XINZE GUO

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AREA OF INTEREST

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, supernova, and the early universe. I'm still exploring different fields in astrophysics, and I'd like to learn more about black holes.

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 5A Introductory Mechanics and Relativity, Physics 5B Introductory Electromagnetism, Waves, and Optics, Physics 5C Introductory Thermodynamics and Quantum Mechanics, Physics 5BL & 5CL Introduction to Experimental Physics I & II*;
Computer Science: *CS 61A The Structure and Interpretation of Computer Programs, CS 70 Discrete Mathematics and Probability Theory, CS 61B Discrete Mathematics and Probability Theory*;
Math: *Math 53 Multivariable Calculus, Math 54 Linear Algebra and Differential Equations*.

TECHNICAL SKILLS

Professional:	Operate Leuschner 30" Optical Telescope; Methods to detect exoplanets; filter out potential exoplanet candidates from data.
Programming:	Python, Java
Technologies:	Latex, Microsoft Suite, Adobe Photoshop, Autodesk 123D Design
Libaries:	Numpy, Matplotlib, Scipy, HealPy, PocoMC
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.
- Designed, modeled, and simulated it using the vortex lattice method and Computational Fluid Dynamics (CFD).
- 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). https://doi.org/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 take pictures of the potential candidates and 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 Code from Ian Hendricksen to create, interpolate, and analysis theoretical sky models and beam cubes.
- Learned to perform interpolation and applied the skills to test PocoMC.
- Used MCMC algorithm to fit parameters that characterized a frequency-determined beam model.

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.

ACTIVITY

Summer Session at Stanford University   *June 2020 - Aug 2020*
Student
- Learned about the life cycle of stars, various types of planets, techniques used to detect extrasolar planets and their detection biases, and habitability.
- Did a project about the collision between the Milky Way and Andromeda Galaxy.

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.