

# Oliver H. E. Philcox MSci MA

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## EDUCATION

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**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:** 1<sup>st</sup> 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' (*Advisors: Dr. Blake D. Sherwin & Dr. Alexander van Engelen*)

Institute of Astronomy Prize

**Emmanuel College, University of Cambridge**

2014 - 2017

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

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

**Part IB:** 1<sup>st</sup> Class (Rank 9/578)

**Part IA:** 1<sup>st</sup> 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

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**Max-Planck Institute for Astrophysics**

Aug 2020 - Present

*Visiting Graduate Student with Prof. Eiichiro Komatsu*

*Munich, Germany*

**Department of Applied Mathematics and Theoretical Physics**

May - Aug. 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

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*Major Author*

1. Philcox, O. H. E., Massara, E., Spergel, D. N. "What does the Marked Power Spectrum Measure? Insights from Perturbation Theory", *accepted by Phys. Rev. D* (arXiv).
2. 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).

3. **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).
4. **Philcox, O. H. E.**, Ivanov, M. I., 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).
5. **Philcox, O. H. E.**, Rybizki, J. "Inferring Galactic Parameters from Chemical Abundances: A Multi-Star Approach", *ApJ* **887**, 9 (2019) (arXiv).
6. **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).
7. **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).
8. **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).
9. **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).
10. **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**

11. 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", *submitted to MNRAS* (arXiv).

#### **SELECTED TALKS**

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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

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

## MISCELLANEOUS

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<b>Computing Languages</b>	Python, C++, Bash
<b>Codes Developed</b>	EffectiveHalos, HIPSTER, RascalC, ChempyMulti, HADES
<b>Teaching</b>	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
<b>Languages</b>	English (Native), Spanish (Conversational), Mandarin (Basic)

## REFEREES

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*References available on request*