

Oliver H. E. Philcox MSci

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Peyton Hall, 4 Ivy Lane, Princeton, NJ 08544, USA (*Semester*)

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EDUCATION

Department of Astrophysical Sciences, Princeton University, USA

2019 - Present

Graduate Student

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

Center for Astrophysics | Harvard & Smithsonian, Cambridge, USA

2018 - 2019

Pre-Doctoral Student (Herchel-Smith Scholar)

Courses: *Radiative Processes in Astrophysics (A)*, *Astrophysical Fluid Dynamics (A)*

Advanced Scientific Computing: Stochastic Methods (A)

Research Projects: ‘Estimating Covariance Matrices for the Two- and Three-Point Galaxy Correlation Functions in Arbitrary Survey Geometries’ & ‘Configuration-Space Estimators for Small-Scale Anisotropic Power Spectra and Bispectra’ (*Advisors: Prof. Daniel J. Eisenstein & Dr. Ross O’Connell*)

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%)

Courses include: *Cosmology*, *Stars*, *Galactic Dynamics*, *Fluids*, *Relativity*, *Quantum Mechanics*

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

Courses: *Maths (86%)*, *Physics A (94%)* and *Physics B (85%)*

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

Courses: *Maths (94%)*, *Physics (89%)*, *Chemistry (84%)* and *Earth Sciences (73%)*

Holgate Pollard Memorial Prize for Part II Examination Results, 2017

College & Rowley Mainhood Prizes for Achievement, 2015-8

RESEARCH EXPERIENCE

Department of Astrophysical Sciences

Sep. 2019 - Present

Graduate Student with Prof. David N. Spergel & Prof. Matias Zaldarriaga

Princeton, USA

Center for Astrophysics | Harvard & Smithsonian

Sep. 2018 - Jun. 2019

Pre-Doctoral Student with Prof. Daniel Eisenstein

Cambridge, USA

Institute of Astronomy

Oct. 2017 - Jun. 2018

Master’s Student with Dr. Blake 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

- 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", *in prep.*
- Philcox, O. H. E.** "A Faster Fourier Transform? Computing Small-Scale Power Spectra and Bispectra for Cosmological Simulations in $\mathcal{O}(N^2)$ Time", *in prep.*
- 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 ", *submitted to JCAP* (arXiv)
- Philcox, O. H. E.**, Rybizki, J. "Inferring Galactic Parameters from Chemical Abundances: A Multi-Star Approach", *ApJ* **887**, 9 (2019) (arXiv)
- 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).
- 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).
- 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)
- 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).
- 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).

- Aug. 2020 American Statistical Association (Joint Statistical Meeting, invited talk)
Inferring Galactic Parameters from Stellar Chemical Abundances
- Apr. 2020 Berkeley Center for Cosmological Physics (Journal Club)
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 (Daniel Eisenstein's 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
- Mar. 2018 CMB-S4 Conference (Argonne)
Modeling Dust Foregrounds (Contributed slides)
- Sep. 2017 Max-Planck-Institut für Astronomie (Hans-Walter Rix's Group)
Creating Objective Scores for Nucleosynthetic Yield Tables
- Sep. 2017 Heidelberg Institute for Theoretical Studies (Volker Springel's Group)
Choosing Nucleosynthetic Yield Tables for Hydrodynamical Simulations

PROFESSIONAL ACTIVITIES

- 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
TEFL Qualification in English teaching with 2 months experience in China |
| Languages | English (Native), Spanish (Conversational), Mandarin (Basic) |

REFEREES

References available on request