

David Yallup

Kavli Institute for Cosmology, University of Cambridge

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Research Themes: Probabilistic Machine Learning, Explainable AI, Scientific applications of Machine Learning

Appointments

Kavli Institute for Cosmology, University of Cambridge

Postdoctoral Research Associate

2021-

- Cosmology, High Energy Physics, Gravitational Wave Physics.
- Accelerated Inference procedures for next generation experiments.
- Simulation Based inference, advanced MCMC algorithms, and interfacing generative AI with scientific inference problems.

Corpus Christi College, University of Cambridge

Research Associate

2022-

Associate member of college research community

Polychord Ltd.

Research Scientist

2021-

Partnered with a Cambridge spin out startup data science consultancy.

Education

UCL

PhD. Particle Physics

2015–2019

Thesis titled, “*Constraining new physics with fiducial LHC measurements.*” supervised by Prof J. Butterworth.
Recipient of UCL HEP postgraduate prize.

Durham University

MSc Particles, Strings and Cosmology

2014–2015

Durham University

MSci Natural Sciences, Maths and Physics

2009–2013

Grants

Google Cloud for Researchers

\$5k Google Compute Engine GPU credits.

2025

Kavli Foundation

£3k to host Cosmological inference in High dimension workshop.

2024

Marie Curie Early Career Researcher

£30k for academic secondment and travel grant.

2016-2019

Teaching

University of Cambridge

Part II Statistical Physics

4 groups of 2 students, ~ 40 hours

Institute of Astronomy (Maths)

2025

University of Cambridge

Part II Relativity

4 groups of 3 students, ~ 40 hours

Natural sciences tripos (Physics)

2022

University of Cambridge

Part III Projects

Primary Supervisor for 4 MSc projects, ~ 20 hours each

Natural sciences tripos (Physics)

2021-

Recent Dissemination (2024-)

ICLR - FPI Workshop

Singapore

2025

Nested Slice Sampling

BayesAI Workshop

Lancaster University

2024

Neural network advances in Nested Sampling

EU AI for Fundamental Physics Conference

Amsterdam

2024

Diffusion Meets Nested Sampling

Cavendish Astrophysics Seminar

University of Cambridge

2024

Diffusion Models for accelerated inference.

Astrophysics ML Seminar

University of Cambridge

2024

Simulation Based Inference

Notable publications ★

- [1] D. Yallup, N. Kroupa and W. Handley, *Nested slice sampling*, in *Frontiers in Probabilistic Inference: Learning meets Sampling*, 2025, <https://openreview.net/forum?id=ekbkMSuPo4>.
- [2] N. Kroupa, D. Yallup, W. Handley and M. Hobson, *Kernel-, mean-, and noise-marginalized Gaussian processes for exoplanet transits and H_0 inference*, *Mon. Not. Roy. Astron. Soc.* **528** (2024) 1232 [2311.04153].
- [3] D. Yallup and W. Handley, *Hunting for bumps in the margins*, *JINST* **18** (2023) P05014 [2211.10391].
- [4] D. Yallup, W. Handley, M. Hobson, A. Lasenby and P. Lemos, *Split personalities in Bayesian Neural Networks: the case for full marginalisation*, 2205.11151.
- [5] Yallup, David, Janßen, Timo, Schumann, Steffen and Handley, Will, *Exploring phase space with nested sampling*, *Eur. Phys. J. C* **82** (2022) 678.
- [6] P. Lemos, M. Cranmer, M. Abidi, C. Hahn, M. Eickenberg, E. Massara et al., *Robust Simulation-Based Inference in Cosmology with Bayesian Neural Networks*, in *39th International Conference on Machine Learning Conference*, 7, 2022 [2207.08435].
- [7] A. Buckley et al., *Testing new physics models with global comparisons to collider measurements: the Contur toolkit*, *SciPost Phys. Core* **4** (2021) 013 [2102.04377].
- [8] S. Amrith, J. Butterworth, F. Deppisch, W. Liu and D. Yallup, *LHC Constraints on a $B - L$ Gauge Model using Contur*, *JHEP* **05** (2019) 154 [1811.11452].
- [9] J.M. Butterworth, D. Grellscheid, M. Krämer, B. Sarrazin and D. Yallup, *Constraining new physics with collider measurements of Standard Model signatures*, *JHEP* **03** (2017) 078 [1606.05296].

★ As an ATLAS collaboration author I was an author on over 280 collaboration papers, only external small authorlist papers are listed here.