

# Maria Tsedrik

## Curriculum Vitae

Institute for Astronomy  
University of Edinburgh, Royal Observatory  
Blackford Hill, Edinburgh EH9 3HJ (UK)  
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### Research Interests

Late universe Cosmological probes of new physics, extended cosmological models, large-scale structure surveys  
Inference Bayesian statistics, machine learning and differentiable techniques, software development  
pipeline

### Employment

Nov'24–present **Postdoc**, *Advanced Inference for Rubin Observatory Cosmology*.  
University of Edinburgh, UK

### Education

2021–2024 **PhD in Cosmology**, *University of Edinburgh, UK*.  
Probing Dark Energy and Modified Gravity with Galaxy Clustering and Weak Lensing  
Supervisors: Alkistis Pourtsidou, Florian Beutler

2018–2020 **Master of Astrophysics**, *Bonn University, Germany*.  
Thesis: *Large-Scale Structure in Modified Gravity and Kinetic Field Theory*  
Supervisors: Cristiano Porciani, Matthias Bartelmann  
Grade: 1.1, equivalent to the first class honours

2015–2018 **Bachelor of Physics**, *RWTH Aachen, Germany*.  
Thesis: *Cosmic Ray Anisotropies and Interstellar Turbulence*  
Supervisor: Philipp Mertsch  
Grade: 1.5, equivalent to the first class honours

### Selected Publications

- Feb'25 **Interacting dark energy constraints from the full-shape analyses of BOSS DR12 and DES Year 3 measurements.**  
[M. Tsedrik](#), S. Lee, K. Markovic, P. Carrilho, A. Pourtsidou, C. Moretti, B. Bose, E. Huff, A. Robertson, P. L. Taylor, J. Zuntz  
arXiv:2502.03390, submitted to MNRAS
- Apr'24 **Stage-IV cosmic shear with modified gravity and model-independent screening.**  
[M. Tsedrik](#), B. Bose, P. Carrilho, A. Pourtsidou, S. Pamuk, S. Casas, J. Lesgourgues  
arXiv:2404.11508, published in JCAP, doi:10.1088/1475-7516/2024/10/099
- June'23 **Modified gravity and massive neutrinos: constraints from the full shape analysis of BOSS galaxies and forecasts for Stage-IV surveys.**  
C. Moretti, [M. Tsedrik](#), P. Carrilho, A. Pourtsidou  
arXiv:2306.09275, published in JCAP, doi:10.1088/1475-7516/2023/12/025
- Oct'22 **Fast and accurate predictions of the nonlinear matter power spectrum for general models of Dark Energy and Modified Gravity.**  
B. Bose, [M. Tsedrik](#), J. Kennedy, L. Lombriser, A. Pourtsidou, A. Taylor  
arXiv:2210.01094, published in MNRAS, doi:10.1093/mnras/stac3783
- Jul'22 **Interacting dark energy from the joint analysis of the power spectrum and bispectrum multipoles with the EFTofLSS.**  
[M. Tsedrik](#), C. Moretti, P. Carrilho, F. Rizzo, A. Pourtsidou  
arXiv:2207.13011, published in MNRAS, doi:10.1093/mnras/stad260

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## Presentations

- Jan'25 **Constraining extended cosmologies in the joint, spectroscopic and photometric, analysis (flash talk)**, *Meeting of the Euclid Galaxy Clustering Science Working Group*, Max Planck Institute for Extraterrestrial Physics, Garching.
- June'24 **Projection effects with EFTofLSS and extended cosmologies (panel discussion)**, *Workshop on Theoretical Modelling of Large-Scale Structure of the Universe*, Royal Observatory, Edinburgh.
- May'24 **Constraining extended cosmologies with Stage-IV cosmic shear (poster)**, *COSMO21 Conference*, Chania, Crete.
- Dec'23 **Constraining extended cosmologies with weak lensing data in the nonlinear regime**, *Euclid Meeting UK*, The Royal Astronomical Society, London.
- Oct'23 **Modified gravity theories in the nonlinear regime with weak lensing**, *de Sitter Journal Club*, Lorentz Centre, Leiden.
- Oct'23 **Constraining extended cosmologies with spectroscopic surveys**, *Astro Journal Club*, University of Newcastle.
- Jan'23 **Dark energy constraints from the joint analysis of power spectrum and bispectrum**, *DEX Meeting*, 2nd place at the best talk awards, IfA, Edinburgh.
- Jul'22 **Interacting dark energy from the joint analysis in redshift space**, *Summer School on Cosmology*, ICTP, Trieste.

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## Other Research Activities

- 2025–present **Mentoring**, *Ottavia Truttero*, graduate student at the University of Edinburgh, Forecasting HEFT-bias and baryonic feedback with LSST.
- 2024–present **Journal referee**, for the *Open Journal of Astrophysics*.
- 2024–present **LSST/VRO collaboration**, Member of forecasting group.
- 2023–present **Euclid collaboration**, Member of key projects on parameters estimation in extended cosmologies.
- Aug–Sep'24 **JPL Visiting Student Research Program**, Pasadena, US.
- Feb–Sep'23 **LSS Journal Club**, Organiser of the weekly meetings, IfA, Edinburgh.
- Feb'22 **SoPa PhD Conference**, Organising committee, University of Edinburgh, Highlands.
- Oct'17 **Internship at Max Planck Institute for Radio Astronomy**, *Analysis of pulsar timing data in the cluster Tucanae-47*, Bonn.

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## Teaching Experience

- 2022–2024 **Tutoring**, *General relativity, Astrophysics: Stars and Planets, Linear Algebra and Several Variable Calculus, Mathematics for Physics*, University of Edinburgh.
- 2019–2021 **Tutoring**, *Cosmology*, Bonn University.

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## Awards and Scholarships

- 2021–2025 **Doctoral studentship in the School of Physics and Astronomy**, University of Edinburgh.
- Oct–Nov'23 **Delta ITP visitor grant**, University of Leiden.
- 2020 **STIBET partial scholarship by DAAD**, Bonn University.

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## Skills and Competences

- Programming Python, SQL, C++, HTML, CSS, JS, Wolfram Mathematica
- Code dev MGL, PBJ, ACTio-ReACTio, MGrowth, ReACT-emus, HMcode2020-emulator for Euclid pipeline
- Cosmo codes CAMB, MGCAMB, HMcode, ReACT, CosmoSIS, samplers (emcee, MultiNest, pocoMC, Nautilus)
- Tools Flask, Git, Kubernetes, Apache Kafka, Cloud-Computing, Microservices