David Yallup

Kavli Institute for Cosmology, University of Cambridge
david.yallup@gmail.com • yallup.github.io • dyallup
yallup • ORCiD: 0000-0003-4716-5817 Google Scholar: david.yallup

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
$5*k Google Compute Engine GPU credits.* *2025*

Kavli Foundation
£3*k to host Cosmological inference in High dimension workshop.* *2024*

Marie Curie Early Career Rresearcher
£30*k for academic secondment and travel grant.* *2016-2019*

Teaching

University of Cambridge **Institute of Astronomy (Maths)**
Part II Statistical Physics *2025*
4 groups of 2 students, ∼ 40 hours

University of Cambridge **Natural sciences tripos (Physics)**
Part II Relativity *2022*
4 groups of 3 students, ∼ 40 hours

University of Cambridge **Natural sciences tripos (Physics)**
Part III Projects *2021-*
Primary Supervisor for 4 MSc projects, ∼ 20 hours each

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 and W. Handley, *Nested slice sampling*, 2025.

[2] N. Kroupa, D. Yallup, W. Handley and M. Hobson, *Kernel-, mean-, and noise-marginalized Gaussian processes for exoplanet transits and H0 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.*