Bastien Carreres

PhD in Astrophysics and Cosmology

bastien.carreres@duke.edu | Homepage | GitHub Profil | ORCID Profil

Education

PhD - Astrophysics and Cosmology 2023
Aix-Marseille Université
Thesis title: Measurement of the growth rate of structures with type Ia supernovae of the ZTF photometric survey.

Master's degree - Subatomic Physics and Cosmology 2020
Université Grenoble-Alpes
Graduated with honors

Bachelor's degree - Fundamental Physics 2018
Université de Montpellier
Graduated with high ho nors

Research Experiences

Post-doctoral Associate Nov. 2023 – Present
Duke University, Durham, NC, USA
Supervisor: Pr. Dan Scolnic
Subject: Cosmology with low-z SNe Ia, peculiar velocities, survey simulation, data analysis.

PhD candidate Oct. 2020 – Sept. 2023
Centre de Physique des Particules de Marseille, Marseille, France
Supervisors: Drs. Dominique Fouchez, Benjamin Racine et Julian Bautista
Subject: SNe Ia cosmology, growth rate of structure measurement, peculiar velocities, survey simulation.

Teaching Experiences

PhD candidate with teaching duties Sept. 2020 – June 2023
Université Aix Marseille
64h / year

Calculus tutoring Oct. 2017 – Dec. 2017
Université de Montpellier
Tutoring for first-year college students.

Math tutoring Sept. 2016 – June 2018
Independent
Tutoring for middle-school and high-school students.

Research interest

Keywords: cosmology, dark energy, large-scale structures, Type Ia Supernovae.
My field of research is observational cosmology. My research focuses on using Type Ia Supernovae to study the nature of dark energy. Particularly, I work on the estimation of peculiar velocities in the nearby universe to constrain the growth rate of structures.

Responsibilities

Member of the SOC of the 2025 DESC Peculiar Velocities workshop Apr. 2025 – Sept. 2025
CPPM, Marseille, France

Member of the SOC of the 2025 DESC summer meeting May 2025 – July 2025

Member of the DESC Collaboration Council Dec. 2024 – Present
Elected for a 2 year term.

Reviewer for MNRAS Feb. 2025 – Present
Review of 1 publication.

Co-organiser of the CPPM cosmology group' journal club Sept. 2021 – June 2023

Co-organiser & Volunteer of the CPPM cosmology "Fête de la Science" stands Oct. 2021 – 2023

Student supervision

PhD student Mentoring Nov. 2023 – Present
Duke University
Maria Acevedo – Subject: Cosmology with DEBASS survey.

Graduate student project supervision Sept. 2024 – June 2025
Duke University
Subject: Estimation of the velocity power spectrum in a N-body simulation.

Research interest

Keywords: Cosmology, dark energy, large-scale structures, type Ia supernovae.

My field of research is observational cosmology. My research focuses on using Type Ia Supernovæ to study the nature of dark energy. Particularly, I work on the estimation of peculiar velocities in the near universe to constrain the growth rate of structures.

Collaborations

- Full member of the Dark Energy Science Collaboration (DESC) of the Legacy Survey of Space and Time (LSST).
- External collaborator of the cosmology group of the Zwicky Transient Facility (ZTF) survey.

Grants and awards

- LSSTC Enabling Science Program Award 2021 - $5000
- National PhD fellowship - 3 years contract (ED352 - Aix-Marseille Université)

Technical skills

Programing languages:

- Python (Expert)
- LaTeX (Intermediate)
- C/C++ (Novice)
- CSS/HTML (Novice)

Contributions to public codes:

- `SNSim` (Creator and main developer)
- `flip` (Creator of a previous version, Co-developer)
- `OpSimSummaryV2` (Principal maintainer, developer)
- `SNCosmo` (Contributor)
- `SNANA` (Contributor)