

# Yi Guo

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## EDUCATION

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### 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

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**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, Regression  
Neural Network, Natural Language Processing

## SOFTWARE DEVELOPMENT PROJECTS

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### Machine Learning Application – AI Voice Assistant

Feb 2023 – Mar 2023

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

### Web Application – Personal Task Management System

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

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### 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

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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].