

# Yi Guo

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## EDUCATION

### University of California, San Diego

*Ph.D. Physics*

Physics Excellence Award

La Jolla, CA  
Sep 2018 – Expected Jun 2023

### University of California, Santa Barbara

*B.S. Physics, Mathematics*

Academic Honors, Worster Fellowship

Isla Vista, CA  
Sep 2014 – Jun 2018

## SKILLS

**Languages and Tools** Python, Mathematica, C/C++, Fortran,  $\text{\LaTeX}$ , Jupyter, Pytorch, Git, Docker

**Web Development** JS, HTML, CSS, React, React Native, Firebase, Gradio

**Numerical Research** Data Visualization, Parallel/Distributed Computing, Monte Carlo, Regression

## EXPERIENCE

### University of California San Diego

Teaching Assistant

La Jolla, CA  
Oct 2018 – Present

- Computational Physics I/II: N-Body Simulation; Quantum Mechanics Simulation.
- Reviewed as “Excellent” by the instructor.

Research Assistant

Dec 2019 – Present

- Numerically forecasted the sensitivities of the primordial non-gaussianity for future LSS surveys. Innovated to include the kSZ effect, and adopt multi-tracer technique. [Todo] As a result, greatly reduced the uncertainty by ???.
- Quantitatively analyzed the constraints on the coupling strength between axions and standard model fermions, with tree level quantum field theory and modern cosmology. Adopted Numba to speed up parallel Python by 100X. Work published on *JCAP*.
- Calculated the CMB anisotropy phase shift in neutrino dominated universe. Confirmed the series expansion from photon dominated universe is only off by 5%.

### University of California Santa Barbara

Student Researcher

Isla Vista, CA  
Sep 2015 – Jun 2017

- Presented research of gas behavior in galaxy mergers on UCSB undergraduate symposium and Worster Symposium with 200 from UCSB in the audience.
- Created package in Python and Fortran that speeds up spectrum fitting workflow by 10X. Created C codes and SHELL scripts to auto-locate galaxies and measure photometries.

## SOFTWARE DEVELOPMENT PROJECTS

### Web Application – Personal Task Management System

Apr 2022 – May 2022

- Developing a voice assistant, with Whisper as speech recognition, fine-tuned GPT-J as language model and VITS as text-to-speech. Demo prototyped with Gradio.
- Developed a Progressive Web App on Firebase for personal task tracking. Built with React and Material UI, using no-SQL database and OAuth2 login.

## PUBLICATIONS

D. Green, **Y. Guo**, J. Han and B. Wallisch, (Forthcoming), “Light Fields during Inflation from Future Galaxy Surveys,”

D. Green, **Y. Guo** and B. Wallisch, “Cosmological implications of axion-matter couplings,” In: *JCAP* 02.02, p. 019 (2022) DOI: [10.1088/1475-7516/2022/02/019](https://doi.org/10.1088/1475-7516/2022/02/019) arXiv: [2109.12088](https://arxiv.org/abs/2109.12088) [astro-ph.CO].