Jiashu Han

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Education

University of California, San Diego, PhD in Physics — September 2019 – December 2025

- GPA: 4.0

University of California, Berkeley, BA in Physics and Astrophysics — August 2015 – May 2019

- GPA: 3.9, Dean's List (Spring 2018, Fall 2018), Isidore Pomerantz Endowment Fund Award (2018)

Experience

Graduate Student Researcher, University of California, San Diego – La Jolla, CA — June 2020 – present

- Derived the likelihoods of scale-dependent signatures of primordial origin in the galaxy power spectrum featuring 60+ model parameters, and demonstrated the practicality of using sample variance cancellation to significantly improve the error bound on the signal amplitude in realistic experimental settings.
- Developed sophisticated Fisher and MCMC forecasting codes that inform the ability of present and future galaxy surveys to detect predicted deviations from Gaussian statistics due to inflationary interactions of light fields.
- Analyzed auto-correlation results of galaxies cataloged in the BOSS survey to place constraints on the amplitude and scaling relationship of non-Gaussian correlators of the early universe.
- Studied means to minimize measurement error of the three-point correlation amplitude via 8 different major experimental design factors in work published on the *Journal of Cosmology and Astroparticle Physics*.
- Examined previously unexplored parameter space in the quasi-single field inflation model to reveal the plausibility of experimentally detecting signals of heavy particle production during the early universe.

Academic Associate, University of California, San Diego – La Jolla, CA — September 2019 – present

- More than three years as a lead TA for 1500+ students in the introductory physics lab series.
- Organized weekly training sessions for a team of more than 10 TAs and 20 graders and coordinated communications within the instructional team.
- Conducted discussion and problem solving sessions for undergraduate physics courses with more than 200 students for two years.

Summer Research Assistant, Simons Foundation – New York, NY — June 2018 – August 2018

- Calculated for the first time the cross-correlation between the *Planck* CMB gravitational lensing signal and 142,017 quasars cataloged by the SDSS-IV/eBOSS survey, a new iteration of spectroscopic redshift surveys of distant objects in the universe, in a work published on the *Monthly Notices of the Royal Astronomical Society*.
- Constrained the bias of the SDSS-IV quasar sample at 5σ level using the CMB lensing-quasar cross-power spectrum, and ruled out systematic effects in the measurement due to 6 possible foreground contaminants at 2σ level, thus demonstrating the potential of CMB lensing as an alternative pathway for probing quasar properties.

Research Affiliate, Lawrence Berkeley National Laboratory – Berkeley, CA — October 2016 – June 2018

- Studied the theoretical and observational connections between gravitational lensing signatures in the cosmic microwave background and the clustering of 200,000+ quasars and galaxies from SDSS-III/BOSS, a spectroscopic survey designed to measure the expansion rate of the universe.
- Performed statistical inference on the *Planck* CMB lensing measurements and quasar/galaxy observations to measure clustering properties of the SDSS-III quasars using statistics and machine learning methodologies.

Skills

- Statistical inference
- Statistical modeling
- Numerical analysis
- Numerical simulation
- Machine learning
- Time-series analysis
- Quantitative forecasting
- Data analysis
- Data visualization

Languages: Python, Java, SQL, Javascript, HTML/CSS, Mathematica, R, C/C++, IDL (Interactive Data Language)
Technologies/Frameworks: Git, Scikit-learn, NumPy/SciPy, Pandas