knowledge.
- **French.** Basic knowledge.

Academic Interests

Academic Interests

- Radio galaxies.
- High-redshift galaxies.
- Sub-mm observations.
- Machine Learning.
- Planetary atmospheres.

Relevant Courses

Physics

- Classical Mechanics, Statistical Mechanics, Quantum Mechanics, Electrodynamics, Mathematical Methods in Physics, Numerical Methods for Science and Engineering.

Astronomy – Astrophysics

- Undergraduate level: Stellar Astrophysics, Galactic Astrophysics, Experimental Astronomy, Astroinformatics, Intergalactic Medium, Introduction to Cosmology. Graduate level: Extragalactic Astrophysics, Stellar Astrophysics, Radiative Processes, Statistics for Astronomy, Stellar Populations

Atmospheric Sciences

- Introduction to Meteorology and Oceanography, Applied Meteorology, Atmospheric Fluid Dynamics.

Mathematics

- Probability and Statistics, Advanced Calculus, Linear Algebra.

Certifications

- Validity: Dec. 2016 - Dec. 2019 — **Collaborative Institutional Training Initiative. CITI Program**, *Responsible Conduct of Research. Stage 1 - Basic Course*
- Validity: Dec. 2016 - Dec. 2019 — **Collaborative Institutional Training Initiative. CITI Program**, *Human Subjects Research. Stage 1 - Basic Course*

Last update: July, 2023.