Tri Nguyen

26-648, 77 Massachusetts Avenue, Cambridge, MA 02139

✆ +1 626-628-4527 • ✉ tnguy@mit.edu • 🖥 trivnguyen.github.io

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

  – Reconstructed the dark matter density profiles of dwarf galaxies from their stellar kinematics with Graph Convolutional Neural Networks and Normalizing Flows
  – Estimated 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
  – Constructed the Ananke DR3 mock stellar catalog using the stellar isochrone, dust extinction model, error model, and selection function consistent with the Gaia DR3 survey

CCA Galaxy Formation Group   Aug 2022 – Feb 2023
Research Advisor: Rachel Sommerville

  – Developed a generative deep learning-based model to generate galaxy merger trees consistent with N-body cosmological simulation

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
Uncovering the dark matter density profiles of dwarf galaxies with graph neural networks
Phys.Rev.Let (*Submitted*)
arXiv:2208.12825

T. Nguyen, X. Ou, et al
Synthetic Gaia DR3 surveys from the FIRE cosmological simulations of Milky-Way-mass galaxies
In progress

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

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

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

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

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

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

Talks

Uncovering the dark matter density profiles in dwarf galaxies with simulation-based inference and graph neural networks
Nature of Dark Matter on Small Scales Seminar, Online
Oct 2022

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

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

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

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

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

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*