

# Oliver H. E. Philcox, Ph.D.

Physics & Astrophysics Building, 452 Lomita Mall, Stanford, CA 94305, USA

*Website:* [oliverphilcox.github.io](https://oliverphilcox.github.io)

*Email:* [ohep2@cantab.ac.uk](mailto:ohep2@cantab.ac.uk), [ophilcox@stanford.edu](mailto:ophilcox@stanford.edu)

## CURRENT POSITION

---

**Department of Physics, Stanford University, Stanford, USA**

*2025 - Present*

Assistant Professor

Leinweber Institute for Theoretical Physics at Stanford, *Faculty*

Kavli Institute for Particle Astrophysics and Cosmology, *Senior Member*

## PREVIOUS POSITIONS

---

**Simons Society of Fellows, New York, USA**

*2022 - 2025*

Junior Fellow

---

**Department of Physics, Columbia University, New York, USA**

*2022 - 2025*

Postdoctoral Research Scientist

*Mentors:* Prof. J. Colin Hill & Prof. Lam Hui

## EDUCATION

---

**Department of Astrophysical Sciences, Princeton University, USA**

*2019 - 2022*

Ph.D. in Astrophysics (2022)

**Thesis:** ‘Probing Fundamental Cosmology with Galaxy Surveys’

**Thesis Advisors:** David N. Spergel & Matias Zaldarriaga

M.A. in Astrophysics (2020)

---

**Center for Astrophysics | Harvard & Smithsonian, Cambridge, USA**

*2018 - 2019*

Pre-Doctoral Student, *Herchel-Smith Scholar*

*Advisor:* Daniel J. Eisenstein

---

**Institute of Astronomy, University of Cambridge, UK**

*2017 - 2018*

M.Sc. in Astrophysics

**Part III:** 1<sup>st</sup> Class (Rank 1/28, 97%)

**Thesis:** ‘Detection and Removal of B-mode CMB Dust Foregrounds with Signatures of Statistical Anisotropy’

*Thesis Advisor:* Blake D. Sherwin

---

**Emmanuel College, University of Cambridge, UK**

*2014 - 2017*

M.A. (Cantab.) in Natural Sciences, *Senior Scholar*

**Parts IA, IB, II:** 1<sup>st</sup> Class (Rank 1/20, 90%)

## LONG-TERM ACADEMIC VISITS

---

**Center for Computational Astrophysics**

*Jul. 2021 - Aug. 2025*

*Guest Researcher*

*New York, USA*

---

**Institute for Advanced Study**

*Sep. 2020 - Jul. 2022*

*Visiting Graduate Student with Matias Zaldarriaga*

*Princeton, USA*

---

**Max-Planck Institute for Astrophysics**

*Aug. - Sep. 2020*

*Visiting Graduate Student with Eiichiro Komatsu*

*Munich, Germany*

**Department of Applied Mathematics and Theoretical Physics**  
*Visiting Graduate Student with Blake D. Sherwin*

May - Jul. 2020  
Cambridge, UK

**Max-Planck-Institut für Astronomie**  
*Summer Intern with Jan Rybizki*

Jul. - Sep. 2017  
Heidelberg, Germany

**Center for Astrophysics | Harvard & Smithsonian**  
*Undergraduate Research Fellow with Ákos Bogdán*

Jun. - Aug. 2016  
Cambridge, USA

## PUBLICATION LIST

---

\* = Author list alphabetized

### **Major Author**

1. Ivanov, M. M., Sullivan, J. M., Chen, S.-F., Chudaykin, A., Maus, M., **Philcox, O. H. E.**, “Reanalyzing DESI DR1: 4. Percent-Level Cosmological Constraints from Combined Probes and Robust Evidence for the Normal Neutrino Mass Hierarchy”, *submitted to Phys. Rev. D* ([arXiv](#)).
2. \*Chudaykin, A., Ivanov, M. M., **Philcox, O. H. E.**, “Reanalyzing DESI DR1: 3. Constraints on Inflation from Galaxy Power Spectra & Bispectra”, *submitted to Phys. Rev. D* ([arXiv](#)).
3. \*Chudaykin, A., Ivanov, M. M., **Philcox, O. H. E.**, “Reanalyzing DESI DR1: 2. Constraints on Dark Energy, Spatial Curvature, and Neutrino Masses”, *submitted to Phys. Rev. D* ([arXiv](#)).
4. **Philcox, O. H. E.**, Zhong, K., Sirletti, S. S., “Separating the Inseparable: Constraining Arbitrary Primordial Bispectra with Cosmic Microwave Background Data”, *submitted to Phys. Rev. D* ([arXiv](#)).
5. El-Haj, L. H. A., **Philcox, O. H. E.**, Hill, J. C., “Constraining Inflationary Particle Production with CMB Polarization”, *submitted to Phys. Rev. D* ([arXiv](#)).
6. \*Bakx, T., Ivanov, M. M., **Philcox, O. H. E.**, Vlah, Z., “One-Loop Galaxy Bispectrum: Consistent Theory, Efficient Analysis with COBRA, and Implications for Cosmological Parameters”, *submitted to Phys. Rev. D* ([arXiv](#)).
7. \*Chudaykin, A., Ivanov, M. M., **Philcox, O. H. E.**, “Reanalyzing DESI DR1: 1.  $\Lambda$ CDM Constraints from the Power Spectrum and Bispectrum”, *accepted by Phys. Rev. D* ([arXiv](#)).
8. \***Philcox, O. H. E.**, Silverstein, E., Torroba, G., “Quantum stress-energy at timelike boundaries: testing a new beyond- $\Lambda$ CDM parameter with cosmological data”, *accepted by JCAP* ([arXiv](#)).
9. **Philcox, O. H. E.**, Hill, J. C., “Integrated Sachs-Wolfe lensing bispectrum and trispectrum”, *Phys. Rev. D* **111**, 123554 (2025) ([arXiv](#)).
10. Goldstein, S., **Philcox, O. H. E.**, Fondi, E., Coulton, W. R., “Wonderings on wiggly bispectra: Nonlinear evolution and reconstruction of oscillations in the squeezed bispectrum”, *Phys. Rev. D* **112**, 083503 (2025) ([arXiv](#)).
11. Zhang, G., Modi, C., **Philcox, O. H. E.**, “Modeling galaxy surveys with hybrid simulation-based inference”, *Phys. Rev. D* **113**, 043518 (2026) ([arXiv](#)).
12. **Philcox, O. H. E.**, “Searching for inflationary physics with the CMB trispectrum. III. Constraints from *Planck*”, *Phys. Rev. D* **111**, 123534 (2025) ([arXiv](#)).
13. **Philcox, O. H. E.**, “Searching for inflationary physics with the CMB trispectrum. II. Code and validation”, *Phys. Rev. D* **111**, 123533 (2025) ([arXiv](#)).
14. **Philcox, O. H. E.**, “Searching for inflationary physics with the CMB trispectrum. I. Primordial theory and optimal estimators”, *Phys. Rev. D* **111**, 123532 (2025) ([arXiv](#)).
15. \***Philcox, O. H. E.**, Shiraishi, M., “Non-Gaussianity beyond the scalar sector: A search for tensor and mixed tensor-scalar bispectra with *Planck* data”, *Phys. Rev. D* **111**, 123502 (2025) ([arXiv](#)).
16. Goldstein, S., **Philcox, O. H. E.**, Hill, J. C., Hui, L., “Intermediate mass-range particles from small scales: Nonperturbative techniques for cosmological collider physics from large-scale structure surveys”, *Phys. Rev. D* **110**, 083516 (2024) ([arXiv](#)).

17. \*Coulton, W. R., **Philcox, O. H. E.**, Villaescusa-Navarro, F., “The Impact of Non-Gaussian Primordial Tails on Cosmological Observables”, *submitted to Phys. Rev. D* ([arXiv](#)).
18. \*Chen, S.-F., Ivanov, M. M., **Philcox, O. H. E.**, Wenzl, L., “Suppression without Thawing: Constraining Structure Formation and Dark Energy with Galaxy Clustering”, *Phys. Rev. Lett.* **133**, 231001 (2024) ([arXiv](#)).
19. **Philcox, O. H. E.**, Kumar, S., Hill, J. C., “Searching for inflationary particle production in Planck data”, *Phys. Rev. D* **111**, 103523 (2025) ([arXiv](#)).
20. **Philcox, O. H. E.**, Flöss, T., “Suite of optimal and efficient power spectrum and bispectrum estimators for large-scale structure analyses”, *Phys. Rev. D* **112**, 063507 (2025) ([arXiv](#)).
21. Cabass, G., **Philcox, O. H. E.**, Ivanov, M. M., Akitsu, K., Chen, S.-F., Simonović, M., Zaldarriaga, M., “BOSS constraints on massive particles during inflation: The cosmological collider in action”, *Phys. Rev. D* **111**, 063510 (2025) ([arXiv](#)).
22. de Belsunce, R., **Philcox, O. H. E.**, Irsic, V., McDonald, P., Guy, J., Palanque-Delabrouille, N., “The 3D Lyman- $\alpha$  forest power spectrum from eBOSS DR16”, *MNRAS* **533**, 3756 – 3770 (2024) ([arXiv](#)).
23. **Philcox, O. H. E.**, Ereza, J., “Could Sample Variance be Responsible for the Parity-Violating Signal Seen in the BOSS Galaxy Survey?”, *Phil. Trans. Roy. Soc. A* **383**, 2290 (2025) ([arXiv](#)).
24. \***Philcox, O. H. E.**, Shiraishi, M., “Testing graviton parity and Gaussianity with Planck  $T$ -,  $E$ -, and  $B$ -mode bispectra”, *Phys. Rev. D* **109**, 063522 (2024) ([arXiv](#)).
25. Goldstein, S., **Philcox, O. H. E.**, Hill, J. C., Esposito, A., Hui, L., “Consistently constraining  $f_{NL}$  with the squeezed lensing bispectrum using consistency relations”, *Phys. Rev. D* **109**, 043515 (2024) ([arXiv](#)).
26. \*Modi, C., **Philcox, O. H. E.**, “Hybrid SBI or How I Learned to Stop Worrying and Learn the Likelihood”, *submitted to Phys. Rev. Lett.* ([arXiv](#)).
27. **Philcox, O. H. E.**, König, M. J., Alexander, S., Spergel, D. N., “What can galaxy shapes tell us about physics beyond the standard model?”, *Phys. Rev. D* **109**, 063541 (2024) ([arXiv](#)).
28. \***Philcox, O. H. E.**, Shiraishi, M., “Testing parity symmetry with the polarized cosmic microwave background”, *Phys. Rev. D* **109**, 083514 (2024) ([arXiv](#)).
29. \*Coulton, W. R., **Philcox, O. H. E.**, Villaescusa-Navarro, F., “Signatures of a parity-violating universe”, *Phys. Rev. D* **109**, 023531 (2024) ([arXiv](#)).
30. **Philcox, O. H. E.**, “Optimal estimation of the binned mask-free power spectrum, bispectrum, and trispectrum on the full sky: Tensor edition”, *Phys. Rev. D* **108**, 063506 (2023) ([arXiv](#)).
31. \*Ivanov, M. M., **Philcox, O. H. E.**, “Measuring  $H_0$  with Spectroscopic Surveys”, *chapter in “Hubble Constant Tension” (Eds. Di Valentino, E. and Brout, D., Springer, Singapore)* ([arXiv](#)).
32. **Philcox, O. H. E.**, “Do the CMB Temperature Fluctuations Conserve Parity?”, *Phys. Rev. Lett.* **131**, 181001 (2023) ([arXiv](#)).
33. **Philcox, O. H. E.**, “Optimal estimation of the binned mask-free power spectrum, bispectrum, and trispectrum on the full sky: Scalar edition”, *Phys. Rev. D* **107**, 123516 (2023) ([arXiv](#)).
34. Creque-Sarbinowski, C., Alexander, S., Kamionkowski, M., **Philcox, O. H. E.**, “Parity-violating trispectrum from Chern-Simons gravity”, *JCAP* **11** 029 (2023) ([arXiv](#)).
35. Surrao, K. M., **Philcox, O. H. E.**, Hill, J. C., “Accurate estimation of angular power spectra for maps with correlated masks”, *Phys. Rev. D* **107**, 083521 (2023) ([arXiv](#)).
36. Ivanov, M. M., **Philcox, O. H. E.**, Cabass, G., Nishimichi, T., Simonović, M., Zaldarriaga, M., “Cosmology with the galaxy bispectrum multipoles: Optimal estimation and application to BOSS data”, *Phys. Rev. D* **107**, 083515 (2023) ([arXiv](#)).
37. \*Cabass, G., Ivanov, M. M., **Philcox, O. H. E.**, Simonovic, M., Zaldarriaga, M., “Constraining single-field inflation with MegaMapper”, *Phys. Lett. B* **841**, 137912 (2023) ([arXiv](#)).
38. \*Cabass, G., Ivanov, M. M., **Philcox, O. H. E.**, “Colliders and ghosts: Constraining inflation with the parity-odd galaxy four-point function”, *Phys. Rev. D* **107**, 023523 (2023) ([arXiv](#)).

39. Goldstein, S., Esposito, A., **Philcox, O. H. E.**, Hui, L., Hill, J. C., Scoccimarro, R., Abitbol, M. H., “Squeezing  $f_{NL}$  out of the matter bispectrum with consistency relations”, *Phys. Rev. D* **106**, 123525 (2022) ([arXiv](#)).
40. \***Philcox, O. H. E.**, Torquato, S., “Disordered Heterogeneous Universe: Galaxy Distribution and Clustering across Length Scales”, *Phys. Rev. X* **13**, 011038 (2023) ([arXiv](#)).
41. **Philcox, O. H. E.**, Johnson, M. C., “Novel cosmological tests from combining galaxy lensing and the polarized Sunyaev-Zel'dovich effect”, *Phys. Rev. D* **106**, 083501 (2022) ([arXiv](#)).
42. **Philcox, O. H. E.**, “Probing parity violation with the four-point correlation function of BOSS galaxies”, *Phys. Rev. D* **106**, 063501 (2022) ([arXiv](#)).
43. **Philcox, O. H. E.**, Ivanov, M. M., Cabass, G., Simonović, M., Zaldarriaga, M., Nishimichi, T., “Cosmology with the redshift-space galaxy bispectrum monopole at one-loop order”, *Phys. Rev. D* **106**, 043530 (2022) ([arXiv](#)).
44. **Philcox, O. H. E.**, Farren, G. S., Sherwin, B. D., Baxter, E. J., Brout, D. J., “Determining the Hubble constant without the sound horizon: A 3.6% constraint on  $H_0$  from galaxy surveys, CMB lensing, and supernovae”, *Phys. Rev. D* **106**, 063530 (2022) ([arXiv](#)).
45. \*Cabass, G., Ivanov, M. M., **Philcox, O. H. E.**, Simonović, M., Zaldarriaga, M., “Constraints on multifield inflation from the BOSS galaxy survey”, *Phys. Rev. D* **106**, 043506 (2022) ([arXiv](#)).
46. \*Cabass, G., Ivanov, M. M., **Philcox, O. H. E.**, Simonović, M., Zaldarriaga, M., “Constraints on Single-Field Inflation from the BOSS Galaxy Survey”, *Phys. Rev. Lett.* **129**, 021301 (2022) ([arXiv](#)).
47. \*Farren, G. S., **Philcox, O. H. E.**, Sherwin, B. D., “Determining the Hubble constant without the sound horizon: Perspectives with future galaxy surveys”, *Phys. Rev. D* **105**, 063503 (2022) ([arXiv](#)).
48. **Philcox, O. H. E.**, Ivanov, M. M., “BOSS DR12 full-shape cosmology:  $\Lambda$ CDM constraints from the large-scale galaxy power spectrum and bispectrum monopole”, *Phys. Rev. D* **105**, 043517 (2022) ([arXiv](#)).
49. Ivanov, M. M., **Philcox, O. H. E.**, Nishimichi, T., Simonović, M., Takada, M., Zaldarriaga, M., “Precision analysis of the redshift-space galaxy bispectrum”, *Phys. Rev. D* **105**, 063512 (2022) ([arXiv](#)).
50. Ivanov, M. M., **Philcox, O. H. E.**, Simonović, M., Zaldarriaga, M., Nischimichi, T., Takada, M., “Cosmological constraints without nonlinear redshift-space distortions”, *Phys. Rev. D* **105**, 043531 (2022) ([arXiv](#)).
51. **Philcox, O. H. E.**, Hou, J., Slepian, Z., “A First Detection of the Connected 4-Point Correlation Function of Galaxies Using the BOSS CMASS Sample”, *submitted to Phys. Rev. D* ([arXiv](#)).
52. **Philcox, O. H. E.**, “Cosmology without window functions. II. Cubic estimators for the galaxy bispectrum”, *Phys. Rev. D* **104**, 123529 (2021) ([arXiv](#)).
53. \***Philcox, O. H. E.**, Slepian, Z., “Efficient computation of N-point correlation functions in D dimensions”, *PNAS* **119**, 33 (2022) ([arXiv](#)).
54. **Philcox, O. H. E.**, Slepian, Z., Hou, J., Warner, C., Cahn, R. N., Eisenstein, D. J., “encore: an O ( $Ng^2$ ) estimator for galaxy N-point correlation functions”, *MNRAS* **509**, 2457 – 2481 (2021) ([arXiv](#)).
55. \***Philcox, O. H. E.**, Slepian, Z., “An exact integral-to-sum relation for products of Bessel functions”, *Proc. Roy. Soc. A* **477**, 2253 (2021) ([arXiv](#)).
56. Slepian, Z., **Philcox, O. H. E.**, “A uniform spherical goat (problem): explicit solution for homologous collapse’s radial evolution in time”, *MNRAS* **522**, L42-L45 (2023) ([arXiv](#)).
57. \***Philcox, O. H. E.**, Slepian, Z., “Beyond the Yamamoto approximation: Anisotropic power spectra and correlation functions with pairwise lines of sight”, *Phys. Rev. D* **103**, 123509 (2021) ([arXiv](#)).
58. **Philcox, O. H. E.**, “Cosmology without window functions: Quadratic estimators for the galaxy power spectrum”, *Phys. Rev. D* **103**, 103504 (2021) ([arXiv](#)).
59. **Philcox, O. H. E.**, Aviles, A., Massara, E., “Modeling the Marked Spectrum of Matter and Biased Tracers in Real- and Redshift-Space”, *JCAP* 03 038 (2021) ([arXiv](#)).
60. **Philcox, O. H. E.**, Ivanov, M. M., Zaldarriaga, M., Simonovic, M., Schmittfull, M., “Fewer Mocks and Less Noise: Reducing the Dimensionality of Cosmological Observables with Subspace Projections”, *Phys. Rev. D* **103**, 043508 (2021) ([arXiv](#)).

61. **Philcox, O. H. E.**, Sherwin, B. D., Farren, G. S., Baxter, E. J., “Determining the Hubble Constant without the Sound Horizon: Measurements from Galaxy Surveys”, *Phys. Rev. D* **103**, 023538 (2021) ([arXiv](#)).
62. **Philcox, O. H. E.**, Massara, E., Spergel, D. N., “What does the marked power spectrum measure? Insights from perturbation theory”, *Phys. Rev. D* **102**, 043516 (2020) ([arXiv](#)).
63. **Philcox, O. H. E.**, “A faster Fourier transform? Computing small-scale power spectra and bispectra for cosmological simulations in  $\mathcal{O}(N^2)$  time”, *MNRAS* **501**, 4004 – 4034 (2021) ([arXiv](#)).
64. \***Philcox, O. H. E.**, Spergel, D. N., Villaescusa-Navarro, F., “Effective halo model: Creating a physical and accurate model of the matter power spectrum and cluster counts”, *Phys. Rev. D* **101**, 123520 (2020) ([arXiv](#)).
65. **Philcox, O. H. E.**, Ivanov, M. M., Simonović, M., Zaldarriaga, M., “Combining Full-Shape and BAO Analyses of Galaxy Power Spectra: A 1.6% CMB-independent constraint on  $H_0$ ”, *JCAP* 05 032 (2020) ([arXiv](#)).
66. **Philcox, O. H. E.**, Eisenstein, D. J., “Computing the Small-Scale Galaxy Power Spectrum and Bispectrum in Configuration-Space”, *MNRAS* **492**, 1214 – 1242 (2020) ([arXiv](#)).
67. **Philcox, O. H. E.**, Eisenstein, D. J., “Estimating Covariance Matrices for Two- and Three-Point Correlation Function Moments in Arbitrary Survey Geometries”, *MNRAS* **490**, 5931 – 5951 (2019) ([arXiv](#)).
68. \***Philcox, O. H. E.**, Rybizki, J., “Inferring Galactic Parameters from Chemical Abundances: A Multi-Star Approach”, *ApJ* **887**, 9 (2019) ([arXiv](#)).
69. **Philcox, O. H. E.**, Eisenstein, D. J., O’Connell, R., Wiegand, A., “rascal: a jackknife approach to estimating single- and multitracer galaxy covariance matrices”, *MNRAS* **491**, 3290 – 3317 (2020) ([arXiv](#)).
70. \***Philcox, O. H. E.**, Sherwin, B. D., van Engelen, A., “Detection and Removal of B-mode Dust Foregrounds with Signatures of Statistical Anisotropy”, *MNRAS* **479**, 5577 – 5595 (2018) ([arXiv](#)).
71. **Philcox, O. H. E.**, Rybizki, J., Gutcke, T., “On the Optimal Choice of Nucleosynthetic Yields, Initial Mass Function, and Number of SNeIa for Chemical Evolution Modeling”, *ApJ* **861**, 40 (2018) ([arXiv](#)).

### *Contributing Author*

72. \*Besuner, R., *et al.* (inc. **Philcox, O. H. E.**), “The Spectroscopic Stage-5 Experiment”, *White Paper* ([arXiv](#)).
73. \*Krause, E., *et al.* (inc. **Philcox, O. H. E.**), “A Parameter-Masked Mock Data Challenge for Beyond-Two-Point Galaxy Clustering Statistics”, *ApJ* **990**, 99 (2025) ([arXiv](#)).
74. Rogers, K. K., Hložek, R., Laguë, A., Ivanov, M. M., **Philcox, O. H. E.**, *et al.*, “Ultra-light axions and the  $S_8$  tension: joint constraints from the cosmic microwave background and galaxy clustering”, *JCAP* 06 023 (2023) ([arXiv](#)).
75. \*Abdalla, E., *et al.* (inc. **Philcox, O. H. E.**), “Cosmology intertwined: A review of the particle physics, astrophysics, and cosmology associated with the cosmological tensions and anomalies”, *JHEA* **34**, 49 – 211 (2022) ([arXiv](#)).
76. Villaescusa-Navarro, F., *et al.* (inc. **Philcox, O. H. E.**), “The CAMELS Project: Public Data Release”, *ApJS* **265**, 54 (2023) ([arXiv](#)).
77. Hou, J., Cahn, R. N., **Philcox, O. H. E.**, Slepian, Z., “Analytic Gaussian covariance matrices for galaxy  $N$ -point correlation functions”, *Phys. Rev. D* **106**, 043515 (2022) ([arXiv](#)).
78. Schmittfull, M., Simonović, M., Ivanov, M. M., **Philcox, O. H. E.**, Zaldarriaga, M., “Modeling Galaxies in Redshift Space at the Field Level”, *JCAP* 05 059 (2021) ([arXiv](#)).
79. Villaescusa-Navarro, F., *et al.* (inc. **Philcox, O. H. E.**), “The CAMELS project: Cosmology and Astrophysics with MachinE Learning Simulations”, *ApJ* **915**, 71 (2021) ([arXiv](#)).
80. Wang, Y., Zhao, G.-B., Zhao, C., **Philcox, O. H. E.**, *et al.*, “The clustering of the SDSS-IV extended Baryon Oscillation Spectroscopic Survey DR16 luminous red galaxy and emission line galaxy samples: cosmic distance and structure growth measurements using multiple tracers in configuration space”, *MNRAS* **498**, 3470 – 3483 (2020) ([arXiv](#)).
81. \*Chudaykin, A., Ivanov, M. M., **Philcox, O. H. E.**, Simonović, M., “Nonlinear perturbation theory extension of the Boltzmann code CLASS”, *Phys. Rev. D* **102**, 063533 (2020) ([arXiv](#)).

## *Other Works*

82. Philcox, O. H. E., “An Introduction to the EFTofLSS”, *Lecture Notes*.

## **SELECTED RESEARCH TALKS**

---

\* = *Virtual Talk*

- 2026    New Synergies in Multiprobe Cosmology, UC Santa Barbara, *Conference*  
2025    41<sup>st</sup> Institut d’Astrophysique de Paris Symposium, *Conference* (Invited Talk)  
          Galileo Galilei Institute for Theoretical Physics, *Symposium* (Invited Plenary)  
          21<sup>st</sup> Rencontres de Vietnam, *Conference* (Invited Talk)  
          Understanding Cosmological Observations, Benasque, *Conference* (Invited Talk)  
          GR24 & Amaldi16, *Conference* (Invited Plenary)  
          Columbia University, *Physics Colloquium*  
          Cosmological Probes of New Physics, Notre Dame, *Conference* (Invited Discussion)  
          Brown University, *Theoretical Physics Seminar*  
          Princeton University, *Cosmology Seminar*  
          Particles vs. New Probes, Flatiron Institute, *Conference* (Invited Plenary)  
          Boston University, *High-Energy Physics Seminar*
- 2024    Essential Cosmology for the Next Generation IX, Mexico, *Winter School* (Invited Lecture Series)  
          21<sup>st</sup> Century Cosmology, Ashoka University, *Conference* (Invited Plenary)  
          Cosmology in the Adriatic, Split, *Conference*  
          University of Edinburgh, *Conference*  
          Lawrence Berkeley National Laboratory, *Workshop* (Invited Plenary)  
          University of Cambridge, *Astronomy Colloquium*  
          Royal Society, London, *Discussion Meeting* (Invited Talk)  
          Harvard University, *Cosmology Seminar*  
          Massachusetts Institute of Technology, *Cosmology Seminar*  
          58<sup>th</sup> Rencontres de Moriond, *Conference*  
          Stanford University, *Physics Colloquium*  
          Perimeter Institute for Theoretical Physics, *Colloquium*
- 2023    Taipei Institute of Astronomy & Astrophysics, *Conference* (Invited Talk)  
          Max-Planck-Institute for Nuclear Physics, Heidelberg, *Particle Physics Seminar*  
          ICTP Trieste, *Workshop*  
          University of Montreal, *Astrophysics Seminar*  
          \*Parity-Violation from Home, *Conference*  
          Ohio State University, *Cosmology and Astro-Particle Physics Seminar*  
          \*Early Universe / AliCPT Forum, University of Science and Technology of China, *Webinar*  
          Sexten Center for Astrophysics, *Workshop* (Invited Plenary)  
          Donostia International Physics Center, *Workshop* (Invited Talk)  
          University of Pennsylvania, *PDT Partners Retreat* (Invited Talk)  
          Yukawa Institute for Theoretical Physics, Kyoto, *Conference* (Invited Talk)  
          Kavli IPMU, Tokyo, *Astronomy Seminar*  
          Stony Brook, *Cosmology Seminar*  
          Cosmology on Safari, *Conference*  
          Johns Hopkins University, *Particle Physics Seminar*  
          University of Maryland, *Particle Physics Seminar*  
          \*Copernicus Series, *Cosmology Webinar*  
          \*University of Oxford, *Cosmology Seminar*

## OUTREACH TALKS

---

- 2026 *Astronomy on Tap*, San Francisco (Public Talk)  
*Discover Our Universe*, Kavli Institute for Particle Astrophysics & Cosmology (Public Lecture)
- 2025 *Stanford University Undergraduate Physics Club* (Faculty Lunch Talk)  
*Taste of Science*, New York (Public Lecture)
- 2023 *Into The Unknown* (Public Podcast)

## MEDIA

---

1. “Scientists detect mysterious suppression in cosmic structure growth”, *Phys.org*, 3 Jan. 2025.
2. “Universe’s ‘Cosmological Collider’ Lands 3 Scientists \$100,000 Physics Prize”, *Live Science*, 14 Sep. 2023.
3. “What Happened Right After the Universe Began?”, *Simons Foundation*, 30 Aug. 2023.
4. “The Cosmos as a Colloid”, *Physics Magazine*, 14 Mar. 2023.
5. “Pinpoint Simulations Provide Perspective on Universe Structure”, *IAS News & Phys.org*, 14 Mar. 2023.
6. “Spatial Patterns In Distribution of Galaxies”, *Princeton News & ScienceDaily*, 14 Mar. 2023.
7. “Is the Universe Asymmetrical?”, *Columbia News*, 27 Feb. 2023.
8. “Do We Live in a Mirror Universe?”, *Into The Unknown Podcast*, 26 Jan. 2023.
9. “Asymmetry Detected in the Distribution of Galaxies”, *Quanta*, 5 Dec. 2022.
10. “The Universe is Surprisingly Lopsided and We Don’t Know Why”, *New Scientist*, 18 Jun. 2022.

## PRIZES & GRANTS

---

- 2024 New Horizons in Physics Prize, *Breakthrough Prize Foundation*
- 2023 Buchalter Cosmology Prize (First Prize)
- 2022 Simons Society of Fellows (Junior Fellowship, \$450 000)  
NHFP Einstein Fellowship, *declined*  
LBL Chamberlain Fellowship, *declined*  
Cambridge Kavli Fellowship, *declined*
- 2018 Herchel-Smith Scholarship (\$70 000), *Cambridge → Harvard*  
Institute of Astronomy Prize, *Cambridge*
- 2017 Holgate Pollard Memorial Prize, *Cambridge*

## gi PROFESSIONAL ACTIVITIES

---

<b>Referee</b>	MNRAS (2020–), JCAP (2020–), MPLA (2021–), Phys. Rev. Lett. (2022–) Phys. Rev. D (2022–), ApJS (2022–), Phys. Dark Univ. (2023–)
<b>Conferences</b>	Large-Scale Parity Violation (Taiwan 2023, SOC)
<b>Review Panels</b>	NASA Astrophysics Theory Program (2023)
<b>Mentor</b>	<i>Beatriz Tucci</i> Stanford Postdoctoral Fellow (2025–)
<b>Advisor</b>	<i>Cooper Jacobus</i> Stanford Graduate Student (2026, rotation) <i>Hanyue Wang</i> Stanford Graduate Student (2026, rotation) <i>Sixiang Yang</i> Stanford Graduate Student (2025, rotation) <i>Alessandro Russo</i> Stanford Graduate Student (2025, rotation) <i>Anita Dunsmore</i> Stanford Graduate Student (2025, rotation) <i>Sam Goldstein</i> Columbia Graduate Student (2022–2025, various projects) <i>John Moynihan</i> Columbia Undergraduate Student (2023, summer project) <i>Jess Boyland</i> Simons-NSBP Undergraduate Scholar (2020–2021, summer project)
<b>Coadvisor</b>	<i>Luca Abu El-Haj</i> Columbia Undergraduate Student (2025, summer project) <i>Gemma Zhang</i> Harvard Graduate Student (2023–2025) <i>Kristen Surrao</i> Columbia Graduate Student (2022–2023) <i>Gerrit Farren</i> Cambridge Graduate Student (2020–2022)

## MISCELLANEOUS

---

<b>Computing Languages</b>	PYTHON, C++, JULIA, MATHEMATICA, CUDA
<b>Codes Developed</b>	<a href="#">POLYSPEC</a> , <a href="#">POLYBIN3D</a> , <a href="#">ENCORE</a> , <a href="#">NPCFs.jl</a> , <a href="#">CLASS-PT</a> , <a href="#">SPECTRA-WITHOUT-WINDOWS</a> , <a href="#">EFFECTIVEHALOS</a> , <a href="#">HIPSTER</a> , <a href="#">RASCALC</a>
<b>Teaching</b>	6 years of online tutoring (high-school to Masters level) Teaching assistant for Princeton introductory astronomy class (AST203) TEFL qualification in English teaching
<b>Other</b>	DipABRSM in Music Performance (Distinction)

## REFERENCES

---

<b>Prof. J C Hill</b> (Postdoctoral Mentor) Columbia University 914 Pupin Hall New York, NY 10027 Tel: +1 (212) 854-7815 <a href="mailto:jch2200@columbia.edu">jch2200@columbia.edu</a>	<b>Prof. D N Spergel</b> (PhD Advisor) Simons Foundation 160 5 <sup>th</sup> Ave. New York, NY 10010 Tel: +1 (609) 258-3589 <a href="mailto:dspergel@simonsfoundation.org">dspergel@simonsfoundation.org</a>	<b>Prof. M Zaldarriaga</b> (PhD Advisor) Institute for Advanced Study 1 Einstein Drive Princeton, NJ 08540 Tel: +1 (609) 734-8058 <a href="mailto:matiasz@ias.edu">matiasz@ias.edu</a>
---	--	--