Tri Nguyen

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Education

Massachusetts Institute of Technology — **Cambridge, MA**
Ph.D. in Physics, Astrophysics Division — *Jun 2019 – Present*

University of Rochester — **Rochester, NY**
B.S. in Physics & Astronomy — *Class of 2019*

- Major GPA: 3.98/4.00
- Magna Cum Laude with highest distinction

Honors and Awards

LIGO SURF Fellowship, *California Institute of Technology* 2018

Dean's List Recognition, *University of Rochester* 2015-2019

Rush Rhees Scholarship, *University of Rochester* 2015-2019

Research Experience

MIT Local Universe Group — Aug 2021 – Present
Research Advisor: Lina Necib

- Reconstructing the dark matter density profiles of dwarf galaxies from their stellar kinematics with Graph Convolutional Neural Networks and Normalizing Flows
- Estimating the mass and accretion redshift of satellite galaxies that are accreted into the Milky Way with neural networks and the Illustris-TNG and FIRE simulations
- Constructing the Ananke DR3 mock stellar catalog using the stellar isochrone, dust extinction model, error model, and selection function consistent with the Gaia DR3 survey

MIT LIGO Laboratory — Jun 2019 – Dec 2021
Research Advisor: Erik Katsavounidis, Philip Harris

- Developed a machine learning framework for non-linear noise subtraction using auxiliary channels in gravitational-wave detectors at LIGO
- Developed a real-time gravitational-wave data analysis pipeline using an Inference-as-a-Service model by the NVIDIA Triton Server
- Estimated the sensitivity of LIGO to compact binary mergers during the LIGO Third Observing Run

Publications

List in decreasing order of contributions

T. Nguyen, S. Mishra-Sharma, L. Necib — *In progress*
Uncovering the dark matter density profiles of dwarf galaxies with graph neural networks

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

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

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

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

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

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

Talks

Uncovering the dark matter density profiles in dwarf galaxies with neural networks — Jul 2022
ML4Astro Workshop, ICML2022, Baltimore, MD, USA

Uncovering the dark matter density profiles in dwarf galaxies with neural networks — Mar 2022
IAIFI-AIMLAC Lightning Talk, MIT, Cambridge, MA, USA

GWTC-3: Compact Binary Coalescences Observed During the Second Part of the Third Observing Run — Dec 2021
LIGO-Virgo-KAGRA Public Webinar, Panelist

Deep Cleaning for Gravitational Wave Data — Sep 2019
Fast Machine Learning Workshop, Fermilab, Batavia, IL, USA

Nonlinear noise regression with machine learning at LIGO — Jan 2019
233rd AAS Meeting, Seattle, WA, USA

Service

Referee for PRD, ASCOM

Teaching Experience

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 2018*, *Spring 2017*
- AST 111 The Solar System & Its Origin, *Fall 2017*
- PHY 113 Mechanics Lab, *Fall 2016*