TRUNG V. HA
Astronomy PhD. Candidate, University of Massachusetts-Amherst

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Curriculum Vitae
(Last updated: January 6, 2025)

EDUCATION

2024 – present	**University of Massachusetts-Amherst, Amherst, Massachusetts** PhD candidate in Astronomy, expected graduation May 2026 PhD advisor: Yuan Li GPA: 4.00 / 4.00
2020 – 2024	**University of North Texas, Denton, Texas** PhD candidate in Physics – transferred to UMass before receiving degree Master of Science in Physics – conferred May 2022 GPA: 4.00 / 4.00
2017 – 2020	**University of Rochester, Rochester, New York** Bachelor of Science in Physics
2015 – 2017	**Central Arizona College, Coolidge, Arizona** Associate of Science

WORK EXPERIENCE

Sep 2024 – present	**Graduate Research Assistant,** University of Massachusetts-Amherst
Jun 2021 – Aug 2024	**Graduate Research Assistant,** University of North Texas
Sep 2023 – May 2024	**Research Analyst and Guest Researcher,** Center for Computational Astrophysics, Flatiron Institute – Simons Foundation
Aug 2020 – May 2021	**Graduate Teaching Assistant,** University of North Texas
Sep 2018 – Dec 2019	**Undergraduate Teaching Assistant,** University of Rochester
Jun 2018 – Aug 2018	**Summer Research Intern,** Laboratory for Laser Energetics, University of Rochester
Sep 2016 – May 2017	**Mathematics tutor,** Mesa Community College

RESEARCH EXPERIENCE

Sep 2024 – present	**Department of Astronomy, University of Massachusetts-Amherst** Examine the turbulent kinematics of young stars in the Milky Way, Machine learning in black holes – host galaxies scaling relations, Convolutional neural networks to identify compact star clusters.
Sep 2020 – Aug 2024	**Department of Physics, University of North Texas** Numerical simulations of supermassive black holes in cool-core clusters with the Athena++ code, Measure turbulence traced by young stars and gas in Milky Way star-forming regions, Near-infrared spectroscopy of weak-emission line quasars.
Sep 2023 – May 2024	**Center for Computational Astrophysics, Flatiron Institute** Develop machine learning techniques to identify and segment current sheets in 3-dimensional plasma simulations.

Sep 2018 – May 2020	**Center for Computational Relativity and Gravitation, Rochester Institute of Technology** Perform dynamical simulations of binary neutron stars with the Einstein Toolkit. Generate binary neutron stars initial data with LORENE.
Jun 2018 – Aug 2018	**Laboratory for Laser Energetics, University of Rochester** Analysis of diffraction energy from laser shots through an under-dense plasma and laser wakefield acceleration simulation.

FIRST AUTHOR PUBLICATIONS

1. ***"Bridging the Gap: Modeling Supermassive Black Holes Feeding and Feedback at the Meso-Scale"***
   Ha, Trung; Li, Y.; et al. (in prep)
2. **"*aweSOM: a CPU/GPU-accelerated Self-organizing Map and Statistically Combined Ensemble Framework for Machine-learning Clustering Analysis"***
   Ha, Trung; Nättilä, J.; Davelaar, J. (submitted to JOSS, GitHub)
3. ***"Machine-Learning Characterization of Intermittency in Plasma Turbulence: Single vs. Double Sheet Structures"***
   Ha, Trung; Nättilä, J.; Davelaar, J.; Sironi, L. (submitted to PRL, arXiv:2410.01878)
4. ***"Shedding New Light on Weak Emission-Line Quasars in the CIV–Hβ Parameter Space"***
   Ha, Trung; Dix, C.; Matthews, B. M.; Shemmer, O.; et al., (2023ApJ...950...97H)
5. ***"Turbulence in Milky Way Star-forming Regions Traced by Young Stars and Gas"***
   Ha, Trung; Li, Y.; Kounkel, M.; Xu, S.; Li, H.; Zheng, Y., (2022ApJ...934....7H)
6. **"*Measuring Turbulence with Young Stars in the Orion Complex*"**
   Ha, Trung; Li, Y.; Xu, S.; Kounkel M.; Li, H., (2021ApJ...907L..40H)

OTHER PUBLICATIONS

1. ***"Anisotropic Motion in Young Star Forming Regions Probed with 6D Stellar Kinematics"***
   Velguth, B.; Li, Y.; **Ha, Trung**, et al. (in prep.)
2. ***"Black Hole Scaling Relations in Cosmological Simulations using Machine Learning"***
   Reinheimer, J.; …; **Ha, Trung**, et al. (in prep.)
3. ***"Rest-Frame Optical Spectroscopy of Ten z ~ 2 Weak Emission-Line Quasars"***
   Chen, Y.; …; **Ha, Trung**, et al. (2024ApJ...972..191C)
4. ***"Gemini Near Infrared Spectrograph - Distant Quasar Survey: Rest-Frame Ultraviolet-Optical Spectral Properties of Broad Absorption Line Quasars"***
   Ahmed, H.; …; **Ha, Trung**, et al., (2024ApJ...968...77A)
5. ***"The Nature of the Motions of Multiphase Filaments in the Centers of Galaxy Clusters"***
   Ganguly, S.; …; **Ha, Trung**, (2023FrASS..1038613)
6. ***"Handing-Off the Outcome of Binary Neutron Star Mergers for Accurate and Long-Term Post-Merger Simulations"***
   Lopez Armengol, F. G.; …; **Ha, Trung**; et al., (2022PhRvD.106h3015L)
7. ***"HARM3D+NUC: A new method for simulating the post-merger phase of binary neutron star mergers with GRMHD, tabulated EOS and neutrino leakage"***
   Murguia-Berthier, A.; …; **Ha, Trung**, et al., (2021ApJ...919...95M)

TALKS

Apr, May, Jun, Oct 2024	**Astronomy Department Lunch Talk,** UMass Amherst, MA, USA &

	AstroAI Workshop, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, USA & **Midwest Magnetic Fields Workshop,** Madison, WI, USA & **Computational Sciences Department Seminar,** Princeton Plasma Physics Laboratory (PPPL), NJ, USA & **Astrophysical Sciences Department "Thunch",** Princeton University, NJ, USA & **Astronomy & Astrophysics Seminar,** Columbia University, NY, USA Title: "Segmentation of Current Sheets in Magnetized Plasma Turbulence with Computer Vision"
Apr 2024	**Center for Computational Relativity and Gravitation Lunch Talk,** Rochester, NY, USA **(invited)** Title: "Can Neural Networks Recognize Current Sheets? Using Computer Vision to Analyze Magnetized Plasma Turbulence"
Mar 2024	**Astronomy Lunch Talk,** Department of Physics, University of California, Santa Barbara, CA, USA Title: "Tracing Turbulence with Young Stars"
Feb 2024	**Kavli Institute for Theoretical Physics (KITP) – Turbulence in the Universe Workshop,** Santa Barbara, CA, USA Title: "Segmentation of Current Sheets in Magnetized Plasma Turbulence with Computer Vision"
Dec 2023, Jan 2024	**243rd Meeting of the AAS,** New Orleans, LA, USA & **Black Holes on Broadway: The Next Generation of AGN Models in Galaxy Formation,** New York, NY, USA Title: "Bridging the Gap: Modeling Supermassive Black Holes Feeding and Feedback at the Meso-Scale"
Aug 2022, Jan 2023	**241st Meeting of the AAS,** Seattle, WA, USA & **Star Formation in Different Environments 2022,** Rencontres du Vietnam, Quy Nhon, Vietnam Title: "Turbulence in Milky Way Star-forming Regions Traced by Young Stars and Gas"
Feb 2021	**AAS Journal Author Series with Frank Timmes,** YouTube Interview on recent publication, title: "Measuring Turbulence with Young Stars in the Orion Complex"
Jul 2020	**TCAN on Binary Neutron Stars Workshop,** Rochester Institute of Technology, Rochester, NY, USA Title: "Generating Initial Data for Binary Neutron Stars using LORENE"
Oct 2019	**Midwest Relativity Meeting,** Grand Valley State University, Grand Rapids, MI, USA Title: "Generating Physically Realistic Binary Neutron Stars Initial Data"

SUPERCOMPUTING AWARD

Mar 2024	**P.I., National Science Foundation ACCESS Explore allocation** Title: "Turbulent multiphase accretion flows from supermassive black hole feedback"; amount: 400,000 ACCESS credits (equiv. 6000 node-hours on Stampede3).

AWARDS AND HONORS

Fall 2023 – Spring 2024	The Zhibing Hu Scholarship, University of North Texas, $1000.

May 2023	Featured on University of North Texas College of Science news: "UNT Physics Graduate Student Selected for Prestigious Pre-Doctoral Program" (link to article)
Spring 2023	College of Science Travel Award, University of North Texas. $500.
Feb 2022	Featured on University of North Texas's Graduate Research Spotlight.
Fall 2021 – Spring 2025	R. B. Toulouse Scholarship, University of North Texas. $1000 / year.
Apr 2021	Featured on the *North Texan*: "Turbulent Motion Moves Research Forward" (link to article).
Spring 2019 – Spring 2020	Take Five Scholar, University of Rochester. Thesis: "Exploring the Advantages and Shortcomings of French Literature in Translation".
Spring 2018 – Spring 2020	Sigma Pi Sigma member.
Fall 2017	Dean's List, University of Rochester.
Spring 2016 – Spring 2020	Phi Theta Kappa member.
Spring 2016	Outstanding Student in Physical Science, Central Arizona College.
Fall 2015 – Spring 2017	Dean's List, Central Arizona College.

OTHER ACTIVITIES

Participated in the Flatiron Institute's Center for Computational Astrophysics Pre-doctoral program in New York City in fall 2023.
Organizer for the weekly joint-UNT/UTD astronomy journal club, 2023.
Participated in student exchange programs: "Cultural Exchange Program" in Arizona, USA during the 2014-15 school year and "French in France" in Rennes, France in summer 2019.
Non-research interests include computer hardware, assembling desktop computers and laptops, solving various Rubik's puzzles, and traveling.
Fluent in English and Vietnamese. Intermediate level fluency in French.

Citizenship: Vietnam.
Pending U.S. permanent residency with active employment authorization (EAD).

REFERENCES

1. Yuan Li, Ph.D. (primary advisor)
   Assistant Professor, Department of Astronomy, University of Massachusetts-Amherst
   Email address: yuanli@umass.edu

2. Joonas Nättilä, Ph.D.
   Associate Professor, Department of Physics, University of Helsinki
   Email address: joonas.nattila@helsinki.fi

3. Siyao Xu, Ph.D.
   Assistant Professor, Department of Physics, University of Florida
   Email address: xusiyao@ufl.edu

4. Lorenzo Sironi, Ph.D.
   Associate Professor, Department of Astronomy, Columbia University
   Research Scientist, Center for Computational Astrophysics – Flatiron Institute
   Email address: lsironi@astro.columbia.edu

5. Ohad Shemmer, Ph.D.
   Associate Professor, Department of Physics, University of North Texas
   Email address: ohad@unt.edu