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, 2019 – 2024
- Thesis - A new paradigm for the estimation of precise stellar radial velocities

MsC **Faculdade de Ciências**, Mestrado Integrado em Engenharia Física — Universidade do Porto, 2014 – 2019
- 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, Nov 2024 – present
- Development of the observational software for the PoET solar telescope.

Faculdade Ciências da Universidade do Porto, Invited Assistant Professor — Physics department, Nov 2024 – present
- Invited assistant to teach a PhD-level unit on high-resolution spectroscopy

Faculdade de Ciências da Universidade de Lisboa, Post-doctoral researcher — FCiências.ID, Aug 2024 – Nov 2024
- Development of software to measure day-time seeing, under the FIERCE ERC project

Faculdade Ciências da Universidade do Porto, Invited assistant — Physics department, Feb 2024 – Sept 2024
- Invited assistant for the practical classes of MsC-level unit on Bayesian data analysis.

Instituto de Astrofísica e Ciências do Espaço, PhD fellow — Physics department, 2019 – July 2024
- FCT funding for the PhD thesis "A new paradigm for the estimation of precise stellar radial velocities"

Talks

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 Fisica 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 25 - now

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

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

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)

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-Neptune 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

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 Ciência 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 Ciências da Universidade de Lisboa

PhD fellowship, Fundação para a Ciência 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 Ciências do Espaço, Ref. IA2019-17-BIM

Scientific Initiation Studenship Apr-Sep 2019
field of Computacional Astrophysics at Instituto de Astrofísica e Ciências do Espaço, Ref. IA2019-04-BIC

Organization

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

SoC of Dias da Física 2025 2025

Part of the Local Organization committee of EPRV6 2025

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 2022-2024

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