

PETER L. TAYLOR

<https://pltaylor16.github.io/>

EMPLOYMENT

CCAPP Fellow

2022 - Present

Center for Cosmology and Astroparticle Physics
The Ohio State University
(5-year independent fellowship)

NASA Postdoctoral Program Fellow

2019 - 2022

Jet Propulsion Laboratory
California Institute of Technology
(3-year independent fellowship)

EDUCATION

PhD, Astrophysics

2016 - 2019

Mullard Space Science Laboratory
University College London
Thesis: *Cosmological Inference with Cosmic Shear*
Supervisors: Prof. Thomas Kitching & Prof. Jason McEwen

MRes, Astrophysics

2015 - 2017

Durham University
Thesis: *On the Shape of Dark Matter Halos in the Galaxy Cluster Abell 3827 and the Scattering Cross-Section of Dark Matter*
Supervisors: Prof. Richard Massey & Prof. Mathilde Jauzac

MMATH, Mathematics

2011 - 2015

University of Oxford
Dissertation: *Kaluza-Klein Cosmologies*
Supervisor: Prof. Pedro Ferreira

PROFESSIONAL ACTIVITIES

Consortium Membership

Euclid Consortium, Roman Cosmology Science Investigation Team,
Dark Energy Survey, Dark Energy Spectroscopic Instrument,
& Rubin Dark Energy Science Collaboration

Euclid Consortium

Member, Diversity Committee	2020 - 2023
Co-Lead, Weak Lensing Forward Modelling Work Package	2019 - 2023
Consultant, Likelihood Inter-Science Task-force	2019 - Present
Science Organizing Committee, Les Houches Advanced School	2022
Internal Referee for Euclid Publications	2023-Present
Flagship Paper Authorship Rights for > 1 Year of Infrastructure Work	2023-Present

DESI

Mentorship Program	2022 - Present
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Refereeing and Reviewing

Subject-matter Expert Reviewer in NASA Proposal Peer Review	2021, 2022
Astronomy and Astrophysics	2019 - Present
Monthly Notices of the Royal Astronomical Society	2020 - Present
Journal of Cosmology and Astroparticle Physics	2021 - Present

Organizer

CCAPP Seminar Series	2023 - Present
NASA JPL Dark Sector Meetings	2020 - 2022
Mullard Space Science Laboratory Cosmology Journal Club	2017 - 2018

AWARDS

UCL Dean's Commendation Thesis Prize	2020
Faculty of Mathematical and Physical Sciences	
Alan Johnstone Award for Outstanding Graduate Research	2018
Department of Space and Climate Physics, University College London	

SELECTED GRANTS

Science-PI	2021
NASA Astrophysics Theory Program	
Leveraging Weak Gravitational Lensing - Redshift Space Distortions Cross-correlations (\$748k)	
Co-I (1 of 5, PI E Huff)	2020
JPL Internal Research and Technology Development Fund	
Mass and Motion, Tension and Concordance:	
What Are Tensions in Current Data Telling us About Dark Energy? (\$220k)	
Co-I (1 of 1, PI E Huff)	2020
JPL Internal Topic Area Proposal	
Next-Generation Weak Lensing with Hyperspectral Imaging Surveys (\$400k)	
Co-I (1 of 10, Science-I B Lee)	2020
HST Cycle 28 Archival Study	
Constraining the masses of galaxy overdensities at $z > 1$ in CANDELS and COSMOS through weak lensing in the NIR (\$751k)	
PI	2019
NASA Postdoctoral Program Fellowship	
A Next Generation Statistical Analysis for Next Generation Dark Energy Surveys (~ \$200k)	

TEACHING

Supervisor	06/22 - Present
Erik Zaborowski	
PhD Student at The Ohio State University	
NSF Graduate Research Fellowship Program (GRFP) Honorable Mention	
Invited Lecturer	06/22
<i>Euclid Advanced School, Les Houches, France</i>	
1.5 hour Lecture on Likelihoods in Cosmology	

Primary Supervisor 06/21 - 06/22
 Sebastian Tsai
 Project: *The Limits of k -cut 3×2 Point Statistics*
 Caltech Summer Undergraduate Research Fellow
 & Project Advisor for Senior Thesis at Yale
 Now Business Analyst at Mckinsey

Primary Supervisor 06/20 - 10/21
 Leah Vazsonyi
 Project: *Constraining $f(R)$ Gravity with k -cut Cosmic Shear*
 Caltech Summer Undergraduate Research Fellow
 Now PhD student at UNC Chapel Hill

Project Supervisor 6/20 - 12/20
 Anurag Deshpande
 PhD student at University College London
 Now Machine Learning Scientist at Amazon

OUTREACH & PUBLIC ENGAGEMENT EVENTS

Lead Organizer 07/19
 The Universe in Virtual Reality
 Royal Society, London

Lead Organizer 07/18
 Mullard Space Science Laboratory Work Experience Week
Week long program for high school students from underrepresented backgrounds.

Project Mentor 07/18
 Mullard Space Science Laboratory Work Experience Week

Outreach Talk 04/18
 Institute for the Arts, London

Project Mentor 07/17
 Mullard Space Science Laboratory Work Experience Week

Public Talk 06/17
 Westminster School, London

Public Demonstrator 05/17
 Mullard Space Science Laboratory 50th Anniversary Open Day

Gravitational Lensing Demonstrator 05/17
 Euclid Consortium School Science Day, London

Demonstrator 03/16
 Schools' Science Festival, Durham

Planetarium Demonstrator 10/15
 Celebrate Science Festival, Durham

PRESENTATIONS

Parity Violations from Home 2023 (selected talk, remote)	10/23
CosmoPalooza ¹ (invited, remote)	10/23
CCAPP Symposium, The Ohio State University (internal)	09/23
Lensing on Different Scales Workshop, Chicago (selected talk)	07/23
DESI Metting, Durham, UK (flash talk)	07/23
Euclid Meeting, Copenhagen (flash talk, selected, remote)	06/23
Statistical Challenges in Modern Astronomy, State College (flash talk)	06/23
Euclid Early Career Talk Series (flash talk, remote)	10/22
CCAPP Symposium, The Ohio State University (internal)	09/22
University of Turin, Italy (invited, remote)	05/22
University of Waterloo, Canada (invited, remote)	02/22
Stanford University (invited, remote)	01/22
Queen Mary University of London (invited, remote)	11/21
Duke University (invited, remote)	10/21
ICG, University of Portsmouth (invited, remote)	10/21
University of California, Santa Cruz (remote)	10/21
Lawrence Berkeley National Lab (remote)	10/21
IPAC, California Institute of Technology (invited, remote)	10/21
University of Geneva (invited, remote)	10/21
USM/LMU, Munich (invited, remote)	09/21
Postdoc Lab-wide Seminar Series, Jet Propulsion Laboratory (remote)	08/21
University of Oxford (invited, remote)	07/21
University of Arizona (invited, remote)	03/21
Stanford University (remote)	12/20
Euclid Inter-Science Task Force (IST) Nonlinear Talk Series (invited, remote)	12/20
University of Minnesota (invited, remote)	10/20
External Synergies for Rubin Community Science Workshop ¹ (invited, remote)	08/20
Euclid US Talk Series (remote)	07/20
University of Manchester, Manchester, UK (invited)	08/19
Euclid Science Ground Segment, Euclid Conference, Helsinki, Finland	06/19

¹On behalf of the Euclid Consortium

Euclid UK Meeting, University of Oxford, Oxford, UK (selected talk)	12/18
Euclid Weak Lensing and Galaxy Clustering Meeting, Milan, Italy	12/18
Alan Johnstone Prize Talk, University College London (internal)	11/18
Euclid France Weak Lensing Atelier, IAP, Paris, France (invited)	10/18
Jet Propulsion Laboratory, California Institute of Technology	08/18
MSSL, University College London (internal)	03/18
ICC/CEA, Durham University (internal)	06/16

FIRST AUTHOR PUBLICATIONS

1. **Peter L. Taylor** and Katarina Markovič. Covariance of photometric and spectroscopic two-point statistics: Implications for cosmological parameter inference. *Phys. Rev. D*, 106(6):063536, 2022.
2. **Peter L. Taylor**, Katarina Markovič, Alksitis Portsido and Eric Huff. Redshift space distortions: Unmixing radial scales in projection. *Phys. Rev. D*, 105(8):084007, 2022.
- 3.² **Peter L. Taylor** et. al. [94 co-authors]. Euclid: forecasts for k -cut 3x2 point statistics. *The Open Journal of Astrophysics*, 10.21105/astro.2012.04672, 2021.
4. **Peter L. Taylor**, Francis Bernardeau, Eric Huff. x -cut Cosmic Shear: Optimally Removing Sensitivity to Baryonic and Nonlinear Physics with an Application to the Dark Energy Survey Year 1 Shear Data. *Phys. Rev. D*, 103(4):043531, 2021.
5. **Peter L. Taylor**, Thomas D. Kitching, Justing Alsing, Benjamin D. Wandelt, Stephen M. Feeney, and Jason D. McEwen. Cosmic Shear: Inference from Forward Models. *Phys. Rev. D*, 100:023519, 2019.
6. **Peter L. Taylor**, Thomas D. Kitching, and Jason D. McEwen. Nonparametric cosmology with cosmic shear. *Phys. Rev. D*, 99:043532, 2019.
7. **Peter L. Taylor**, Francis Bernardeau, and Thomas D. Kitching. k -cut cosmic shear: Tuneable power spectrum sensitivity to test gravity. *Phys. Rev. D*, 98(8):083514, 2018.
8. **Peter L. Taylor**, Thomas D. Kitching, Jason D. McEwen, and Thomas Tram. Testing the cosmic shear spatially-flat universe approximation with generalized lensing and shear spectra. *Phys. Rev. D*, 98(2):023522, 2018.
9. **Peter L. Taylor**, Thomas D. Kitching, and Jason D. McEwen. Preparing for the cosmic shear data flood: Optimal data extraction and simulation requirements for stage iv dark energy experiments. *Phys. Rev. D*, 98:043532, 2018.
10. **Peter Taylor**, Richard Massey, Mathilde Jauzac, Frederic Courbin, David Harvey, Remy Joseph, and Andrew Robertson. A test for skewed distributions of dark matter, and a possible detection in galaxy cluster abell 3827. *Monthly Notices of the Royal Astronomical Society*, 468(4):50045013, 2017.

²Euclid Consortium Paper.

PAPERS BY STUDENTS

11. Leah Vazsonyi, **Peter L. Taylor**, Georgios Valogiannis, Nesar S. Ramachandra, Agnès Ferté, and Jason Rhodes. Constraining $f(R)$ Gravity with a k -cut Cosmic Shear Analysis of the Hyper Suprime-Cam First-Year Data. *Phys. Rev. D.*, 104(8):083527, 2021.
12. A. Deshpande, **P. L. Taylor**, and T. Kitching. Accessing the high- ℓ frontier under the reduced shear approximation with k -cut cosmic shear. *Phys. Rev. D*, 102(8):083535, 2020.

OTHER PUBLICATIONS

13. Near-IR weak-lensing (NIRWL) measurements in the CANDELS fields I: point-spread function modeling and systematics. Kyle Finner (2023) (... **Peter L. Taylor 7/8**) (*ApJ Accepted*)
14. A. Ferté (...**Peter L. Taylor 5/6**) et. al. Categorizing models using self-organizing maps: An application to modified gravity theories probed by cosmic shear. 10.21105/astro.2110.13171, 2023.
15. T. D. Kitching, A. C. Deshpande and **P. L. Taylor**. Spatially varying additive biases in cosmic shear data. *The Open Journal of Astrophysics*, 10.21105/astro.2010.07749, 2021.
16. T. D. Kitching, A. C. Deshpande, and **P. L. Taylor**. Mitigating biases in cosmic shear power spectra amplitude inference. *The Open Journal of Astrophysics*, 10.21105/astro.2110.01275, 2021.
17. A. Deshpande, T. Kitching, V. Cardone, **P. L. Taylor**, S. Casas, S. Camera, C. Carbone, M. Kilbinger, V. Pettorino, Z. Sakr, et al. Euclid: The reduced shear approximation and magnification bias for stage iv cosmic shear experiments. *Astronomy and Astrophysics*, 636, 2020.
18. Thomas D. Kitching, **Peter L. Taylor**, Peter Capak, Daniel Masters, and Henk Hoekstra. Rainbow cosmic shear: Optimization of tomographic bins. *Phys. Rev. D*, 99(6):063536, 2019.
19. Alessio Spurio Mancini, **Peter L. Taylor**, R Reischke, T. Kitching, V. Pettorino, B. M. Schafer, B. Zieser, and P. M. Merkel. 3d cosmic shear: Numerical challenges, 3d lensing random fields generation, and minkowski functionals for cosmological inference. *Phys. Rev. D*, 98(10):103507, 2018.
20. Richard Massey, David Harvey, Jori Liesenborgs, Johan Richard, Stuart Stach, Mark Swinbank, **Peter Taylor** et al. Dark matter dynamics in abell 3827: new data consistent with standard cold dark matter. *Monthly Notices of the Royal Astronomical Society*, 477(1):669677, 2018.
21. M. Jauzac, D. Eckert, J. Schwinn , D. Harvey , C. M. Baugh, A. Robertson, S. Bose, R. Massey (... **Peter Taylor 23/24**) et al. The Extraordinary Amount of Substructure in the Hubble Frontier Fields Cluster Abell 2744, *Monthly Notices of the Royal Astronomical Society*, 463(4), 3876-3893, 2016.

SUBMITTED

22. Spatial propagation of weak lensing shear response corrections. T.D. Kitching, N. Tessore, **P.L. Taylor**, arXiv:2302.14656 (2023) (*Open Journal of Astrophysics Submitted*)