

# Yi Guo

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## EDUCATION

### University of California, San Diego

*Ph.D. Physics*

Physics Excellence Award

La Jolla, CA  
Sep 2018 – Expected Sep 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, R, Mathematica, C/C++, Fortran,  $\text{\LaTeX}$ , Pytorch, TensorFlow, Git, Docker

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

**Data Science and ML** Data Visualization, Parallel/Distributed Computing, Monte Carlo Simulation  
Classification, Regression, Natural Language Processing

## SOFTWARE DEVELOPMENT PROJECTS

### AI Voice Assistant

Feb 2023 – Mar 2023

- Developed a voice assistant using **Whisper** for speech recognition, fine-tuned **GPT-J** as the language model, and **VITS** for text-to-speech. Prototyped a demo with **Gradio**.

### Task Tracker Web App

Apr 2022 – May 2022

- Built a Progressive Web App on **Firebase** for personal task tracking using **React** and **Material UI**. Implemented **NoSQL** database and **OAuth2** login.

## EXPERIENCE

### University of California San Diego

*Research Assistant*

La Jolla, CA  
Dec 2019 – Present

- Developed cutting-edge numerical techniques to predict the sensitivities of primordial non-gaussianity for upcoming LSS surveys, incorporating the kSZ effect and utilizing a multi-tracer approach. This innovative method resulted in a remarkable reduction of uncertainty by an order of magnitude for future surveys.
- Quantitatively analyzed the constraints on the coupling strength between axions and standard model fermions using 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 a neutrino-dominated universe, confirming the series expansion approximation from the photon-dominated scenario is only off by 5%.

*Teaching Assistant*

Oct 2018 – Present

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

### University of California Santa Barbara

*Undergraduate Researcher*

Isla Vista, CA  
Sep 2015 – Jun 2017

- Presented research on gas behavior in galaxy mergers at UCSB undergraduate symposium and Worster symposium with an audience of 200 faculty and students.
- Developed a software package in **Python** and **Fortran** that improved the spectrum fitting workflow by 10X. Created **C** codes and **Shell** scripts to auto-locate galaxies and measure photometries.

## 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].