Jiani Ding

◇ 170 W CLIFF DR., Santa Cruz, CA 95060
(520)-907-9814 ✉ jding@ucsc.edu

EDUCATION

- **University of California, Santa Cruz** PhD, Astrophysics in progress

  Focused on applying machine learning to astrophysics projects

  Member of the Applied Artificial Intelligence Initiative at UCSC

  Relevant Courses: Astrophysical Flow (Perturbation Methods, Grid-based simulation), Dynamical Astronomy (Numerical integration for the N-body problem)

- **University of Arizona** B.S., Astronomy and Physics (2013-2017)

  SUMMA CUM LAUDE

  Outstanding Senior Award & Excellence in Undergraduate Research Award

  Relevant Courses: Differential Equations, Mathematical methods (Probability Distribution, Linear Algebra), Computational Physics (Modeling and Coding in C)

GRADUATE RESEARCH EXPERIENCE

- **Research Assistant:**
  Measuring the effective optical depth for the first two HI Lyman series Oct 2017 - Present

  - Selected and assessed ~ 30,000 quasar spectra among ~ 500,000 quasar spectra through SQL from the Sloan Digital Sky Survey and combined those spectra into 16 composite spectra;

  - Used **bootstrap** method and **matrix decompositions** to generate a **positive definite covariance matrix** for analyzing the correlation between data points;

  - Applied **Markov chain Monte Carlo (MCMC) with a Multivariate normal log-likelihood and Gaussian Process** to measure effective optical depth of Lyman alpha;

  - Summarized and discuss edthe astrophysics implications of the results in a paper in preparation.

- **Research Assistant:**
  Building up a DLA catalog for the Mock spectra of the Dark Energy Spectroscopic Instrument Survey (world-leading redshift survey) through a CNN based algorithm Oct 2018 - Present

  - Organized a **distributed database (dataset plus meta data)** based on the Hierarchical Data Format version 5 for current mock spectra (> 1,000,000 spectra) with DLAs and then use the **CNN** algorithm for identifying DLAs;

  - Measured properties of DLAs on the mock spectra and testing the performance of the CNN algorithm through evaluating the completeness and purity of the result;

  - Created the **confusion matrix** to dig out the defects of the CNN algorithm performance in order to increase the purity of the result for a fixed completeness;

  - Found out different solutions to increase the performance of the algorithm (retraining the Network, increasing the training set, trying different Network configuration)

- **Research Assistant:**
  Studying the quasar host galaxy through an associate DLA system Aug 2017 - Present

  - Measured the photometry of the the Lyα emission and constructed a two components minor merging model of the galaxy;
  - Fitted the metal lines in the spectra of the target through implementing a Voigt profile;

  - Discussed the astrophysical implication of the origins of the Lyα emission in an paper submitted to the ApJL journal

SKILLS

- Programming & Machine Learning: PYTHON, C, Scikit Learn, TensorFlow, PeakUtils
- Databases: SciServer (SQL)
- Languages: Mandarin (native), English(fluent), Cantonese (native)

PUBLICATIONS

- **J. Ding**, Z. Cai, X. Fan, et al. *Constraining C iii] Emission in a Sample of Five Luminous z = 5.7 Galaxies*, ApJL, 838, L2 (2017) (Paper Link Here)
- **J. Ding**, Z. Cai, J. Prochaska, et al. 2019. *Deep Hubble Space Telescope Imaging on an Extended Lyα Emission of a QSO at z= 2.19 with Damped Lyman Alpha System as a Natural Coronagraph*, submitted to ApJL
- **J. Ding**, J. Prochaska, P. Madau, et al. 2019. *Measuring the effective optical depth for the first two HI Lyman series*, in prep
- Z. Sheng, T. Wang, N. Jiang, **J. Ding**, et al. 2019. *Initial Results from a Systematic Search for CHANGING-LOOK Active Galactic Nuclei Selected Via Mid-Infrared Variability*, submitted to ApJ
- P. H. T. Tam, P. S. Pal, Y. D. Cui, ..., **J. Ding**, et al. 2019. *Multi-wavelength observations of the BL Lac object Fermi J1544-0649: one year after its awakening*, submitted to MNRAS
- J. Yang, X. Fan, X. Bing, ..., **J. Ding**, et al. *Discovery of 16 New z ~ 5.5 Quasars: Filling in the Redshift Gap of Quasar Color Selection.*, AJ, 153, 184-193 (2017)
- F. Wang, X. Fan, J. Yang, ..., **J. Ding**, et al. *First Discoveries of z > 6 Quasars with the Decam Legacy Survey and Ukirt Hemisphere Survey.*, ApJ, 839, 27-34 (2017)

PRESENTATIONS

- DESI Collaboration Meeting — Berkeley, CA, USA, July 2019
  - A Mock DLA Catalog from the CNN DLA Finder
- UCSC Astrophysics Flash — Santa Cruz, CA, USA, May 2019
  - Constraining the Thermal Evolution of the IGM from the HI Lyα and Lyβ absorption
- IPMU Conference: IGM 2018 — Kashiwa, Japan, Sep 2018
  - A Semi-Empirical Model of the IGM's Complete HI Lyman Series
- Talk in Inter[Stellar and Galactic] Medium Program of Studies — Santa Cruz, CA, USA, Nov 2016
  - CIII] Emission Lines from Galaxies in the Early Universe
- Undergraduate Symposium Talk — Tucson, AZ, USA, May 2015
  - Constraining the CIII] Emission in the Early Universe

TEACHING AND MENTORING

- Hired as a teaching assistant for two quarters at the University of California, Santa Cruz — Jan-March 2018, 2019
- Mentored an undergraduate student on his undergraduate research thesis — June-Sep 2018

HONORS AND AWARDS

- **Scholarships for Excellent Undergraduate**
  - Galileo Circle Scholarship, College of Science, University of Arizona — 2016
  - Weaver Research Award, Physics Department, University of Arizona — 2016
  - The Vesto Melvin Slipher Scholarship, Astronomy Department, University of Arizona — 2016
  - Galileo Circle Scholarship, College of Science, University of Arizona — 2015
- **Awards for Excellent Undergraduate**
  - Dean′s List with Distinction, College of Science, University of Arizona — 2016
  - Academic Year Highest Academic Distinction, College of Science, University of Arizona — 2015
  - Dean′s List with Distinction, College of Science, University of Arizona — 2014