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
Beyesian 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