

# 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

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### 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

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### 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

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### 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

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### 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-)

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### 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 ★

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- [1] D. Yallup, M. Prathaban, J. Alvey and W. Handley, *Parallel Nested Slice Sampling for Gravitational Wave Parameter Estimation*, in *2nd European AI for Fundamental Physics Conference*, 9, 2025 [[2509.24949](#)].
- [2] T. Lovick, D. Yallup, D. Piras, A. Spurio Mancini and W. Handley, *High-Dimensional Bayesian Model Comparison in Cosmology with GPU-accelerated Nested Sampling and Neural Emulators*, [2509.13307](#).
- [3] M. Prathaban, D. Yallup, J. Alvey, M. Yang, W. Templeton and W. Handley, *Gravitational-wave inference at GPU speed: A bilby-like nested sampling kernel within blackjax-ns*, [2509.04336](#).
- [4] D. Yallup, N. Kroupa and W. Handley, *Nested slice sampling*, in *ICLR 2025: Frontiers in Probabilistic Inference*, 2025, <https://openreview.net/forum?id=ekbkMSuPo4>.
- [5] 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](#)].
- [6] D. Yallup and W. Handley, *Hunting for bumps in the margins*, *JINST* **18** (2023) P05014 [[2211.10391](#)].
- [7] D. Yallup, W. Handley, M. Hobson, A. Lasenby and P. Lemos, *Split personalities in Bayesian Neural Networks: the case for full marginalisation*, [2205.11151](#).
- [8] Yallup, David, Janßen, Timo, Schumann, Steffen and Handley, Will, *Exploring phase space with nested sampling*, *Eur. Phys. J. C* **82** (2022) 678.
- [9] 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](#)].
- [10] 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](#)].
- [11] 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](#)].
- [12] 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.*