

Mariana Carolina Sastre

Curriculum Vitae

Personal information

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Website <https://planetmariana.github.io>

Professional profile

I am an Astrophysics PhD student with specialisation in exoplanetology. With a background on geodynamical problems applied to extra solar planets, data analysis and observational techniques. Strong interest in planetary geophysics. Proven experience in scientific programming, writing and discussion. Very proactive person, with rapid learning skills and new ideas to collaborate in different work environments.

Education

2023- **PhD Student-Astrophysics**, Kapteyn Astronomical Institute-University of Groningen, The Netherlands.

2021-2023 **MSc. Astrophysics**, Astronomical Observatory of Geneva, Switzerland.

2016-2020 **BSc. in Geosciences**, University of Los Andes, Bogotá, Colombia.

2014-2019 **BSc. in Physics**, University of Los Andes, Bogotá, Colombia.

Research experience

2023- **Magma Ocean evolution**, (*PhD research*), Improvement of a self-consistent framework designed for magma ocean crystallisation coupled with atmosphere interaction including volatile content during its evolution. This, with the implementation of a new EoS that according different compositions that let me change the solidus/liquidus curves. Adding the posterior solid-state convection phase to characterise the final geodynamical regime of rocky exoplanets., **Advisors: Dr. Tim Lichtenberg & Prof. Inga Kamp.**

Kapteyn Astronomical Institute - University of Groningen

2023 **Modeling the tectonic regime on Earth-like exoplanets**, (*Master thesis*), The objective is to run 2D simulations of planetary interiors in order to study the main parameters involved in the tectonic regime for different core/mantle ratios in Earth-like exoplanets, **Advisors: Prof. Emeline Bolmont & Prof. Luca Caricchi.**

University of Geneva

2022 **Mapping the Sun's active regions from SDO images to HARPS-N solar spectra**, (*Astrophysics Laboratory project*), The objective was to perform an analysis to determine if there's any individual contribution to the relative spectra driven by Sun's activity, **Advisor: Dr. Michael Cretignier.**

University of Geneva

2021 **Searching for disintegrating planets in the TESS data**, (*Astrophysics Laboratory project*), The objective was to optimize and implement a Python routine capable of identifying asymmetrical light curves observed by TESS telescope, **Advisors: Dr. Vincent Bourrier & Dr. Nathan Hara.**

University of Geneva

2019 **Spectroscopy of rocky bodies of the Solar system: The Moon and Mars**, (*Thesis in Physics*), The objective was to identify the spectral signatures of the rock-forming minerals from the Moon and Mars with spectral data obtained at the astronomical observatory at University of Los Andes.

- 2018 **Episodic thermal convection in Enceladus Ice shell**, (*Thesis in Geosciences*), The objective was to run simulations in 2D/3D in order to study the heat behavior on the icy moon crust.

Awards

- 2021 **Colombian Ministry of Science and Foundation COLFUTURO scholarship**, *Grant of \$50.000 USD to start a science-related Master program outside Colombia.*

Computational skills

Advanced level lang. Python, JavaScript, html, p5js

Intermediate level lang. C/C++, Fortran

OS MacOS, Gnu/Linux, Windows.

Specialized software [IRAF](#), [ArcGIS](#), [Matlab](#), [L^AT_EX](#), Geomatics, [Cit-comS](#), [ASPECT](#), [BurnMan](#)

Selected contributed talks

- 2025 **Exoclimes VII Conference**, *Poster*, Montreal, Canada.
2025 **EGU Conference**, *Speaker*, Vienna, Austria.
2024 **EPSC Conference**, *Speaker*, Berlin, Germany.
2024 **Exoplanets V Conference**, *Speaker*, Leiden, The Netherlands.
2024 **Rocky Worlds III Conference**, *Speaker*, ETH, Zürich, Switzerland.
2019 **European Rover Challenge**, *Competitor*, Planet partner, Kielce, Poland.

DEI Leadership

- 2021-Current **Organizing committee member**, *Mentoring program of the Colombian Astronomy Network of Students ([RECA](#)).*

Job Experience

- 2020-2021 **Geophysics GPR International Inc**, *Geophysicist Jr*, Bogotá, Colombia.

Teaching assistant experience

- 2025 **Astrophysical hydrodynamics**, *Astronomy Department*, University of Groningen.
2025 **Physics of Galaxies**, *Astronomy Department*, University of Groningen.
2023 **Exoplanets**, *Astronomy Department*, University of Groningen.
2019 **Solid state physics and condensed matter**, *Physics Department*, University of Los Andes.
2018 **Advanced seismology**, *Geosciences Department*, University of Los Andes.
Remote Sensing, SIG and GPS, *Geosciences Department*, University of Los Andes.
Introduction to observational astronomy, *Physics Department*, University of Los Andes.

Languages

Spanish Native
English Fluent
French B2 (DELF)