

Francesca Gerardi

PHD STUDENT IN ASTROPHYSICS AT UNIVERSITY COLLEGE LONDON

16/07/1994 | CITIZENSHIP: ITALIAN

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I am currently in the final year of my PhD, mainly working on applying Bayesian statistics to perform cosmological inference. My primary area of expertise is Density Estimation Likelihood-Free Inference, a novel Bayesian methodology, based on machine-learning.

Skills and strenghts

Programming

Python: Advanced
Fortran: Intermediate
C++: Basic
R: Basic

Operating Systems

Ubuntu, Windows, MacOS

Deep Learning

Tensorflow, Keras

Version control

git, Github

Bayesian Statistics

LFI, Nested Sampling,
MCMC, Stan (*pyStan*)

Editing

vim, Latex

Clusters

NERSC (U.S. Energy Dept)
Hypatia and Splinter (UCL)

Software

Microsoft Office, Faceswap,
IRAF, Supermongo

Personal strenghts

Self-motivated, Learner,
Persistent, Curious

Languages

English: Fluent (CEFR B2)
French: Basic
Italian: Native

Experience

Data Science Intern @ Google

London, UK

GOOGLE UK

22 Aug - 25 Nov 2022

- Probabilistic Regression problem
- Use of the Machine-Learning based tool Natural Gradient Boosting (github link), with amendments

Teaching Assistant @ London Business School

London, UK

LONDON BUSINESS SCHOOL

Apr 2022 - Ongoing

- Courses: 'Python for Finance', with exam marking

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
- Likelihood-free inference, Bayesian hierarchical modeling and Population-level inference experience
- Use of 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
- 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)

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)

Volunteering

Volunteer afterschool with foreign kids (2009)

Extracurricular Activities

- 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

Peer-Reviewed Journal Articles

- [2022] Francesca Gerardi, *et al.* Direct cosmological inference from three-dimensional correlations of the Lyman α 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 (12 mins) at DESI meeting in Berkeley – [2022] paper
- 21 Apr 2022 Contributed talk (15 mins) at 'Likelihood-free in Paris' conference – [2021] paper
- 8 Apr 2022 Chair of departmental Peer-Learning session about 'Scientific writing' (60 mins)
- 20 Jan 2022 Invited talk (20 mins) at LCDM (*London Cosmology Discussion Meetings*) 'Machine Learning for Cosmology' session – [2021] paper
- 2 Aug 2021 Contributed talk (15 mins) at COSMO'21 conference – [2021] paper
- 1 Jun 2021 Invited talk (45 mins) at Geneva University – [2021] paper with coding tutorial

Personal Interests

Sport • Nature & cultural trips • Gaming • Loud classical and pop musics • Art • Cook and good fork

