Dr. Andrew J. Tolley

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Positions

2006 - Present: Distinguished Research Fellow (5yr position),
Perimeter Institute for Theoretical Physics, Waterloo, Canada.
Research interests: Early Universe Cosmology, Dark Energy, Modified Gravity, Strings, Extra Dimensions and Branes.

2003 - 2006: Postdoctoral Research Associate,
Princeton University, Department of Physics.
Member of Prof. Paul Steinhardt's group.

Education

1999 - 2003: **Cambridge University**, Gonville and Caius College.
PhD. in Theoretical Cosmology, Department of Applied Mathematics and Theoretical Physics.
Advisor: Prof. Neil Turok. Thesis title 'From big-crunch to big-bang'.

1995 - 1999: **Oxford University**, Jesus College. MPhys (Hons) Physics.
Degree result: 1st class Honours. Highest mark in University.
Final year specialization: Theoretical Physics, Condensed Matter Physics, Fluid dynamics.

1988 - 1995: **Newcastle-under-Lyme School.**
Awarded 5 Grade A A Levels and 10 Grade A GCSE's.

Academic Experience

- Regular referee for Physical Review Letters, Nuclear Physics **B**, Physics Letters **B**, Physical Review **D**, Journal of Cosmology and Astroparticle Physics, Journal of High Energy Physics, Classical and Quantum Gravity, Astroparticle Physics, Foundations of Physics, General Relativity and Gravitation.
- Member of the Cosmology Postdoc Recruitment (2007-2009)
- Chair of Library Committee at Perimeter Institute. (2007-2008)
  Oversaw expansion and restructuring of library.
- Member of Long Term Visitor Committee at Perimeter Institute. (2008-2009)
- Member of *John Brodie Memorial Prize* committee. (2009-2010)
- Organizer of 'String Cosmology Seminar' series in Princeton/IAS. (2003-2005) and 'Gravity Group' talks (Princeton physics department). (2004-2005)
- Organizer of Student Seminars (Cambridge University). (2000-2001)

Workshops/Summer Schools organized

- Lead organizer of five-week 'Holographic Cosmology' workshop and four day 'Holographic Cosmology' conference held at Perimeter Institute (June-July 2009).
- Organizer of Perimeter Institute Summer School: 'Exploring the Cosmological Frontiers', held at Perimeter Institute (June-July 2009). With Prof. R. Myers and Prof. J. Khoury.

- Lead organizer of 'Effective Field Theory and Inflation' workshop held at Perimeter Institute (May 2009). With Prof. R. Holman and Prof. C. Burgess.
- Organizer of 'Effective Field Theory and Cosmology' workshop to be held at University of Michigan (March 7-11 2010). With Prof. Scott Watson, Prof. C. Burgess and Prof. Finn Larsen.
- Organizer of PI-CITA workshop (May 2009).
- Organizer of 'Cosmological Frontiers' workshop to be held at Perimeter Institute (June 14-17 2010).

Teaching Experience

- Invited Lecturer for **Troisième Cycle de la Physique en Suisse Romande** - *Dark energy and Dark gravity.* (To take place Fall 2010) http://www.cuso.ch/3e-cycle/physique.html
- Invited Lecturer for **ICTP Summer School in Cosmology**- *Dark energy and Dark gravity.* (To take place July 2010)
- Lecturer for **Perimeter Scholars International (PSI)** Masters course - *Explorations in Cosmology.* (To take place March - April 2010) www.perimeterscholars.org/psi-info.html
- Supervisor for PI undergraduate summer student project (Jennifer Lin). (May to August 2009)
- **CMB/LSS school, Pune India** Lectured at broad summer school on non-minimal models of inflation. (August 2008)
- **Nordita, Stockholm.** Lecturer at focused summer school on de Sitter cosmology. Contributed over 15 hours of lectures on the topic of dark energy and the cosmological constant. (August 2008)
- **Perimeter Institute.** Lectured the cosmology component of a credit course 'New Horizons in Fundamental Physics' for University of Waterloo and Guelph final year physics undergraduates, introducing them to current research topics in cosmology. (2008)
- **Princeton University.** Preceptor for Phys 102.
  Involved lecturing, setting quizzes/examinations. (2005)
- **Cambridge University.** Supervisor for undergraduate mathematics courses, Part IA, IB and II. (1999-2002)
- Private tutor for A-level Mathematics and Chemistry (1996-1998) via *Jacari* scheme, and US Princeton High School Mathematics. (2003)

Selected Invited Talks

- University of Geneva (April 2009): 'Dynamics in the Dark'.
- Perimeter Institute (March 2009): 'Dynamics in the Dark'.
- Case Western Reserve University (March 2009): 'Dynamics in the Dark' (**Colloquium**).
- Mitchell Institute, Texas A + M (November 2008): 'Cascading gravity'.
- PI/CITA day, Perimeter Institute (October 2008): 'Cascading Perturbations' .
- CMB/LSS workshop, Pune (August 2008): 'Cascading Gravity'.
- Carnegie Mellon University (June 2008): 'Stochastic DBI-inflation'.
- Nordita, Stockholm, (May 2008): 'Stochastic DBI-Inflation'.
- University of Nottingham, (May 2008): 'Cascading Gravity'.
- Perimeter Institute, (February 2008): 'New Era for Cosmic Inflation' (**Colloquium**).
- UC Davis, (October 2007): 'Enhanced Non-Gaussianity from Excited Initial States'.
- Oxford University, (June 2007): 'Extra dimensions and Dark Energy'.

- University of Michigan, Ann Arbor, (April 2007): 'Transplankian effects and non-gaussianity'.
- University of North Carolina, (March 2007): 'What branes and extra dimensions can do for cosmology' (**Colloquium**).
- ISCAP, Columbia (Oct 2005): 'Dynamics of codimension two branes'.
- Harvard University, (Feb 2005): 'String propagation in a big-crunch/big-bang spacetime'.
- Institute for Advanced Study, Princeton, (Nov 2003): 'Cosmological Perturbations in a big-crunch/big–bang spacetime'.

Selected conference presentations

- Holographic Cosmology Workshop, McGill University (October 2009): 'Review talk on holographic cosmology'.
- *Plenary Speaker* at Cosmo 2009, CERN, Geneva (September 2009): 'Dark Energy'.
- PSI-G workshop on IR modifications of gravity, APC Paris (November 2008): 'Tensing the ghost in cascading gravity'.
- Cosmological Frontiers in Fundamental Physics, APC Paris (May 2008): 'Stochastic/Thermal Tunneling in Non-minimal kinetic theories'.
- Perimeter Institute Novel Ideas workshop, (March 2008): 'Constraining initial state non-gaussianity via backreaction'.
- Cosmo 2007, University of Sussex (August 2007): 'Stochastic Inflation revisited: Non-slow roll statistics and DBI inflation'.
- Cosmo 2006, California (Sept 2006): 'Mimicking Lambda with a spin-two ghost condensate'.
- PI/CITA workshop, CITA Toronto (Dec 2005): 'Bulk singularities and the Effective cosmological constant for Higher co-dimension branes'.
- Cosmo 2005, Bonn (Aug 2005): 'String pair production in a Time-dependent gravitational field'.
- Workshop in string phenomenology, Perimeter Institute (April 2005): 'String propagation in a big-crunch/big-bang spacetime'.
- Oxford-Princeton Cosmology Meeting (Jan 2004):'Cosmological Perturbations in a big-crunch/big-bang spacetime'.
- UK Cosmology Meeting, Queen Mary (2004): 'Quantum Field theory in a big-crunch/big-bang spacetime'.

Awards and Prizes

- Distinguished Research Fellow at Perimeter Institute (2007).
- Smith-Knight Prize for Essay on Current Research (2000).
- Scott Prize for Highest Mark Awarded in Final Examination (1999).
- Scholar, Jesus College, Oxford (1996 - 1999). Numerous academic achievement awards.
- MInstP, Member of the Institute of Physics.
- Mathematical Scholarship, Newcastle-under-Lyme School (1993-1995).

Skills

- Languages: English (native), French (GCSE level), German (GCSE level).
- Computer Skills: Mathematica, Maple, Fortran, Unix, Linux, LaTeX, HTML.
  Developed codes for analysis of astronomical data while at AAO.

Personal Interests

Music

Choral Singing: Member of *Kitchener-Waterloo Grand Philharmonic Choir* (Tenor).
Recent performances: 'Handel's Messiah' and 'The Triumph of the Human Spirit', music by Chatman, Brahms and Beethoven, at 'Centre in the Square' in Kitchener, Ontario.
Toured with *Jesus College Choir, Oxford* to Prague, Switzerland, Dublin.
CD Recorded *'Steal Away to Jesus'*.
Instrumental: Awarded Piano Grade 7, Clarinet Grade 7, Music Theory Grade 7, under the Associated Board of the Royal Schools of Music.

Sports

Running, swimming.

Referees

Prof. Gia Dvali
European Organization for
Nuclear Research
TH-Division, CERN CH-1211
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Prof. Cliff Burgess
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Prof. Paul Steinhardt
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Prof. Fernando Quevedo
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