# 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' (*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:** 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

**Department of Applied Mathematics and Theoretical Physics** May 2020 - Present
*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*

## SELECTED PUBLICATIONS & TALKS

1. **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).
2. **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", *accepted by PRD* (arXiv).
3. **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).

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

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| Aug. 2020 | American Statistical Association (Joint Statistical Meeting, invited talk)<br>*Inferring Galactic Parameters from Stellar Chemical Abundances* |
| May 2020 | Berkeley Center for Cosmological Physics (Journal Club)<br>*The Effective Halo Model: Accurate Models for the Power Spectrum and Cluster Counts* |
| Apr. 2020 | NYU / CCA Cosmology X Data Science Group<br>*The Effective Halo Model: Accurate Models for the Power Spectrum and Cluster Counts* |
| Mar. 2020 | Institute for Advanced Study (Cosmology Group)<br>*Constraining Cosmology from Galaxy Surveys: Combining Full Shape and BAO Analyses* |
| Dec. 2019 | Princeton University (Gravity Group)<br>*Detection and Removal of CMB B-mode Dust via Statistical Anisotropy* |
| Nov. 2019 | JINA-CEE Nuclear Astrophysics Seminar<br>*Inferring the Milky Way Stellar Initial Mass Function using Chemical Evolution Modelling* |
| Jul. 2019 | Center for Astrophysics \| Harvard & Smithsonian (Daniel Eisenstein's Group)<br>*Computing Clustering Statistics and Covariances in Configuration Space* |
| Apr. 2019 | Center for Astrophysics \| Harvard & Smithsonian (Joint Cosmology Group)<br>*Detection and Removal of CMB B-mode Dust via Statistical Anisotropy* |
| Sep. 2017 | Max-Planck-Institut für Astronomie (Hans-Walter Rix's Group)<br>*Creating Objective Scores for Nucleosynthetic Yield Tables* |
| Sep. 2017 | Heidelberg Institute for Theoretical Studies (Volker Springel's Group)<br>*Choosing Nucleosynthetic Yield Tables for Hydrodynamical Simulations* |

## PROFESSIONAL ACTIVITIES

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| **Referee** | Monthly Notices of the Royal Astronomical Society (2020−) |

## MISCELLANEOUS

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| **Computing Languages** | Python, C++, Bash |
| **Codes Developed** | `EffectiveHalos`, `HIPSTER`, `RascalC`, `ChempyMulti`, `HADES` |
| **Teaching** | 5 years of online tutoring in Physics and Astronomy at high-school to graduate level<br>TEFL Qualification in English teaching with 2 months experience in China |
| **Languages** | English (Native), Spanish (Conversational), Mandarin (Basic) |

## REFEREES

*References available on request*