

# Rodrigo Carvajal

PHD RESEARCHER IN ASTROPHYSICS

OAL - Edifício Leste, 2º piso. Tapada da Ajuda. 1349-018 Lisboa. Portugal

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## Summary

Final-year PhD student in Physics and Astrophysics at the Instituto de Astrofísica e Ciências do Espaço (IA), in the Faculdade de Ciências of the Universidade de Lisboa (FCUL), in Lisbon, Portugal. Working on identification and characterisation of radio-detected active galactic nuclei from multi-wavelength data and implementation of machine learning tools to detect and study them in large-area radio surveys. My work has been presented in Carvajal et al. (2021, 2023) among other publications and contributed presentations.

## Education

### INSTRUCTION

#### Faculdade de Ciências, Universidade de Lisboa

PHD IN PHYSICS AND ASTROPHYSICS (THESIS SUBMITTED)

Lisbon, Portugal

Nov. 2019 - Dec. 2024 (scheduled)

- Thesis: 'Towards better selection and characterisation criteria for high-redshift radio galaxies using machine-assisted pattern recognition'<sup>1</sup> Supvs.: J. Afonso, I. Matute, H. Messias.

#### Pontificia Universidad Católica de Chile

MSC IN ASTROPHYSICS (MAXIMUM DISTINCTION)

Santiago, Chile

Mar. 2016 - Jan. 2019

- Thesis: 'Stacking UV-selected Lyman-Break Galaxies in the ALMA Frontier Fields'<sup>2</sup>. Supv.: F. E. Bauer.

#### Universidad de Chile

LICENCIADO EN CIENCIAS (BSC EQUIVALENT. DISTINCTION)

Santiago, Chile

Mar. 2007 - Jan. 2014

- Degree in Astronomy (no thesis required).

### PRIZES AND AWARDS

- 2019 - 2024 **PhD::SPACE Fellowship**, Instituto de Astrofísica e Ciências do Espaço
- 2024 **JAO Visitor Program**, Joint ALMA Observatory
- 2017 **Teaching Assistant Scholarship**, Pontificia Universidad Católica de Chile
- 2007 - 2010 **Beca Universidad de Chile**, Universidad de Chile

Lisbon, Portugal

Santiago, Chile

Santiago, Chile

Santiago, Chile

## Publications

Ten refereed publications. Three of them as first author with 21 citations. Seven publications as co-author, with 140 citations. Additionally, one publication in a conference proceedings book and one press release with impact on mass media. Values from NASA ADS as of December, 2024<sup>3</sup>.

### REFEREED ARTICLES

#### Identifying type II quasars at intermediate redshift with few-shot learning photometric classification

P. A. C. CUNHA, A. HUMPHREY, J. BRINCHMANN, S. G. MORAIS, **R. CARVAJAL**, J. M. GOMES, I. MATUTE, AND A. PAULINO-AFONSO

A&A 687 A269. 2024. doi: 10.1051/0004-6361/202346426

#### Selection of powerful radio galaxies with machine learning

**R. CARVAJAL**, I. MATUTE, J. AFONSO, R. P. NORRIS, K. J. LUKEN, P. SÁNCHEZ-SÁEZ, P. A. C. CUNHA, A. HUMPHREY, H. MESSIAS, S. AMARANTIDIS, D. BARBOSA, H. A. CRUZ, H. MIRANDA, A. PAULINO-AFONSO, AND C. PAPPALARDO

A&A 679 A101. 2023. doi: 10.1051/0004-6361/202245770

#### Improving machine learning-derived photometric redshifts and physical property estimates using unlabelled observations

A. HUMPHREY, P. A. C. CUNHA, A. PAULINO-AFONSO, S. AMARANTIDIS, **R. CARVAJAL**, J. M. GOMES, I. MATUTE, AND P. PAPADEROS

MNRAS 520.1 pp. 305–313. 2023. doi: 10.1093/mnras/stac3596

#### An investigation of the star-forming main sequence considering the nebular continuum emission at low-z

H. MIRANDA, C. PAPPALARDO, P. PAPADEROS, J. AFONSO, I. MATUTE, C. LOBO, A. PAULINO-AFONSO, **R. CARVAJAL**, S. LORENZONI, AND D. SANTOS

A&A 669 A16. 2023. doi: 10.1051/0004-6361/202244390

#### Exploring New Redshift Indicators for Radio-Powerful AGN

**R. CARVAJAL**, I. MATUTE, J. AFONSO, S. AMARANTIDIS, D. BARBOSA, P. CUNHA, AND A. HUMPHREY

Galaxies 9.4 p. 86. 2021. doi: 10.3390/galaxies9040086

#### Self-consistent population spectral synthesis with FADO. II. Star formation history of galaxies in spectral synthesis methods

C. PAPPALARDO, L. S. M. CARDOSO, J. M. GOMES, P. PAPADEROS, J. AFONSO, I. BREDÁ, A. HUMPHREY, T. SCOTT, S. AMARANTIDIS, I. MATUTE, **R. CARVAJAL**, S. LORENZONI, P. LAGOS, A. PAULINO-AFONSO, AND H. MIRANDA

A&A 651 A99. 2021. doi: 10.1051/0004-6361/202039792

#### 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

**R. CARVAJAL**, 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. KNEISL, A. M. KOEKEMOER, H. MESSIAS, ET AL.

A&A 633 A160. 2020. doi: 10.1051/0004-6361/201936260

<sup>1</sup>Thesis text available upon request

<sup>2</sup>Thesis text available at <https://repositorio.uc.cl/handle/11534/22335>

<sup>3</sup>ADS Public Library: <https://ui.adsabs.harvard.edu/public-libraries/prom6U0VR26WDYTftnpyYw>

**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**  
J. GONZÁLEZ-LÓPEZ, 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  
A&A 608 A138. 2017. doi: 10.1051/0004-6361/201730961

**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**  
N. LAPORTE, 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**, ET AL.  
A&A 604 A132. 2017. doi: 10.1051/0004-6361/201730628

**The ALMA Frontier Fields Survey. I. 1.1 mm continuum detections in Abell 2744, MACS J0416.1-2403 and MACS J1149.5+2223**  
J. GONZÁLEZ-LÓPEZ, 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, ET AL.  
A&A 597 A41. 2017. doi: 10.1051/0004-6361/201628806

CONFERENCE PROCEEDINGS

**Radio Galaxy Detection Prediction with Ensemble Machine Learning**  
**R. CARVAJAL**, I. MATUTE, J. AFONSO, S. AMARANTIDIS, AND D. BARBOSA  
Machine Learning for Astrophysics, 2023, Cham. ISBN: 978-3-031-34167-0. doi: 10.1007/978-3-031-34167-0\_6

PRESS RELEASES

**Black holes are missing in the early Universe, and computers are after them**  
INSTITUTE OF ASTROPHYSICS AND SPACE SCIENCES · FACULTY OF SCIENCES, UNIVERSITY OF LISBON · Dec. 2023  
Reproduced in local media. For instance, in National Geographic Portugal

Experience

RESEARCH EXPERIENCE

**Faculdade de Ciências, Universidade de Lisboa**  
PHD RESEARCHER

- Research as a PhD student. Project ‘The first Radio Galaxies in the Universe’.

**Joint ALMA Observatory (JAO)**  
SCIENTIFIC VISITOR

- Research as scientific visitor for four weeks. Working with H. Messias in the project ‘Identifying giants in ELAIS-S1 with machine learning’.

**Institute of Astrophysics, Pontificia Universidad Católica de Chile**  
RESEARCH ASSISTANT

- Imaged and analysed ALMA data for project ‘Hunting for redshifts of faint DSGFs in A2744’.

**Institute of Astrophysics, Pontificia Universidad Católica de Chile**  
MSc RESEARCHER

- Research as MSc student. Project ‘Lyman-Break Galaxies in the ALMA Frontier Fields’.

**Institute of Astrophysics, Pontificia Universidad Católica de Chile**  
RESEARCH ASSISTANT (SUPVS. PROF. FRANZ BAUER, DR JORGE GONZÁLEZ)

- Used image enhancement techniques to improve quality of ALMA observations and study objects with low signal-to-noise ratio.

**Joint ALMA Observatory (JAO)**  
RESEARCH ASSISTANT (SUPVS. DR RÜDIGER KNEISSL, DR DAVID RABANUS)

- Studied Mars’ atmosphere and produce profiles for temperature, and wind speed using ALMA observations.

**Departament of Astronomy, Universidad de Chile**  
RESEARCH ASSISTANT (SUPV. PROF. SEBASTIÁN LÓPEZ)

- Studied differences from outer structures of lensing galaxies through absorbed light of far quasars.

**Departament of Astronomy, Universidad de Chile**  
RESEARCH ASSISTANT (SUPV. DR ISABELLE PÂRIS)

- Searched quasars pairs at small distances over catalogue of more than 100000 objects (SDSS-DR9 Quasar Catalog. Pâris et al. 2012).

**Departament of Astronomy, Universidad de Chile**  
RESEARCH ASSISTANT (SUPV. PROF. SEBASTIÁN LÓPEZ)

- Confirmed influence of thermal-broadening Doppler parameter in turbulent broadening in Intergalactic Medium.
- Measured correlation for results of Voigt curve-fitting procedures in metallic species absorption lines from far quasar emission.

**Departament of Astronomy, Universidad de Chile**  
RESEARCH ASSISTANT (SUPV. PROF. SEBASTIÁN LÓPEZ)

- Determined influence of thermal-broadening Doppler parameter in turbulent broadening in Intergalactic Medium.

**Departament of Astronomy, Universidad de Chile**  
RESEARCH ASSISTANT (SUPV. DR NADIA LO)

- Worked in project “A study of the Molecular Properties of the Vela Molecular Ridge (Coud C)” searching possible clumps using data from Mopra Radio Telescope.

Lisbon, Portugal  
Nov. 2019 - Present

Santiago, Chile  
May. 2024

Santiago, Chile  
Jan. 2019 - Oct. 2019

Santiago, Chile  
Mar. 2016 - Jan. 2019

Santiago, Chile  
Aug. 2015 - Mar. 2016

Santiago, Chile  
Jan. 2014 - Mar. 2015

Santiago, Chile  
Aug. 2013 - Oct. 2013

Santiago, Chile  
Mar. 2013 - May. 2013

Santiago, Chile  
Mar. 2012 - Jul. 2012

Santiago, Chile  
Aug. 2011 - Dec. 2011

Santiago, Chile  
Jan. 2011

STUDENT SUPERVISION EXPERIENCE

## Instituto de Astrofísica e Ciências do Espaço

Co-SUPERVISOR SUMMER INTERNSHIP (SUPV. DR I. MATUTE)

- Guided J. Castelo and F. Rosado. Project: 'Supermassive Black Hole growth on galaxies: Linking AGN phases through Cosmic Time'.

Lisbon, Portugal

Jul. 2024

## Instituto de Astrofísica e Ciências do Espaço

Co-SUPERVISOR SUMMER INTERNSHIP (SUPVS. DRS. B. ARSIOLI, I. MATUTE)

- Guided L. Rodrigues, G. Monteiro, A. Correia, D. Barreta, and T. Melo. Project: 'Multifrequency Analysis and Machine Learning for the most powerful quasars in the Universe'.

Lisbon, Portugal

Jul. 2023

## Faculdade de Ciências, Universidade de Lisboa

Co-SUPERVISOR BSc STUDENT (SUPV. DR I. MATUTE)

- Guided J. Bagagem. Project: 'Connecting galaxies photometry with Super-Massive Black Hole (SMBH) properties: A machine learning approach'.

Lisbon, Portugal

Sep. 2022 - Feb. 2023

## Faculdade de Ciências, Universidade de Lisboa

Co-SUPERVISOR BSc STUDENT (SUPV. DR I. MATUTE)

- Guided J. Lopes. Project: 'Modelling Active Galactic Nuclei with Machine Learning'.

Lisbon, Portugal

Sep. 2021 - Feb. 2022

## Faculdade de Ciências, Universidade de Lisboa

Co-SUPERVISOR BSc STUDENT (SUPV. DR I. MATUTE)

- Guided B. Resendes. Project: 'Identifying and characterising AGN in next-generation radio surveys with machine learning'.

Lisbon, Portugal

Sep. 2021 - Feb. 2022

## Instituto de Astrofísica e Ciências do Espaço

Co-SUPERVISOR SUMMER INTERNSHIPS' STUDENTS (SUPV. DR I. MATUTE)

- Guided J. Sandrin, P. Ferreira, P. Rodrigues, and A. Monteiro. Project: 'Identifying and characterising AGN in next-generation radio surveys using machine and deep learning'.

Lisbon, Portugal

Jul. 2021

## Instituto de Astrofísica e Ciências do Espaço

Co-SUPERVISOR SUMMER INTERNSHIPS' STUDENTS (SUPV. DR J. AFONSO)

- Guided A. Labib, M. E. Pimentel, L. Barroso, and J. Rato. Project: 'The 200: exploring the most active supermassive black holes in the first Gyr of the Universe'.

Lisbon, Portugal

Jul. 2021

## Faculdade de Ciências, Universidade de Lisboa

Co-SUPERVISOR BSc STUDENT (SUPV. DR I. MATUTE)

- Guided I. Tiago. Project: 'Understanding triggering Radio emission from AGNs'.

Lisbon, Portugal

Sep. 2020 - Feb. 2021

## Faculdade de Ciências, Universidade de Lisboa

Co-SUPERVISOR BSc STUDENT (SUPV. DR J. AFONSO)

- Guided L. Piscarreta on studying radio and X-ray emission of high-z AGN.

Lisbon, Portugal

Jul. 2020

## TEACHING EXPERIENCE

### Department of Physics, Facultad de Ciencias Físicas y Matemáticas, Universidad de Chile

TEACHING ASSISTANT (LECTURER: PROF. SEBASTIÁN LÓPEZ)

- Teaching Assistant of course FI1001: Introduction to Newtonian Physics.

Santiago, Chile

Mar. 2013 - Jul. 2013

### School of Engineering, Facultad de Ciencias Físicas y Matemáticas, Universidad de Chile

TEACHING ASSISTANT (LECTURER: PROF. SEBASTIÁN LÓPEZ)

- Teaching Assistant of course EI2001: Project Workshop.
- Taught students how to characterise a CCD at the University Observatory.

Santiago, Chile

Mar. 2013 - Jul. 2013

### Department of Astronomy, Facultad de Ciencias Físicas y Matemáticas, Universidad de Chile

TEACHING ASSISTANT (LECTURER: PROF. SEBASTIÁN LÓPEZ)

- Teaching Assistant of course AS3004-AS758.

Santiago, Chile

Mar. 2012 - Jul. 2012

## TIME ALLOCATION

### PI. ACA@ALMA

2024.1.01181.S. HOW RICH ARE THE ENVIRONMENTS OF HIGH REDSHIFT RADIO GALAXIES?

115 hours (Graded C)

Cycle 11

### Co-PI. 12m@ALMA

2017.1.01219.S. HUNTING FOR REDSHIFTS OF FAINT DSFGs IN A2744 (PI: F. BAUER)

14 hours (Graded B)

Cycle 5

## OBSERVATION EXPERIENCE

### 30m Pico Veleta Radio Telescope

NIKA2 AND EMIR INSTRUMENTS - ONE-WEEK OBSERVATION RUN UNDER POOLED OBSERVATIONS SCHEME

IRAM, Spain

Nov. 2022

### 6.5m Magellan-Clay Telescope

MAGE INSTRUMENT - ONE-NIGHT OBSERVATION RUN UNDER THE SUPERVISION OF DR. ISABELLE PÂRIS

LCO, Chile

Feb. 2013

## WORKING EXPERIENCE

### Observatorio Astronómico Andino (OAA)

TOURIST GUIDE

- Showed tourists main features of night sky and answering questions on Astronomy and Astrophysics in both Spanish and English.

Santiago, Chile

2013 - 2019

## Participation in Conferences and Seminars

### CONTRIBUTED TALKS

## Deep 24. Beyond the Edge of the Universe

‘RADIO LUMINOSITY FUNCTIONS FROM ML ANALYSIS’

Sintra, Portugal

Oct. 2024

## International EMU Collaboration Meeting 2024

‘ENHANCING RADIO LUMINOSITY FUNCTIONS WITH MACHINE LEARNING’

Perth, Western Australia

Sep. 2024

## XXXIV Encontro Nacional de Astronomia e Astrofísica (ENAA)

‘FEEDING RADIO LUMINOSITY FUNCTIONS WITH MACHINE LEARNING PREDICTIONS’

Guimarães, Portugal

Sep. 2024

## Internal Workshop of the Instituto de Astrofísica e Ciências do Espaço (IA-ON9)

‘BLACK HOLES FROM BLACK BOXES’

Universidade de Lisboa, Portugal

Jan. 2024

## Debating the potential of Machine Learning in astronomical surveys # 2

‘EXTRACTING PHYSICAL RULES FROM ENSEMBLE MACHINE LEARNING FOR THE SELECTION OF RADIO AGN’

IAP, Paris/Flatiron Institute, New York

Nov. 2023

## XXXIII Encontro Nacional de Astronomia e Astrofísica (ENAA)

‘ENSEMBLE MACHINE LEARNING FOR THE SELECTION OF RADIO AGN IN MULTI-SURVEY DATA’

Universidade de Coimbra, Portugal

Sep. 2023

## SPARCS XI. Meeting of the SKA Pathfinders Radio Continuum Surveys (SPARCS)

‘ENSEMBLE MACHINE LEARNING FOR RADIO GALAXY DETECTIONS’

IDIA, South Africa

Nov. 2022

## XXXII Encontro Nacional de Astronomia e Astrofísica (ENAA)

‘ENSEMBLE MACHINE LEARNING FOR THE EXTRACTION OF HIGH-REDSHIFT RADIO GALAXIES’

University of Lisbon, Portugal

Sep. 2022

## EMU International Virtual Meeting

‘SEARCHING FOR HIGH-Z RADIO GALAXY DETECTIONS WITH ENSEMBLE MACHINE LEARNING’

Online

Jul. 2022

## Jornadas Doutorais (Doctoral Day) - Faculdade de Ciências

‘PREDICTION OF DISTANT RADIO GALAXIES CANDIDATES WITH MACHINE LEARNING’

Universidade de Lisboa, Portugal

Feb. 2022

## SAZERAC SIPS: Learning the high-redshift Universe

‘HIGH-REDSHIFT RADIO GALAXIES CANDIDATES PREDICTION WITH ENSEMBLE MACHINE LEARNING’

Online

Feb. 2022

## XVII SOCHIAS Meeting. Meeting of the Chilean Society of Astronomy

‘PREDICTION OF HIGH-REDSHIFT RADIO GALAXY CANDIDATES WITH ENSEMBLE MACHINE LEARNING’

Online

Jan. 2022

## SPARCS X. Meeting of the SKA Pathfinders Radio Continuum Surveys (SPARCS)

‘USING ENSEMBLE MACHINE LEARNING TO PREDICT HIGH-REDSHIFT RADIO GALAXY DETECTIONS’

IDIA, South Africa

Nov. 2021

## Internal Workshop of the Instituto de Astrofísica e Ciências do Espaço (IA-ON8)

‘OBTAINING HIGH-REDSHIFT RADIO GALAXY CANDIDATES WITH MACHINE LEARNING’

Universidade de Coimbra, Portugal

Nov. 2021

## Debating the potential of Machine Learning in astronomical surveys

‘USING A SERIES OF MACHINE LEARNING MODELS FOR THE DETECTION OF HIGH-REDSHIFT RADIO GALAXY CANDIDATES’

IAP, France

Oct. 2021

## 50th Young European Radio Astronomers Conference

‘USING MACHINE LEARNING TO IDENTIFY HIGH-REDSHIFT RADIO GALAXY CANDIDATES’

IRAM

Aug. 2021

## RGCW: A new window on the radio emission from galaxies, clusters and cosmic web

‘EXPLORING NEW REDSHIFT INDICATORS FOR RADIO-POWERFUL AGNs’

INAF, Italy

Mar. 2021

## Internal Workshop of the Instituto de Astrofísica e Ciências do Espaço (IA-ON7)

‘SEARCHING FOR THE EARLIEST AGN IN THE RADIO SKY’

Online, Portugal

Oct. 2020

## Jornadas Doutorais (Doctoral Day) - Faculdade de Ciências

‘THE FIRST RADIO GALAXIES IN THE UNIVERSE’

Universidade de Lisboa, Portugal

Mar. 2020

## Distant Galaxies from the Far South

‘STACKING IN THE ALMA FRONTIER FIELDS’

Bariloche, Argentina

Dec. 2017

## INVITED TALKS AND SEMINARS

### IA/ML Forum - ESO

‘HOW CONFIDENT CAN YOU BE? CALIBRATING PROBABILITIES FOR THE SELECTION OF AGN’

Garching, Germany

Jun. 2024

### Seminar - Joint ALMA Observatory (JAO)

‘IDENTIFYING GIANTS IN ELAIS-S1 WITH MACHINE LEARNING’

Santiago, Chile

May. 2024

### Python Coffee - ESO

‘SHAP ANALYSIS FOR INTERPRETABLE MACHINE LEARNING IN ASTROPHYSICS’

Santiago, Chile

May 2024

### Machine Learning in Australian Astronomy

‘SELECTION OF RADIO-DETECTED AGN WITH ENSEMBLE MACHINE LEARNING’

Australia

Nov. 2023

### Machine Learning in Astronomy Group – SPARCS

‘DEVELOPING A ML PIPELINE TO DETECT HIGH-REDSHIFT RADIO GALAXY CANDIDATES’

WSU, Sydney, Australia

Jun. 2021

### IA - Galaxies Machine Learning Club

‘EXPLAINING MACHINE LEARNING MODELS: SHAP’

Porto, Portugal

May. 2022

### Seminar - Instituto de Astrofísica e Ciências do Espaço

‘STACKING UV-SELECTED LYMAN-BREAK GALAXIES IN THE ALMA FRONTIER FIELDS’

Lisbon, Portugal

Jul. 2020

### Seminar - ESO

‘STACKING UV-SELECTED LYMAN-BREAK GALAXIES IN THE ALMA FRONTIER FIELDS’

Santiago, Chile

Jun. 2019

## CONTRIBUTED POSTERS

### Encontro Ciência ’24: Encontro com a Ciência e Tecnologia em Portugal

‘PREDICTION OF RADIO AGN WITH ENSEMBLE MACHINE LEARNING IN MULTI-SURVEY DATA’

Porto, Portugal

Jul. 2024

### Encontro Ciência ’23: Encontro com a Ciência e Tecnologia em Portugal

‘ENSEMBLE MACHINE LEARNING FOR THE PREDICTION OF RADIO AGN IN MULTI-SURVEY DATA’

Aveiro, Portugal

Jul. 2023

### Coordinated Surveys of the Southern Sky

‘RADIO GALAXY PREDICTION WITH MULTI-SURVEY DATA AND ENSEMBLE MACHINE LEARNING’

Garching, Germany

Feb 2023

## VLA Sky Survey in the Multiwavelength Spotlight

‘SEARCHING FOR RADIO GALAXY DETECTIONS WITH ENSEMBLE MACHINE LEARNING’

## International Conference on Machine Learning for Astrophysics - ML4Astro

‘RADIO GALAXY DETECTION PREDICTION WITH ENSEMBLE MACHINE LEARNING’

## Encontro Ciência ’22: Encontro com a Ciência e Tecnologia em Portugal

‘FINDING HIGH-REDSHIFT RADIO GALAXIES WITH MACHINE LEARNING’

## Encontro Nacional de Astronomia e Astrofísica

‘DETECTION OF HIGH-REDSHIFT RADIO GALAXIES USING MACHINE LEARNING MODELS’

## Encontro Ciência ’21: Encontro com a Ciência e Tecnologia em Portugal

‘USING MACHINE LEARNING TO LOOK FOR HIGH-REDSHIFT RADIO GALAXIES’

## A precursor view of the SKA Sky

‘EXPLORING NEW REDSHIFT INDICATORS FOR RADIO-POWERFUL AGNs’

## Encontro Ciência ’20: Encontro com a Ciência e Tecnologia em Portugal

‘MINING THE RADIO SKY TOWARD THE EARLIEST AGN’

## Encontro Nacional de Astronomia e Astrofísica

‘MINING THE RADIO SKY TOWARD THE EARLIEST AGN’

## Ground and space observatories: a joint venture to planetary science

‘MAPPING THE WINDS ON MARS. TEST STUDY FOR PLANETARY ATMOSPHERIC MONITORING WITH ALMA’

## OTHER MEETINGS

‘SPARCS XII 2024’ - SKA PATHFINDERS RADIO CONTINUUM SURVEYS (SPARCS) - INAF

‘MOONS SCIENCE CONSORTIUM MEETING 2024’ - FACULDADE DE CIÊNCIAS, UNIVERSIDADE DE LISBOA

‘ARTIFICIAL INTELLIGENCE AND THE UNCERTAINTY CHALLENGE IN FUNDAMENTAL PHYSICS’ - SCAI, PARIS AND INSTITUT PASCAL PARIS-SACLAY

‘MACHINE LEARNING MEETS GALAXY CLASSIFICATION: ADDRESSING PARADIGMS OF GALAXY EVOLUTION AND THEIR ENVIRONMENT’ - ESAC

‘COSMOLOGY IN THE RADIO SKY: PROSPECTS AND CHALLENGES IN THE SQUARE KILOMETRE ARRAY OBSERVATORY ERA’ - INSTITUTO DE ASTROFÍSICA E CIÊNCIAS DO ESPAÇO

‘MACHINE LEARNING IN SCIENCE & ENGINEERING’ - COLUMBIA UNIVERSITY - DATA SCIENCE INSTITUTE

‘SOCHIAS (CHILEAN SOCIETY OF ASTRONOMY) ANNUAL MEETING’

‘EXPLOITING ARCHIVES FOR RADIO ASTRONOMY IN THE SKA-ERA’

‘EUROPEAN ASTRONOMICAL SOCIETY ANNUAL MEETING’

‘SOCHIAS (CHILEAN SOCIETY OF ASTRONOMY) ANNUAL MEETING’

NRAO. Socorro, NM. U.S.A.

Sep. 2022

Catania, Italy

May 2022

Lisbon, Portugal

May 2022

Portugal

Sep. 2021

Lisbon, Portugal

Jun. 2021

The SKA Observatory

Mar. 2021

Lisbon, Portugal

Nov. 2020

Online, Portugal

Sep. 2020

Santiago, Chile

Mar. 2015

Bologna, Italy - May 2024

Lisbon, Portugal - Jan. 2024

Paris, France - Nov. 2023

Villafranca del Castillo, Spain - Nov. 2023

Portugal - Dec. 2021

NY U.S.A. - Dec. 2020

Pucón, Chile - Dec. 2020

Lisbon, Portugal - Nov. 2020

Leiden, Netherlands - Jun. 2020

Santiago, Chile - Jan. 2011

## Skills

### Programming

Python, L<sup>A</sup>T<sub>E</sub>X, C, Java, Bash, Mathematica, Matlab

### Software

Common Astronomy Software Application (CASA), Tool for operations on catalogues and tables (TOPCAT), The Atmospheric Radiative Transfer Simulator (ARTS), SAOImage DS9, Gnuplot, ESO-MIDAS, EsoRex, Astropy

### Machine Learning

scikit-learn, XGBoost, LightGBM, CatBoost, PyCaret, SHAP, betacal, ppscore, crepes

### Languages

Spanish, English, Portuguese

## TRAINING

### 18th Synthesis Imaging Workshop

NATIONAL RADIO ASTRONOMY OBSERVATORY

Socorro, NM. USA

May. 2022

### SKilled, Innovative & Entrepreneurial Scientists

INSTITUTO DE ASTROFÍSICA E CIÊNCIAS DO ESPAÇO

Coimbra, Portugal

Apr. - May 2022

### SKA regional centre training event. Hands-on Containerisation

SCIENCE USER ENGAGEMENT (SUE) GROUP OF SKA REGIONAL CENTRE STEERING COMMITTEE

SKAO

Feb. 2022

### ALMA Community Day (Cycle 7 Proposing Workshop)

JOINT ALMA OBSERVATORY (JAO)

Santiago, Chile

Mar. 2019

### MUSE Data Reduction Workshop

INSITUTO DE ASTROFÍSICA, PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE (TAUGHT BY E. JOHNSTON)

Santiago, Chile

Aug. 2019

## Outreach

### IX Ecuadorian School of Astronomy and Astrophysics

LECTURER: ‘LOOKING FOR GALAXIES IN A UNIVERSE OF DATA’ (IN SPANISH)

Quito, Ecuador

Aug. 2023

### Ser Cientista (Being a Scientist). Faculdade de Ciências, Universidade de Lisboa

CO-SUPERVISION OF HIGH SCHOOL STUDENTS

Guiding students on project ‘O FADO das Galáxias’ through one week of work (supv. C. Pappalardo)

Lisbon, Portugal

Jul. 2022

### Festival Internacional de Ciência (FICA) - International Festival of Science

ANSWERED QUESTIONS ABOUT OBSERVATORIES IN THE STAND OF THE INSTITUTO DE ASTROFÍSICA E CIENCIAS DO ESPAÇO

Oeiras, Portugal

Oct. 2021

## Service

MEMBER OF LOC IN DEEP 24 CONFERENCE	2024
REVIEWER IN OPEN RESEARCH EUROPE (BY EUROPEAN COMMISSION)	2024
REVIEWER IN CYCLE 11 DISTRIBUTED REVIEW PROCESS - ALMA OBSERVATORY	2024
MEMBER OF DATA VALIDATION TEAM - EVOLUTIONARY MAP OF THE UNIVERSE	2023 - Present
CO-ORGANISER GALAXIES RESEARCH GROUP JOURNAL CLUB - INSTITUTO DE ASTROFÍSICA E CIENCIAS DO ESPAÇO	Sep. 2022 - Jul. 2023
CHAIR OF KS8 SESSION - EMU INTERNATIONAL VIRTUAL MEETING	Jul. 2022
PACE ANALYST - PORTUGUESE ALMA CENTRE OF EXPERTISE (PACE) - INSTITUTO DE ASTROFÍSICA E CIENCIAS DO ESPAÇO	2019 - 2020

## Projects and Collaborations Membership

### PROJECTS

<b>Finding Lyman-alpha emitters through machine learning</b>	FCT, Portugal
PTCRIS: EXPL/FIS-AST/1085/2021 - P.I. A. PAULINO-AFONSO	Jan. 2022 - Dec. 2023

### COLLABORATIONS

MULTI-OBJECT OPTICAL AND NEAR-INFRARED SPECTROGRAPH (MOONS)	2023 - Present
EVOLUTIONARY MAP OF THE UNIVERSE (EMU)	2020 - Present
SQUARE KILOMETRE ARRAY OBSERVATORY (SKAO) - EXTRAGALACTIC CONTINUUM SCIENCE WORKING GROUP	2020 - Present
SKA PATHFINDERS RADIO CONTINUUM SURVEYS WORKING GROUP (SPARCS)	2020 - Present

## Certificates

RESPONSIBLE CONDUCT OF RESEARCH. STAGE 1 - BASIC COURSE - COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI)	2016
HUMAN SUBJECTS RESEARCH. STAGE 1 - BASIC COURSE - COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI)	2016
IELTS ACADEMIC 7.5/9.0	2017

