

Nikolaos Triantafyllou

PHYSICIST, PHD CANDIDATE IN COSMOLOGY | ML

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Education

Scuola Normale Superiore

Pisa, Italy

PHD IN COMPUTATIONAL ASTROPHYSICS AND COSMOLOGY

Nov. 2023 - Present

- Advisor: Prof. A. Mesinger
- Ongoing project: Bayesian Inference for Constraining the Cosmological Initial Density Field with 21-cm Observations from the Epoch of Reionisation (EoR)

University of Crete

Heraklion, Greece

MSc GRADUATE DEGREE IN PHYSICS

Sept. 2022 - June 2023

- Grade: 8.88/10 ("Excellent")
- Program: "Advanced Physics"
- Specialization: "Astrophysics and Space Physics"
- Advisor: Prof. V. Pavlidou
- Thesis: "Searching for a signature of turnaround in velocity profiles of galaxy clusters with machine learning"

University of Crete

Heraklion, Greece

BSc UNDERGRADUATE DEGREE IN PHYSICS

Sept. 2018 - Sept. 2022

- Grade: 7.95/10 ("Very Good")
- Advisor: Prof. V. Pavlidou
- Thesis: "Machine learning methods to detect the turnaround radius of galaxy clusters"

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.

Institute of Astrophysics at 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

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

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

International Conferences

Physics in the AI era

Pisa, Italy

PARTICIPANT

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

Teaching ExperienceFall 2022 **Advanced Physics Lab I**, Teaching AssistantHeraklion,
GreeceSpring
2022 **Physics Lab III - Optics**, Teaching AssistantHeraklion,
GreeceSpring
2020 **Physics Lab II- Electromagnetism**, Teaching AssistantHeraklion,
Greece**Fellowships**

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

Research Interests

Cosmology, Computational Astrophysics, Machine learning, Bayesian Methods

Skills**Programming & Software**Proficient in: Python, \LaTeX

Familiar with: C, C++, MATLAB

Languages

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

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