Yi Guo

(805)895-0554| yig053@ucsd.edu | 43108 Calle Sagrada, Fremont, CA, 94539| GitHub/y1guo

EDUCATION

University of California, San Diego   La Jolla, CA
Ph.D. Physics   Physics Excellence Award   Sep 2018 – Expected Sep 2023
University of California, Santa Barbara   Isla Vista, CA
B.S. Physics, Mathematics   Academic Honors, Worster Fellowship   Sep 2014 – Jun 2018

SKILLS

Languages and Tools   Python, C/C++, Fortran, Mathematica, 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, Natual Language Processing

SOFTWARE DEVELOPMENT PROJECTS

Auto-Transcribe (PyTorch, FFmpeg, Gradio)   May 2023 – Aug 2023
- Created a software to automatically transcribe videos, including stem separation and speech recognition. 30X realtime speed, with 85% accuracy. No comparative products on the market.
- Implemented a front-end with Gradio to search, preview and export audios among 10M sentences within 1s.
- Designed for 24/7 robustness, with parallel computing, error handling and multi-GPU support.

Voice Chatbot (PyTorch, LLM, Gradio)   Feb 2023 – Mar 2023
- Developed a chatbot using Whisper for speech recognition, GPT-J as language model, and VITS for text-to-speech. Prototyped a demo with Gradio.
- Improved performance of the language model and allow multiple personalities by few-shot learning.

Task Tracker App (JavaScript, React, SQL)   Apr 2022 – May 2022
- Developed a multi-user Task Tracker App from end to end. Deployed on Google Cloud.
- Used by 20+ family members, friends and colleagues.

SELECTED RESEARCH PROJECTS

Cosmological Parameters Forecast (HPC, Python, Parallel, Distributed)   Jan. 2022 – Present
- Developed high performance code to predict f_{NL} for various surveys, guiding future LSS survey design.
- Optimized the performance to be 10X-100X faster than commonly used packages (e.g. FishLSS).
- Increased the sensitivity by $\sim$10X with cutting-edge physics techniques.

Standard Model with Axion (HPC, Python, Parallel, Distributed)   Dec 2020 – Jan. 2022
- Analyzed the thermal history between axions and Standard Model fermions using quantum field theory.
- Gained SOTA constraints by explicitly solving the Boltzmann equation with 6-dimensional integral.
- Speeded up native Python by 100X with Numba. Another 50X from distributed computing with Ray.

Spectroscopy and Photometry (ML, Python, C/C++, Fortran, Shell)   Sep 2015 – Jun 2017
- Developed a package for rapid spectrum fitting using least squares regression with LMA optimization.
- Combined a Python UI for graphics and automation, and a Fortran kernel. Sped up the workflow by $>$10X.
- Created C/C++ code and Shell scripts to locate galaxies from images and measure photometry automatically. Reduced time cost by 100X compared to traditional DS9 software.

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 arXiv: 2109.12088 [astro-ph.CO].