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Kaitlyn Chen

Education

Harvey Mudd College — Claremont, CA
B.S. Physics and Computer Science Joint Major — 2022 - 2026 *(expected)*

- Emphasis in Data Science; Concentration in Music
- **Relevant Courses**
  Physics: Statistical Mechanics; Theoretical Mechanics; Quantum Physics; Electricity and Magnetism; Mechanics and Wave Motion; Special Relativity

  Computer Science: Deep Learning (Python); Data Structures (C++); Computer Systems (C); Data Science, Probability & Statistics (Python); Computing Practices, People, and Projects (Python); CS Principles (Java, DrRacket)

Research Experience

SETI Institute Intern | **Mentor: Dr. Jeff Smith**
Finding Bolide Clusters — 2025-present

- Using Ball Tree clustering to find pairs of bolides that could have originated from the same object
- Conducted statistical inference through cumulative distribution functions (CDFs), Kolmogorov–Smirnov (K–S) goodness-of-fit tests, and Monte Carlo simulations to evaluate robustness
- Maintain the bolides Python package and its documentation hosted on ReadTheDocs

NRAO/Green Bank Observatory Intern | **Mentor: Dr. Evan Smith**
Quantifying Radio Frequency Interference Excision Algorithms — 2024-2025

- Compared multiple radio frequency interference (RFI) mitigation algorithms (spectral kurtosis, interquartile range mitigation, AOFlagger) based on their effectiveness in detecting undesired RFI and their false positivity rate.
- Visualized results on spectrograms, pulse profiles, and fine channelized spectra
- Created a Python package with the algorithms; documented with ReadTheDocs

Carnegie Observatories Intern | **Mentor: Dr. Trevor Dorn-Wallenstein**
Hunting for Post-Red Supergiants with Massive Stars — 2023-2024

- Established a Bayesian framework to regress fundamental parameters on our highly-dimensional dataset by using Markov Chain Monte Carlo to fit models to yellow supergiant spectra
- Enhanced technical skills in Python, data visualization with matplotlib, statistical significance with astropy, data manipulation with pandas, and numpy, and Unix commands in Terminal

Harvey Mudd Undergraduate Researcher | **Mentor: Prof. Daniel Tamayo**
Simulating Exoplanetary Period Ratio Distributions — 2023-2025

- Updated and trained the machine learning model Stability of Planetary Orbital Configurations Klassifier (SPOCK) with scikit-learn, using the ROC curve to quantify its performance
- Used SPOCK to simulate multi-planet systems to test if orbital separations fall off as period ratios approach unity as a result of stability dynamics and used Kolmogorov–Smirnov tests to quantify the results

Research Experience

Pomona Undergraduate Researcher | **Mentors: Dr. Francisco Mercado and Prof. Katy Rodriguez Wimberly**

Simulating Neutral Hydrogen in the Local Group 2024-present

- Using ELVIS hydrodynamical simulations to simulate HI-bearing low mass galaxies. We are motivated by a discrepancy in the number of detectable, HI-bearing low-mass galaxies in the local group between surveys and simulations

First-Author Publications

1. Carving Out the Inner Edge of the Period Ratio Distribution through Giant Impacts.
   K. Chen, O. Cardenas, B. Bonifacio, N. Hall, D. Tamayo. 2025 *ApJ* 982 100
2. A Spectroscopic Hunt for Post-Red Supergiants in the Large Magellenic Cloud: I. Preliminary Results.
   K. Chen, T. Dorn-Wallenstein. 2024 *RNAAS* 8 75
3. Quantifying Radio Frequency Interference Excision Algorithms for the Green Bank Telescope
   K. Chen, E. Smith. 2024 *National Radio Astronomy Observatory*

Second-Author

1. A Spectroscopic Hunt for Post-Red Supergiants in the Large Magellanic Cloud II: Turbulent Line Broadening in the Spectra of LMC Yellow Supergiants.
   T. Dorn-Wallenstein, **K. Chen**, et al. *ApJ*, in prep.

Awards

- **Chambliss Award Honorable Mention**, American Astronomical Society Jan 2025
- **Chambliss Award Finalist**, American Astronomical Society Jan 2024

Coding Projects

Predicting Housing Prices with Deep Learning

Python: scikit-learn, tensorflow, numpy, pandas, matplotlib 2025

- Developed a model for multi-step time series prediction of the sale price of houses based on image detection

ColorSmash

APIs, Python: scikit-learn, PIL, numpy, pandas, matplotlib 2024

- Wrote a Jupyter Notebook tutorial using the Chicago Art Institute API and k-means clustering to match colors from a given photo to artwork

Identifying GD-1 Stellar Stream

Python: SQL/ADQL, astropy, numpy, pandas, matplotlib 2024

- Use Gaia and Pan-STARRS data to identify and visualize the GD-1 stellar stream. Conduct coordinate transformations from ICRS to SkyCoord to GD-1 to work with the data.

Spampede

Java 2023

- Designed the game board (view), collected input data (model) to determine direction of the snake, and kept track of the snake's position and length (controller). Used a BFS data structure to automatize the snake's movement.

Othello

Python: numpy 2022

- Coded interactive text-based interface that allows players to make moves and visualize the game board's state. Implemented an AI opponent programmed to make a winning move.

Presentations

245th American Astronomical Society Meeting | **iPoster**
Quantifying Radio Frequency Interference Excision Algorithms — Jan 2025

Green Bank Observatory Summer Student Symposium | **Talk**
Unveiling the Signal: Mitigating RFI in GBT Data — Aug 2024

Green Bank Observatory Lunch Talk | **Talk**
Astrophotography for Beginners — Aug 2024

55th AAS Division on Dynamical Astronomy Meeting | **Poster**
Inner Edge of Period Ratio Distribution — May 2024

Conference for Undergraduate Women in Physics | **Poster**
A Spectroscopic Hunt for Post-Red Supergiants in the LMC — Feb 2024

243th American Astronomical Society Meeting | **iPoster**
A Spectroscopic Hunt for Post-Red Supergiants in the LMC — Jan 2024

Harvey Mudd Summer Student Poster Symposium | **Poster**
A Spectroscopic Hunt for Post-Red Supergiants in the LMC — Sep 2023

Carnegie Observatories Summer Student Symposium | **Talk**
Hunting for Post-Red Supergiants — Aug 2023

Carnegie Observatories Summer Student Poster Symposium | **Poster**
A Spectroscopic Hunt for Post-Red Supergiants in the LMC — Aug 2023

Teaching and Outreach

CSCI60 Tutor and Grader | Harvey Mudd College — Jan 2024-present
- Teach Java, algorithms, and CS principles to college students

Lecturer | Physics2Astro — Jun 2025-present
- Teach fundamental Python skills needed for astrophysics to high school students
- Create astronomy related coding homework assignments

Mentor | Carnegie Astrophysics Summer Student Internship — Jun 2024-present
- Provide guidance to students relating to the internship and their future goals

How to Build a Radio Telescope | National Science Foundation — Aug 2024
- Filmed and directed a video tutorial on how to assemble a corn horn radio telescope at home

Educator and Panelist | Upward Bound — Jan 2023
- Lead a comprehensive spectroscopy demonstration for 40 low-income/first generation high school students in a pre-college program
- Shared and answered questions about my educational path in the college panel

Observation Experience

- **Allen Telescope Array**, Hat Creek Radio Observatory,
  Observing Mars satellite Tianwen — July 2025
- **40-Foot Telescope**, Green Bank Observatory,
  Mapping HI presence in the Milky Way — May 2024

Skills

Developer on open source software packages: nettingi, bolides, movel, spock

Programming: Python (matplotlib, numpy, pandas, scipy, scikit-learn, tensorflow, astropy, emcee, sphinx, sqlite3), Java, C++, C, DrRacket, R

Societies and Extracurriculars

- **Asian and Pacific Islander Sponsorship Program**, Mentor 2025-present
- **Harvey Mudd Photographer**, Event Photographer 2025-present
- **Harvey Mudd Admissions Office**, Senior Intern 2025-present
- **Minoritized Genders across Physics**, Member 2022-present
- **Society of Women Engineers**, Member 2023-present
- **Women in Math**, Member 2022-present
- **Mechanical Keyboard Club**, Member 2023-present
- **American Astronomical Society**, Member 2023-present
- **Claremont College Orchestra**, Violinist 2022-2024

Academic Services

Reviewers for: *Journal of Operations Research and Optimization*, *International Conference on Optimization and Machine Learning*, ...

Internships

ABC Tech Ltd. | Shanghai, China 2024.01 - 2024.06

- Develop engaging content for social media platforms.
- Prepare reports and presentations summarizing research findings.

XYZ Tech Inc. | Shanghai, China 2023.07 - 2023.12

- Develop engaging content for social media platforms.
- Prepare reports and presentations summarizing research findings.