

Guangyi Zhang

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EDUCATION

Reed College, Portland, OR

Sep 2020 - May 2024

- B.A. in Physics-Mathematics, GPA: 3.92
- Thesis: Geodesics and Dynamics of Wormholes
- Advisors: Prof. Joel Franklin, Prof. Jerry Shurman

RESEARCH & PROJECTS

Non-parametric Model for Stochastic Gravitational Wave Background

Jun 2023 - present

REU Summer Research, Northwestern University, Evanston, IL

- Advisors: Prof. Vicky Kalogera, Dr. Sharan Banagiri
- Enhanced and integrated the Autoregressive Process model into a Python-based Bayesian Inference Pipeline for Laser Interferometer Space Antenna.
- Validated the model by recovering the power spectrum of gravitational waves of Double White Dwarfs.
- Presented the results in poster sessions at Northwestern University and Reed College.

Simulation of Planet Trajectory in Binary-Star Systems

Dec 2022

Independent Class Project, Reed College, Portland, OR

- Simulated the planet's motions in binary star systems with Runge-Kutta and Velocity Verlet methods.
- Determined certain stable and unstable solutions of the restricted three-body system.

Depolarization Ratios for Benzene and Chromium Hexacarbonyl

May 2022 - Aug 2022

Summer Research, Reed College, Portland, OR

- Advisor: Prof. Daniel Gerrity
- Calculated analytical depolarization ratios of the molecules and the relationship of reduced matrix elements with irreducible tensor methods, applying group theory and representation theory.
- Streamlined the ab-initio calculations in Mathematica and compared the results of three vibronic transitions with experimental data for Benzene.
- Presented the work in a poster session at Reed College.

Optimize Comb Model for Gravitational Wave Echoes

May 2021 - Aug 2021

Summer Research, Institute of High Energy Physics, Beijing, China

- Advisor: Prof. Jing Ren
- Derived analytical expressions of errors of parameter estimation for different search models by Fisher Information Matrix and compared with errors from Bayesian data analysis.
- Studied Signal-to-Noise Ratio of the signal in terms of frequency resolution to determine optimal bin width.

SKILLS

- Programming: Advanced in Mathematica, Python; Proficient in R
- Techniques: Bayesian Statistical Inference, Runge-Kutta Methods

OTHER EXPERIENCES

Physics, Math & Chemistry Tutor, Reed College, Portland, OR

Sep 2021 - present

- Tutored for General Physics for Quantum Chemistry, Vector Calculus, and Linear Algebra.

AstroBites Discussion Host, Reed College, Portland, OR

Sep 2021 - Dec 2022

- Participated and organized weekly discussions on astrophysics articles from AstroBites.

NANOSTars Workshop Mentor, West Virginia University, Morgantown, WV

May 2022

- Mentored three high school students on estimating pulsar timing and calculating scintillation value.

HONORS & AWARDS

- Commendations for Excellence in Scholarship, Reed College Academic Years 2021 – 2023
- Summer Opportunity Fellowship Award, Reed College Summers 2021 & 2023
- Jane Galbraith Shell Raymond Fellowship, Reed College Summer 2022