

Will Handley

Summary

willhandley.co.uk/CV

Cosmologist and statistician whose research programme weaves theory, observation & inference: *Nested sampling; Bayesian machine learning; cosmological model selection, parameter estimation & tension quantification; likelihood-free inference; early universe cosmology; CMB; 21cm; gravitational waves; exoplanets.*

Education

- 2012–2016 **University of Cambridge**, *PhD Astrophysics*, Prof. A. Lasenby & Prof. M. Hobson
2008–2012 **University of Cambridge**, *MSci, MA: Natural Sciences*, Gonville & Caius College
2001–2008 **Alleyn's School**, *A levels, GCSEs*, London

Employment & Research

- Oct 2024– **Associate Professor**, *Institute of Astronomy*, University of Cambridge
Oct 2020– **Royal Society University Research Fellow**, *IoA*, University of Cambridge
Bayesian machine learning and tensions in cosmology (Cavendish Lab 2020–2024)
May 2021– **Teaching Fellow**, *Gonville & Caius College*, University of Cambridge
2017– **Chief Technical Officer**, *PolyChord Ltd*, polychord.co.uk
2021–2023 **Turing Fellow**, *Alan Turing Institute*
2016–2020 **Research fellow**, *Gonville & Caius College*, University of Cambridge
Funded by Gonville & Caius College and an STFC IPS grant.
Jul-Sep 2016 **Postdoctoral researcher**, *Prof. H. Peiris*, University College London
Searching for features in the primordial power spectrum.
2012–2016 **PhD Astrophysics**, *Prof. A. Lasenby & Prof. M. Hobson*, University of Cambridge
Kinetic initial conditions for inflation: Theory, observations & methods.
2011–2012 **Part III Dissertation**, *Prof. P. Alexander*, University of Cambridge
Investigating the origins of cosmic magnetism.
Summer 2011 **Summer Research Student**, *Prof. M. Faulkes & Dr. J. Spencer*, Imperial College
Folded spectrum full configuration interaction quantum Monte Carlo.
Summer 2011 **Summer Research Student**, *Dr. R. Blumenfeld*, University of Cambridge
Geometry and field equations of granular systems.
2010–2011 **Research Review**, *Prof. S. Gull*, University of Cambridge
Literature Survey of the Physics-Philosophy crossover field of measurement theory.
Summer 2010 **iGEM Team Physicist**, *Dr. J. Haseloff*, University of Cambridge
E-glowli 2010 iGEM team (placed in final 6) <http://2010.igem.org/Team:Cambridge>

Grants won (£4.29m)

Cosmology

- £3k **Google Cloud compute award**, *GPU nested sampling research*
£1.3m **ERC starting grant** ⇒ **UKRI frontier research**, *Resolving cosmological tensions with diverse data, novel theories and Bayesian machine learning*
Oct 2024

willhandley.co.uk/ERC.pdf

£240k **Royal Society Enhancement**, *Next generation nested sampling for cosmological inference*
 £170k **Royal Society Enhancement**, *Likelihood-free inference and Bayesian neural networks*
 200kGPUh **AIRR Early Access allocation**, *Alnstein: a limited time-window trained LLM for (re)formulating modern physics*
 ≡ £80k
 52MCPUh **DiRAC RAC 15th call 2023**, *New frontiers in particle cosmology*
 ≡ £520k
 30MCPUh **DiRAC RAC 13th call 2021**, *Next generation cosmological analysis with nested sampling*
 ≡ £300k
 £723k **Royal Society URF 2020**, *Bayesian machine learning and tensions in cosmology*
 2MCPUh **DiRAC directors discretionary 2020**, *Bayesian model comparison of inflation and spatial curvature*
 ≡ £20k
 £15k **KICC Workshop 2023**, *GAMBIT at the KICC*
 £15k **KICC Workshop 2019**, *AstroHackWeek 2019*
 \$6k **George Southgate Visiting Fellowship 2020**, *GAMBIT visit*
 £2k **KICC visitors 2019**, *Likelihood free inference workshop*
 £2k **KICC visitors 2017**, *Class and MontePython workshop*

PolyChord

£260k **MSCA DTN 2023**, *GLITTER: Gnss-r sateLIITe earTh obsERvation*, PC Ltd et al
 £100k **DASA GAN 2023**, *Optimal dynamic manoeuvring & adaptation of communications networks*, PC Ltd
 £25k **DSTL CEME 2023**, *MIDAS: Maximum information data acquisition strategies*, PC Ltd
 £100k **DSTL CEME 2022**, *Further optimisation of sensor location*, PC Ltd & QML
 £60k **DSTL CEME 2021**, *Optimisation of sensor location*, PC Ltd & QML
 £10k **DSTL CEME 2020**, *Optimising search route for constrained network discovery*
 £50k **Amadeus Seed capital**, *PolyChord for protein folding*, PC Ltd
 £225k **STFC IPS 2019**, *PolyChord and Bayesian sparse facial recognition*
 £42k **STFC IAA 2018**, *PolyChord and Bayesian neural network facial recognition*
 £25k **STFC IAA 2016**, *Interfacing PolyChord 2.0*

Awards & Prizes

Jul. 2022	Pacific Institute of Theoretical Physics visitor	University of British Columbia
Feb. 2020	George Southgate visiting Fellow	University of Adelaide
Jul. 2019	Guiseppe and Vanna Cocconi Prize (WMAP and Planck)	EPS-HEPP Division
Dec. 2013	Best presentation	Cavendish grad. students conference
Jun. 2012	Best theoretical part III project	University of Cambridge
	Physics prize	Gonville & Caius College
Summer 2011	Undergraduate Research Bursary	Nuffield Foundation
	UROP Studentship	Imperial College
Summer 2010	iGEM Studentship	Wellcome Trust
2009–12	Junior and Senior Scholarships	Gonville & Caius College

Current students & postdocs

handley-lab.co.uk/group

Postdoc	Jiamin Hou, Chris Lovell, Natalie Hogg, Matt Grayling	2025-present
	David Yallup	2021-present
PhD	Charlotte Priestley	2025-present
	Toby Lovick	2024-present
	Namu Kroupa, Dily Ong, Sam Leeney	2023-present
	Metha Prathaban, Wei-Ning Deng, Sinah Legner	2022-present
	Adam Ormondroyd	2021-present

Previous students & postdocs

PhD

Aug 2024	Kilian Scheutwinkel , <i>Simulation-based Bayesian machine learning methods for Cosmology and beyond</i> co-supervised with Eloy de Lera Acedo
Aug 2024	George Carter , <i>The Bayesian Global Sky Model (B-GSM)</i> co-supervised with Nima Razavi-Ghods & Mark Ashdown
Mar 2024	Thomas Gessey-Jones , <i>Probing the First Stars with the 21-cm Signal: Theory, Methods, and Forecasts</i> co-supervised with Eloy de Lera Acedo & Anastasia Fialkov
Dec 2023	Ian Roque , <i>EXCALIBRATE: Calibration for astrophysical experimentation</i> co-supervised with Nima Razavi-Ghods
Jun 2023	Harry Bevins , <i>A Machine Learning-enhanced Toolbox for Bayesian 21-cm Data Analysis and Constraints on the Astrophysics of the Early Universe</i> co-supervised with Eloy de Lera Acedo and Anastasia Fialkov
Jul 2022	Dominic Anstey , <i>Data Analysis in Global 21cm Experiments: Physically Motivated Bayesian Modelling Techniques</i> co-supervised with Eloy de Lera Acedo
Sep 2021	Fruzsina Agocs , <i>Primordial evolution of cosmological perturbations: Theory and computation</i> co-supervised with Mike Hobson & Anthony Lasenby
Aug 2021	Will Barker , <i>Gauge Theories of Gravity</i> co-supervised with Mike Hobson & Anthony Lasenby
Dec 2020	Lukas Hergt , <i>Constraining the kinetically dominated Universe</i> co-supervised with Mike Hobson & Anthony Lasenby
Oct 2018	Ed Higson , <i>Bayesian Methods and machine Learning in Astrophysics</i> co-supervised final year with Mike Hobson & Anthony Lasenby
Individual projects	Thomas McAloon (2020-21), Isidro Gómez Vargas (2020), Ayngaran Thavenesan (2021-22)

MPhil

Sep 2023	Danielle Dineen , <i>Cosmological Matching Conditions for Primordial Perturbations</i>
Jan 2023	Allahyar Sahibzada , <i>Machine Learning and Nested Sampling: in the context of data intensive science and cosmology</i>
Nov 2022	Sam Leeney , <i>Data science in early universe Cosmology: a novel Bayesian RFI mitigation approach using numerical sampling techniques</i> co-supervised with Eloy de Lera Acedo
Aug 2020	Emma Shen , <i>Ionospheric Effects in the Global 21-cm Experiment</i> co-supervised with Eloy de Lera Acedo & Anastasia Fialkov

- Aug 2019 **Ian Roque**, *Bayesian Techniques for the Calibration of 21 cm Global Experiments*
co-supervised with Nima Razavi-Ghods
- Aug 2018 **Panagiotis Mavrogiannis**, *Wheeler–Feynman absorber theory of radiation: Establishing the cosmological electrodynamic arrow of time*
co-supervised with Anthony Lasenby

MSci

- 2025 Harvey Williams, Krish Nanavati, Ming Yang, Will Templeton, Charlotte Priestley
- 2024 Nicolas Mediato Diaz, Samuel Hewson, Felicity Ibrahim, Patrick Lau, Tze Goh
- 2023 Zixiao Hu, Cole Meldorf, Sankalan Bhattacharyyan, Toby Lovick
- 2022 Yoann Launay, Oliver Normand, Xy Wang, Carola Zanoletti
- 2021 Yi Jer Loh, Metha Prathaban
- 2020 Thomas Gessey-Jones, Aleks Petrosyan
- 2019 Deaglan Bartlet, Jamie Bamber, Ian Roque
- 2018 Ward Haddadin, Jessica Rigley
- 2017 Fruzsina Agocs, Robert Knighton, Stephen Pickman, Daniel Manela

Summer students

- 2024 Charlotte Priestley
- 2023 Zixiao Hu, Toby Lovick, Namu Kroupa
- 2022 Mary Letey, Beichen Xu, Artyom Baryshnikov
- 2021 Zak Shumaylov, Mattia Varrone
- 2019 Denis Werth, Maxime Jabarian, Liam Lau
- 2018 Elizabeth Guest, Ward Haddadin, Shu-Fan Chen

Postdocs

- 2024 Thomas Gessey-Jones
- 2020 Jianghui Lui
- 2018-19 Kamran Javid

Lecturing

- 2021-2023 Part III Physics: Relativistic Astrophysics & Cosmology *MSci 24 lecture course*
- 2017-2021 Bayesian Statistics *Graduate 2 lecture course*

Workshops

- 2025 **GPU-native nested sampling in BlackJAX**, *For simulation-based inference at scale*, SBI Galaxy Evolution 2025, Bristol
github.com/handley-lab/workshop-blackjax-nested-sampling
- 2025 **AI/ML Tools for Research**, *KICC Workshop*, July 2025
github.com/williamjameshandley/talks
- 2025 **An Introduction to Artificial Intelligence and Large Language Models, Part II/III students**, February 2025
docs.google.com/presentation
- 2023 **Monte Carlo Methods**, *For Cosmology and Particle Physics*, UNAM, Mexico
github.com/handley-lab/workshop-monte-carlo-methods
- 2022 **ICCS**, *Training Machine Learning models*, Cambridge, UK
github.com/handley-lab/2022-cambridge-iccs
- 2018 **CosmoTools**, *Introduction to Statistics*, Aachen, Germany
indico.cern.ch/e/CosmoTools2018

2017 **CosmoTools**, *Cosmological statistics & sampling*, IFT Madrid, Spain
workshops.ift.uam-csic.es/cosmotools2017

Small group teaching

2020–present	Part III Physics: Relativistic Astrophysics and Cosmology	<i>Supervising (24 hours)</i>
2013–present	Part II Physics: General relativity	<i>Supervising (156 hours)</i>
2023–present	Part II Physics: Statistical Mechanics	<i>Supervising (28 hours)</i>
2012–2017	Part IA Mathematics for NatSci	<i>Tripes classes (20 hours), Supervising (580 hours)</i>
2015–2016	Part IA Physics	<i>Supervising (20 hours)</i>
2013	Part II Theoretical Physics 1 & 2	<i>Demonstrating (8 hours)</i>
2006–2012	Maths and Science Tuition	<i>Individual coaching, key stage 1 – STEP</i>

Academic Talks willhandley.co.uk/talks † = remote

- Jul. 2025 **A Statistician's Guide to the Galaxy (Fitting Zoo)**, *Future of SED Fitting Workshop*, Cambridge, UK
github.com/williamjameshandley/talks
- Jun. 2025 **GPU Accelerated Nested Sampling**, *Newton Institute workshop*, Cambridge, UK
github.com/williamjameshandley/talks
- Jun. 2025 **lsbi: linear simulation based inference**, *EUCAIFCON 2025*, Sardinia
github.com/williamjameshandley/talks
- May. 2025 **GPU-native nested sampling in BlackJAX: For simulation-based inference at scale**, *SBI Galaxy Evolution 2025*, Bristol
github.com/williamjameshandley/talks
- May. 2025 **Scanning for cosmological tensions across a DiRAC-enabled grid of models, datasets and samplers**, *Cosmoverse 2025*, Italy
github.com/williamjameshandley/talks
- Jan. 2025 **Cosmological tensions? A guide for high energy theorists**, *DAMTP HEP group*, Cambridge, UK
github.com/williamjameshandley/talks
- Jan. 2025 **Theory meets experiment 2025: New frontiers in particle cosmology**, *Rencontres du Vietnam*, Quy Nhon, Vietnam
github.com/williamjameshandley/talks
- Dec. 2024 **Next-generation statistical inference tools: Simulation-based inference, marginal statistics & accelerated nested sampling**, *Towards a realistic detection of Primordial Gravitational Wave Backgrounds*, Madrid, Spain
github.com/williamjameshandley/talks
- Oct. 2024 **PolySwyft: a sequential simulation-based nested sampler**, *Global 21cm workshop 2024*, Raman Research Institute, Bangalore, India
github.com/williamjameshandley/talks
- Sep. 2024 **lsbi: linear simulation based inference**, *PhyStat: Statistics meets ML*, Imperial college London, UK
github.com/williamjameshandley/talks
- Aug. 2024 **Nested sampling: powering next-generation inference and machine learning tools for astrophysics, cosmology, particle physics and beyond**, *University of Sydney*, Sydney, Australia
github.com/williamjameshandley/talks
- Aug. 2024 **Sampling methods for high energy physics & particle astrophysics**, *XVIth Quark Confinement and the Hadron Spectrum*, Cairns, Australia
github.com/williamjameshandley/talks

- Aug. 2024 **Nested sampling: powering next-generation inference and machine learning tools for astrophysics, cosmology, particle physics and beyond**, *University of Queensland*, Brisbane, Australia
github.com/williamjameshandley/talks
- Jul. 2024 **Nested sampling: powering next-generation inference and machine learning tools for astrophysics, cosmology, particle physics and beyond**, *RWTH*, Aachen, Germany
github.com/williamjameshandley/talks
- Jul. 2024 **PolySwyft: a sequential simulation-based nested sampler**, *CosmoVerse 2024*, Krakow, Poland
github.com/williamjameshandley/talks
- Jul. 2024 **The scaling frontier of nested sampling**, *MaxEnt 2024*, Ghent, Belgium
github.com/williamjameshandley/talks
- Jun. 2024 **Resonant or asymmetric: The status of sub-GeV dark matter**, *Dark Matter in Astrophysical Laboratories*, Cambridge, UK
github.com/williamjameshandley/talks
- May. 2024 **Next generation astrophysical inference across the interdisciplinary frontier**, *UCL job talk*, UCL, UK[†]
github.com/williamjameshandley/talks
- May. 2024 **PolySwyft: a sequential simulation-based nested sampler**, *PhyStat 2024*, CERN, Switzerland
github.com/williamjameshandley/talks
- Apr. 2024 **Next generation astrophysical inference across the interdisciplinary frontier**, *IoA job talk*, Cambridge, UK
github.com/williamjameshandley/talks
- Mar. 2024 **Nested sampling: powering next-generation inference and machine learning tools for astrophysics, cosmology, particle physics and beyond**, *Gatsby computational neuroscience unit*, UCL, UK
github.com/williamjameshandley/talks
- Feb. 2024 **Sampling techniques in high-dimensional parameter spaces with ScannerBit 2.0**, *ORIGINS data science cluster*, Munich, Germany
github.com/williamjameshandley/talks
- Jan. 2024 **Next-generation inference tools for cosmology and beyond**, Oxford, UK
github.com/williamjameshandley/talks
- Jan. 2024 **Simulation Based Inference: theory, sampling & model comparison**, *RAS*, London, UK
github.com/williamjameshandley/talks
- Dec. 2023 **Nested sampling: powering next-generation inference and machine learning tools for astrophysics, cosmology, particle physics and beyond**, *UNAM*, Mexico City, Mexico
github.com/williamjameshandley/talks
- Nov. 2023 **Bayesian OODA loops with MIDAS: Augmented decision making in a complex future electromagnetic environment**, *OFEME 2023*, Nottingham, UK
- Oct. 2023 **unimpeded: Universal model comparison and parameter estimation distributed over every dataset**, *Oscar Klein Center*, Stockholm, Sweden
github.com/williamjameshandley/talks
- Oct. 2023 **Nested sampling: powering next-generation inference and machine learning tools for cosmology, particle physics and beyond**, *Manchester*, UK
github.com/williamjameshandley/talks
- Sep. 2023 **Nested sampling tools**, *REACH AGM*, Malta
github.com/williamjameshandley/talks

- Sep. 2023 **Nested sampling: powering next-generation inference and machine learning tools for cosmology, particle physics and beyond** , *UCL*, UK
github.com/williamjameshandley/talks
- Aug. 2023 **Nested sampling: powering next-generation inference and machine learning tools for cosmology, particle physics and beyond** , *KCL*, UK
github.com/williamjameshandley/talks
- Jul. 2023 **The scaling frontier of nested sampling: Summary talk**, *MaxEnt*, Munich, Germany
github.com/williamjameshandley/talks
- Jun. 2023 **Gradients and Nested Sampling: the present state of the art**, *MIAPbP*, Munich, Germany
github.com/williamjameshandley/talks
- Mar. 2023 **Nested Sampling: A multi-purpose numerical tool for science and machine learning**, *ETH Zurich*, Switzerland
github.com/williamjameshandley/talks
- Jan. 2023 **Nested sampling: powering the next-generation of Bayesian inference tools for cosmology, particle physics and beyond**, *Cavendish job talk*, Cambridge, UK
- Jan. 2023 **High dimensional nested sampling**, *Simulation based inference with swyft*, Amsterdam, Netherlands
github.com/williamjameshandley/talks
- Jan. 2023 **What is the benefit of adversarial systems?**, *Mathematical Challenges in the Electromagnetic Environment*, London, UK
- Dec. 2022 **Theory, observation & cosmological inference**, *KICC christmas*, Cambridge, UK
github.com/williamjameshandley/talks
- Sep. 2022 **Next generation cosmological analysis with nested sampling**, *KICC Symposium*, Cambridge, UK
github.com/williamjameshandley/talks
- Sep. 2022 **Next generation cosmological analysis with nested sampling**, *Corfu2022: Tensions in Cosmology*, Corfu, Greece
github.com/williamjameshandley/talks
- Aug. 2022 **Dark matter, cosmology and likelihood-free Inference**, *GAMBIT XIV*, Kelowna, Canada
- Jul. 2022 **Nested Sampling: An efficient and robust Bayesian inference tool for particle physics and cosmology** , *TRIUMF & UBC*, Vancouver, Canada
github.com/williamjameshandley/talks
- Jul. 2022 **Frontiers of Nested Sampling**, *MaxEnt 2022*, Paris, France
github.com/williamjameshandley/talks
- Apr. 2022 **Nested Sampling and Likelihood-free inference**, *Likelihood-free in Paris*, Paris, France
github.com/williamjameshandley/talks
- Apr. 2022 **Statistical methods in Cosmology**, *Obs. and Theor. 21-cm Cosmology*, Cambridge, UK
github.com/williamjameshandley/talks
- Jan. 2022 **PolyChord: Next generation nested sampling**, *UK Atomic Energy Authority*, UK[†]
- Nov. 2021 **Review on Statistical Tools and Samplers**, *TOOLS 2021*, IP2I, Lyon, France[†]
github.com/williamjameshandley/talks
- Jul. 2021 **Success Story 2 — Optimum Sensor Placement**, *Mathematical Challenges in the Electromagnetic Environment*, Isaac Newton Institute, Cambridge, UK
- Jul. 2021 **Success Story 1 — Detecting Illicit Mesh Networks**, *Mathematical Challenges in the Electromagnetic Environment*, Isaac Newton Institute, Cambridge, UK
- Mar. 2021 **PolyChord: Novel Bayesian Machine Learning**, *Cambridge Data Science Fair*, UK[†]

- Feb. 2021 **Bayesian methods for quantifying global parameter tensions between cosmological datasets**, *Tehran meeting on cosmology at the crossroads*, Tehran, Iran[†]
github.com/williamjameshandley/talks
- Jan. 2021 **Bayesian information fusion**, *Mathematical Challenges in the Electromagnetic Environment*, Isaac Newton Institute, Cambridge, UK[†]
- Oct. 2020 **Nested Sampling: an efficient and robust Bayesian inference tool for 21cm cosmology**, *3rd Global 21-cm Workshop*, Cambridge, UK[†]
github.com/williamjameshandley/talks
- Sep. 2020 **Nested Sampling for optimising sensor location**, *Mathematical Challenges in the Electromagnetic Environment*, Isaac Newton Institute, Cambridge, UK[†]
- Feb. 2020 **Nested Sampling: an efficient and robust Bayesian inference tool for physics and machine learning**, *Physics Colloquium*, Adelaide, Australia
github.com/williamjameshandley/talks
- Jan. 2020 **Nested Sampling: an efficient and robust Bayesian inference tool for astrophysics and cosmology**, Oxford, UK
github.com/williamjameshandley/talks
- Jan. 2020 **PolyChord: next generation nested sampling**, *Mathematical Challenges in the Electromagnetic Environment*, Isaac Newton Institute, Cambridge, UK
- Dec. 2019 **Quantised primordial power spectra**, *Texas 2019*, Portsmouth, UK
github.com/williamjameshandley/talks
- Nov. 2019 **Nested Sampling: an efficient and robust Bayesian inference tool for Machine Learning and Data Science**, *CDT talk*, Cambridge, UK
github.com/williamjameshandley/talks
- Aug. 2019 **Curvature tension: evidence for a closed universe(?)**, ICG Portsmouth, UK
github.com/williamjameshandley/talks
- Jul. 2019 **Quantifying cosmological tensions**, University College London, UK
github.com/williamjameshandley/talks
- Jun. 2019 **Likelihood free inference**, *GAMBIT X*, Germany
github.com/williamjameshandley/talks
- Mar. 2019 **Compromise-free Bayesian sparse reconstruction**, *LFI workshop*, Flatiron institute, US
github.com/williamjameshandley/talks
- Dec. 2018 **Inflation, curvature and kinetic dominance**, *Future uses of Planck data*, ESAC, Spain
github.com/williamjameshandley/talks
- Nov. 2018 **BAMBI Resurrection: Blind Accelerated Multimodal Bayesian Inference**, *Dark Machines*, Worldwide[†]
github.com/williamjameshandley/talks
- Nov. 2018 **Nested Sampling: an efficient and robust Bayesian inference tool for cosmology and particle physics**, *Dark Machines*, Worldwide[†]
github.com/williamjameshandley/talks
- Oct. 2018 **Bayesian Statistics**, *Third Asterics-Obelics workshop*, Cambridge, UK
github.com/williamjameshandley/talks
- May. 2018 **Planck, inflation and the future of inflationary constraints**, *Consistency of Cosmological Datasets*, Cambridge, UK
github.com/williamjameshandley/talks
- May. 2018 **MaxEnt priors with derived parameters in a specified distribution**, Cambridge, UK
github.com/williamjameshandley/talks

- May. 2018 **Nested Sampling: an efficient and robust Bayesian inference tool for astrophysics and cosmology**, ICIC, UK
github.com/williamjameshandley/talks
- April. 2018 **Introduction to statistics**, *CosmoTools 18*, RWTH Aachen, Germany
github.com/williamjameshandley/talks
- Jan. 2018 **Advances in Nested Sampling & astrophysical application**, Cambridge, UK
- Aug. 2017 **PolyChord 2.0: Fast inference & nested sampling**, *Cosmo17*, Paris, France
- Jun. 2017 **Modern Bayesian Inference: Theory and Practice**, RWTH Aachen, Germany
github.com/williamjameshandley/talks
- Mar. 2017 **Parameter estimation and Model comparison**, *CosmoTools 17*, Madrid, Spain
github.com/williamjameshandley/talks
- Feb. 2017 **PolyChord 2.0: Advances in Nested Sampling & astrophysical application**, Flatiron institute, US
github.com/williamjameshandley/talks
- Sep. 2016 **PolyChord 2.0 & the future of nested sampling**, University College London, UK
github.com/williamjameshandley/talks
- May. 2016 **PolyChord 2.0 & the future of nested sampling**, University of Sussex, UK
github.com/williamjameshandley/talks
- Mar. 2016 **PolyChord & the future of nested sampling**, Edinburgh, UK
github.com/williamjameshandley/talks
- Dec. 2015 **PolyChord: next generation nested sampling**, *MPA Bayes Forum*, Munich, Germany
github.com/williamjameshandley/talks
- Feb. 2015 **PolyChord: next generation nested sampling**, University of Sussex, UK
- Dec. 2013 **Kinetic dominance in the pre-inflationary universe**, Cavendish grad. conference

Selected Outreach

Over the course of my career I have given 19 public outreach talks including:

- May 2015 **Intro. to Astronomy: Beyond the Milky Way**, *IoA Public Talk*, Cambridge
- May 2015 **To infinity and beyond: Dark Energy**, *Pint of Science*, Cambridge Brewhouse
- Feb 2014 **The Physics of Juggling**, *CCPE*, Cavendish Laboratory
- Jan 2014 **The first 3 yocto-pico seconds**, *Three minute wonder*, Cavendish Laboratory

Leadership development

- Mar.–Sep. 2025 **Cambridge Leading Researchers Programme**, *Competitively selected pilot cohort*, 64 Million Artists & University of Cambridge
Multi-institutional leadership development programme with workshops and individual coaching
- 2017 **Impulse**, *STFC-funded entrepreneurship programme*, Cambridge Enterprise & Maxwell Centre
Technology commercialization training with mentoring, IP guidance, and grant application support

Institutional responsibilities

Summer 2025–present	Chair of AI working group	<i>Gonville & Caius college</i>
2024–present	Teaching committee	<i>Institute of Astronomy</i>
2024–present	CPAC (CATAM) committee	<i>University of Cambridge</i>
2024	CASU steering committee	<i>Institute of Astronomy</i>
2020–present	Convener of CosmoBit	<i>GAMBIT</i>

2020–2024	Leader of data analysis team	REACH
2021–present	Center for data-driven discovery (C2D3) steering committee	University of Cambridge
2025–present	CamCEAD Strategy Committee	University of Cambridge
2022–present	KICC Scientific Strategy Committee	KICC
2022–present	KICC Visitor and Lecturer committee	KICC
2018–present	Science Research Fellowships committee	Gonville & Caius college
2018–present	Investments committee	Gonville & Caius college
2016–present	Undergraduate Admissions	Gonville & Caius college
2020–present	Wine Committee (WSET3)	Gonville & Caius college
2019–2022, 2024–present	Gonville & Caius College Council	Gonville & Caius college
2021–2023	CDT in data intensive science executive committee	University of Cambridge
2018–2020	Education and research committee	Gonville & Caius college
2017–2022	Organiser of weekly group seminars	Cavendish astrophysics group

Examination

2024–	Senior Examiner, Astrophysics, Part II
2024–	CATAM coordinator, Astrophysics, Part II
2021–2023	Exam setting, Relativistic Astrophysics and Cosmology, Part III Physics
2020–2022	Masters exam checking, Astrostatistics, Part III Maths

PhD

2025	Emilie Hertig , <i>Probes of cosmic inflation: from the CMB to quantum analogues</i>
Jul 2025	Matthew Craigie , <i>Interpretable and Physically-Motivated Deep Learning Solutions for Large-Scale Structure Cosmology</i>
May 2024	Stefan Heimersheim , <i>Constraining reionization: Evidence from 21 cm limits and predictions for fast radio bursts</i>
Dec 2023	Lester Sandles , <i>Star-forming Galaxies and Quenched Systems throughout Cosmic Time</i>
Dec 2021	Wu Hyun Sohn , <i>High-resolution CMB bispectrum estimator</i>

First year reports (probationary reviews)

Sep 2025	Mohammad-Hadi Sotoudeh
Aug 2025	Edward Stevenson
Nov 2023	Yuchen Liu
Mar 2023	Dily Ong
Aug 2022	Yu Hsuan Shen

Second year reports

Jul 2025	Alexander Byrne
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MPhil

Sep 2020	Kyriakos Stylianiopoulos , <i>Machine Learning Applied to Gaia and Other Survey Data: Applications Supporting a Polarisation Survey</i>
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Organisation of scientific meetings

2025	LoC member for IOP Joint APP and HEPP Annual Conference 2025	Cavendish
2024	Cosmological Inference in High Dimension	KICC
2023	GAMBIT at the KICC	KICC
2023	Frontiers of nested sampling	Munich

2023	Simulation based inference workshop (delayed from 2019)	KICC
2020	Scientific organising committee member of 3 rd Global 21-cm Workshop	KICC
2019	Local organising committee member of KICC 10 th anniversary symposium	KICC
2019	Helped secure funding and organised AstroHack week 2019	KICC
2018	Secured funding for and organised CLASS+MontePython software workshop	KICC

Peer review

Performed 78 reviews for journals including Physical Review D and Physical Review Letters;

<https://www.webofscience.com/wos/author/record/S-9134-2018>

PRD (34), MNRAS (7), JCAP (8), PRL (8), JOSS (2), APJ (2), EPJC (1), PLB (6), RASTI (2) Entropy (4), Astronomy & Computing (2), Physics of the Dark Universe (2)

Review for fellowship awards:

2022	C2D3 Early Career Researcher Seed Fund
2022	ABTA UK Doctoral Research Award
2022	Blavatnik fellowship
2021–	Gonville & Caius Junior Research Fellowships

Collaborations

2018–present	REACH	astro.phy.cam.ac.uk/research/research-projects/reach
2018–present	GAMBIT	gambit.hepforge.org
2018–2020	DarkMachines	darkmachines.org
2017–2018	Terra Hunter Experiment	terra hunting.org
2016–2017	CORE	core-mission.org
2015–2016	AMI	astro.phy.cam.ac.uk/research/research-projects/AMI
2015–2019	Planck	cosmos.esa.int/web/planck

Software

willhandley.co.uk/software

PolyChord	Sole author and maintainer: github.com/PolyChord/PolyChordLite
anesthetic	Principle author and maintainer: github.com/handley-lab/anesthetic
lsbi	Principle author and maintainer: github.com/handley-lab/lsbi
unimpeded	Principle author and maintainer: github.com/handley-lab/unimpeded
fgivenx	Sole author and maintainer: github.com/handley-lab/fgivenx
pyBAMBI	Team maintainer: github.com/DarkMachines/pyBAMBI
MultiNest	Maintainer: github.com/farhanferoz/MultiNest
primordial	Sole author and maintainer: github.com/williamjameshandley/primordial
ModeCode	Maintainer: modecode.org
Open source	scipy: Weighted kernel density estimation in <code>scipy.stats.gaussian_kde</code> matplotlib: Vertical slider in <code>matplotlib.widgets.Slider</code>

Interaction with industry

PolyChord	2017–: Founded start-up company PolyChord Ltd. to bring Bayesian methods & tools from cosmology to Machine Learning & Biotech industries: polychord.co.uk
CMAM	2017–2023: Consulted for finance spin-out on Bayesian algorithmic trading
Shell	2016: Worked with department postdocs in the department applying nested sampling to geophysics

AnyVision 2019–2020: Worked collaboratively as part of STFC grant to apply Bayesian sparse reconstruction to facial recognition

Interaction with Government

- 2020– DSTL: Consult for government defence research using Bayesian inference
- 2024 Workshop participant in national security resilience in the future electromagnetic environment
- 2025 AI consult to the UK Technology Advisor (Dave Smith)
- 2025 Invited participant: "11 Years of Resistance: Advancing the UK–Ukraine Strategic Partnership" conference, London

In the media

- 2022 **Cavendish Laboratory News**, *What can astrophysical data-intensive science do beyond the Universe?*, PolyChord, the next generation optimisation technology
<https://www.phy.cam.ac.uk/news/what-can-astrophysical-data-intensive-science-do-beyond-universe-polychord-next-generation>
- 2022 **BBC Radio 4**, *The Third Degree*, Astrophysics Don
"Students vs Dons" BBC radio quiz aired July 2022
- 2020 **Quanta Magazine**, *Modified gravity in cosmology led by Will Barker*
quantamagazine.org/why-is-the-universe-expanding-so-fast-20200427/
- 2022 **KICC annual report**, *Bringing astrostatistics back to Earth*
kicc.cam.ac.uk/aboutus/kicc-annual-reports
- 2019 **KICC annual report**, *Compromise-free Bayesian cosmology & AstroHack week*

Computer skills

- Programming MPI parallelisation, C++, FORTRAN, Mathematica, Maple, Python
- Computing Unix, Bash, zsh, vim, git, svn, L^AT_EX, TikZ, VMs, CI, LLMs (Claude, Gemini, GPT)
- OS Arch Linux & HPC supercomputing (Experienced), Windows & OSX (Familiar)

References

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