


# Lionel J. Garcia

born in 1994 in France

✉ [lionel\\_garcia@live.fr](mailto:lionel_garcia@live.fr)  [lgrcia](#)

 <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

## SOFTWARE DEVELOPMENTS

### **prose**

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

### **nuance**

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

### **SPECULOOS - portal**

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

### **SPECULOOS - workflows**

Data analysis    Development of data analysis workflows for the automatic analysis  
Python, snakemake    and reporting of SPECULOOS observations (Manager of the related  
working group).

### **TRAPPIST - ESO public release**

Data analysis    Reduction and first release of the TRAPPIST telescope photometric  
Python, snakemake, prose    products (beginning 2023 with ESO).

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

## 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*

## 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

- 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.](#)) *arXiv e-prints*, [arXiv:2209.09112](#)
- 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.](#)) *arXiv e-prints*, [arXiv:2209.02831](#)
- 2022 **Observation Scheduling and Automatic Data Reduction for the Antarctic telescope, ASTEP+**  
Dransfield, G., Mekarnia, D., Triaud, A. H. M. J., et al. (including [Garcia L. J.](#)) *arXiv e-prints*, [arXiv:2208.04501](#)
- 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 **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  **$\pi$  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

## 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

## MISCELLANEOUS

Ultra running - Illustration