

Nikolaos Triantafyllou

PHYSICIST, PHD CANDIDATE IN COMPUTATIONAL ASTROPHYSICS AND COSMOLOGY

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Research Interests

Large-scale structure, 21cm cosmology, machine learning, bayesian statistics

Education

Scuola Normale Superiore

PHD IN COMPUTATIONAL ASTROPHYSICS AND COSMOLOGY

- Advisor: Prof. A. Mesinger

Pisa, Italy

Nov. 2023 - Present

University of Crete

MSC GRADUATE DEGREE IN ADVANCED PHYSICS (SPECIALIZATION: ASTROPHYSICS)

- Grade: 8.88/10 ("Excellent")
- Advisor: Prof. V. Pavlidou

Heraklion, Greece

Sept. 2022 - June 2023

University of Crete

BSC UNDERGRADUATE DEGREE IN PHYSICS

- Grade: 7.95/10 ("Very Good")
- Advisor: Prof. V. Pavlidou

Heraklion, Greece

Sept. 2018 - Sept. 2022

Research Experience

Scuola Normale Superiore

SUPERVISOR: PROF. ANDREI MESINGER

- Description: Research on Large-scale structure and Cosmology for the EoR. Using **bayesian** techniques (Posterior Density Estimation, Neural Ratio Estimation, Denoising Diffusion Probabilistic Models) to constrain the amplitudes and phases of large scale modes of the **primordial density field** and astrophysical parameters.

Pisa, Italy

2023 - Present

University of Crete and IA FORTH

SUPERVISOR: PROF. VASILIKI PAVLIDOU

- Description: Research on Large-scale structure and Cosmology. Used deep (NNs, **CNNs**) and shallow learning to probe the **turnaround radius** on the plane of the sky based on mass and line-of-sight velocity simulated data in order to constrain cosmological parameters.

Heraklion, Greece

2021 - 2023

Publications

IN PREPARATION

Bayesian Inference for Constraining the Cosmological Initial Density Field with 21-cm Observations from the Epoch of Reionisation

N. Triantafyllou, A. Mesinger, D. Prelogovic, S. Gagnon-Hartman

SUBMITTED

Searching for a Signature of Turnaround in Galaxy Clusters with Convolutional Neural Networks

(<https://arxiv.org/abs/2412.13304>)

N. Triantafyllou, G. Korkidis, V. Pavlidou, P. Bonfini

Teaching Experience

Fall 2022	Advanced Physics Lab I , Teaching Assistant	Heraklion, Greece
Spring 2022	Physics Lab III - Optics , Teaching Assistant	Heraklion, Greece
Spring 2020	Physics Lab II- Electromagnetism , Teaching Assistant	Heraklion, Greece

Fellowships

2018-2019 "Chrysanthos and Anastasia Karidis" Bequest Scholarship,

International Conferences

17th Tonale Winter School in Cosmology 2024 PARTICIPANT	Passo del Tonale, Italy December 2024
Physics in the AI era PARTICIPANT	Pisa, Italy September 2024
CosmoVerse Training school @Corfu 2024 PARTICIPANT	Corfu, Greece May 2024
RAS Specialist Discussion Meeting on Simulation Based Inference PARTICIPANT	Online / London, UK January 2024
Onassis Lectures on Gravitational Waves 2022 PARTICIPANT	Heraklion, Greece July 2022

Skills

Programming & Software

Proficient in: Python, \LaTeX
Familiar with: C, C++, MATLAB

Languages

Greek (native), English (fluent, B2-ECCE, working proficiency), Italian (A1)

Academic

Scientific research, academic writing, \LaTeX typesetting, problem-solving abilities, data analysis, teaching, report writing, presentation & communication skills, collaboration, time management, work ethic

Other Interests

Music (guitar playing, singing, lyric writing), philosophy, art, movies, road trips, swimming, basketball, wine/beer tastings, bars/pubs, board games