

# Dr Andrew David Brooke-Taylor

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## Major areas of interest:

- Set theory: large cardinal axioms and forcing
- Applications of set theory to other areas, particularly category theory and algebraic topology

## Education:

- 2005-2007      Doctorate, University of Vienna  
                  Thesis title: *Large cardinals and L-like combinatorics*  
                  Advisor: Professor Sy Friedman
- 2001-2005      Work towards PhD, MIT  
                  Advisors: Professor Haynes Miller (algebraic topology)  
                              Professor Gerald Sacks (set theory)  
                  Transferred to the University of Vienna (see above) to complete my doctorate.
- 1997-2000      Bachelor of Science with Honours, The Australian National University  
                  Honours thesis title: *Derived Categories*  
                  Advisor: Professor Amnon Neeman  
                  Received a University Medal

## Professional Experience:

- From October 2011: JSPS fellow, Kobe University.
- March 2008 – September 2011: Research Fellow, University of Bristol.
- September 2007 – March 2008: Teaching Fellow, University of Bristol.
- December 1998 – February 1999: Computer Programmer, MAGMA computer algebra group, University of Sydney.

**Scholarly Articles:**

1. (With Joan Bagaria, University of Barcelona) On colimits and elementary embeddings. In preparation.
2. (With Damiano Testa, Oxford University) Fraïssé limits for infinite relational languages. In preparation.
3. (With Benedikt Löwe, University of Amsterdam, and Birgit Richter, University of Hamburg) Finding concrete elements in the complement of **cBA** in **DL**. Typeset notes that have been distributed to experts; will probably form part of a later paper. September 2010.
4. (With Sy Friedman, University of Vienna) Subcompact cardinals, squares, and stationary reflection. Submitted to the *Israel Journal of Mathematics*.
5. Indestructibility of Vopěnka's Principle. *Archive for Mathematical Logic* 50 no. 5 (2011), pp 515—529.
6. Large cardinals and definable well-orders on the universe. *Journal of Symbolic Logic* 74 no. 2 (June 2009), pp 641—654.
7. (With Sy Friedman, University of Vienna) Large cardinals and gap-1 morasses. *Annals of Pure and Applied Logic* 159 no. 1-2 (2009), pp 71—99.

**Awards and Honours:**

- Dean's Educational and Student Advising Award, MIT, 2005.
- Invited panelist, *Better teaching @ MIT* series, 2005.
- Graduate Presidential Fellowship, MIT, 2001.
- University Medal, The Australian National University, 2000.

**Service and Leadership:**

- On the committee choosing the winner of the Peregrine Prize for the best undergraduate project, University of Bristol 2011.
- Organiser, GRASP workshop on the consistency of Reinhardt cardinals (September 2011, University of Bristol).  
GRASP workshops draw in 6 leading mathematicians alongside two from the University of Bristol for intensive work attacking an important open problem.
- Organiser, Young Set Theory Workshop 2011 (Königswinter near Bonn, Germany).  
These workshops bring together about 70 young set theorists and four invited tutorial speakers from around the world to learn from and work with each other.
- Chair of the Programme Committee, Young Set Theory Workshop 2010.
- Refereeing for *Mathematical Logic Quarterly* and *Journal of the European Mathematical Society*.

**Talks:**

## Invited conference talks:

- *Unprepared Indestructibility*, RIMS Set theory workshop, Kyoto, October 2011.
- *Large cardinals and colimits*, Workshop on large cardinal methods in homotopy theory, September 2011, Barcelona.
- *The limits of large cardinal compatibility for  $\square$* , Set theory special session, Logic Colloquium 2011, July 2011, Barcelona.
- *Unprepared Indestructibility*, 3<sup>rd</sup> European Set Theory Meeting, July 2011, Edinburgh.
- *Squares, stationary reflection and subcompact cardinals*, Torino Set Theory Workshop, November 12, 2010.
- *Consistency results for Vopěnka's Principle*, Young Set Theory Workshop 2009, Barcelona.
- *Large cardinals and definable well-orderings of the universe*, Set Theory & its Neighbours 16, 2007 London.

## Invited mini-course:

- 12 hour mini-course over 3 days at the University of East Anglia on the topic of *Large cardinals and forcing*, June 2010.

## Invited seminar talks:

- *Indestructibility of Vopěnka's Principle*, City University of New York (CUNY) Logic Workshop, November 2010.
- *Vopěnka's Principle: a useful strong axiom*, City College of New York (CCNY) Colloquium, November 2010.
- *Vopěnka's Principle: a useful large cardinal axiom*, Oxford University Logic Seminar, November 2010.
- *Fraïssé limits for a kind of "locally finite" Fraïssé class*, Kurt Gödel Research Center for Mathematical Logic, University of Vienna, May 2010.
- *Indestructibility of Vopěnka's Principle*, University of Leeds Logic Seminar, 2009.

Other conference talks. Slides for most of these talks are available on my website,  
<http://kurt.scitec.kobe-u.ac.jp/~andrewbt>

- *Subcompact cardinals, squares, and stationary reflection*, Czech Winter School in Abstract Analysis: Section Set Theory, Hejnice, 2011.
- *Fraïssé limits for infinite languages*, International Congress of Mathematicians satellite conference on Logic and Set Theory, Chennai, 2010.
- *Indestructibility of Vopěnka's Principle*, Czech Winter School in Abstract Analysis: Section Topology, Hejnice, 2010.
- *Indestructibility of Vopěnka's Principle*, Indian School in Logic and its Applications, Hyderabad, 2010.
- *A new zero-one law for simplicial complexes*, 10th Asian Logic Conference, Kobe, 2008.
- *Forcing to get universal morasses*, Workshop on Combinatorial and Descriptive Set Theory, Kyoto, 2008.
- *Definable Well-Ordering, the GCH, and Large Cardinals*, Logic Colloquium 2007, Wrocław.
- *Forcing while preserving 1-extendibles*, Logic Colloquium 2006, Nijmegen.

**Teaching Experience:**

## Project Supervision:

- A 3<sup>rd</sup> year undergraduate student project on *Large cardinals and category theory*, University of Bristol, 2010-11.
- Two MSc (4<sup>th</sup> year undergraduate) level student projects on *Ramsey-type large cardinal axioms*, University of Bristol, 2008-09. One of my students won the prize for best project that year.

## Graduate Course Lecturing:

- Forcing for independence proofs, Taught Course Centre, first semester 2010-11. ~6 students.  
The “Taught Course Centre” is a collaboration between the Mathematics Departments of the Universities of Bristol, Bath, and Warwick, Imperial College London, and Oxford University. Graduate level courses are teleconferenced between the Universities, giving graduate students access to a broad range of classes. I developed this course entirely myself. As of writing this CV, the course webpage is still available online at <http://www.maths.bris.ac.uk/~maadb/ForcingClass.html>

## Undergraduate Course Lecturing:

- Logic, University of Bristol, first semester 2007-8. ~100 students, 3<sup>rd</sup> year undergraduate.
- Mathematical Methods for Engineers, MIT, Summer 2003 and Summer 2004. ~20 students each year, 2<sup>nd</sup> year undergraduate level.
- Linear Algebra, MIT, Summer 2002. ~20 students, 1<sup>st</sup> or 2<sup>nd</sup> year undergraduate.

## Tutoring:

- 1st year pure mathematics, University of Bristol, Semester 1, 2007-8. Two groups of 6 students.
- Linear Algebra, MIT, Fall Semester 2004. ~30 students, 1<sup>st</sup> or 2<sup>nd</sup> year undergraduate.
- Mathematical writing class, MIT, 2003-4. Two classes of ~10 students, 2<sup>nd</sup> year advanced stream undergraduate.
- Calculus with Theory, MIT, 2002-3. Two classes of ~10 students, 1<sup>st</sup> year undergraduate.
- Second year Calculus, James Cook University, Semester 1, 2001. ~100 students, with tutorials run by multiple tutors.
- In-house mathematics tutor, John XXIII College, The Australian National University, 1998-2000. Regular meetings with 2–6 students, various year levels and degree courses.

## Class Coordination:

- Linear Algebra, MIT, Fall Semester 2004. ~100 students, 1<sup>st</sup> and 2<sup>nd</sup> year undergraduate.