Farnik Nikakhtar

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Education

Ph.D. in Physics & Astronomy — Philadelphia, PA | 2022
University of Pennsylvania

M.A. in Statistics & Data Science — Philadelphia, PA | 2020
The Wharton School, University of Pennsylvania

B.S. in Physics (Major) & Computer Science (Minor) — Tehran, Iran | 2017
Sharif University of Technology

Honors & Awards

YCAA Postdoctoral Fellowship, Yale Center for Astronomy & Astrophysics — 2023–2026
Balzan Fellowship, Centre for Cosmological Studies, University of Oxford — 2022
NSF Graduate Research Fellowship, U.S. National Science Foundation — 2018–2021
GAPSA Research Travel Grant, University of Pennsylvania — 2019
Research Experiences for Undergrads, Institute for Research in Fundamental Sciences — 2015, 2016
Silver Medalist, Astronomy & Astrophysics Olympiad — 2011

Research Experience

Postdoctoral Fellow — New Haven, CT
Yale Center for Astronomy & Astrophysics, Yale University — 2022–

- **YCAA Prize Postdoctoral Fellow**
- Implementing and applying large-scale structure reconstruction algorithms for the Dark Energy Spectroscopic Instrument (DESI) survey.
- Quantifying the out-of-equilibrium characteristics of dwarf galaxies and constraining their gravitational potential through the analysis of both simulated and observed datasets using deep generative models.

Visiting Graduate Researcher — Paris, France
Institut d'astrophysique de Paris (IAP) — May–July 2022

- Developed and validated semi-discrete optimal transport algorithm for reconstructing Baryon Acoustic Oscillations (BAO) from biased tracers.

Guest Reseacher — New York, NY
Center for Computational Astrophysics (CCA) — Apr–July 2021

- Implemented unsupervised machine learning techniques for objective classification of structures in both simulated (FIRE) and observed (Gaia×APOGEE) stars of the solar neighborhood.

Graduate Researcher Philadelphia, PA
Department of Physics & Astronomy, University of Pennsylvania 2018–2022

- **NSF GRFP Fellow**
- Developed physical models and statistical methods for the reconstruction of Baryon Acoustic Oscillations (BAO) from 2-point correlation function measurements in large-scale galaxy surveys.
- Generated a new suite of realistic synthetic stellar surveys using FIRE (Feedback In Realistic Environments) simulations designed to resemble the crossmatch between Gaia and APOGEE observations.

Teaching Experience

Yale Certificate of College Teaching Preparation (CCTP) 2022–
UPenn Certificate in College and University Teaching 2021

Guest Lecturer

Machine Learning in Astronomy New York, NY
Center for Computational Astrophysics (CCA) May 2021

- Developed and delivered two lectures as part of a graduate-level course, focusing on unsupervised learning and clustering algorithms.

Nonlinear Structure Formation Tehran, Iran
Sharif University of Technology Jan 2020

- Led a month-long course for ∼30 senior undergraduate and graduate students, focusing on non-perturbative approaches to cosmic structure formation.

Teaching Assistant

University of Pennsylvania Philadelphia, PA
Department of Physics & Astronomy 2018–2022

- **Cosmology (Spring 2019)**: Graduate-level course; led office hours for ∼10 students
- **Introduction to Astrophysics (Fall 2019)**: Undergraduate-level course; led office hours for ∼25 students.
- **Survey of the Universe (Fall 2018)**: Science course for non-majors; led section discussions for ∼25 students in an active learning format.

The Wharton School Philadelphia, PA
Department of Statistics & Data Science 2018–2022

- **Modern Data Mining (Spring 2020, Spring 2021)**: science course for non-majors and MBA students; led active learning format office hours for ∼30 students and guided two case study course projects.

Mentoring Experience

Graduate Research

2023–	Navya Uberoi	Yale University
2022–	Sasha Gaines	Yale University
2021–2024	Jason (Jaemyoung) Lee	University of Pennsylvania

Undergraduate Research

2023	Andrew Hicks	C.U. Boulder, REVU Program[1]
2022–	Andy Nilipour	Yale University
2018	Setareh Foroozan	Sharif University of Technology
2018	Arefe Abghari	Sharif University of Technology

[1] The Research Experience for Veteran Undergraduate, 9-week summer program for enlisted U.S. veteran undergraduates conducting STEM research.

Academic Service & Outreach

Professional Service

2024	NASA ADAP Grant Review Panel
2023	DESI Year 1 Data Release/Tutorial Coordinator
2023–	Co-Group Leader, Dark Matter Topical Group of DESI Milky Way Survey
2022–	Member of DESI Education & Public Outreach (EPO) Committee
2019–	Member of American Physical Society (APS)
2019–	Member of American Astronomical Society (AAS)
2018–	Reviewer for *APJ, PRL, PRD, PRE, JCAP, MNRAS, RASTI, A&A*

Department & University Service

2023–	Member of Yale Postdoctoral Advisory Committee (PDAC)
2022–2023	Member of Yale Time Allocation Committee (TAC)
2020 & 2021	Member of Organizing Committee for Penn Live Data Science
2019–2021	Member of Penn Diversity & Inclusion in Physics (DIP) Group

Media & Press Coverage

July 2023	The Conversation
Apr 2023	**Exploring the dark side of the universe**, Inria
Mar 2023	**Turning Back Time on Space**, Yale News

Selected Talks

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July 2024	Cosmology in the Adriatic – From PT to AI
Apr 2024	* Perimeter Institute, Cosmology & Gravitation Seminar
Feb 2024	* Yale University, Center for Astronomy and Astrophysics Colloquium
July 2023	University of Oxford, Rudolf Peierls Centre for Theoretical Physics, Cosmology Seminar
Mar 2023	Ecole de physique des Houches, Optimal Transport Theory and Applications to Physics
Aug 2022	Lorentz Center Leiden, Towards Real-Time Galactic Dynamics Workshop
July 2022	Max Planck Institute for Nuclear Physics Heidelberg, Particles, Strings and Cosmology (PASCOS)
July 2022	* IAP, Initiative in Cosmology and Physics of Astro Particles (ICAP) Seminar
Apr 2022	Center for Computational Astronomy (CCA), DDA Meeting