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.** "Cosmology Without Windows: Quadratic Estimators for the Galaxy Power Spectrum", *submitted to Phys. Rev. D* (arXiv).
2. **Philcox, O. H. E.**, Aviles, A., Massara, E. "Modeling the Marked Spectra of Matter and Biased Tracers in Real and Redshift Space", *submitted to JCAP* (arXiv).
3. **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).
4. **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. D* (arXiv).
5. **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).
6. **Philcox, O. H. E.** "A Faster Fourier Transform? Computing Small-Scale Power Spectra and Bispectra for Cosmological Simulations in $\mathcal{O}(N^2)$ Time", *accepted by MNRAS* (arXiv).
7. **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).
8. **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).
9. **Philcox, O. H. E.**, Rybizki, J. "Inferring Galactic Parameters from Chemical Abundances: A Multi-Star Approach", *ApJ* **887**, 9 (2019) (arXiv).
10. **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).
11. **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).
12. **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).
13. **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).
14. **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

15. Schmittfull, M., Simonović, M., Ivanov, M. M, **Philcox, O. H. E.**, Zaldarriaga, M. "Modeling Galaxies in Redshift Space atthe Field Level", *submitted to JCAP* (arXiv).
16. Villaescusa-Navarro, F., Anglés-Alcázar, D., Genel, S., *et al.* (inc. **Philcox, O. H. E.**) "The CAMELS project: Cosmology and Astrophysics with MachinE Learning Simulations", *submitted to ApJ* (arXiv).
17. 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).
18. Chudaykin, A., Ivanov, M. M., **Philcox, O. H. E.**, Simonović, M., "`CLASS-PT`: non-linear perturbation theory extension of the Boltzmann code `CLASS`", *Phys. Rev. D*, **102**, 063533 (2020) (arXiv).

SELECTED TALKS

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

PROFESSIONAL ACTIVITIES

Referee	Monthly Notices of the Royal Astronomical Society (2020−)
Coadvisor	*Jess Boyland* Simons-NSBP Undergraduate Scholars Program (2020)

MISCELLANEOUS

Computing Languages	Python, C++
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