

Yi Guo

SKILLS (805)895-0554|guoyi0328@gmail.com|43108 Calle Sagrada, Fremont, CA, 94539|GitHub/y1guo

Languages and Tools Python, C/C++, Fortran, Mathematica, L^AT_EX, PyTorch, TensorFlow, Git, Docker
Machine Learning Transformers, CNNs, GANs, VAEs, Diffusion Models, NLP, Speech Recognition
Data Science Data Visualization, Monte Carlo Simulation, Parallel/Distributed Computing
Web Development JavaScript, HTML, CSS, React, React Native, Firebase, Gradio

SOFTWARE DEVELOPMENT PROJECTS

RealChar.ai, 5K+ Stars (PyTorch, React, Google Cloud Platform) [↗](#) Aug 2023 – Present

- Designed and implemented the latency monitoring feature for the backend.
- Integrated local speech-to-text solution. Reduced realtime dialogue latency by 8X.
- Developed dedicated endpoint for the speech-to-text API. Containerized and deployed on GCP kubernetes.
- Collaborated closely with the core developer team and engaged in code reviews.

Auto-Transcribe (PyTorch, Speech Recognition, Multiprocessing) [↗](#) May 2023 – Aug 2023

- Created a software to automatically transcribe videos, including stem separation and speech recognition. 30X real-time speed each GPU 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 1 sec.
- Designed for 24/7 robustness, with error handling and multi-GPU support. Transcribed 50TB within a month.
- Utilized to produce video content, resulting in a channel with 550K+ views and 1.2K+ engaged subscribers.

Voice Chatbot (PyTorch, LLM) [↗](#) 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 the performance of the language model and allowed multiple personalities by few-shot learning.

Task Tracker App (HTML, JavaScript, React) [↗](#) Apr 2022 – May 2022

- Developed a multi-user Task Tracker App from end to end. Deployed on Google Cloud Platform.
- Used by 10+ family members, friends and colleagues.

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 the best 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 using traditional DS9 software.

EDUCATION

University of California, San Diego La Jolla, CA

Ph.D. Physics Physics Excellence Award Sep 2018 – Present

University of California, Santa Barbara Isla Vista, CA

B.S. Physics, Mathematics Academic Honors, Worster Fellowship Sep 2014 – Jun 2018

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].