

Nathan Barker MMath (Dunelm)

School of Mathematics & Statistics,
Herschel Building Room 4.07,
Newcastle University,
Newcastle upon Tyne,
NE1 7RU,
United Kingdom

Phone: +44(0)191 222 7286
nathan.barker@ncl.ac.uk
<http://www.students.ncl.ac.uk/nathan.barker/>

Education

PhD student, Mathematics, Newcastle University. Supervisors: Prof. Sarah Rees and Dr Alina Vdovina (2008-2012). *Topics in Algebra: The Higman-Thompson group $G_{2,1}$ and Beauville p -groups.*

MMath, University of Durham, 2008 (First Class Honors)

A-Levels, The Mosslands School, 2004

Mathematics	A
Further Mathematics	A
Physics	A
Chemistry	A
General Studies	A

Honors and Awards

Baxter Prize for academic achievement, Hatfield College, University of Durham, 2007

Baxter Prize for academic achievement, Hatfield College, University of Durham, 2006

Baxter Prize for academic achievement, Hatfield College, University of Durham, 2005

Unilever Award for outstanding achievement at A-Level, The Mosslands School, 2004

Publications

1. (online first Monatsh. Math. February 2011) New Examples of Beauville surfaces, with Nigel Boston, Norbert Peyerimhoff, Alina Vdovina. DOI: 10.1007/s00605-011-0284-6
2. (accepted Experimental Math. February 2012) A note on Beauville p -groups, with Nigel Boston and Ben Fairbairn. DOI:10.1080/10586458.2012.669267

Current Work

1. (submitted May 2011) An algebraic approach to centralizers and the simultaneous conjugacy problem in the Higman-Thompson group $G_{2,1}$.
2. (preprint August 2011) Regular algebraic surfaces isogenous to a higher product constructed from group representations using projective planes, with Nigel Boston, Norbert Peyerimhoff, Alina Vdovina. arXiv:1109.6053v1 [math.GR].
3. (in-preparation 2012) Automorphisms of the higher dimensional Thompson groups nV , with Collin Bleak.
4. (preprint August 2011) The power conjugacy problem in the Higman-Thompson group $G_{n,r}$.
5. (preprint August 2011, not for publication) Studying the automorphism group of the Higman-Thompson group $G_{2,1}$ using universal algebra.
6. (preprint May 2011, not for publication) Symbol decompositions for elements of Thompson's group F .

Events and Conferences organized

LMS Northern meeting and Workshop, Newcastle University 12th-14th April 2010 (postgraduate coordinator/day-to-day running, main organizer Dr Andrew Duncan, Newcastle University).

Pure Mathematics Postgraduates Conference 2010, Newcastle University 15th April 2010 (main organizer).

Joint Durham-Newcastle postgraduate afternoon of talks, Newcastle University 31st March 2011 (co-organizer).

NBGGT Meeting, 30th November 2011, Newcastle University (co-organizer).

Beauville surfaces and groups conference 2012, Newcastle University 7th-9th June 2012 (local organizer).

Grants and Funding

EPSRC grant for Ph.D. funding for 3.5 years.

Partial funds for travel to attend Infinite group theory conference (CUNY), New York City, October 2009.

LMS Grant Ref 8904. Funding for a postgraduate conference in Newcastle April 2010, £3050 (application supported by Andrew Duncan).

Support (from Newcastle University Mathematics School), for Durham-Newcastle Afternoon of talks (at Newcastle University Mathematics School), March 2011.

Funded postgraduate participant of LMS/EPSRC Durham Symposium on Geometry and Arithmetic of Lattices, Durham University, July 2011.

Research visit, Departament de Matemàtica Aplicada IV Universitat Politècnica de Catalunya, Barcelona, Spain, April 2011, (to visit Prof. Jose Burillo).

Research visit, School of Mathematics and Statistics, University of St Andrews, Scotland, 13th-15th December 2011 (to visit Dr Collin Bleak).

Talks

Postgraduate Seminar, Newcastle University 2009 - Galois Theory.

Postgraduate Seminar, Newcastle University 2009 - A Finitely Presented Infinite Simple Group.

Geometry Seminar, Durham University 2010 - Diagrams and Conjugacy in Thompson's group F .

Postgraduate Mathematics Event, Newcastle University 2010 - An introduction to Expanders.

Geometry and Algebra Seminar, Newcastle University 2010 - Finitely generated torsion-free abelian subgroups of $G_{2,1}$.

Postgraduate Seminar, Newcastle University 2010 - DNA and Knots.

Durham-Newcastle Afternoon, Newcastle University 2011 - New Beauville Surfaces.

Seminari de teoria de grups UAB - UPC, Centre de Recerca Matemàtica, Campus de Bellaterra, Barcelona, Spain 2011 - Centralizers in Higman-Thompson group $G_{2,1}$.

Postgraduate group theory conference, Aberdeen University 2011 - A useful group

$$\Gamma = \{x_0, \dots, x_6 \mid x_i x_{i+1} x_{i+3} = 1 \text{ for } i \text{ in } \mathbb{Z}/7\mathbb{Z}\}.$$

Seminar, Open University October 2011 - Decision problems and Richard Thompson's groups F , T and V .

Algebra Seminar, University of Glasgow November 2011 - Decision problems and Richard Thompson's groups F , T and V .

Seminar in Pure and Applicable Mathematics, Birbeck University of London November 2011 - Richard Thompson's groups F , T and V .

Teaching Experience

Maths Aid Tutor, Newcastle University, 2008-present

Independent Mathematics Tutor for two AS-level students, 2007

Employment

Newcastle University Maths Aid
Mathematics Tutor 2008-2012
Member of a drop in service for mathematics questions from all backgrounds. Any member of the University can drop in and ask questions about various topics in mathematics. These include students from Chemistry, Biology, Engineering, Computer Science and the Social Sciences.

Newcastle University School of Mathematics and Statistics
Student Assessment Marker 2008-2012
Marking fortnightly level 1 (approximately 150 students), 2 (approximately 100 students), 3 (approximately 40 students) and 4 assignments.

University of Durham Department of Mathematical Sciences
Student Assessment Marker 2007-08
Marking fortnightly level 2 problems for Analysis in Many Variables (approximately 60 students), level 2 problems for Geometric Topology (approximately 25 students) and level 2 problems for Mathematical Physics (approximately 25 students).

Burtons Foods Moreton, Wallasey
Production Operator July2005-Sep05, July2006-Sep06, July2007-Sep07,
July2008-Aug08
Working as part of a team in the production of food goods. Various responsibilities.

The Mosslands School Wallasey Village, Wallasey
Maths Summer School Assistant Summer 2004
Providing a safe and fun environment to encourage the study of mathematics at secondary level. Required me to teach year 7 students and work as part of a team to provide a successful summer school by communicating mathematics at the appropriate level.

Service

Faculty of Science, Agriculture and Engineering postgraduate representative at the Survey for Advancement conference, Nottingham 19th May 2011, run by The Higher Education Academy.

Staff Student Committee, Newcastle University - Secretary, 2011-12.

Staff Student Committee, Newcastle University - Postgraduate representative, 2010-11.

Computing

Proficient in the use of Unix, Mac and Windows operating systems. Able to use the computer programs MAGMA and GAP4.

Research Seminars

I regularly attend the Algebra & Geometry and Analysis seminars at Newcastle University, Pure mathematics research colloquium at Durham University and occasionally attend Statistic seminars

and Applied mathematics seminars at Newcastle University.

Courses and Meetings attended

Topics in Geometric Group Theory, LMS Short Course, Heriot-Watt University, 1st-5th Sept 2008
Quantum Computation, 22nd Sept 2008, Newcastle University, UK.

NBGGT meeting, 3rd Dec 2008, University of York, UK.

MAGIC'09 Conference, 12th-14th Jan 2009, Manchester University, UK.

LMS Northern meeting, 14th Jan 2009, Manchester University, UK.

Memorial Lectures - Douglas Munn, 26th Jan 2009, Glasgow University, UK.

PGGTC Manchester, 15th-17th April 2009, Manchester University, UK.

NBGGT meeting, 30th April 2009, Nottingham University, UK.

NBGGT meeting, 13th July 2009, Newcastle University, UK.

A celebration of the 65th birthday of John Cannon (Sydney) & 60th birthday of Derek Holt (Warwick), 22nd July 2009, Warwick University, UK.

Where do we go from here? Infinite group theory conference, 1st-2nd Oct 2009, New York City University, USA.

Support for Postgraduates who teach - workshop. 26th Oct 2009, Durham University, UK.

Chriswell Symposium, 9th Nov, Queen Mary's London, UK. Talks by Jim Howie, Martin Dunwoody and Peter Kropoller.

NBGGT meeting, 25th November 2009, Glasgow University, UK.

NBGGT meeting, 10th March 2010, York University, UK.

LMS Northern meeting and workshop, 12th-14th April 2010 Newcastle University, UK.

Postgraduate pure mathematics conference, 15th April 2010, Newcastle University, UK.

Group Theory Day, 26th April 2010, Birmingham University, UK.

Expansion in Groups, Workshop, 27th-28th May 2010, Imperial College London, UK.

PGGTC St. Andrews, 28-30th June 2010, University of St. Andrews, UK.

NBGGT Meeting, 7th July 2010, Nottingham University, UK.

Geometry and Analysis on Graphs and Groups, 11-13th November 2010, Exeter College, University of Oxford, UK.

NBGGT Meeting, 8th December 2010, Edinburgh University, UK.

Pure Mathematics Colloquium - Terry Tao, 19th January 2011, University of Birmingham, UK.

EMS meeting - Terry Tao, 11th February 2011, University of Edinburgh.

Durham-Newcastle Postgraduate Afternoon of Talks, 31st March 2011, Newcastle University, UK.

PGGTC Aberdeen, 23rd-25th June 2011, University of Aberdeen, UK

LMS/EPSRC Durham Symposium on Geometry and Arithmetic of Lattices, 4th July - 14th July 2011, Durham University, UK.

Workshop on Geometric presentations of finite and infinite groups, 17th - 23rd July 2011, University of Birmingham, UK.

NBGGT meeting, 28th July 2011, Newcastle University, UK.

NBGGT meeting, 30th November 2011, Newcastle University, UK.

Beauville surfaces and groups conference 2012, Newcastle University 7th-9th June 2012, UK.