

Oliver H. E. Philcox MSci MA

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EDUCATION

Department of Astrophysical Sciences, Princeton University, USA

2019 - Present

PhD Candidate

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

M.A. in Astrophysics (2020)

Center for Astrophysics | Harvard & Smithsonian, Cambridge, USA

2018 - 2019

Pre-Doctoral Student (Herchel-Smith Scholar)

Advisor: Prof. Daniel J. Eisenstein

Institute of Astronomy, University of Cambridge

2017 - 2018

MSci in Astrophysics

Part III: 1st Class (Rank 1/28, 97%)

Courses: Cosmology (97%), Advanced Cosmology (91%), General Relativity (92%)
Quantum Field Theory (84%), Stellar Structure and Evolution (95%)

Master's Thesis: 'Detection and Removal of B-mode CMB Dust Foregrounds with Signatures of Statistical Anisotropy' (*Advisor:* Dr. Blake D. Sherwin)

Institute of Astronomy Prize

Emmanuel College, University of Cambridge

2014 - 2017

BA (Hons) in Natural Sciences, *Senior Scholar*

Part II: 1st Class (Rank 1/20, 90%)

Part IB: 1st Class (Rank 9/578)

Part IA: 1st Class (Rank 6/626)

Holgate Pollard Memorial Prize for Part II Examination Results, 2017

College & Rowley Mainhood Prizes for Achievement, 2015-8

ADDITIONAL RESEARCH EXPERIENCE

Institute for Advanced Study

Sep. 2020 - Present

Visiting Graduate Student with Prof. Matias Zaldarriaga

Princeton, USA

Max-Planck Institute for Astrophysics

Aug. - Sep. 2020

Visiting Graduate Student with Prof. Eiichiro Komatsu

Munich, Germany

Department of Applied Mathematics and Theoretical Physics

May - Jul. 2020

Visiting Graduate Student (Virtual) with Dr. Blake D. Sherwin

Cambridge, UK

Max-Planck-Institut für Astronomie

Jul. - Sep. 2017

Summer Intern with Dr. Jan Rybizki

Heidelberg, Germany

Center for Astrophysics | Harvard & Smithsonian

Jun. - Aug. 2016

Undergraduate Research Fellow with Dr. Ákos Bogdán

Cambridge, USA

PUBLICATIONS

Major Author

1. Philcox, O. H. E., Ivanov, M. M., Simonović, M., Zaldarriaga, M., Schmittfull, M. "Fewer Mocks and Less Noise: Reducing the Dimensionality of Cosmological Observables with Subspace Projections", *submitted to Phys. Rev. D* (arXiv).

2. **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", *submitted to Phys. Rev. Lett.* (arXiv).
3. **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).
4. **Philcox, O. H. E.** "A Faster Fourier Transform? Computing Small-Scale Power Spectra and Bispectra for Cosmological Simulations in $\mathcal{O}(N^2)$ Time", *submitted to MNRAS* (arXiv).
5. **Philcox, O. H. E.**, Spergel, D. N., Villaescusa-Navarro, F. "The Effective Halo Model: Creating a Physical and Accurate Model of the Matter Power Spectrum and Cluster Counts", *Phys. Rev. D* **101**, 123520 (2020) (arXiv).
6. **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).
7. **Philcox, O. H. E.**, Rybizki, J. "Inferring Galactic Parameters from Chemical Abundances: A Multi-Star Approach", *ApJ* **887**, 9 (2019) (arXiv).
8. **Philcox, O. H. E.**, Eisenstein, D. J., "Computing the Small-Scale Galaxy Power Spectrum and Bispectrum in Configuration-Space", *MNRAS* **492** 1214 – 1242 (2019) (arXiv).
9. **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).
10. **Philcox, O. H. E.**, Eisenstein, D. J., O’Connell, R., Wiegand, A., "RascalC: A Jackknife Approach to Estimating Single and Multi-Tracer Galaxy Covariance Matrices", *MNRAS* **491**, 3290 – 3317 (2019) (arXiv).
11. **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).
12. **Philcox, O. H. E.**, Rybizki, J., Gutcke, T., "On the Optimal Choice of Nucleosynthetic Yields, Initial Mass Function, and Number of SNe Ia for Chemical Evolution Modeling", *ApJ* **861**, 40 (2018) (arXiv).

Contributing Author

13. Chudaykin, A., Ivanov, M. M., **Philcox, O. H. E.**, Simonović, M. "CLASS-PT: non-linear perturbation theory extension of the Boltzmann code CLASS", *accepted by Phys. Rev. D* (arXiv).
14. 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", *accepted by MNRAS* (arXiv).

SELECTED TALKS

Sep. 2020	UK Cosmology Meeting (Virtual) <i>What's Next for the Effective Field Theory of Large Scale Structure?</i>
Sep. 2020	Institute for Advanced Study (Cosmology Group, Virtual) <i>Data Compression via Subspace Projections & H_0 Without the Sound Horizon</i>
Aug. 2020	Cosmology from Home (Virtual Conference) <i>Measuring H_0 from Galaxy Surveys: With and Without the Sound Horizon</i>
Aug. 2020	American Statistical Association (Joint Statistical Meeting, invited talk) <i>Inferring Galactic Parameters from Stellar Chemical Abundances</i>
Jun. 2020	Perimeter Institute for Theoretical Physics (Cosmology Colloquium) <i>What's Next for the Effective Field Theory of Large Scale Structure?</i>
May 2020	Berkeley Center for Cosmological Physics (Journal Club) <i>The Effective Halo Model: Accurate Models for the Power Spectrum and Cluster Counts</i>
Apr. 2020	NYU / CCA (Cosmology X Data Science Group) <i>The Effective Halo Model: Accurate Models for the Power Spectrum and Cluster Counts</i>
Mar. 2020	Institute for Advanced Study (Cosmology Group) <i>Constraining Cosmology from Galaxy Surveys: Combining Full Shape and BAO Analyses</i>
Dec. 2019	Princeton University (Gravity Group) <i>Detection and Removal of CMB B-mode Dust via Statistical Anisotropy</i>
Nov. 2019	JINA-CEE Nuclear Astrophysics Seminar <i>Inferring the Milky Way Stellar Initial Mass Function using Chemical Evolution Modelling</i>
Jul. 2019	Center for Astrophysics Harvard & Smithsonian (Daniel Eisenstein's Group) <i>Computing Clustering Statistics and Covariances in Configuration Space</i>
Apr. 2019	Center for Astrophysics Harvard & Smithsonian (Joint Cosmology Group) <i>Detection and Removal of CMB B-mode Dust via Statistical Anisotropy</i>
Sep. 2017	Max-Planck-Institut für Astronomie (Hans-Walter Rix's Group) <i>Creating Objective Scores for Nucleosynthetic Yield Tables</i>
Sep. 2017	Heidelberg Institute for Theoretical Studies (Volker Springel's Group) <i>Choosing Nucleosynthetic Yield Tables for Hydrodynamical Simulations</i>

PROFESSIONAL ACTIVITIES

Referee	Monthly Notices of the Royal Astronomical Society (2020–)
Coadvisor	<i>Jess Boyland</i> Simons-NSBP Undergraduate Scholars Program (2020)

MISCELLANEOUS

Computing Languages	Python, C++, Bash
Codes Developed	EffectiveHalos, HIPSTER, RascalC, CLASS-PT, ChempyMulti, HADES
Teaching	5 years of online tutoring in Physics and Astronomy at high-school to graduate level TEFL Qualification in English teaching with 2 months experience in China
Languages	English (Native), Spanish (Conversational), Mandarin (Basic)
Other	DipABRSM in Music Performance (Distinction)

REFEREES

References available on request