Tri Nguyen

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Education

Ph.D. in Physics, Massachusetts Institute of Technology 2019 – present
Advisor: Lina Necib
Thesis: "Decoding dark matter halos through the lens of machine learning"

B.S. in Physics & Astronomy, University of Rochester 2015 – 2019
Magna Cum Laude with the highest distinction in Physics

Research Positions

Graduate Research Assistant, MIT Local Universe Group Sep 2021 – present
Advisor: Lina Necib
Thesis: "Decoding dark matter halos through the lens of machine learning"

Research Analyst, Center for Computational Astrophysics Sep 2022 – Jan 2023
Advisor: Rachel Somerville, Chirag Modi
Project: Generating dark matter merger trees with generative models

Graduate Research Assistant, MIT LIGO Laboratory Jun 2019 – Sep 2021
Advisor: Erik Katsavounidis, Phillip Harris
Project: Detecting gravitational waves from binary mergers with machine learning

Undergraduate Research Assistant, University of Rochester Sep 2016 – Jun 2019
Advisor: Segev BenZvi, Regina Demina
Thesis: "Efficiently calculating the galaxy two-point correlations using K-D tree"

Honors and Awards

Graduate Service Award, Massachusetts Institute of Technology 2023
CCA Pre-Doctoral Program, Center for Computational Astrophysics, Flatiron Institute 2022
Dean's List Recognition, University of Rochester 2015 – 2019
Rush Rhees Scholarship, University of Rochester 2015 – 2019
LIGO SURF Fellowship Program, California Institute of Technology 2018

Publications

Led/Co-led/Major Contributions

[7] M. Huang, **T. Nguyen**, X. Ou, K. Brauer, L. Necib In prep.
Using Graph Neural Network and Spectral Clustering to find Stellar Substructures

[6] H. Su, **T. Nguyen**, N. Shipp, X. Ou, L. Necib In prep.
Using Machine Learning to Catalog Accreted Stars in Gaia DR3

[5] **T. Nguyen**, C. Modi, L.Y.A. Yung, R. S. Somerville In prep.
FLORAH: A generative model for assembly histories of halos

[4] L. Y. A. Yung, R. S. Somerville, **T. Nguyen**, C. Modi, J. Gardner — In prep.
The GUREFT simulations – Dark matter halo demographics and assembly histories at ultrahigh redshift

[3] **T. Nguyen**, X. Ou, N. Panithanpaisal, N. Shipp, L. Necib, R. Sanderson, A. Wetzel — Submitted to ApJ arXiv:2306.16475
Synthetic Gaia DR3 surveys from the FIRE cosmological simulations of Milky-Way-mass galaxies

[2] **T. Nguyen**, S. Mishra-Sharma, R. Williams, L. Necib — Phys.Rev.D **107**, 043015 arXiv:2208.12825
Uncovering the dark matter density profiles of dwarf galaxies with graph neural networks

[1] R. Ormiston, **T. Nguyen**, M. Coughlin, R. Adhikari, E. Katsavounidis — Phys.Rev.Res. **2**, 033066 arXiv:2005.06534
Noise reduction in gravitational-wave data via deep learning

N-th Author Papers & Collaboration Papers

[2] The LIGO-Virgo-KAGRA collaboration (including **T. Nguyen**) — Phys.Rev.X arXiv:2111.03606
GWTC-3: Compact Binary Coalescences Observed by LIGO and Virgo During the Second Part of the Third Observing Run

[1] A. Gunny, D. Rankin, J. Krupa, M. Saleem, **T. Nguyen**, M. Coughlin, P. Harris, E. Katsavounidis, S. Timm, B. Holzman — Nat Astron 6, 529–536 arXiv:2108.12430
Hardware-accelerated Inference for Real-Time Gravitational-Wave Astronomy

White Papers & Conference Proceedings

[3] A. Deiana, et al. (including **T. Nguyen**) — Front. Big Data 2022.787421 arXiv:2110.13041
Applications and Techniques for Fast Machine Learning in Science

[2] E. Cuoco, et al. (including **T. Nguyen**) — Mach. Learn.:Sci.Tech. **2**, 011002 arXiv:2005.03745
Enhancing Gravitational-Wave Science with Machine Learning

[1] S. BenZvi, R. Cross, **T. Nguyen** — Int. Cosmic Ray Conf. 2017 arXiv:1710.01201
Estimating the Sensitivity of IceCube to Signatures of Axion Production in a Galactic Supernova

Invited Talks

[2] Galaxy Formation and Evolution in the Data Science Era, KITP, CA, USA — Mar 2023

[1] NCSA Accelerated Artificial Intelligence for Big-Data Experiments Conference, Remote — Oct 2020

Contributed Talks

[8] Galactic Frontiers: Dwarf Galaxies in the Local Volume and Beyond, Center for Computational Astrophysics, NY, USA — Jul 2023

[7] Statistical Challenges in Modern Astronomy VIII, Penn State University, PA, USA — Jun 2023

[6] Cosmic Connections: A ML X Astrophysics Symposium, Center for Computational Astrophysics, NY, USA — May 2023

[5] 241st AAS Winter Meeting, Seattle, WA, USA — Jan 2023

[4] ML4Astro Workshop, International Conference on Machine Learning, Baltimore, MD, USA — Jul 2022

[3] IAIFI–AIMLAC Lightning Talk, Massachusetts Institute of Technology, MA, USA Mar 2022

[2] Fast Machine Learning Workshop, Fermilab, IL, USA Sep 2019

[1] 233rd AAS Winter Meeting, Seattle, WA, USA Jan 2019

Seminars & Poster Presentations

[7] ML4Astro Workshop, Poster, International Conference on Machine Learning, Honolulu, HI, USA Jul 2023

[6] Lunch Talk, Center for Computational Astrophysics, New York, NY, USA Dec 2022

[5] Blackboard Lunch Talk, Columbia University, New York, NY, USA Nov 2022

[4] Galaxy Formation Meeting, Center for Computational Astrophysics, New York, NY, USA Nov 2022

[3] Nature of Dark Matter on Small Scales Seminar, Remote Oct 2022

[2] LIGO–Virgo–KAGRA Public Webinar, Remote Dec 2021

[1] AI in Astronomy, University of São Paulo, Remote Sep 2021

Mentoring and Advising

Anna V Orgel, MIT Undergraduate Research Opportunities Program Jun 2023 – present
Project: "Building a Generative Model of Self-Interacting Dark Matter Dwarf Galaxies"

Hanna Chen, MIT Undergraduate Research Opportunities Program, Jun 2023 – present
Project: "Accreted Kinematic Structures in Gaia DR3"

Hang Su, MIT Summer Research Program Jun 2022 – present
Project: "Using Machine Learning to Catalog Accreted Stars in Gaia ESA DR3"

Michael Huang, Research Science Institute Program Jul 2022 – present
Project: "Automating Stellar Substructure Detection using Supervised Neural Clustering"

Teaching Positions

Massachusetts Institute of Technology

8.022 Physics II Spring 2022
8.01L Physics I Fall 2021
8.S50 Computational Data Science in Physics Jan 2020, Jan 2021

University of Rochester

PHY 235 Classical Mechanics Fall 2018
PHY 121 Mechanics Lab Spring 2017, Spring 2018
AST 111 The Solar System & Its Origin Fall 2017
PHY 113 Mechanics Lab Fall 2016

Leadership Positions

Co-organizer, Astronomy on Tap Boston 2022 – present
Co-organizer, MIT Astrogazers Club 2022 – present
Committee Member, IAIFI Public Engagement Committee 2021 – present
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
Tour Guide, C.E.K Mees Observatory Summer 2017, Summer 2018
Vice President, University of Rochester Astronomy Club 2017 – 2018

Science Communication & Public Engagement

Volunteer, Accenture's Learning to Lead program, Accenture Boston — Jul 2023
Volunteer, Teen Programming Council Event @ MIT Museum — May 2023
Volunteer, After Dark @ MIT Museum — May 2023
Panelist, MIT Physics Graduate Student Council Internship Panel — Apr 2023
Volunteer, AAS 241st Graduate School Fair — Jan 2023
Volunteer, Cambridge Science Festival 2022 — Oct 2022
Lecturer, Gaia DR3 Hackathon — Jun 2022
Volunteer, Solar Telescope for Middle Schoolers — Jul 2019
Organizer, Earth Hour @ University of Rochester — Mar 2018

Service

Reviewer, Physics Review D — 2021 – present
Reviewer, Physics Review Letter — 2021 – present
Reviewer, Astronomy and Computing — 2021 – present
Reviewer, ML for Astrophysics workshop at ICML 2023 — Jun 2023
Reviewer, ML for Physical Sciences workshop at NeurIPS 2022 — Oct 2022