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Will Handley

Education

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

Research Experience

2016–present **Research fellow**, *Gonville & Caius College*, University of Cambridge.
Jul-Sep 2016 **Postdoctoral position**, *Prof. H. Peiris*, University College London.
Searching for features in the primordial power spectrum.
Apr-Jul 2016 **Research Associate**, University of Cambridge.
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

Awards & Prizes

Jun. 2018	Gruber Prize (co-shared with Planck)	*Gruber Foundation*
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*

Teaching

2017-present	Bayesian Statistics	*Graduate lecture course*
2013–2018	Part II Physics: General relativity	*Supervising*
2012–2017	Part IA Mathematics for NatSci	*Supervising, Tripos classes*

2013	Part II Theoretical Physics 1 & 2	*Demonstrating*
2006–2012	Maths and Science Tuition	*Individual coaching, key stage 1 — STEP*

Supervision of graduate students and postdoctoral fellows

Post-Doc	Kamran Javid	*2018-present*
PhD	Ed Higson, Lukas Hergt, Fruzsina Agocs, Will Barker	*2016-present*
Masters	Deaglan Bartlet, Jamie Bamber	*2018-present*
	Ward Haddadin, Jessica Rigley, Panagiotis Mavrogiannis	*2017-2018*
	Fruzsina Agocs, Robert Knighton, Stephen Pickman, Daniel Manela	*2016–2017*
Summer	Elizabeth Guest, Ward Haddadin, Shu-Fan Chen	*2018*

Grants won

£25,000 **STFC IAA 2016**, *Interfacing PolyChord 2.0*.

£2,000 **KICC visitors 2017**, *Class and MontePython workshop*.

£42,000 **STFC IAA 2018**, *PolyChord and Bayesian Neural network facial recognition*.

£1,500 **King's + Kavli**, *Summer student funding*.

£15,000 **KICC Workshop 2019**, *AstroHack week 2019*.

Academic Talks

Dec. 2018 **Inflation, curvature and kinetic dominance**, *Future uses of Planck data*, ESAC, Spain.

Nov. 2018 **BAMBI Resurrection: Blind Accelerated Multimodal Bayesian Inference**, *Dark Machines*, Worldwide.

Nov. 2018 **Nested Sampling: an efficient and robust Bayesian inference tool for cosmology and particle physics**, *Dark Machines*, Worldwide.

Oct. 2018 **Bayesian Statistics**, *Third Asterics-Obelics workshop*, Cambridge, UK.

May. 2018 **Planck, inflation and the future of inflationary constraints**, *Consistency of Cosmological Datasets*, Cambridge, UK.

May. 2018 **MaxEnt priors with derived parameters in a specified distribution**, Cambridge, UK.

May. 2018 **Nested Sampling: an efficient and robust Bayesian inference tool for astrophysics and cosmology**, ICIC, UK.

April. 2018 **Introduction to statistics**, *CosmoTools 18*, RWTH Aachen, Germany.

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.

Mar. 2017 **Parameter estimation and Model comparison**, *CosmoTools 17*, Madrid, Spain.

Feb. 2017 **PolyChord 2.0: Advances in Nested Sampling & astrophysical application**, CCA, US.

Sep. 2016 **PolyChord 2.0 & the future of nested sampling**, University College London, UK.

May. 2016 **PolyChord 2.0 & the future of nested sampling**, University of Sussex, UK.

Mar. 2016 **PolyChord & the future of nested sampling**, Edinburgh, UK.

Dec. 2015 **PolyChord: next generation nested sampling**, Max Planck Institute, Germany.

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.
Jan. 2014 **The first 3 yocto-pico seconds**, *Three minute wonder*, Cavendish Laboratory.

Institutional responsibilities

2017–present	Organiser of internal weekly group seminars	*Cavendish astrophysics group*
2018–present	Education and research committee	*Gonville & Caius college*
2018–present	Investments committee	*Gonville & Caius college*
2016–present	Undergraduate Admissions	*Gonville & Caius college*

Organisation of scientific meetings

2018	Secured funding for and organised CLASS+MontePython software workshop	*KICC*
2019	Secured funding for AstroHack week 2019	*KICC*

Collaborations

2018–present	GAMBIT	*gambit.hepforge.org*
2018–present	DarkMachines	*darkmachines.org*
2017–present	Terra Hunter Experiment	*terrahunting.org*
2016–2017	CORE	*core-mission.org*
2015–2016	AMI	*mrao.cam.ac.uk/outreach/radio-telescopes/ami*
2015–2018	Planck	*cosmos.esa.int/web/planck*

Software

PolyChord	Sole author and maintainer: github.com/PolyChord/PolyChordLite
pyBAMBI	Team maintainer: github.com/DarkMachines/pyBAMBI
fgivenx	Sole author and maintainer: github.com/williamjameshandley/fgivenx
ModeCode	Maintainer: modecode.org
MultiNest	Maintainer: github.com/farhanferoz/MultiNest
Open source	scipy: Weighted kernel density estimation in scipy.stats.gaussian_kde
	matplotlib: Vertical slider in matplotlib.widgets.Slider

Interaction with industry

PolyChord	Founded start-up company PolyChord Ltd. to bring Bayesian methods & tools from cosmology to Machine Learning & Biotech industries: polychord.co.uk
Shell	Work with department postdocs in the department applying nested sampling to geophysics
Tesco	Consultancy work applying Bayesian inference to supply-chain management
CMAM	Consult for local finance company on Bayesian algorithmic trading

Computer skills

Programming	MPI parallelisation, C++, FORTRAN, Mathematica, Maple, Python
Computing	Unix, Bash, zsh, vim, git, svn, LaTeX, Ti*k*Z, VMs
OS	Arch Linux & HPC supercomputing (Experienced), Windows & OSX (Familiar)

References

Prof. Anthony Lasenby, +44 (0)1223 337293/4, a.n.lasenby@mrao.cam.ac.uk,
Prof. Mike Hobson, +44 (0)1223 339992, mph@mrao.cam.ac.uk

Prof. Hiranya Peiris, +44 (0)203 5495831, h.peiris@ucl.ac.uk

Publications

[1] W. Handley, M. Hobson, and A. Lasenby, MNRAS **453**, 4384 (2015), arXiv:1506.00171 .
[2] W. Handley, M. Hobson, and A. Lasenby, MNRAS **450**, L61 (2015), arXiv:1502.01856 .
[3] W. J. Handley, M. P. Hobson, and A. N. Lasenby, ASCL (2015), ascl:1502.011 .
[4] W. Handley, S. Brechet, A. Lasenby, and M. Hobson, PRD **89**, 063505 (2014), arXiv:1401.2253 .
[5] W. Handley, A. Lasenby, and M. Hobson, arXiv (2016), arXiv:1612.02288 .
[6] W. Handley, A. Lasenby, and M. Hobson, PRD **94**, 024041 (2016), arXiv:1607.04148 .
[7] W. Handley and M. Millea, ArXiv e-prints , arXiv:1804.08143 (2018), arXiv:1804.08143 .
[8] W. Handley, The Journal of Open Source Software **3** (2018), 10.21105/joss.00849.
[9] J. S. Spencer, N. S. Blunt, S. Choi, J. Etrych, M.-A. Filip, W. M. C. Foulkes, R. S. T. Franklin, W. J. Handley, F. D. Malone, V. A. Neufeld, R. Di Remigio, T. W. Rogers, C. J. C. Scott, J. J. Shepherd, J. Weston, W. A. Vigor, R. Zu, and A. J. W. Thom, ArXiv e-prints , arXiv:1811.11679 (2018), arXiv:1811.11679 [physics.comp-ph] .
[10] W. E. Barker, A. N. Lasenby, M. P. Hobson, and W. J. Handley, ArXiv e-prints (2018), 1811.09844 .
[11] R. D. Hall, S. J. Thompson, W. Handley, and D. Queloz, MNRAS **479**, 2968 (2018).
[12] W. I. J. Haddadin and W. J. Handley, ArXiv e-prints (2018), 1809.11095 .
[13] L. T. Hergt, W. J. Handley, M. P. Hobson, and A. N. Lasenby, ArXiv e-prints (2018), 1809.07737 .
[14] L. T. Hergt, W. J. Handley, M. P. Hobson, and A. N. Lasenby, ArXiv e-prints (2018), 1809.07185 .
[15] E. Higson, W. Handley, M. Hobson, and A. Lasenby, ArXiv e-prints (2018), 1809.04598 .
[16] A. J. K. Chua, S. Hee, W. J. Handley, E. Higson, C. J. Moore, J. R. Gair, M. P. Hobson, and A. N. Lasenby, MNRAS **478**, 28 (2018).
[17] E. Higson, W. Handley, M. Hobson, and A. Lasenby, ArXiv e-prints (2018), 1804.06406 .
[18] G.-B. Zhao, M. Raveri, L. Pogosian, Y. Wang, R. G. Crittenden, W. J. Handley, and et al., Nature Astronomy **1**, 627 (2017).
[19] S. Hee, J. A. Vázquez, W. J. Handley, M. P. Hobson, and A. N. Lasenby, MNRAS **466**, 369 (2017).
[20] E. Higson, W. Handley, M. Hobson, and A. Lasenby, ArXiv e-prints (2017), 1704.03459 .
[21] E. Higson, W. Handley, M. Hobson, and A. Lasenby, ArXiv e-prints (2017), 1703.09701 .
[22] C. Rumsey, M. Olamaie, Y. C. Perrott, H. R. Russell, F. Feroz, K. J. B. Grainge, W. J. Handley, M. P. Hobson, R. D. E. Saunders, and M. P. Schammel, MNRAS **460**, 569 (2016).
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[25] CORE collaboration, Journal of Cosmology and Astro-Particle Physics **2018**, 022 (2018).
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[44] Planck Collaboration, ArXiv e-prints (2018), 1801.04945 .

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