

XINZE (SUNNY) GUO

📍1780 Le Roy Ave, Berkeley, CA 94709

✉️sunnyguo@berkeley.edu 📞(510)-735-4152

Personal Website: <https://sunnyxinzeguo.github.io>

RESEARCH INTERESTS

I am most passionate about applying programming and data analysis skills to study astrophysics topics. I have a strong interests in exoplanets and habitable zones, radio astronomy, black holes, and the early universe. I am still exploring different fields in astrophysics.

EDUCATION

Beijing National Day School, Beijing, China

July 2021

High School Diploma

University of California, Berkeley, CA

Expected Spring 2025

Bachelor of Arts in Astrophysics and Computer Science

GPA: 4.0/4.0

Related Coursework:

Astrophysics: Physics 5 Series, Astronomy 7 Series, Physics 112 *Introduction to Statistical and Thermal Physics*

Computer Science: CS 61A, CS 61B, CS 70, CS 170 *Efficient Algorithms and Intractable Problems*

TECHNICAL SKILLS

Professional:	Operate Leuschner 30" Optical Telescope; filter out potential exoplanet candidates from TESS data; Data Fitting; Interpolation of data.
Programming:	Python, Java
IDE:	Jupyter, Colaboratory, Wing101, VSCode, IntelliJ, Spyder, Anaconda
Technologies:	Latex, Microsoft Suite, Adobe Photoshop, Autodesk 123D Design
Libraries:	NumPy, matplotlib, SciPy, pandas, healpy, pocoMC, UltraNest
Language:	English (fluent), Chinese (native speaker)

RESEARCH EXPERIENCE

Beijing University of Aeronautics and Astronautics

Jan 2018 - Dec 2019

Researcher of TAFA Project

- Proposed the idea of Twin-body Asymmetric Flying-Wing Aircraft (TAFA) to carry out the air-monitoring task. TAFA increases the flight performance, lift, and endurance of the twin-body aircraft.
- Designed, modeled, and simulated it using the vortex lattice method and Computational Fluid Dynamics.
- Fabricated the TAFA plane model and did a successful flight test.
- Won S. -T. Yau High School Science Award (Physics) Division final first prize.
- Attended the 4th International Conference on Modeling, Simulation, and Applied Mathematics.
- Publication: GUO, Xin-ze, Bo-zhao FAN, Jun HUANG, and Jing-feng XIE. "CFD and VLM Simulation of the Novel Twin-Body Asymmetric Flying-Wing Aircraft." DEStech Transactions on Computer Science and Engineering, no. msam (2020). doi: 10.12783/dtcse/msam2020/34237

Undergraduate Laboratory at Berkeley(ULAB)*Sep 2021 - May 2022**Mentee of the Exoplanets Project*

- The goal is to discover and confirm an unknown exoplanet by looking and filtering data from TESS and taking pictures of potential candidates.
- Looked through the light curves, periods, secondary eclipse, Even Odd Test, SNR and other data to evaluate and filter out potential candidates.
- Found three potential candidates with shorter transit period and suitable coordinate after filtering through 5000 data.
- Used Leuschner 30" Optical Telescope to observe two transits. Used AstroImageJ to deal with the observed pictures and plot the luminosity plot.

Undergraduate Research Apprentice Program (URAP)*Feb 2022 - Present**Researcher of MIST Project*

- Learned about radio antenna behavior, sky temperature, beam cube, and convolution.
- Used NumPy, matplotlib, healpy, and provided code to create, interpolate, and analyze theoretical sky models and beam cubes.
- Created theoretical 2D Gaussian Beam cubes with Gaussian noise to test data fitting ability of pocomc.
- Used pocomc, and UltraNest to fit parameters that characterized a frequency-determined beam model.
- Decompose the Beam using two-dimensional Hermite functions (TDH) functions.
- Attend weekly telecom to present my work and listen to colleagues' updates.
- Wrote memos to communicate work. They are posted under "Memos" section on MIST official website.

TEACHING EXPERIENCE

CS 70 Discrete Mathematics and Probability Theory*Sep 2022 - Present**Discussion Academic Intern (AI)*

- Answer conceptual and discussion questions. Give hints to direct the students to come up with the answers.
- Lead some problem in front of the discussion section.

CS 61B Data Structures*Jan 2023 - Present**Computer Science Junior Mentor*

- Lead a weekly one hour section to help students understand the concepts better.
- Give a mini-lecture to review the topics and guide students to discuss and work out the practice problems.
- Hold review sessions to prepare students for the exams.

ACTIVITY

Berkeley Physics Directed Reading Program (PDRP)*Sep 2021 - Dec 2021**Mentee*

- Read papers about simulations methods and using the exoplanets data to derive earlier universe formation.
- Delivered a speech about exoplanets and application of data.

Undergraduate Astronomical Society (UAS)*Sep 2021 - May 2022**Member*

- Learned to use ground-based telescope to observe Jupiter, Saturn, Moon, M31, and ring nebula.

Cal Science Fiction Club*Sep 2022 - Present**Member*

- Read and discuss Science Fiction bi-weekly.
- *Dune, Three-body Problem, The Overstory.*