

SIHAN (SANDY) YUAN

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RESEARCH INTEREST

I am broadly interested in the interpretation of observed large-scale distributions of galaxies and the inference of underlying galaxy evolution physics and cosmology, particularly through leveraging state-of-the-art cosmological simulations.

keywords: *galaxy clustering, galaxy-dark matter connection, assembly bias, cosmological simulations, Bayesian inference, high performance computing.*

EMPLOYMENT

KIPAC Postdoctoral Fellow

September 2021 - Present

Kavli Institute for Particle Astrophysics and Cosmology,
Stanford University, Stanford, CA

EDUCATION

Harvard University

September 2016 - May 2021

Ph.D. Astronomy and Astrophysics

GPA: 3.96/4.00

- Thesis: *Towards better interpretation of small-scale structure of the Universe.*

Advisor: Prof. Daniel J. Eisenstein

Princeton University

September 2012 - May 2016

A.B. Astrophysical Sciences

GPA: 3.95/4.00

- Honors: *summa cum laude, Phi Beta Kappa, Sigma Xi Book Award, Shapiro Prize for Academic Excellence*
- Thesis: *Photometric Identification and Studies of Ultra Diffuse Galaxies In Hyper Suprime-Cam.*
- Advisor: Prof. David N. Spergel

PUBLICATIONS (14 TOTAL, 10 FIRST AUTHOR, > 200 CITATIONS)

- *Stringent σ_8 constraints from small-scale galaxy clustering using a hybrid MCMC+emulator framework*

Sihan Yuan, Lehman H. Garrison, Daniel J. Eisenstein, and Risa H. Wechsler, 2022, MNRAS, preprint

- *Illustrating galaxy-halo connection in the DESI era with IllustrisTNG*

Sihan Yuan, Boryana Hadzhiyska, Sownak Bose, and Daniel J. Eisenstein, 2022, MNRAS, preprint

- *Constructing high-fidelity halo merger trees in AbacusSummit*

Sownak Bose, Daniel J. Eisenstein, Boryana Hadzhiyska, Lehman H. Garrison, and **Sihan Yuan**, 2022, MNRAS, 512 (1): 837-854

- *AbacusHOD: A highly efficient extended multi-tracer HOD framework and its application to BOSS and eBOSS data*

Sihan Yuan, Lehman H. Garrison, Boryana Hadzhiyska, Sownak Bose, and Daniel J. Eisenstein, 2022, MNRAS, 510 (3): 3301-3320

- *Evidence for galaxy assembly bias in BOSS CMASS redshift-space galaxy correlation function*

Sihan Yuan, Boryana Hadzhiyska, Sownak Bose, Daniel J. Eisenstein, and Hong Guo, 2021, MNRAS, 502 (3): 3582-3598

- *Can Assembly Bias Explain the Lensing Amplitude of the BOSS CMASS Sample in a Planck Cosmology?*

Sihan Yuan, Daniel J. Eisenstein, and Alexie Leauthaud, 2020, MNRAS, 493 (4): 5551-5564

- *A Hybrid Deep Learning Approach to Cosmological Constraints From Galaxy Redshift Surveys*

Michelle Ntampaka, Daniel J. Eisenstein, **Sihan Yuan**, and Lehman H. Garrison, 2020, ApJ, 889 (2): 151-166

- *Decorrelating the errors of the galaxy correlation function with compact transformation matrices*

Sihan Yuan, and Daniel J. Eisenstein, 2019, MNRAS, 486 (1): 708-724

- *Exploring the squeezed three-point galaxy correlation function with generalized halo occupation distribution models*
Sihan Yuan, Daniel J. Eisenstein, and Lehman H. Garrison, 2018, MNRAS, 478 (2): 2019-2033
- *Using galaxy pairs to investigate the three-point correlation function in the squeezed limit*
Sihan Yuan, Daniel J. Eisenstein, and Lehman H. Garrison, 2017, MNRAS, 472 (1): 577-590
- *Spectroscopic Identification of Type 2 Quasars at $Z < 1$ in SDSS-III/BOSS*
Sihan Yuan, Michael Strauss, and Nadia Zakamska, 2016, MNRAS, 462 (2): 1603-1615
- *The Physical Nature of the Most Metal-Poor Damped Lyman Alpha Systems*
Sihan Yuan, and Renyue Cen, 2016, MNRAS, 457 (1): 487-495
- *New light on 21cm intensity fluctuations from the dark ages*
Yacine Ali-Haïmoud, P. Daniel Meerburg, and **Sihan Yuan**, 2014, Phys. Rev. D 89, 083506

SELECTED TALKS

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| (invited) Cosmology Seminar, University of Arizona, Tucson
Title: <i>Simulation-based inference from large-scale structure on non-linear scales</i> | April 2022 |
| (invited) Kavli Institute for Theoretical Physics Reunion Conference, Santa Barbara (Virtual)
Title: <i>Assembly Bias and the Application of the Galaxy-Halo Connection in Cosmological Studies</i> | August 2020 |
| Special Seminar, National Astronomical Observatory of China, Beijing
Title: <i>Generalizing the Halo Occupation Distribution Model and testing the Squeezed 3PCF.</i> | August 2018 |
| Institute for Theory and Computation Luncheon, Harvard University, Cambridge
Title: <i>Using galaxy pairs to investigate the three-point correlation function in the squeezed limit.</i> | May 2017 |
| Cosmology Group Meeting, Center for Computational Astrophysics, New York
Title: <i>Constraining high mass end of HOD with the squeezed 3-point correlation function.</i> | March 2017 |

SERVICE AND TEACHING

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| E&I Committee
<i>Stanford University</i> | 2022-Present |
| · Co-chair of the mentoring task force. | |
| Graduate Admission Committee
<i>Stanford University</i> | 2021-2022 |
| Journal Referee
<i>Monthly Notices of the Royal Astronomical Society</i> | 2018-Present |
| Teaching Fellow
<i>Harvard University</i> | 2017-2018
<i>Cambridge, MA</i> |
| · Led weekly sections and designed/graded homework for AY17 and AY130. | |
| · Co-supervised lab sections and telescope observing runs. | |
| Treasurer/Co-Founder
<i>Open Labs At Harvard</i> | 2017-2018
<i>Cambridge, MA</i> |
| · Co-led quarterly science outreach events to engage K-12 students in local underprivileged communities through interactive sessions and TED-like talks. | |
| · Applied for and managed an annual budget of ~\$2000. | |

TECHNICAL SKILLS

Programming Languages in Python, bash, MATLAB, Java, C, Julia
Mandarin (Native), English (Bilingual)