

Eleni Tsaprazi

Postdoctoral Research Associate · Cosmology

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Research interests

Cosmology: large-scale structure: clustering, clusters, velocities, supernovae, lensing

Data analysis & Modelling: Bayesian statistics, forward modelling, field-level inference

Scientific network

[1] **Euclid Consortium**, project lead in the Statistics of Galaxy Clusters WP

[2] **Wide-Field Spectroscopic Telescope**, project lead in the Dense Structures WP

[3] **LSST Dark Energy Science Collaboration**, lead of the Bayesian Pipelines Topical Team

[4] **Aquila Consortium**, developing novel methodologies for field-level inferences of galaxy clustering

Employment

02/10/2023 - : Postdoctoral Research Associate, Imperial College London

Education

02/09/2019 - 15/09/2023: **PhD Physics**, Stockholm University

Thesis: Physics-informed inferences of galaxy clustering with Bayesian forward modelling

Supervisors: Dr. Jens Jasche, Prof. Ariel Goobar

03/09/2018 - 19/09/2019: **MSc Nuclei, Particles, Astroparticles & Cosmology**, Sorbonne University

Thesis: The large-scale flow of galaxies: effects on cosmological data

Supervisor: Dr. Roya Mohayaee, Paris Institute of Astrophysics (IAP)

Internship: Detection of X-rays of astrophysical origin

Supervisor: Dr. Jean-Luc Sauvageot, Institute of Research into the Fundamental laws of the Universe, CEA Saclay

01/09/2014 - 27/07/2018: **BSc Physics**, Aristotle University of Thessaloniki

Thesis: Relativistic approach to the kinematics of large-scale peculiar velocities

Supervisor: Prof. Christos Tsagas

Invited talks

[1] **2025**. Field-level inference of H_0 in the low-redshift Universe, Putting the Cosmic LSS on the map, Vienna

[2] **2025**. Bayesian inferences in the cosmic large-scale structure, University of Bologna, Italy

[3] **2025**. Bayesian inferences in the cosmic large-scale structure, CURL Group, UC Louvain, Belgium

[4] **2025**. Field-level inference of H_0 in the low-redshift Universe, ICCUB, University of Barcelona

[5] **2024**. Modern Cosmology: Opportunities & Challenges, PHYSTAT: Statistics meets ML, Imperial College London

[6] **2024**. Advancements in large-scale structure reconstructions in light of cosmological tensions, Standard Cosmology at the threshold of change, Aristotle University of Thessaloniki, Greece

[7] **2023**. Physics-informed inferences of galaxy clustering, Institut d' Astrophysique de Paris

[8] **2023**. Physics-informed inferences of galaxy clustering, LCDM meeting, The London Institute of Cosmology

[9] **2023**. Field-level inferences of intrinsic alignment, HoI-IA Workshop, Lorentz Center

[10] **2023**. High-order statistics of photometric galaxy clustering, BIPAC, Oxford University

[11] **2023**. High-order statistics of photometric galaxy clustering, Photometric Redshifts WG, LSST DESC

[12] **2023**. High-order statistics of photometric galaxy clustering, Additional GC Probes WG, Euclid Consortium

[13] **2022**. Field-level analyses of galaxy surveys, Advances in Cosmology through Numerical Simulations, MIAPbP

[14] **2022**. Bayesian inference of intrinsic alignment in the large-scale structure, Euclid Consortium

- [15] **2022.** Bayesian inference of intrinsic alignment in the large-scale structure, MPA, Germany
[16] **2021.** Tracing the cosmic web with supernovae, Cosmology Journal Club, University of Cambridge

Contributed talks & posters

- [1] **2025.** Field-level inference of H_0 from simulated type Ia supernovae in a local Universe analogue, An Extraordinary Journey Into The Transient Sky, flash talk & poster, Padova, Italy
[2] **2024.** Field-level inferences of galaxy clustering, Cosmo21 conference, talk, Chania, Greece
[3] **2021.** Supernova clustering in the large-scale structure, LSST Dark Energy Science Collaboration Meeting, talk
[4] **2021.** Improving redshift accuracy through the large-scale structure, 3rd AUTH Alumni Workshop on Theoretical Physics, talk
[5] **2017.** The accelerating expansion of the Universe for observers in bulk flows, Modern Physics at All Scales, talk, Leiden University
[6] **2016.** The deceleration parameter for observers in bulk flows, The Olympian School of Astrophysics, talk, Katerini, Greece

Grants

- [1] **2025.** Faculty of Natural Sciences Researcher Mobility Grant, Imperial College London, £1,200
[2] **2023.** Travel grant, Balzan Cosmological Studies Program, University of Oxford, £2,000
[3] **2022.** Project grant, Royal Swedish Academy of Sciences, SEK 20,000
[4] **2021.** Research stipend, Birger och Gurli Grundströms foundation, SEK 5,000
[5] **2021.** Travel grant, Fonden för främjande av fysisk forskning, SEK 5,000
[6] **2018.** Full MSc scholarship, Institut Lagrange de Paris, 10.000€

Honours

- [1] **2024.** Elected Member, Astronomy Large Awards Sift Panel, UK Research and Innovation - Tasked to assess applications and make recommendations to the Science and Technology Facilities Council (STFC), taking account of strategic advice provided by the STFC and the UK Space Agency, alongside senior experts in the field.

Open Science

- [1] **Data Science tutorials (Bayesian regression):** github.com/elts6570/Data_Science
[2] **Machine Learning tutorials (classification & neural networks):** github.com/elts6570/ML_classification
[3] **Public data repository:** simulations by Tsaprazi & Heavens 2025, zenodo.org/records/15631583
[4] **GLASS-jax:** contributor to field-level inference pipeline for weak lensing, github.com/LSSTDESC/glass-jax
[5] **Bayesian photo-z pipeline:** main developer, github.com/LSSTDESC/bayesian-pipelines-cosmology/tree/photo-z
[6] **Public data repository:** data in Tsaprazi et al. 2022a, <https://nextcloud.fysik.su.se/s/nnwsFaGFeKqpx7Q>

Teaching Experience

- [1] **2025.** Lecturer, PhD courses (Supervised ML), Imperial College
[2] **2025.** Marking, MSc course Statistical Methods for Experimental Physics, Imperial College
[3] **2024.** Lecturer, PhD courses (Machine Learning classification, Bayesian regression), Imperial College
[4] **2024.** Lecturer, Bayesian inference in practice, ICIC Data Analysis Workshop, Imperial College
[5] **2024.** Demonstrator on Bayesian inference methods, ICIC Data Analysis Workshop, Imperial College
[6] **2023.** Open questions in Cosmology, textbook author, Stockholm University
[7] **2015.** Electricity – Magnetism, Teaching assistant, Aristotle University of Thessaloniki
[8] **2014.** Informatics laboratory, Teaching assistant, Aristotle University of Thessaloniki

Supervision

- [1] **2026.** Co-supervisor of MSc student Ettore Delpogetto (UniBo), Probing deviations from General Relativity with gravitational wave strong lensing in third-generation detectors
[2] **2025.** Supervisor of BSc student Francesco Calice (UROP programme), Simulating type Ia supernovae in the cosmic large-scale structure, Imperial College London
[3] **2022.** Co-supervisor of MSc student Somaya Bakhsh, Searching for the ISW effect in large-scale structure

surveys, Stockholm University

Technical skills

Programming: Python, C, C++, MATLAB, Fortran, SQL

Scientific computing: Shell, HPC, OpenMP, MPI, cosmological simulations, MCMC, Linux/Unix, Bayesian programming [PyMC, nested sampling (Dynesty, Ultranest)], Gibbs sampling, slice sampling, Hamiltonian Monte Carlo, Stan, clustering estimation [CosmoBolognaLib]

Version control: Bitbucket, Github, Gitlab - Website building: WordPress, MediaWiki, Indico

Languages: English (fluent), French (advanced), Italian (basic), Greek (native)

Leadership

[1] **Reviewer:** ApJ, Euclid Consortium Internal Reviews

[2] **2024.** Lead of the Bayesian Pipelines Topical Team, Dark Energy Science Collaboration

[3] **2024.** Invited discussion leader: COSMO CLASSIC, Future prospects for Cosmology, “If you’re tired of w_0 , w_a , what are the interesting problems?”, University of Padova, Asiago

[4] **2024.** Elected member of the Diversity Committee, Euclid Consortium

[5] **2024.** Postdoctoral Representative, Physics Department, Imperial College London

[6] **2023.** Elected PhD representative of the Incident Contact Unit, Aquila Consortium

Organisation

[1] **2025.** Co-organiser of the Astrophysics Group Postgraduate Courses, Imperial College London

[2] **2024.** Co-organiser of the Soft-skills Roundtable, Imperial College London

[3] **2024.** Co-organiser of the Astrophysics seminars, Imperial College London

[4] **2023.** Chair of plenary session, February Collaboration Meeting, LSST DESC

[5] **2022.** Co-author of the Aquila Consortium Code of Conduct, Aquila Consortium

[6] **2022.** Co-organiser of the Aquila Consortium fall meeting, Aquila Consortium

[7] **2021.** Co-organiser of the Cosmology & Gravitation meetings, Stockholm University

[8] **2020.** Co-organiser of the Supernova & Cosmology meetings, Stockholm University

Outreach

[1] Public experiment with supernova simulations, <https://tsaprazi.eu/outreach/>

[2] Interview with an Astronomer, aimed at high-school students, <https://tsaprazi.eu/outreach/>

[3] Women & Girls in Astronomy, IAU Outreach, www.youtube.com/watch?v=R3HzRuyi3eM

[4] The Scientia Publica project, podcast & article series, <https://scientia publica.gr/>

[5] Research vlogs and summaries, <https://tsaprazi.eu/research/>, <https://www.youtube.com/@elts6570>

[6] Texts from Space, science philosophy blog, <https://textsfromspace.wordpress.com/>

[7] Scientific content translator for the NASA HiRISE mission, www.uahirise.org/gr/

Training

[1] Active bystander, Imperial College, Challenging poor behaviours and bringing cultural change

[2] Project management & stress handling, Stockholm University

[3] History, Philosophy of Science and Research ethics, Stockholm University

Publication List

Real-time library on ADS: <https://ui.adsabs.harvard.edu/public-libraries/eglSAoEOTaqy4Qzi9bjO2w>

Peer-reviewed publications

- [1] **Tsaprazi**, E. and Heavens, A. F., Field-level inference of H_0 from simulated type Ia supernovae in a local Universe analogue, Monthly Notices of the Royal Astronomical Society, Volume 529, Issue 2, May 2025
- [2] Lamman C., **Tsaprazi** E., Shi J., Šarčević N., Pyne S., Legnani E., Ferreira T., The IA Guide: A Breakdown of Intrinsic Alignment Formalisms, The Open Journal of Astrophysics, vol. 7, id. 14, February 2024
- [3] **Tsaprazi** E., Nguyen N. M., Jasche J., Schmidt S., Lavaux G., Field-level inference of galaxy intrinsic alignment from the SDSS-III BOSS survey, Journal of Cosmology and Astroparticle Physics, vol. 2022, no. 8, August 2022
- [4] **Tsaprazi** E., Jasche J., Goobar A., Peiris H. V., Andreoni I., Coughlin M. W., Fremling C. U., Graham M. J., Kasliwal M., Kulkarni S. R., Mahabal A. A., Riddle R., Sollerman J., Tzanidakis A., The large-scale environment of thermonuclear and core-collapse supernovae, Monthly Notices of the Royal Astronomical Society, Volume 510, Issue 1, 366–372, February 2022
- [5] **Tsaprazi** E., Tsagas C. G., Relativistic approach to the kinematics of large-scale peculiar motions, The European Physical Journal C, 80, 757, August 2020

Preprints

- [6] Fumagalli A., Costanzi M., Batalha de Castro, T., Saro A., Borgani S., Romanello M., Marulli F., **Tsaprazi** E., Monaco P. et al., Euclid: exploring observational systematics in cluster cosmology: a comprehensive analysis of cluster counts and clustering, 2025, arXiv: [2510.13509](https://arxiv.org/abs/2510.13509), submitted to A&A
- [7] Stiskalek R., Desmond H., **Tsaprazi** E., Heavens A., Lavaux G., McAlpine S., Jasche J., 1.8 per cent measurement of H_0 from Cepheids alone, 2025, arXiv: [2509.09665](https://arxiv.org/abs/2509.09665), submitted to MNRAS
- [8] Melin J. B., Stanford S. A., Widmer A., Tarrío P., Bartlett J. G., Sadibekova T., Pratt G. W., Arnaud M. et al., Euclid preparation: Validation of the Euclid Catalogue of Galaxy Clusters with external data, 2025, arXiv: [2509.06805](https://arxiv.org/abs/2509.06805), submitted to A&A
- [9] Malavasi N., Sarron F, Kuchner U., Laigle C., Kraljic K., Jablonka P., Balogh M., Bahé Y. et al., Euclid preparation. 2D reconstruction of the Cosmic Web with Euclid photometry, 2025, arXiv: [2508.15915](https://arxiv.org/abs/2508.15915), submitted to A&A
- [10] **Tsaprazi** E., Jasche J., Lavaux G., Leclercq F., Higher-order statistics of the large-scale structure from photometric redshifts, 2023, arXiv: [2301.03581](https://arxiv.org/abs/2301.03581)
- [11] Boonkongkird C., Lavaux G., Peirani S., Dubois Y., Porqueres N., **Tsaprazi** E., LyAI-Net: A high-efficiency Lyman- α forest simulation with a neural network, 2023, arXiv: [2303.17939](https://arxiv.org/abs/2303.17939)