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, LaTeX, Vim, nano
- **Languages:** Spanish (native), English (C1), French (good) and German (basic)

Soft Skills

- Effective Team Collaboration
- Strategic Planning and Problem Solving
- Leading and Delegation (including mentoring junior colleagues)
- Clear Communication (both technical and non-technical)
- Adaptability and Time Management

Summary

PhD in Astrophysics with 5+ years of experience in data modeling and visualization, statistical analysis, and software development. Built scalable Python-based data pipelines for space mission analysis (PLATO, ESA). Skilled in working with large datasets, Bayesian modeling, and machine learning. Effective communicator with a strong record of collaboration in international research environments. Now seeking to apply these skills to data-driven roles in industry, including analytics, finance, or tech.

Research Experience & Education

March 2022 – March 2025

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

- **Thesis:** The PLATO space mission: Double-aperture photometry and Centroid Shifts to detect False Positives
  - Grade: **With honors**
- **Key result:** Developed python-based simulations to estimate the detection efficiency of exoplanet vetting techniques (the established centroid shift and the novel double-aperture photometry) for the PLATO space mission. Integrated C and bash libraries; published code on Gitlab. The produced results constitute the first estimation of the overall efficiency of both techniques.
- Collaborated with an international consortium (<20 institutions and countries) on instrument development and pipeline design for ESA's PLATO space mission.

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 software pyaneti to improve exoplanet parameter estimation for K2 systems.

2014 – 2019

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

- **GPA: 9.0/10**
- **Undergraduate Research Assistant** in the group of Non-linear Optics of the University of Guanajuato — 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 using Python and DS9.
- Conducted in-situ measurements with a real PLATO CCD detector

Conferences

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

Scholarships & Awards

- 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

- 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-$M_{\oplus}$ 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.