

André M. Silva

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Short Bio

I am André Silva, a postdoctoral researcher at the Instituto de Astrofísica e Ciências do Espaço. My research spans instrumentation and exoplanetary science. I am currently working on the PoET solar telescope, leading the development of its observation software. In parallel, I focus on the development of novel algorithms for precise radial velocity extraction and analyze systematic effects that impact such measurements. Over the past three years, I have lectured an advanced course on Python, a Master's-level course on Bayesian statistics, and a PhD-level module on high-resolution spectroscopy.

Education

PhD	Faculdade de Ciências , Doctor's Degree in Astronomy	Universidade do Porto
• Thesis - A new paradigm for the estimation of precise stellar radial velocities		
MsC	Faculdade de Ciências , Mestrado Integrado em Engenharia Física	Universidade do Porto
• Thesis - An expansion to the CHEOPS mission official pipeline.		

Awards

IAU PhD Prize 2024 	Division B	2025
• Awarded the PhD Prize 2024 from the International Astronomical Union (IAU) Division B (Facilities, Technologies, and Data Science) for the work developed during my PhD thesis.		

Experience

Instituto de Astrofísica e Ciências do Espaço , Post-doctoral researcher	CAUP
• Development of the observational software for the PoET solar telescope.	
Faculdade Ciências da Universidade do Porto , Invited Assistant Professor	Physics department
• Invited assistant Professor to teach a PhD-level unit on high-resolution spectroscopy	Nov 2024 – present
Faculdade de Ciências da Universidade de Lisboa , Post-doctoral researcher	FCTiencias.ID
• Development of software to measure day-time seeing, under the FIERCE ERC project	Aug 2024 – Nov 2024
Faculdade Ciências da Universidade do Porto , Invited assistant	Physics department
• Invited assistant for the practical classes of MsC-level unit on Bayesian data analysis.	Feb 2024 – Sept 2024
Instituto de Astrofísica e Ciências do Espaço , PhD fellow	Physics department
• FCT funding for the PhD thesis "A new paradigm for the estimation of precise stellar radial velocities"	2019 – July 2024

Talks

Physis Week 2025 , Python for data analysis	Sept 2025
ENAA XXXV  , A Quest to Detect a Star Velocity: Radial Velocity Extraction and Associated Challenges	Sept 2025
EPRV6  , A systematic bias in template-based RV extraction algorithms	July 2025
Planets throughout the Habitable Zone  , A systematic bias in template-based RV extraction algorithms	June 2025
PoET workshop 2  , 2 talks: PoET observation software; Observing strategies and their role in the improvement of RV analysis	Nov 2024

TOI III 🔗 , Approaches for RV extraction – s-BART and the first steps towards a fully Bayesian model	July 2023
EPRV 5 🔗 , Towards a fully Bayesian RV extraction model	Mar 2023
Exoplanets 4 EPRV splinter , sBART application to the ESPRESSO WG1 targets	Feb 2023
ESPRESSO science team meeting , s BART a semi Bayesian implementation of template matching for precise Radial Velocities	May 2022

Seminars

Astronomical Institute of the Czech Academy of Sciences , Avenues and challenges for radial velocity extraction – s-BART & PoET	Aug 2025
Astronomy department, Uni. of Geneva , Avenues for radial velocity extraction – s-BART & PoET	Jan 2025
ESA research seminar, European Space Agency (Madrid) , Towards an improvement in the characterisation of stellar radial velocities	May 2024
Café com Física 🔗 Departamento de Física da Universidade de Coimbra , The (radial) velocity of stars - detection and characterisation of exoplanets	Mar 2024

Supervision

Transforming H-alpha images of the Sun in astronomical seeing for the PoET solar telescope , Supervisor	Undergraduate project Feb 2025 – July 2025
Looking at the Sun, finding other Earths - Identification of Solar Regions , Co-supervisor	MsC thesis Oct 22 - Nov 23
Development of a GUI interface for the exploitation of data from the s-BART pipeline , Co-supervisor	Undergraduate project Feb 2024 – July 2024
Solar-to-sky coordinate conversion for PoET operations , Co-supervisor	Undergraduate project Feb 2024 – July 2024
Exoplanet detection through a new model for the correction of instrumental effects , Co-supervisor	Undergraduate project Feb 2024 – July 2024
Development of a tool for the normalization of stellar spectra - application to ESPRESSO data , Co-supervisor of BII project with ref CIAAUP-03/2023-BII 🔗	Funded project Feb 2024 – July 2024
A new activity proxy for finding other Earths , Co-supervisor	Bachelors project Nov 2022 – Feb 2023
An analysis of the performance of CHEOPS mission pipelines - the DRP and archi , Co-supervisor	Bachelors project Feb 2020 – June 2020

First Author Publications

ASTRA: A Python Package for Cross-Instrument Stellar and Telluric Template Construction	2026
André M. Silva et al; (JOSS, 10.21105/joss.09413 🔗)	
A systematic bias in template-based radial velocity extraction algorithms	2025
André M. Silva et al; (A&A, 10.1051/0004-6361/202554955 🔗)	
A novel framework for semi-Bayesian radial velocities through template matching	2022
André M. Silva et al; (A&A, 10.1051/0004-6361/202142262 🔗)	
archi: pipeline for light curve extraction of CHEOPS background stars	2020
André M. Silva et al; (Monthly Notices of the Royal Astronomical Society, 10.1093/mnras/staa1443 🔗)	

Co-authored Publications

Gas-depleted planet formation occurred in the four-planet system around the red dwarf LHS 1903	2026
Wilson et al; (Science, 10.1126/science.adl2348 ↗)	
A comprehensive study on radial velocity signals using ESPRESSO: Pushing precision to the 10 cm/s level	2025
Figueira et al; (A&A, 10.1051/0004-6361/202553869 ↗)	
TOI-2322: Two transiting rocky planets close to the stellar rotation period and its first harmonic	2025
Hobson et al; (A&A, 10.1051/0004-6361/202555614 ↗)	
Synthesizing Sun-as-a-star flare spectra from high-resolution solar observations	2025
De Wilde et al; (A&A, 10.1051/0004-6361/202554870 ↗)	
Two neighbours of the ultra-short-period Earth-sized planet K2-157 b in the warm Neptunian savanna	2025
Castro-González et al; (A&A, 10.1051/0004-6361/202554736 ↗)	
PoET: the Paranal solar ESPRESSO Telescope	2025
Santos et al; (Published in The Messenger vol. 194, 10.18727/0722-6691/5381 ↗)	
TOI-512: Super-Earth transiting a K-type star discovered by TESS and ESPRESSO	2025
Rodrigues et al; (A&A, 10.1051/0004-6361/202452887 ↗)	
TESS and HARPS-N unveil two planets transiting TOI-1453: A super-Earth and one of the lowest mass sub-Neptunes	2025
Stalport et al; (A&A, 10.1051/0004-6361/202452969 ↗)	
A Planet Candidate Orbiting near the Hot Jupiter TOI-2818 b Inferred through Transit Timing	2025
McKee et al; (ApJ, 10.3847/1538-4357/adac63 ↗)	
Revisiting the multi-planetary system of the nearby star HD 20794: Confirmation of a low-mass planet in the habitable zone of a nearby G-dwarf	2025
Nari et al; (A&A, 10.1051/0004-6361/202451769 ↗)	
A sub-Earth-mass planet orbiting Barnard's star: No evidence of transits in TESS photometry	2025
Stefanov et al; (A&A, 10.1051/0004-6361/202452450 ↗)	
KOBE-1: The first planetary system from the KOBE survey: Two planets likely residing in the sub-Neptune mass regime around a late K-dwarf	2025
Balsalobre-Ruza et al; (A&A, 10.1051/0004-6361/202452631 ↗)	
Detecting and characterising exoplanets with HARPS-N	2024
Rice et al; (Proc. IAU, 10.1017/S1743921324001741 ↗)	
Characterization of K2-167 b and CALM, a new stellar activity mitigation method	2024
De Beurs et al; (Monthly Notices of the Royal Astronomical Society, 10.1093/mnras/stae207 ↗)	
Expanding the frontiers of cool-dwarf asteroseismology with ESPRESSO: Detection of solar-like oscillations in the K5 dwarf ε Indi	2024
Campante et al; (A&A, 10.1051/0004-6361/202449197 ↗)	
TESS and ESPRESSO discover a super-Earth and a mini-Neptune orbiting the K-dwarf TOI-238	2024
Suárez Mascareño et al; (A&A, 10.1051/0004-6361/202348958 ↗)	

Confronting compositional confusion through the characterisation of the sub-Nep-tune orbiting HD 77946	2024
Palethorpe et al; (Monthly Notices of the Royal Astronomical Society, 10.1093/mnras/stae707 	
The compact multi-planet system GJ 9827 revisited with ESPRESSO	2024
Passegger et al; (A&A, 10.1051/0004-6361/202348592 	
Implementation of a seeing measurement device for the PoET solar telescope	2024
Wehbé et al; (Proc. SPIE, 10.1117/12.3017481 	
PoET, the Paranal solar ESPRESSO Telescope: a spatially resolved Sun in a high resolution spectrograph	2024
Leite et al; (Proc. SPIE, 10.1117/12.3016776 	
ESPRESSO reveals blueshifted neutral iron emission lines on the dayside of WASP-76 b	2024
Costa Silva et al; (A&A, 10.1051/0004-6361/202449935 	
A sub-Earth-mass planet orbiting Barnard's star	2024
González Hernández et al; (A&A, 10.1051/0004-6361/202451311 	
Two temperate Earth-mass planets orbiting the nearby star GJ1002	2023
Mascareño et al; (A&A, 10.1051/0004-6361/202244991 	
An unusually low-density super-Earth transiting the bright early-type M-dwarf GJ 1018 (TOI-244)	2023
Castro-González et al; (A&A, 10.1051/0004-6361/202346550 	
KOBESim: A Bayesian observing strategy algorithm for planet detection in radial velocity blind-search surveys	2023
Balsalobre-Ruza et al; (A&A, 10.1051/0004-6361/202243938 	
Automatic model-based telluric correction for the ESPRESSO data reduction software: Model description and application to radial velocity computation	2022
Allart et al; (A&A, 10.1051/0004-6361/202243629 	
A candidate short-period sub-Earth orbiting Proxima Centauri	2022
Faria et al; (A&A, 10.1051/0004-6361/202142337 	
The KOBE experiment: K-dwarfs Orbited By habitable Exoplanets: Project goals, target selection, and stellar characterization	2022
Lillo-Box et al; (A&A, 10.1051/0004-6361/202243898 	
HD22496b: the first ESPRESSO standalone planet discovery	2021
Lillo-Box et al; (A&A, 10.1051/0004-6361/202141714 	

Posters

The Paranal solar ESPRESSO Telescope - towards a resolved view of the Sun	2024
André M. Silva et al, Leiden, Exoplanets 5	
A fully-Bayesian model for RV extraction	2024
André M. Silva et al, Leiden, Exoplanets 5	
Navigating Through a Sea of Activity – A Portuguese Solar Telescope	2024
André M. Silva et al, Lisbon, ENAA XXXV	
A Bayesian template matching approach applied to HARPS : towards the improvement of the RV precision	2021
André M. Silva et al, Online, European Astronomical Society Annual meeting 2021	
A semi-Bayesian implementation of template matching for precise Radial Velocities	2021

André M. Silva et al, Online, Statistical challenges in Modern astronomy VII

A semi-Bayesian implementation of template matching for precise Radial Velocities 2021

André M. Silva et al, Online, Encontro Ciéncia 21

ARCHI: pipeline for light curve extraction of CHEOPS background stars 2020

André M. Silva et al, Online, Europlanet Science Congress 2020

A Bayesian approach to precise Radial Velocities 2020

André M. Silva et al, Online, 30th Encontro Nacional de Astronomia e Astrofísica

Grants

Post-doctoral fellowship Aug-Nov 2024

Software development for the PoET telescope, funded by the FIERCE ERC project, grant number 101052347, Faculdade de Ciéncias da Universidade de Lisboa

PhD fellowship, Fundação para a Ciéncia e Tecnologia (FCT) 2021-2024

"A new paradigm for the estimation of precise stellar radial velocities - towards the development of an innovative data analysis software", Ref. 2020.05387.BD

FLAD grant 2023

Fund travel to the EPRV V conference in Santa Bárbara, California, PAPERS 4 USA, Ref. 2023/052

Research fellowship Nov-Dec 2019

field of Planetary Systems at Instituto de Astrofísica e Ciéncias do Espaço, Ref. IA2019-17-BIM

Scientific Initiation Studenship Apr-Sep 2019

field of Computacional Astrophysics at Instituto de Astrofísica e Ciéncias do Espaço, Ref. IA2019-04-BIC

Skills

Programming: Proficient with Python and Git; Familiar with code optimization to large datasets through numpy operations and Cython development

Data manipulation: Proficient with numpy and pandas for the manipulation of large datasets, coupled with matplotlib for data visualization

Data Analysis: Analysis of complex datasets using classical statistics (scipy) and Bayesian models (emcee, tinyGP)

Languages: English (fluent), Portuguese (native)

Organization

Coordinator of internal working group focused on modelling time-series for exo-planet detection and characterisation 2025 - now

Organizer of the scientific seminars of CAUP September 2025 - now

Co-organizer of PoET's Working Group 1 - Radial velocities 2025 - now

Coordinator and lecturer of advanced course "Python for astronomers" 2021 - now

SoC of Dias da Física 2025 2025

Part of the Local Organization committee of EPRV6 2025

Refereed

Main referee of the MsC thesis of Telmo Monteiro, in FCUP 2025

Refereed 1 manuscript for A&A

Outreach

Ignite sessions; 'Torres Vedras Ílhavo Armamar' 2023-2024

Outreach talks to highschool students: Espaço vai à Escola - Descoberta de outra Terra - deteção de planetas fora do sistema solar

2022-2025

2022 (3 talks); 2023 (5 online; 5 in-person); 2024 (6 online; 4 in-person); 2025 (6 in-person; 17 online)