Taotao Yang

Master of Science in Astrophysics

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School of Physics & Astronomy, University of Glasgow, United Kingdom, G12 8QQ

Education

University of Glasgow — Glasgow, United Kingdom
Master of Science in Astrophysics — *Sept. 2022 - Dec. 2023*

Georgia Institute of Technology — Atlanta, United States
Bachelor of Science in Physics — *Aug. 2017 - Dec. 2021*

- Concentration: Astrophysics
- Minor: Sustainable Cities, International Affairs

Research Interest

Gravitational-wave waveform template bank placement with machine learning

Projects

Gravitational Wave Signal Space Study with Machine Learning — Glasgow, United Kingdom
Institute for Gravitational Research, University of Glasgow — *Summer, 2023*

- Developed fast template density test statistics calculation package with JAX
- Used normalizing flow to approximate template bank density

Radio Signal Data Analysis — Glasgow, United Kingdom
University of Glasgow — *Spring, 2023*

- Investigated solar emission during a flare event with radio data
- Filtered, validated, and fitted the radio telescope data with NumPy and SciPy

Mock Data Analysis Challenge — Glasgow, United Kingdom
University of Glasgow — *Spring, 2023*

- Implemented least-squares and metropolis algorithm for data set fitting
- Implemented Bayesian analysis for various mock data models with NumPy

Modern Optics Laboratory — Atlanta, United States
Georgia Institute of Technology — *Spring, 2021*

- Designed optic table experiment apparatus
- Performed measurements using digital multimeter and oscilloscope for laser diodes
- Executed data collection and analysis with IGOR and MATLAB concerning beam profiles

Vertically Integrated Projects: Patagonia — Atlanta, United States
Georgia Institute of Technology — *Spring, 2021*

- Performed GIS analysis to evaluate strategic infrastructure planning for Patagonia national park
- Conducted comparative analysis with established national parks for infrastructure improvement
- Provided GIS support for sustainable carrying capacity model development
- Built GIS inventory to identify baselines for trails, utilities, and transportation

Cosmology Computational Project — Atlanta, United States
Georgia Institute of Technology — *Fall, 2020*

- Performed numerical integration with Python simulating Distance - Redshift relation
- Simulated the Age of the Universe - Redshift relation with Python numerical integration
- Presented talk on cosmic distance ladder and its relation with supernova cosmology project

Advanced Laboratory — Atlanta, United States
Georgia Institute of Technology — *Summer, 2020*

- Recreated Cavendish experiment with laser mounted torsion balance
- Recreated Davisson-Germer experiment using electron diffraction apparatus

- Calculated the electron charge-mass ratio using data collected by Tracker
- Analysed data on Hall effect experiment to determine the property of Hall probes
- Analysed data on single and double slit interference to demonstrate particle-wave duality
- Verified the Fraunhofer's equation and the validity of de Broglie's matter wave theory

Chaos and Entropy Project Atlanta, United States

Georgia Institute of Technology *Spring, 2020*

- Conducted comparative analysis between classical mechanic and thermodynamic systems
- Used qualitative methods to address the seeming paradox of entropy generation in classical system

Stellar Characteristics Project on 2.0 Solar Mass Star Atlanta, United States

Georgia Institute of Technology *Spring, 2020*

- Calculated mass-luminosity, luminosity-radius, temperature-radius, and pressure-radius relations
- Compared the structural and surface difference between Sol and 2.0 solar mass star
- Analysed core volume/mass to star volume/mass ratio
- Analysed PP & PPI chains and CBN cycles of 2.0 solar mass star and its luminosity and magnitudes
- Conducted comparative analysis on main sequence lifetime between theory and observations

Sustainable Cities Studio Atlanta, United States

Georgia Institute of Technology *Fall, 2018*

- Designed up a solution for green infrastructure on Downtown Atlanta Master Plan
- Performed microclimate analysis of green infrastructure with data from the Eco Urban Lab
- Calculated the climate modulating effect of green infrastructure in different environments
- Employed GIS based data collection and analysis to identify key points for green infrastructure

Sunset Observation Project Atlanta, United States

Georgia Institute of Technology *Fall, 2017*

- Observed and filmed the sunset location throughout the semester from a set location
- Imagery analysis with geographical data to calculate the motion variation of the Sun in the sky

Experience

Teaching Assistant Atlanta, United States

Georgia Institute of Technology *Aug. 2021 - Dec. 2021*

- Provided grading for Modern Optics Laboratory
- Provided revision comments on lab reports

Research Assistant Hangzhou, China

Zhejiang Sci-Tech University *Aug. 2016 - Feb. 2017*

- Explored methods of modelling airframe using SolidWorks
- Designed and patented a novel model of v-tail quadcopter
- Used 3-D printing and soldering to develop the quadcopter

Assistant Curator Ningbo, China

TEDxNingbo *Oct. 2016 - Jun. 2017*

- Organized and publicized TEDxYouth event in 2017
- Coordinated local student band to perform and give talk on TEDxYouth event
- Assisted with manuscript and video subtitle translations

Advanced Physics & Astronomy Courses

Advance Laboratory	General Relativity	Radio & Optical Instrument
Advanced Data Analysis	Gravitational Wave Detection	Solar Atmosphere
Classical Mechanics	Modern Optics Lab	Solar System
Cosmology	Nonlinear Dynamics & Chaos	Statistical Mechanics
Electro & Magnetostatics	Pulsar & Supernova	Stellar Astrophysics
Electrodynamics	Quantum Mechanics	Thermodynamics

Language, Software, and Skills

Chinese, English, Python (NumPy, SciPy, JAX), LaTeX, Mathematica, Linux (Ubuntu), GitHub, Jupyter
Photography, Lightroom, Darktable, Blender, SolidWorks, Saxophone

Honors & Awards

Faculty Honors *Fall, 2021; Spring, 2021; Summer, 2020*
Dean's List *Fall, 2020; Spring, 2020*