

# Dr David James Mulryne

Astronomy Unit, Queen Mary University of London, Mile End Road, E1 4NS  
email: [d.mulryne@qmul.ac.uk](mailto:d.mulryne@qmul.ac.uk) tel: +44 20 7882 7046 web: [davidmulryne.net](http://davidmulryne.net)

---

## EDUCATION AND QUALIFICATIONS

Postgraduate Degree (2003 – 2006)	Astronomy Unit, Queen Mary University of London. PhD in theoretical cosmology. Thesis: ‘The dynamics of cosmological models inspired by quantum gravity’ supervised by Prof. J. E. Lidsey and Prof. R. Tavakol.
Degree (1999 – 2003)	Christ’s College, University of Cambridge. MA and MSci in physical natural sciences, specialising in theoretical physics. Part Ia (1st), Part Ib (1st), Part II (2.1) and Part III (1st).

## EMPLOYMENT HISTORY AND DUTIES

Queen Mary (2014 – present)	Royal Society university research fellow and proleptic lecturer.
Queen Mary (2011 – 2014)	Postdoctoral researcher in the School of Physics and Astronomy, Queen Mary University of London.
Imperial College (2009 – 2010)	Postdoctoral researcher in the Theoretical Physics Group at Imperial College, London.
DAMTP, Cambridge (2006-2009)	Postdoctoral researcher in the Department of Applied Mathematics and Theoretical Physics, University of Cambridge.

## AWARDS AND OTHER ACHIEVEMENTS

Research fellowship	Royal Society university research fellowship.
Scholarships	QinetiQ university scholarship during my undergraduate studies.
Prizes	Scholar of Christ’s College Cambridge, college prizes in 2000, 2001 and 2003. Anne Cook Prize, Queen Mary, 2005, for presentation of my PhD research.
Other	Nominated a FreshMinds ‘one to watch’, 2003. Accepted onto University of Cambridge’s ‘rising stars’ programme, 2007.

## RESEARCH HIGHLIGHTS

Papers	Author of 26 research papers. H-index of 17. Five papers with over 50 citations.
Nature reviews	Nature reviewed my paper ‘An emergent universe from a loop’ – M. Bojowald, ‘Original questions’, <a href="#">Nature, 2005</a> . Nature Physics reviewed my paper ‘Superinflation in Loop Quantum Cosmology’ as a research highlight, 2007.
Invited review	In 2007, I was invited by the editors of Classical and Quantum Gravity to write a review for their focus issue on string cosmology – D. Mulryne and J. Ward, ‘Towards an observational appraisal of string cosmology’.

- Grant successes I hold a Royal Society university research fellowship. ‘Inflationary cosmology after Planck and the LHC’. Value  $\sim$ £550k. Previously, as the ‘named post-doc’, in 2011 I wrote the research proposal for an extension to the inflationary cosmology project within the Astronomy Unit’s STFC consolidated grant application. The extension was funded, worth  $\sim$ £150k. As an ‘international advisor’ I co-authored with PI Nelson Nunes an ‘Explorations 2013’ Portuguese grant application. The project was funded worth  $\sim$ €40k.
- Invited visits I am regularly invited and funded by institutes abroad to visit. Occasions include: Heidelberg, 1 week, 2009, 2010 and 2011; Helsinki, 1 week, 2011 and 2013, 1 month, 2014; Perimeter Institute, 1 week, 2013. Lisbon, 2 weeks, 2014.

## TEACHING AND OUTREACH

- Lecturing I wrote and lectured part of a course on theoretical physics for the Cambridge Institute of Continuing Education, 2008. In 2013, I covered lecturing duties for part of K. Malik’s cosmology course, Queen Mary.
- Other teaching Since 2003, I have undertaken other teaching duties in a wide range of subjects including teaching classes in quantum mechanics and differential equations whilst at Queen Mary, and C++ computing classes at Imperial.
- PhD/MSc Supervision I regularly supervise PhD research projects: Mariam Shaeri (Nottingham); Stefano Orani (Imperial); Joseph Elliston (Queen Mary). And masters research theses: Tommy Cusack, 2011; Ajith Dharmakeerthi, 2012; Andy Gilbert 2013; Shailee Varsha Imrith, 2014.
- Outreach I have a strong belief in the importance of outreach work. Activities include: being accepted onto the ‘Rising Stars’ programme, which seeks to advance the communication skills of early career researchers, Cambridge, 2007; an invited public lecture for the Mathematics Millennium Project, Cambridge, 2008; regularly speaking to visiting students at Cambridge, Imperial College and Queen Mary 2008-2014; lecturing at the Goldsmiths summer astrophysics course for teachers, 2011-2014; videos for [facultimedia.com](http://facultimedia.com), 2013; speaking at A Pint of Science, 2014; writing [Plus Magazine articles](#), 2014.

## SEMINARS AND CONFERENCES

- Recent talks Recent conference talks include: London Cosmology Discussion Meeting, 2012, 2013 and 2014; Marcel Grossmann Meeting, Stockholm, 2012; Helsinki workshop on perturbations post Planck, 2013 (*invited speaker*); COSMO, Cambridge, 2013; Royal Society funded workshop on non-Gaussianity post Planck, 2013 (*invited speaker*); IOP meeting on B-modes and primordial gravitational waves, 2014 (*invited speaker*). In addition I have given recent invited research talks at: Heidelberg, 2011; Helsinki, 2011, 2013 and 2014; Queen Mary, 2011 and 2012; Portsmouth, 2012; Sussex, 2013; Oxford, 2013; Perimeter Institute, 2013; Imperial, 2014; Nottingham 2014; Lisbon 2014.
- Organisation Active member of the organising committee for the Cambridge Centre for Theoretical Cosmology’s workshop on gravitational waves, 2009. Seminar organiser for the London relativity and cosmology seminar series at Queen Mary 2012-2014. Organiser of the joint cosmology seminar series, Cambridge, 2007-2009.

## LIST OF PAPERS (30)

The convention in cosmology is for authors to be listed alphabetically unless there is a clear difference in the contributions of the authors. PDF versions for the majority of the list below can be found at [arXiv.org](http://arXiv.org). Citations are as measured by [inSPIRE](http://inspire.hepnet.org).

### Primary papers (26):

J. Elliston, S. Orani and **D. J. Mulryne**, *General analytic predictions of two-field inflation and perturbative reheating*, submitted to Phys. Rev. D, arXiv:1402.4800 [astro-ph.CO].

2 Citations.

J. Ellis, N. E. Mavromatos, **D. J. Mulryne**, *Exploring Two-Field Inflation in the Wess-Zumino Model*, accepted by JCAP, arXiv:1401.6078 [astro-ph.CO].

4 Citations.

J. Elliston, **D. J. Mulryne** and R. Tavakol, *What Planck does not tell us about inflation*, Phys. Rev. D 88, 063533 (2013), arXiv:1307.7095 [astro-ph.CO].

6 Citations.

**D. J. Mulryne**, *Transporting non-Gaussianity from sub to super-horizon scales*, JCAP 1309, 010 (2013), arXiv:1302.3842 [astro-ph.CO].

8 Citations

**D. J. Mulryne**, J. Noller and N. Nunes, *Three-form inflation and non-Gaussianity*, JCAP 1212, 016 (2012), arXiv:1205.0024 [astro-ph.CO].

4 Citations

G. J. Anderson, **D. J. Mulryne** and D. Seery, *Transport equations for the inflationary trispectrum*, JCAP 1210, 019 (2012), arXiv:1205.0024 [astro-ph.CO].

12 Citations

J. Elliston, L. Alabidi, I. Huston, **D. J. Mulryne** and R. Tavakol, *Large trispectrum in two-field slow-roll inflation*, JCAP 1209, 001 (2012), arXiv:1203.6844 [astro-ph.CO].

14 Citations

D. Seery, **D. J. Mulryne**, J. Frazer and R. H. Ribeiro, *Inflationary perturbation theory is geometrical optics in phase space*, JCAP 1209, 010 (2012), arXiv:1203.2635 [astro-ph.CO].

22 Citations

**D. J. Mulryne**, S. Orani and A. Rajantie, *Non-Gaussianity from the hybrid potential*, Phys. Rev. D 84, 123527 (2011), arXiv:1107.4739 [hep-th].

24 Citations

J. Elliston, **D. J. Mulryne**, D. Seery and R. Tavakol, *Evolution of  $f_{\text{NL}}$  to the adiabatic limit*, JCAP 1111, 005 (2011), arXiv:1106.2153 [astro-ph.CO].

52 Citations

**D. J. Mulryne** and J. Ward, *Towards an observational appraisal of string cosmology*, Class. Quant. Grav. 28, 204010 (2011), arXiv:1105.5421 [astro-ph.CO].

5 Citations

**D. J. Mulryne**, D. Seery and D. Wesley, *Moment transport equations for the primordial curvature pertur-*

*bation*, JCAP 1104, 030 (2011), arXiv:1008.3159 [astro-ph.CO].

32 Citations

M. Bojowald, W. Nelson, **D. J. Mulryne** and R. Tavakol, *The high-density regime of kinetic-dominated loop quantum cosmology*, Phys. Rev. D 82, 124055 (2010), arXiv:1004.3979 [gr-qc].

13 Citations

**D. J. Mulryne**, D. Seery and D. Wesley, *Non-Gaussianity constrains hybrid inflation*, arXiv:0911.3550 [astro-ph.CO].

15 Citations

**D. J. Mulryne**, D. Seery and D. Wesley, *Moment transport equations for non-Gaussianity*, JCAP 1001, 024 (2010), arXiv:0909.2256 [astro-ph.CO].

31 Citations

N. Barnaby, **D. J. Mulryne**, N. J. Nunes and P. Robinson, *Dynamics and stability of light-like tachyon condensation*, JHEP 0903, 018 (2009), arXiv:0811.0608 [hep-th].

21 Citations

E. J. Copeland, **D. J. Mulryne**, N. J. Nunes and M. Shaeri, *The gravitational wave background from super-inflation in loop quantum cosmology*, Phys. Rev. D 79, 023508 (2009), arXiv:0810.0104 [astro-ph].

42 Citations

**D. J. Mulryne** and N. J. Nunes, *Diffusing non-local inflation: Solving the field equations as an initial value problem*, Phys. Rev. D 78, 063519 (2008), arXiv:0805.0449 [hep-th].

39 Citations

E. J. Copeland, **D. J. Mulryne**, N. J. Nunes and M. Shaeri, *Super-inflation in loop quantum cosmology*, Phys. Rev. D 77, 023510 (2008), arXiv:0708.1261 [gr-qc].

57 Citations

F. C. Mena, **D. J. Mulryne** and R. Tavakol, *Non-linear vector perturbations in a contracting universe*, Class. Quant. Grav. 24, 2721 (2007), gr-qc/0702064.

14 Citations

**D. J. Mulryne** and N. J. Nunes, *Constraints on a scale invariant power spectrum from superinflation in LQC*, Phys. Rev. D 74, 083507 (2006), astro-ph/0607037.

32 Citations

J. E. Lidsey and **D. J. Mulryne**, *A graceful entrance to braneworld inflation*, Phys. Rev. D 73, 083508 (2006), hep-th/0601203.

29 Citations

**D. J. Mulryne**, R. Tavakol, J. E. Lidsey and G. F. R. Ellis, *An emergent universe from a loop*, Phys. Rev. D 71, 123512 (2005), astro-ph/0502589.

97 Citations

**D. J. Mulryne**, N. J. Nunes, R. Tavakol and J. E. Lidsey, *Inflationary cosmology and oscillating universes in loop quantum cosmology*, Int. J. Mod. Phys. A 20, 2347 (2005), gr-qc/0411125.

32 Citations

J. E. Lidsey, **D. J. Mulryne**, N. J. Nunes and R. Tavakol, *Oscillatory universes in loop quantum cosmology and initial conditions for inflation*, Phys. Rev. D 70, 063521 (2004), gr-qc/0406042.

80 Citations

M. Bojowald, J. E. Lidsey, **D. J. Mulryne**, P. Singh and R. Tavakol, *Inflationary cosmology and quantization ambiguities in semiclassical loop quantum gravity*, Phys. Rev. D 70, 043530 (2004), gr-qc/0403106.

63 Citations

**Proceedings (4):**

**D. J. Mulryne**, *Transport techniques for non-Gaussianity*, to appear in Proceedings of 13th Marcel Grossmann Meeting (2012), arXiv:1302.4636 [astro-ph.CO].

J. Elliston, **D. J. Mulryne**, D. Seery and R. Tavakol, *Evolution of non-Gaussianity in multi-scalar field models*, Int. J. Mod. Phys. A 26, 3821 (2011), arXiv:1107.2270 [astro-ph.CO].

19 Citations

N. J. Nunes and **D. J. Mulryne**, *Non-linear non-local cosmology*, AIP Conf. Proc. 1115, 329 (2009), arXiv:0810.5471 [astro-ph].

21 Citations

**D. J. Mulryne** and R. Tavakol, *Some cosmological consequences of Loop Quantum Gravity*, Proceedings of 11th Marcel Grossmann Meeting (2006).

**Thesis:**

**D. J. Mulryne**, *The dynamics of cosmological scenarios inspired by quantum gravity*, University of London (2006), [qmro.qmul.ac.uk/jspui/handle/123456789/1763](http://qmro.qmul.ac.uk/jspui/handle/123456789/1763).

**InSpire citation summary:**

Total number of citable papers analysed: 29

Total number of citations: 790

Average citations per paper: 27.2

Well-known papers (50-99): 5

h-index: 17