# 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.*
Adviosr: *Prof. D. 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*

## FIRST AUTHOR/MAJOR AUTHORS PUBLICATIONS

1. *Full forward model of galaxy clustering statistics with simulation lightcones*
   **S. Yuan**, B. Hadzhiyska, T. Abel, 2023, MNRAS, submitted (arXiv)

2. *Stringent $\sigma_8$ constraints from small-scale galaxy clustering using a hybrid MCMC+emulator framework*
   **S. Yuan**, L. H. Garrison, D. J. Eisenstein, and R. H. Wechsler, 2022, MNRAS, 515 (1), 871-896 (arXiv)

3. *Illustrating galaxy-halo connection in the DESI era with IllustrisTNG*
   **S. Yuan**, B. Hadzhiyska, S. Bose, and D. J. Eisenstein, 2022, MNRAS, 512 (4), 5793-5811 (arXiv)

4. *Consistent lensing and clustering in a low-$S_8$ Universe with BOSS, DES Y3, HSC Y1 and KiDS-1000*
   Amon et al. including **S. Yuan**, 2022, MNRAS, 518 (1), 477-503 (arXiv)

5. *AbacusHOD: A highly efficient extended multi-tracer HOD framework and its application to BOSS and eBOSS data*
   **S. Yuan**, L. H. Garrison, B. Hadzhiyska, S. Bose, and D. J. Eisenstein, 2022, MNRAS, 510 (3): 3301-3320 (arXiv)

6. *Evidence for galaxy assembly bias in BOSS CMASS redshift-space galaxy correlation function*
   **S. Yuan**, B. Hadzhiyska, S. Bose, D. J. Eisenstein, and H. Guo, 2021, MNRAS, 502 (3): 3582-3598 (arXiv)

7. *Can Assembly Bias Explain the Lensing Amplitude of the BOSS CMASS Sample in a Planck Cosmology?*
   **S. Yuan**, D. J. Eisenstein, and A. Leauthaud, 2020, MNRAS, 493 (4): 5551-5564 (arXiv)

8. *Decorrelating the errors of the galaxy correlation function with compact transformation matrices*
   **S. Yuan**, and D. J. Eisenstein, 2019, MNRAS, 486 (1): 708-724 (arXiv)

9. *Exploring the squeezed three-point galaxy correlation function with generalized halo occupation distribution models*
   **S. Yuan**, D. J. Eisenstein, and L. H. Garrison, 2018, MNRAS, 478 (2): 2019-2033 ([arXiv](#))

10. *Using galaxy pairs to investigate the three-point correlation function in the squeezed limit*
    **S. Yuan**, D. J. Eisenstein, and L. H. Garrison, 2017, MNRAS, 472 (1): 577-590 ([arXiv](#))

11. *Spectroscopic Identification of Type 2 Quasars at Z < 1 in SDSS-III/BOSS*
    **S. Yuan**, M. Strauss, and N. Zakamska, 2016, MNRAS, 462 (2): 1603-1615 ([arXiv](#))

12. *The Physical Nature of the Most Metal-Poor Damped Lyman Alpha Systems*
    **S. Yuan**, and R. Cen, 2016, MNRAS, 457 (1): 487-495 ([arXiv](#))

13. *New light on 21cm intensity fluctuations from the dark ages*
    Y. Ali-Haïmoud, P. D. Meerburg, and **S. Yuan**, 2014, Phys. Rev. D 89, 083506 ([arXiv](#))

## COLLABORATION/CONTRIBUTING AUTHOR PUBLICATIONS

1. *Overview of the Instrumentation for the Dark Energy Spectroscopic Instrument*
   DESI Collaboration including **S. Yuan**, 2022, The Astronomical Journal, 164-207 (62pp) ([arXiv](#))

2. *Constructing high-fidelity halo merger trees in AbacusSummit*
   S. Bose, D. J. Eisenstein, B. Hadzhiyska, L. H. Garrison, and **S. Yuan**, 2022, MNRAS, 512 (1): 837-854 ([arXiv](#))

3. *A Hybrid Deep Learning Approach to Cosmological Constraints From Galaxy Redshift Surveys*
   M. Ntampaka, D. J. Eisenstein, **S. Yuan**, and L. H. Garrison, 2020, ApJ, 889 (2): 151-166 ([arXiv](#))

## SELECTED TALKS

| | |
|---|---:|
| (invited) DESI Special Session, AAS Meeting, Seatle | January 2023 |
| (invited) Cosmology Seminar, University of Pittsburg, Pittsburg | September 2022 |
| (invited) Theoretical Astrophysics & Cosmology Seminar, University of Arizona, Tucson | April 2022 |
| (invited) Astronomy Seminar, Tufts University, Virtual | March 2022 |
| (invited) Special Seminar, Midwest Cosmology Network, Virtual | November 2021 |
| (invited) Galaxy-Halo Connection Workshop, Kavli Institute for Theoretical Physics, Virtual | August 2020 |
| (invited) Special Seminar, National Astronomical Observatory of China, Beijing | August 2018 |
| Institute for Theory and Computation Luncheon, Harvard University, Cambridge | May 2017 |
| Cosmology Group Meeting, Center for Computational Astrophysics, New York | March 2017 |

## SERVICE AND TEACHING

| | |
|---|---:|
| • Chair, Cosmological Simulation Working Group, *DESI* | 2022-Present |
| • Lead, HOD Task Force, *DESI* | 2021-Present |
| • Co-lead, E&I Committee – Mentoring Task Force, *Stanford University* | 2022-Present |
| • Member, Graduate Admission Committee, *Stanford University* | 2021-2022 |
| • Journal Referee, *MNRAS, ApJ* | 2020-Present |
| • Teaching Fellow, *Harvard University* | 2017-2018 |
| • Treasurer/Co-Founder, Open Labs At Harvard, *Harvard University* | 2017-2018 |

## TECHNICAL SKILLS

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