Nikolaos Triantafyllou

PHYSICIST, PHD CANDIDATE IN COMPUTATIONAL ASTROPHYSICS AND COSMOLOGY

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Research Interests

Large-scale structure, 21cm cosmology, Machine learning, Bayesian Methods

Education

Scuola Normale Superiore   *Pisa, Italy*
PHD IN COMPUTATIONAL ASTROPHYSICS AND COSMOLOGY   *Nov. 2023 - Present*
- Advisor: Prof. A. Mesinger

University of Crete   *Heraklion, Greece*
MSc GRADUATE DEGREE IN ADVANCED PHYSICS (SPECIALIZATION: ASTROPHYSICS)   *Sept. 2022 - June 2023*
- Grade: 8.88/10 ("Excellent")
- Advisor: Prof. V. Pavlidou

University of Crete   *Heraklion, Greece*
BSc UNDERGRADUATE DEGREE IN PHYSICS   *Sept. 2018 - Sept. 2022*
- Grade: 7.95/10 ("Very Good")
- Advisor: Prof. V. Pavlidou

Research Experience

Scuola Normale Superiore   *Pisa, Italy*
SUPERVISOR: PROF. ANDREI MESINGER   *2023 - Present*
- 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.

University of Crete and IA FORTH   *Heraklion, Greece*
SUPERVISOR: PROF. VASILIKI PAVLIDOU   *2021 - 2023*
- 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.

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

LAST STAGES OF PREPARATION

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

International Conferences

17th Tonale Winter School in Cosmology 2024   *Passo del Tonale, Italy*
Participant   *December 2024*

Physics in the AI era   *Pisa, Italy*
Participant   *September 2024*

CosmoVerse Training school @Corfu 2024   *Corfu, Greece*
Participant   *May 2024*

RAS Specialist Discussion Meeting on Simulation Based Inference   *Online / London, UK*
Participant   *January 2024*

Onassis Lectures on Gravitational Waves 2022   *Heraklion, Greece*
Participant   *July 2022*

Fellowships

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

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