

# Francesca Gerardi

PHD STUDENT IN ASTROPHYSICS AT UNIVERSITY COLLEGE LONDON

16/07/1994 | CITIZENSHIP: ITALIAN

☎ (+39) 3341475109 | ✉ fgerardi.uk@gmail.com | 🏠 fgerardi.github.io | 📧 fgerardi | 📷 fgerardi | 📞 0000-0002-2743-244X

*I am a final year PhD student working on Bayesian Inference for Cosmology and Machine-Learning.*

## Skills and strengths

Programming	Python: Advanced
	Fortran: Intermediate
	C++: Basic
	R: Basic
	HTML: Basic, learning
Operating Systems	Ubuntu, Windows, MacOS
Deep Learning	Tensorflow, Keras
Version control	git, Github, Google internal tool
Bayesian Statistics	Simulation-based inference, Nested Sampling, MCMC, Stan ( <i>pyStan</i> )
Editing	vim, Latex
Software	Google Workspace, Microsoft Office, Faceswap (github link), IRAF, Supermongo
Personal strengths	Self-motivated, Learner, Persistent, Curious
Languages	Italian: Native English: Fluent (CEFR B2) French: Basic

## Experience

### Data Science Intern @ Google

London, UK

GOOGLE UK

22 Aug - 25 Nov 2022

- I developed extensions to Natural Gradient Boosting (github link), a Machine-Learning algorithm for probabilistic regression. These were implemented in production-ready, unit-tested code and improved the performance the ML model used by my host team by 10%.
- Software and modules used: Python, version control (Google internal tools), numpy, matplotlib, scikit-learn, pandas, multiprocessing, Google Workspace

### Teaching Assistant @ London Business School

London, UK

LONDON BUSINESS SCHOOL

Apr 2022 - Jun 2022

- Courses: 'Python for Finance', with exam marking
- Assisted students (~ 50/class) during lecture coding laboratories
- Software and modules used: Python, Spider, conda, numpy, pandas, seaborn

## Postgraduate Education

### PhD in Astrophysics [3.5yrs long]

London, UK

UCL, DEPARTMENT OF PHYSICS AND ASTRONOMY, COSMOPARTICLE INITIATIVE

Oct 2019 - Exp. Summer 2023

- Data analysis and Bayesian statistics applied to high dimensional problems and Big-Data
- Simulation-based inference, Bayesian hierarchical modeling and Population-level inference
- Machine-learning, e.g. for data compression (regression) and probability density estimation
- **Data Intensive Science (CDT DIS) Project on Deepfakes** - colab. with NCC Group. Publication Link
- Software and modules used: Python, conda, jupyter, numpy, scipy, matplotlib, pandas, seaborn, scikit-learn, pingouin, getdist, mpi4py, multiprocessing, Tensorflow, Keras
- Access to supercomputer clusters NERSC (U.S. Energy Dept), Hypatia and Splinter (UCL)
- Member of DESI (Dark Energy Spectroscopic Instrument) International Collaboration since Dec 2021

### Master's Degree in Astronomy: 110/110 cum laude

Padua, Italy

UNIVERSITÀ DEGLI STUDI DI PADOVA

Oct 2016 - Oct 2018

- Thesis work: "Non-parametric reconstruction of cosmological functions", **Erasmus+** in Leiden (NL)

## Peer-Reviewed Journal Articles

- [2022] Francesca Gerardi, *et al.* Direct cosmological inference from three-dimensional correlations of the Lyman  $\alpha$  forest. MNRAS, Volume 518, Issue 2, Jan 2023. Link
- [2021] Francesca Gerardi, *et al.* Unbiased likelihood-free inference of the Hubble constant from light standard sirens. Phys. Rev. D, 104:083531, Oct 2021. Link
- [2019] Francesca Gerardi, *et al.* Reconstruction of the Dark Energy equation of state from latest data: the impact of theoretical priors. JCAP, 07:042, 2019. Link

## Talks and presentations

- 21 Jun 2022 Contributed talk at DESI meeting in Berkeley – [2022] paper
- 21 Apr 2022 Contributed talk at 'Likelihood-free in Paris' conference – [2021] paper
- 8 Apr 2022 Chair of departmental Peer-Learning session about 'Scientific writing'
- 20 Jan 2022 Invited talk at LCDM (*London Cosmology Discussion Meetings*) 'Machine Learning for Cosmology' session – [2021] paper
- 2 Aug 2021 Contributed talk at COSMO'21 conference – [2021] paper
- 1 Jun 2021 Invited talk at Geneva University – [2021] paper with coding tutorial

## Undergraduate Studies

### Bachelor's Degree in Astronomy 105/110

Padua University, Padua, Italy (Oct 2013 - Sept 2016)

## Doctoral Activities

- Organizer of Journal Club (2021-22)
- Organizer of PhDs discussion meetings (2020-21)

## Extracurricular Activities

- Volunteer afterschool with foreign kids (2009)
- Private Maths and Physics classes (2015-2019)
- Animator in summer camp (*Summers 2007, 2012*)
- Articles writing for school website (2010-2012)
- Volleyball (2009-2014), one-year team captain

## Personal Interests

Sport • Nature & cultural trips • Gaming • Loud classical and pop music • Art • Cooking and good food

