

# Dr. Fernando Gutiérrez Canales

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## Skills

### Programming:

- **Advanced:** Python (NumPy, SciPy, Matplotlib, Conda, Venv, Scikit-Learn), C, Fortran,
- **Intermediate:** R, Version Control (Git and Subversion), bash, ssh
- **Beginner:** Parallel computing: OpenMP (used with Fortran and C)
- **Computational modeling:** PDEs, Large Data-bases, Time-series
- Data analysis, data visualization
- **Astrophysics:** Hydrodynamics, kinetic simulations, Bayesian statistics
- **Office applications:** Microsoft Office, Libre Office, L<sup>A</sup>T<sub>E</sub>X, Vim, nano

### Languages

- **Spanish:** native
- **English:** professional  
– IELTS: C1
- **French:** good

### Soft and interpersonal

- Team-work
- Planification
- Delegate
- Organization

## Summary

Computational astrophysicist and software developer with 5 years experience in tools like datasets, **optimization algorithms**, Monte Carlo simulations, **machine learning** and physics. A team player who is also ready to take leadership roles and enjoys mentoring junior team members. Being a PhD researcher focused in data science and programming, I am excited to apply my quantitative and soft skills to explore the field of quantitative finance and data visualization within dynamic fast-paced environments.

## Research Experience & Education

### March 2022 – March 2025

**PhD — Paris Observatory and Max Planck Institute for Solar System Research**

- Thesis topic: The PLATO space mission: Double-aperture photometry and Centroid Shifts to detect False Positives  
– Grade: **With honors**
- **Key result:** Developed, in the context of PLATO space mission, a **state-of-the-art numerical code** that estimates for the first time the overall efficiency of the centroid method to detect false planetary transit and also the overall efficiency a novel method called double-aperture photometry.
- The code is written in Python language, based on several libraries written in C and bash, and publicly available in a gitlab remote repository
- Participating in a huge multi-institution international consortium formed to develop the PLATO mission instrument and pipeline

### 2019 - 2021

**Master's degree in Sciences: Astrophysics — University of Guanajuato, Mexico**

- **GPA: 9.5/10**
- Thesis: Homogeneous Analysis of K2 exoplanet systems hosting USP planets
- **Key result:** Implemented and mastered the scientific code `pyaneti` for improving the mass and radii measurement of several exoplanets previously discovered by K2 space mission.

### 2014 – 2019

**Bachelor's Degree in Physics — University of Guanajuato, Mexico**

- **GPA: 9.39/10** (ranking 1st among 280 students)
- **Undergraduate Research Assistant** in group Non-linear Optics — 01/2016 – 10/2019
- Thesis: Atomic theory and scientific realism
- Developed a scientific publication about the most important philosophical and physical ways to show that atoms exist.

**Research intern — ESTEC (European Space Agency), The Netherlands — 2023**

- Estimating Charge Transfer Inefficiency, CTI, parameters for PLATO detectors
- Conducted in-situ measurements with a real PLATO CCD detector

- Used **Python** and **DS9** to analyze multi-dimensional simulation data output

## Conferences

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- EAS (European Astronomical Union) — 2024
- PLATO Week # 15 Meeting — 2024
- PLATO Week # 14 Meeting — 2023
- Workshop *Journé des thèses* — 2022

## Scholarships & Awards

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- PhD obtained with Honors — 2025
- Erasmus+ scholarship for an internship at ESTEC, the largest European Space Agency (ESA) center in Europe — 2023
- Master's degree obtained with Honors — 2021
- Scholarship for studying a master's degree in Mexico with international competence — 2018
- Bachelor's degree obtained with Honors — 2019

## Publications

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- Interpretation of Optical and IR Light Curves for Transitional Disk Candidates in NGC 2264 Using the Extincted Stellar Radiation and the Emission of Optically Thin Dust Inside the Hole, 2021, E. Nagel, F. Gutiérrez-Canales, S. Morales-Gutiérrez and A. P. Sousa.
- The young HD 73583 (TOI-560) planetary system: Two 10-M<sub>⊕</sub> mini-Neptunes transiting a 500-Myr-old, bright, and active K dwarf, 2023, O. Barragán,..., F. Gutiérrez-Canales, ..., E. Nagel
- Detecting False Positives with PLATO using Double-Aperture Photometry and Centroid Shifts , F. Gutiérrez-Canales, R. Samadi A. Birch, , submitted in December 2024.