JAYANTH TUMULURI

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EDUCATION

Carnegie Mellon University, Pittsburgh, PA   May 2024
Bachelor of Science in Physics
Concentration: Astrophysics

RELEVANT COURSEWORK

- General Relativity
- Extragalactic Astrophysics and Cosmology
- Astrophysics of Stars and the Galaxy
- Stars, Galaxies, and the Universe
- Physical Mechanics
- Thermal Physics I & II
- Advanced Quantum Physics I
- Electricity & Magnetism I

RESEARCH EXPERIENCE

Carnegie Mellon University, Department of Physics, Pittsburgh, PA
Research Assistant, Professor Hy Trac   August 2023 – Present
- Numerically integrating different rigid-sphere setups to create gravitational force plot to feed into a symbolic regression analysis using Python libraries such as Scipy, PySR, and NumPy
- Creating a gravitational profile to more accurately represent gravitational interactions between tracer particles in N-body simulations

Research Assistant, Professor Rupert Croft   August 2022 – May 2023
- Used artificial intelligence to create a density map of the cosmic web within a 3-dimensional region of a cosmological simulation using the Python library TensorFlow
- Created architecture for a convolutional neural network to predict the density of a region of the cosmological simulation from redshift flux from Lyman-α forest

PRESENTATIONS

Poster Presentation   20 April 2023
Physics Undergraduate Research Symposium, Carnegie Mellon University
          Title: [Mapping of the Cosmic Web Using Artificial Intelligence](#)

PROJECTS

Astrophysics of Stars and the Galaxy   Fall 2023
The Fate of the Earth, and Other Exoplanets
- Simulated stellar evolution using Modules for Experiments in Stellar Astrophysics (MESA)
- Determined how the habitability zone of a star changes depending on initial conditions such as mass and metallicity

Finding Dark Matter with Stellar Streams
- Queried data from Gaia's second data release using the Astronomical Data Query Language within the Astropy package collection
- Identified the stellar stream GD-1 from data, and synthesized sources to argue that the stellar stream's gaps were due to dark matter perturbations

RELEVANT WORK EXPERIENCE

Carnegie Mellon University, Department of Physics, Pittsburgh, PA   August 2021 – December 2021
Undergraduate Teaching Assistant, Physics I
- Supervised recitation sessions twice per week to explain concepts to students and assist with practice assignments
- Provided guidance to students with homework problems and clarified concepts to help with studying for exams in a course center once per week

HONORS AND AWARDS

Dean's List
Carnegie Mellon University   Fall 2021, Spring 2022, Spring 2023

SKILLS

Software: Mathematica, LaTeX, Vim, Git, MESA, Numpy, Scipy, COSMIC, Astroquery, Tensorflow
Operating Systems: Mac OS X, Windows
Computer Languages: Python, Fortran, Java, C#, MATLAB, HTML, R, SQL