


Lionel J. Garcia

born in 1994 in France

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 <https://lgrcia.github.io>

EDUCATION

2019 - 2023 **PhD in Astronomy**

University of Liège
Belgium

Towards the detailed atmospheric characterization of temperate rocky exoplanets

Supervisor: Michaël Gillon (SPECULOOS & TRAPPIST teams)

2016 - 2017 **MSc in Computer Science**

University of Bordeaux
France

High performance computing and Image processing

2014 - 2017 **MSc in Optical Instrumentation**

Institut d'Optique
France

Photonics and optical Instrumentation

2012 - 2014 **BS in Physics**

University of Paris-Sud
France

Applied Physics

POSITIONS

2019 - 2021 **Teaching assistant**

University of Liège
Belgium

Supervision of tutorial sessions at undergraduate and graduate levels
150h/year – combined with half-time research

2018 (1 year) **Young Graduate Trainee**

ESA-ESTEC
Netherlands

Development of novel strategies to build better spacecraft precursor models

2017 (6 months) **Technical Student**

CERN
Switzerland

Characterization and prototyping of next-generation Beam Wire Scanners for the LHC injectors upgrade

2016 (3 months) **Trainee**

ESA-ESTEC
Netherlands

Development and validation of a CCD cosmic ray impact simulator against Gaia in-orbit data

TEACHING

University of Liège

2019 - 2021

Mechanics 101 Tutorials - Undergraduate

From Newtonian mechanics to the study of solids' motion

Professor: Pierre Dauby

Mathematical modeling for the environment Tutorials - Graduate

Dynamical modeling of populations and their environments

Professor: Marilaure Grégoire

Astronomical observations Tutorials and Lectures - Graduate

Telescope observations and applications to astrophysics (including practical sessions at the Oukaimeden observatory, Morocco)

Professor: Emmanuel Jehin

SOFTWARE DEVELOPMENTS

prose

Image Processing

Python, LaTeX

A Python package to build image processing pipelines. Developed for Astronomy to enable transparent research and reproducible products.

nuance

Signal Processing

Python, JAX

A Python package to detect exoplanetary transits in the presence of stellar variability and instrumental noises.

SPECULOOS - portal

Web application
HTML-CSS-JS (VueJS)

A web-based portal to monitor the SPECULOOS transit survey nightly observations (interactive schedule, data visualization, comments and flagging system, diagnostics, and more)

SPECULOOS - workflows

Data analysis
Python, snakemake

Development of data analysis workflows for the automatic analysis and reporting of SPECULOOS observations (manager of the related working group).

TRAPPIST - ESO public release

Data analysis
Python, snakemake, prose

Reduction and first release of the TRAPPIST telescope photometric products (beginning 2023 with ESO).

Related skills: Python C++ C Julia JS - HTML - CSS LaTeX git

COMMUNICATIONS

★ denotes invited

- July 2022 **HST/WFC3 transmission spectroscopy of the cold rocky planet TRAPPIST-1h**
Talk [Garcia L. J.](#), Moran S., Rackham B. V. et al. *NAM 2022 (Warwick, UK)*
- July 2022 **The bright future of PSF photometry using convolutional neural networks**
Poster [Garcia L. J.](#), *NAM 2022 (Warwick, UK)*
- May 2022 **Transmission spectroscopy of the cold rocky planet TRAPPIST-1h**
Poster [Garcia L. J.](#), Moran S., Rackham B. V. et al. *Exoplanet IV (Las Vegas, USA)*
- May 2020 **TRAPPIST-1h transmission spectrum: Knowing the star**
Talk [Garcia L. J.](#), Moran S., Rackham B. V. et al. *SAG21 symposium (online)*
- Jun. 2019 ★ **specphot: a suite for SPECULOOS data analysis**
Poster [Garcia L. J.](#) & the SPECULOOS team *TRAPPIST-1 conference (Liège, Belgium)*

GRANTS

- 2021 FRIA Doctoral scholarship**
F.R.S.–FNRS 2 years full-time research funding

PUBLICATIONS

First-authored

- 2022 **Spectroscopic anatomy of a polar spot on an M4-type star**
[Garcia L. J.](#) et al. *in prep.*
- 2022 **nuance: Transit detection in the presence of stellar variability and correlated noise**
[Garcia L. J.](#), Foreman-Mackey, D. *in prep. for A&A*
- 2022 **HST/WFC3 transmission spectroscopy of the cold rocky planet TRAPPIST-1h**
[Garcia L. J.](#), Moran, S. E., Rackham, B. V., et al. *A&A*, 665, A19
- 2022 **prose: a Python framework for modular astronomical images processing**
[Garcia L. J.](#), Timmermans, Mathilde, Pozuelos, Francisco J. et al. *MNRAS* 509 4817-4828
- 2018 **Validation of a CCD cosmic ray event simulator against Gaia in-orbit data**
[Garcia L.](#), Prod'homme T., Lucsanyi D. et al. *Proc. SPIE* 10709

Other collaborations

- 2023 **Precise near-infrared photometry, accounting for precipitable water vapour at SPECULOOS Southern Observatory**
Pedersen, P. P., Murray, C. A., Queloz, D., et al. (including Garcia L. J.) *MNRAS*, 518, 2661
- 2022 **Two temperate super-Earths transiting a nearby late-type M dwarf**
Delrez, L., Murray, C. A., Pozuelos, F. J., et al. (including Garcia L. J.) *A&A*, 667, A59
- 2022 **SPECULOOS Northern Observatory: Searching for Red Worlds in the Northern Skies**
Burdanov, A. Y., de Wit, J., Gillon, M., et al. (including Garcia L. J.) *PASP*, 134, 105001
- 2022 **TESS discovery of a sub-Neptune orbiting a mid-M dwarf TOI-2136**
Gan, T., Soubkiou, A., Wang, S. X., et al. (including Garcia L. J.) *MNRAS*, 514, 4120
- 2022 **Observation scheduling and automatic data reduction for the Antarctic Telescope, ASTEP+**
Dransfield, G., Mékarnia, D., Triaud, A. H. M. J., et al. (including Garcia L. J.) *Proc. SPIE*, 12186, 121861F
- 2022 **A study of flares in the ultra-cool regime from SPECULOOS-South**
Murray, C. A., Queloz, D., Gillon, M., et al. (including Garcia L. J.) *MNRAS*, 513, 2615
- 2022 **Complex Modulation of Rapidly Rotating Young M Dwarfs: Adding Pieces to the Puzzle**
Günther, M. N., Berardo, D. A., Ducrot, E., et al. (including Garcia L. J.) *AJ*, 163, 144
- 2022 **TOI-1442 b and TOI-2445 b: two ultra-short period super-Earths around M dwarfs**
Morello, G., Parviainen, H., Murgas, F., et al. (including Garcia L. J.) *arXiv e-prints*, arXiv:2201.13274
- 2022 **TOI-2257 b: A highly eccentric long-period sub-Neptune transiting a nearby M dwarf**
Schanche, N., Pozuelos, F. J., Günther, M. N., et al. (including Garcia L. J.) *A&A*, 657, A45
- 2021 **A large sub-Neptune transiting the thick-disk M4 V TOI-2406**
Wells, R. D., Rackham, B. V., Schanche, N., et al. (including Garcia L. J.) *A&A*, 653, A97
- 2021 **Six transiting planets and a chain of Laplace resonances in TOI-178**
Leleu, A., Alibert, Y., Hara, N. C., et al. (including Garcia L. J.) *A&A*, 649, A26
- 2021 **SPECULOOS: Ultracool dwarf transit survey. Target list and strategy**
Sebastian, D., Gillon, M., Ducrot, E., et al. (including Garcia L. J.) *A&A*, 645, A100
- 2020 **Development of the SPECULOOS exoplanet search project**
Sebastian, D., Pedersen, P. P., Murray, C. A., et al. (including Garcia L. J.) *Proc. SPIE*, 11445, 1144521
- 2020 **π Earth: A 3.14 day Earth-sized Planet from K2's Kitchen Served Warm by the SPECULOOS Team**
Niraula, P., Wit, J. de., Rackham, B. V., et al. (including Garcia L. J.) *AJ*, 160, 172
- 2020 **A super-Earth and a sub-Neptune orbiting the bright, quiet M3 dwarf TOI-1266**
Demory, B.-O., Pozuelos, F. J., Gómez Maqueo Chew, Y., et al. (including Garcia L. J.) *A&A*, 642, A49
- 2020 **GJ 273: on the formation, dynamical evolution, and habitability of a planetary system hosted by an M dwarf at 3.75 parsec**
Pozuelos, F. J., Suárez, J. C., de Elía, G. C., et al. (including Garcia L. J.) *A&A*, 641, A23
- 2020 **Photometry and performance of SPECULOOS-South**
Murray, C. A., Delrez, L., Pedersen, P. P., et al. (including Garcia L. J.) *MNRAS*, 495, 2446

MISCELLANEOUS

Ultra running - Illustration