Raghav Chari

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Citizenship

United States & Canada

Education

Honors College, The University of Tennessee, Knoxville *2021–2025*

- **B.S., Physics (Hons.)**
  - Thesis Advisor: Prof. Mike Guidry
- **B.A., Astrophysics & Philosophy of Physics**
  - Thesis Advisors: Prof. Mariam Thalos (Philosophy) & Prof. Sean Lindsay (Astrophysics)

Publications

h-index — As of May 25, 2024: 1, Total Publications: 7, Peer-Reviewed Journal Papers: 2
Google Scholar

Refereed Journal Papers

- Miroshnichenko, A.S., **Chari, R.**, Danford, S., Prendergast, P., Aarnio, A.N., Andronov, I.L., Chinarova, L.L., Lytle, A., Amantayeva, A., Gabitova, I.A., *et al.* (2023). *Searching for Phase-Locked Variations of the Emission-Line Profiles in Binary Be Stars.* **Galaxies**, 11, 83. [DOI:10.3390/galaxies11040083].
- Lackey-Stewart, A., **Chari, R.**, Cole, A., Brey, N., K. G., Crowley, R., Guidry, M., and Endeve, . (2024). *Fast Explicit Solutions for Neutrino-Electron Scattering: Explicit Asymptotic Methods.* **Phys. Rev. D**, [DOI:10.1103/PhysRevD.109.103019].

B.S. Thesis

- **Raghav Chari** (2024). *Explicit Asymptotic Solutions of ν_e+e^- Neutrino Networks for Large Sets of Partial Differential Equations in Core-Collapse Supernovae.* **Defended April 19, 2024**.

B.A. Thesis

- **Raghav Chari** (2024). *Temporal Discontinuity in the Existentialist Perspective of Lived Time.* **Thesis in Progress**.

First Author Conference Proceedings

- **Chari, R.**, et al. (2024). *Advancing Astrophysical Models through FENN: Algebraically Stabilized Explicit Integration for Neutrino Electron Scattering in Stellar Explosions and Mergers.* Bulletin of the AAS. [Abstract].
- **Chari, R.**, et al. (2023). *Neutrino Electron Scattering in Dense Astrophysical Environments: A New Frontier in Neutrino Transport.* Frontiers in Nuclear Astrophysics Book of Abstracts (pp. 22). [Abstract].

Grants and Fellowships

Successfully secured **$8,250** in research funding through the following grants and fellowships.

- *Enhancing Astrophysical Modeling: Integrating WEAKLIB with Fast Explicit Neutrino Networks for Advanced Large Scale Neutrino Electron Scattering*, Faculty Mentor: Prof. Mike Guidry, Advanced Undergraduate Research Activity (AURA), **$1750**, 2024
- *New Approaches to Astrophysical Nucleosynthesis and Neutrino Transport*, Fellowship, Faculty Mentor: Prof. Mike Guidry, University of Tennessee, Knoxville Department of Physics and Astronomy, **$5500**, 2021
- Department of Undergraduate Research & Fellowships *Travel Grant* (x2), **$1000**, 2023

Research Experience

Research Assistant and Fellow, The University of Tennessee, Knoxville, TN
Professor Guidry & UT/ORNL Computational Astrophysics Group September 2021 - Present

- Developed new computational algorithms for solving large sets of partial differential equations related to hydrodynamics, radiation transport, and thermonuclear reactions.
- Awarded the Department Summer Fellowship in 2022 and played a pivotal role in the development of "FENN," a computational framework.
- Awarded AURA grant Spring 2024 to integrate FENN with WEAKLIB for demonstrating scalability to sets of large Neutrino Networks for arbitrary ρ, T, Ye.

Research Assistant, Duke University, Durham, NC
Professor Kannawadi & Duke Cosmology Group May 2024 - Present

- Summer Research internship under the mentorship of Dr. Arun Kannawadi research Dark Matter through Gravitational lensing.
- Working on python based pixel analysis code for the Rubin Observatory

Research Assistant, California Institute of Technology, Pasadena, CA
Dr. Oza Group November 2022 - Present

- Formulated advanced computational models focusing on stellar pollution, accretion disk dynamics, and spallation reactions.
- Performed calculations using SERPENDS to innovate extended models for Black Hole Pollution dynamics.

Research Assistant, The University of Tennessee, Knoxville, TN
Professor Thalos/Department of Philosophy February 2023 - Present

- Conducted Philosophy research under the mentorship of Professor Mariam Thalos, primarily as it relates to the philosophy of physics.
- Working on a research project studying literature and investigating space (time) from a philosophical perspective.

Research Assistant, The University of North Carolina, Greensboro, NC
Professor Miroshnichenko/UNCG Astrophysics Group September 2020 - July 2023

- Conducted spectral analysis to scrutinize the binarity of Be stars, contributing to the detection of orbital periods.
- Used IRAF and python data analysis including leveraging NASA databases to model orbital periods and analyze data to contribute to overall mission.

Teaching Experience

Undergraduate Teaching Assistant, University of Tennessee, Knoxville

- Astronomy 151: Journey through the Solar System *Springs 2023-2024, Falls 2022-2024*
- Astronomy 152: Stars, Galaxies, and Cosmology *Springs 2023-2024, Falls 2022-2024*
- Astronomy 153 Lab I *Springs 2023-2024, Falls 2022-2024*
- Astronomy 154 Lab II *Springs 2023-2024, Falls 2022-2024*
- Physics 221: Elements of Physics I *Spring 2023*
- Physics 222: Elements of Physics II *Spring 2023*

Professional Activities, Outreach, and Service

People of Color in Physics, Founder and President *2023–2024*

- Established an inclusive initiative to amplify diverse voices in Physics, including meeting with Tennessee representatives to discuss diversity issues on the University level.
- Led efforts including the University of Tennessee hosting the National Society of Black Physicists Conference.

University Provost Advisory Council *2023–2024*

- Selected by the Dean to serve on the University Provost Council and serve as the Representative of the College of Arts & Sciences on the University level. Council term is 2 years.
- Emphasized on diversity in Science during my term and focusing university admissions on broader ranges of socio-economic status's across Tennessee, with an emphasis on Science and Physics.

Computer Skills

Expert in C/C++. Proficient in Matlab, Python, Bash, Experience in HPC (Summit Supercomputer). Markup languages: LaTeX, HTML, CSS, Markdown. **Software**—Most contributions can be found at https://github.com/Rchari1. Author of **Fast Explicit Neutrino Networks (FENN)** (https://github.com/Rchari1/FENN).

Awards

2024 EUReCA Achievement Award, Undergraduate Research & Fellowships *May 2024*

SPS National Leadership Scholarship, Society of Physics Students (AIP) *May 2023*

Outstanding First-Year Physics Student, University of Tennessee, Knoxville *May 2022*

Robert Talley Physics Scholarship, University of Tennessee, Knoxville *August 2021*

Tennessee Explore Scholarship, University of Tennessee, Knoxville *August 2021*

Distinguished District Governor, Key Club International *May 2021*

Eagle Scout, Boy Scouts of America *Oct 2020*