Tri V. Nguyen CIERA Postdoctoral Fellow

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CIERA Postdoctoral Fellow Sep 2024 – Present

Center for Interdisciplinary Exploration and Research in Astrophysics

CCA Pre-doctoral Research Analyst Sep 2022 – Jan 2023

Center for Computational Astrophysics, Flatiron Institute Advisor: Rachel Somerville, Chirag Modi, Aaron Yung

Education

Ph.D. in Physics, Massachusetts Institute of Technology 2019 - 2024

2015 - 2019

Thesis: "Decoding Dark Matter Halos through the lens of Machine Learning"

Advisor: Lina Necib

B.S. in Physics & Astronomy, University of Rochester

Magna Cum Laude with the highest distinction in Physics

Advisor: Segev BenZvi, Regina Demina

Research Interest

Astrophysics: Dark Matter; Galactic Dynamics; Galaxy Formation & Evolution; Near-field Cosmology

Machine Learning: Simulation-based Inference; Generative Models: Diffusions, Flows; Geometric Deep Learning;

Multi-modal Learning

Honors and Awards

LEAdership and Professional Strategies and Skills (LEAPS) Certificate, MIT	2023
Astrophysics Division Graduate Service Award, MIT	2023
Undergraduate Teaching Award, University of Rochester	2019
Dean's List Recognition, University of Rochester	2015 – 2019
Rush Rhees Scholarship, University of Rochester	2015 – 2019
Annual Award for Excellence in SPS Tutoring, University of Rochester	2018

Publications

Led/Co-led/Major Contributions

[6] T. Nguyen , et al.	Submitted to ApJ
How DREAMS are made: Emulating Satellite Galaxy and Subhalo Populations with	arXiv:2409.02980
Diffusion Models and Point Clouds	
[5] I. V. A. Yung, R. S. Somerville, T. Nguyen, P. Behroozi, C. Modi, I. Gardner	MNR AS 530 4

[5] L. Y. A. Yung, R. S. Somerville, T. Nguyen , P. Behroozi, C. Modi, J. Gardner	MNRAS 530 , 4
Characterising ultra-high-redshift dark matter halo demographics and assembly	arXiv:2309.14408
histories with the GUREFT simulations	

[4] T. Nguyen, C. Modi, L. Y. A. Yung, R. S. Somerville	MNRAS 533 , 3
FLORAH: A generative model for assembly histories of halos	arXiv:2308.05145

Supernova

[3] T. Nguyen , X. Ou, N. Panithanpaisal, N. Shipp, L. Necib, R. Sanderson, A. Wetzel Synthetic Gaia DR3 surveys from the FIRE cosmological simulations of Milky-Way-mass galaxies	<i>ApJ</i> 966 , 108 arXiv:2306.16475
[2] T. Nguyen , S. Mishra-Sharma, R. Williams, L. Necib Uncovering the dark matter density profiles of dwarf galaxies with graph neural networks	<i>Phys.Rev.D</i> 107 , 043015 arXiv:2208.12825
[1] R. Ormiston, T. Nguyen , M. Coughlin, R. Adhikari, E. Katsavounidis <i>Noise reduction in gravitational-wave data via deep learning</i>	<i>Phys.Rev.Res.</i> 2 , 033066 arXiv:2005.06534
N-th Author Papers & Collaboration Papers	
[5] J. Rose et al. (including T. Nguyen) Introducing the DREAMS Project: DaRk mattEr and Astrophysics with Machine learning and Simulations	Submitted to ApJ arXiv:2405.00766
[4] C. Roche, L. Necib, T. Lin, X. Ou, T. Nguyen The Escape Velocity Profile and Dark Matter Halo of the Milky Way from Gaia DR3	Submitted to ApJ arXiv:2402.00108
[3] M. Saleem et al. (including T. Nguyen) Demonstration of Machine Learning-assisted real-time noise regression in gravitational wave detectors	Submitted to PNAS arXiv:2306.11366
[2] The LIGO-Virgo-KAGRA collaboration (including T. Nguyen) <i>GWTC-3: Compact Binary Coalescences Observed by LIGO and Virgo During the Second Part of the Third Observing Run</i>	<i>Phys.Rev.X</i> 13 , 041039 arXiv:2111.03606
[1] A. Gunny, D. Rankin, J. Krupa, M. Saleem, T. Nguyen , M. Coughlin, P. Harris, E. Katsavounidis, S. Timm, B. Holzman <i>Hardware-accelerated Inference for Real-Time Gravitational-Wave Astronomy</i>	Nat Astron 6 , 529–536 arXiv:2108.12430
White Papers & Conference Proceedings	
[3] A. Deiana et al. (including T. Nguyen) Applications and Techniques for Fast Machine Learning in Science	Front. Big Data 5 2022.787421 arXiv:2110.13041
[2] E. Cuoco et al. (including T. Nguyen) Enhancing Gravitational-Wave Science with Machine Learning	Mach. Learn.:Sci.Tech. 2, 011002 arXiv:2005.03745
[1] S. BenZvi, R. Cross, T. Nguyen Estimating the Sensitivity of IceCube to Signatures of Axion Production in a Galactic	Int. Cosmic Ray Conf. 2017 arXiv:1710.01201

Invited Talks

[8] Galactic Frontiers: Dwarf Galaxies in the Local Volume and Beyond, CCA Flatiron Institute [7] Statistical Challenges in Modern Astronomy VIII, Penn State University [8] Galactic Frontiers: Dwarf Galaxies in the Local Volume and Beyond, CCA Flatiron Institute [8] Cosmic Connections: A ML X Astrophysics Symposium, CCA Flatiron Institute [8] Cosmic Connections: A ML X Astrophysics Symposium, CCA Flatiron Institute [8] Cosmic Connections: A ML X Astrophysics Symposium, CCA Flatiron Institute [8] Cosmic Connections: A ML X Astrophysics Symposium, CCA Flatiron Institute [9] Settler Machine Meeting, Seattle [9] Jul 2022 [1] Littler-AIMLAC Lightning Talk, MIT [9] Mar 2022 [1] Sath Machine Learning Workshop, Fermilab [9] Sep 2019 [1] 233rd AAS Winter Meeting, Seattle [9] Jan 2019 Seminars & Poster Presentations [13] CIERA Theory Group Meeting, Northwestern University [9] Jul 2024 [14] Journal Club, University of Pittsburgh [15] Junnal Club, University of Pittsburgh [16] Dark Cosmos Seminar, Princeton University [17] Dec 2023 [18] KICP Seminar, University of Washington [18] KICP Seminar, University of Chicago [19] Astro Lunch Talk, University of Chicago [10] CIERA Theory Group Meeting, Northwestern University [11] Oct 2023 [12] Lunch Talk, CCA Flatiron Institute [12] Dec 2022 [13] Galaxy Formation Group Meeting, CCA Flatiron Institute [14] Blackboard Lunch Talk, Columbia University [15] CLERA Theory Group Meeting, CCA Flatiron Institute [16] Nov 2022 [17] Al in Astronomy, University of São Paulo, Remote [18] Cataching Positions	Invited Talks	
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Mentoring and Advising

Undergraduate students

Christine Hao, MIT Undergraduate Research Opportunity Program	June 2024 – Present
Rutong Pei, Carnegie Mellon University	Aug 2023 – Present
Hanna Chen, MIT Undergraduate Research Opportunity Program	Summer 2023
Anna Orgel, MIT Undergraduate Research Opportunity Program	Summer 2023
Hang Su, MIT Summer Research Program	Summer 2022

High school students

Michael Huang, MIT Research Science Institute

Summer 2022

Leadership Positions

Organizer, Astronomy on Tap Boston	2022 - 2024
Co-director, MIT Astrogazers Initiative	2022 - 2024
Committee Member, IAIFI Public Engagement Committee	2021 - 2024
Committee Member, MIT Physics Graduate Council Social Committee	2019 – 2020
President, The Kapitza Society for Theoretical Physics	2018 – 2019
Dance Instructor, University of Rochester Breakdance Club	2017 – 2019
Observatory Guide & Telescope Operator, C.E.K Mees Observatory	Summer 2017, 2018
Vice President, University of Rochester Astronomy Club	2017 – 2018

Public Engagement Activities

Lead organizer, Astronomy on Tap: Solar System Exploration	Apr 2023
Lead organizer, Astronomy on Tap: AI in Astronomy	Oct 2023
Co-organizer, Astrogazers Solar Telescope Workshop @ Cambridge Science Festival	Oct 2023
Co-organizer, Astrogazers Observing Night @ MIT/Kendall Fall Festival	Oct 2023
Co-organizer, Astronomy on Tap: Science (in) Fiction	Aug 2023
Lecturer, Learning to Lead @ Accenture Boston	Jul 2023
Co-organizer, Teen Programming Council @ MIT Museum	May 2023
Co-organizer, After Dark @ MIT Museum	May 2023
Co-organizer, Astronomy on Tap	Mar 2023
Volunteer, AAS 241st Graduate School Fair	Jan 2023
Volunteer, Astrogazers Telescope Workshop @ Cambridge Science Festival	Oct 2022
Lecturer, Gaia DR3 Hackathon	Jun 2022
Volunteer, Solar Telescope for Middle Schoolers	Jul 2019
Lead organizer, Earth Hour @ University of Rochester	Mar 2018

Professional Development Activities

Panelist, IAIFI Internship & Career Panel	Oct 2023
Panelist, MIT Physics Graduate Student Council Internship & Career Panel	Apr 2023
Student Contributor, MIT Physics Graduate Student Handbook	Mar 2023

Peer Review Service

Astrophysical Journal

Astronomy and Computing

Physics Review D

Physics Review Letter

ML for Physical Sciences workshop at NeurIPS 2024

ML for Physical Sciences workshop at NeurIPS 2023

ML for Astrophysics workshop at ICML 2023

ML for Physical Sciences workshop at NeurIPS 2022