

CV: Robert D. Gray

Personal Information

Web: <http://www.uea.ac.uk/~fga12juu/>

Address: School of Mathematics
University of East Anglia
Norwich NR4 7TJ, UK

Telephone: +44 1603 591443

Email: Robert.D.Gray@uea.ac.uk

Career History

- 2013– **Lecturer in Pure Mathematics**
School of Mathematics, University of East Anglia, UK
– Recommended by the University Promotions Committee (7 March 2017) for promotion to *Senior Lectureship* with effect from 1 August 2017.
– Awarded for outstanding performance (special increment), June 2016
- 2010–2013 **Research Fellow**
Centre of Algebra of the University of Lisbon, Portugal.
I held an *FCT Ciência Research Fellowship*.
- 2008–2010 **EPSRC Postdoctoral Research Fellow**
School of Mathematics and Statistics, University of St Andrews, UK.
- 2006–2008 **Research Fellow**
School of Mathematics, University of Leeds, UK. Member of the *Leeds Logic Group* working on the EPSRC funded project *Homogeneous structures, bipartite graphs, and partial orders*.

Academic Degrees

- 2002–2006 **PhD Pure Mathematics**
School of Mathematics and Statistics, University of St Andrews, UK.
Thesis title: *A Graph Theoretic Approach to Combinatorial Problems in Semigroup Theory*.
- 1998–2002 **M.Sci Hons. Mathematics, first class (averaged 19.99 points out of 20)**
School of Mathematics and Statistics, University of St Andrews, UK.
Class medals for best performance in honours mathematics (2001, 2002).
Arthur Hinton Read Memorial Prize for showing the greatest distinction in senior honours pure mathematics (2002).
Institute of Mathematics and its Applications Prize for outstanding performance in the final year of undergraduate degree (2002).
Carnegie Trust Vacation Scholarship for Training for Algebra Research (Summer 2001).

Grants and Fellowships

- *EPSRC First Grant* (EPSRC Reference: EP/N033353/1). Principal (sole) investigator on EPSRC project *Special inverse monoids: subgroups, structure, geometry, rewriting systems and the word problem* (2016–2018, total FEC value of grant awarded £124,207).
 - This project was ranked in first place in the Panel Rank Ordered List of First Grants at the EPSRC Mathematics Prioritisation Panel Meeting, 8th June 2016.
- *EPSRC Postdoctoral Research Fellowship* (EPSRC Reference: EP/E043194/1). Principal (sole) investigator on EPSRC project *Finiteness Conditions and Index in Semigroups and Monoids* (2008–2010, total FEC value of grant awarded £203,056).
- *FCT Ciência Research Fellowship*. A personal fellowship held at the Centre of Algebra of the University of Lisbon, Portugal, 2010–2013.
- *London Mathematical Society Scheme 4 grant*, to fund a one-week research visit of Prof. I. Dolinka of the University of Novi Sad, Serbia to the University of East Anglia (Summer 2016, total value £870.00).
- *London Mathematical Society Undergraduate Research Bursary*, to fund a second year undergraduate student, who carried out a six week research project entitled “The directed geometry of finitely generated amenable semigroups” under my supervision at the University of East Anglia (Summer 2014, total value £1,080.00).
- *British Council (Portuguese/British) Treaty of Windsor Award*, to fund research collaboration between the University of St Andrews and the Centre of Algebra of the University of Lisbon (2009–2010, total value £2,000).

Refereed Research Publications

- [1] Amenability and geometry of semigroups (with M. Kambites). *Transactions of the American Mathematical Society* (to appear).
- [2] On regularity and the word problem for free idempotent generated semigroups (with I. Dolinka and N. Ruskuc). *Proceedings of the London Mathematical Society* Vol. 114, 2017, pp. 401–432.
- [3] Diagram monoids and Graham–Houghton graphs: idempotents and generating sets of ideals (with J. East). *Journal of Combinatorial Theory, Series A* Vol. 146, 2017, pp. 63–128.
- [4] Motzkin monoids and partial Brauer monoids (with I. Dolinka and J. East). *Journal of Algebra* Vol. 471, 2017, pp. 251–298.
- [5] Automorphism groups of countable algebraically closed graphs and endomorphisms of the random graph (with I. Dolinka, J. D. McPhee, J. D. Mitchell, and M. Quick). *Mathematical Proceedings of the Cambridge Philosophical Society* Vol. 160, 2016, pp. 437–462.
- [6] Ends of Semigroups (with S. Craik, V. Kilibarda, J. D. Mitchell and N. Ruskuc) *Semigroup Forum* Vol. 93, 2016, pp. 330–346.

- [7] Rewriting systems and biautomatic structures for Chinese, hypoplactic, and Sylvester monoids (with A. J. Cain and A. Malheiro). *International Journal of Algebra and Computation* Volume 25, no. 1-2, February & March 2015. DOI: 10.1142/S0218196715400044.
- [8] Finite Gröbner–Shirshov bases for Plactic algebras and biautomatic structures for Plactic monoids (with A. J. Cain and A. Malheiro). *Journal of Algebra* Vol. 423, 2015, pp. 37–53.
- [9] A strong geometric hyperbolicity property for directed graphs and monoids (with M. Kambites). *Journal of Algebra* Vol. 420, 2014, pp. 373–401.
- [10] The minimal number of generators of a finite semigroup. *Semigroup Forum* Vol. 89, 2014, pp. 135–154.
- [11] Homotopy bases and finite derivation type for subgroups of monoids (with A. Malheiro). *Journal of Algebra* Vol. 410, 2014, pp. 53–84.
- [12] Countable locally 2-arc-transitive bipartite graphs (with J. K. Truss). *European Journal of Combinatorics* Vol. 39, 2014, pp. 122–147
- [13] On residual finiteness of monoids, their Schützenberger groups and associated actions (with N. Ruskuc). *Journal of Algebra* Vol. 407, 2014, pp. 21–45
- [14] Maximal subgroups of free idempotent generated semigroups over the full linear monoid (with I. Dolinka), *Transactions of the American Mathematical Society* Vol. 366, 2014, pp. 419–455
- [15] Ideals and finiteness conditions for subsemigroups (with V. Maltcev, J. D. Mitchell and N. Ruskuc). *Glasgow Mathematical Journal* Vol. 56, 2014, pp. 65–86
- [16] Quasi-isometry and finite presentations for left cancellative monoids (with M. Kambites). *International Journal of Algebra and Computation* Vol. 23, 2013, pp. 1099–1114
- [17] Groups acting on semimetric spaces and quasi-isometries of monoids (with M. Kambites), *Transactions of the American Mathematical Society* Vol. 365, 2013, pp. 555–578
- [18] Homotopy bases and finite derivation type for Schützenberger groups of monoids (with A. Malheiro and S. J. Pride), *Journal of Symbolic Computation* Vol. 50, 2013, pp. 50–78.
- [19] On maximal subgroups of free idempotent generated semigroups (with N. Ruskuc), *Israel Journal of Mathematics* Vol. 189, 2012, pp. 147–176.
- [20] Green index in semigroups: generators, presentations and automatic structures (with A. J. Cain and N. Ruskuc), *Semigroup Forum* Vol. 85, 2012, pp. 448–476.
- [21] Set-homogeneous directed graphs (with D. Macpherson, C. Praeger and G. Royle), *Journal of Combinatorial Theory, Series B*, Vol. 102, 2012, pp. 474–520.
- [22] Maximal subgroups of free idempotent generated semigroups over the full transformation monoid (with N. Ruskuc), *Proceedings of the London Mathematical Society (3)* Vol. 104, 2012, pp. 997–1018.

- [23] A Svarc–Milnor lemma for monoids acting by isometric embeddings (with M. Kambites), *International Journal of Algebra and Computation*, Vol. 21, 2011, pp. 1135–1147.
- [24] Presentations of inverse semigroups, their kernels and extensions (with C. Carvalho and N. Ruskuc), *Journal of the Australian Mathematical Society*, Vol. 90, 2011, pp. 289–316.
- [25] Homological finiteness properties of monoids, their ideals and maximal subgroups (with S. J. Pride), *Journal of Pure and Applied Algebra*, Vol. 215, 2011, pp. 3005–3024.
- [26] On properties not inherited by monoids from their Schutzenberger groups (with A. Malheiro and S. J. Pride). *Information and Computation*, Vol. 209, 2011, pp. 1120–1134.
- [27] Generators and relations for subsemigroups via boundaries in Cayley graphs (with N. Ruskuc), *Journal of Pure and Applied Algebra*, Vol. 215, 2011, pp. 2761–2779.
- [28] Locally-finite connected-homogeneous digraphs (with R. Möller), *Discrete Mathematics*, Vol. 311, 2011, pp. 1497–1517.
- [29] Finite complete rewriting systems for regular semigroups (with A. Malheiro), *Theoretical Computer Science*, Vol. 412, 2011, pp. 654–661.
- [30] Countable connected-homogeneous graphs (with D. Macpherson), *Journal of Combinatorial Theory, Series B*, Vol. 100, 2010, pp. 97–118.
- [31] Cycle-free partial orders and ends of graphs (with J. K. Truss), *Mathematical Proceedings of the Cambridge Philosophical Society*, Vol. 146, 2009, pp. 535–550.
- [32] On residual finiteness of direct products of algebraic systems (with N. Ruskuc), *Monatshefte für Mathematik*, Vol. 158, 2009, pp. 63–69.
- [33] k -CS-transitive infinite graphs, *Journal of Combinatorial Theory, Series B*, Vol. 99, 2009, pp. 378–398.
- [34] Construction of some countable one-arc transitive bipartite graphs (with J. K. Truss), *Discrete Mathematics*, Vol. 308, 2008, pp. 6392–6405.
- [35] Green index and finiteness conditions for semigroups (with N. Ruskuc), *Journal of Algebra*, Vol. 320, 2008, pp. 3145–3164.
- [36] Construction of some uncountable 2-arc-transitive bipartite graphs (with M. Droste and J. K. Truss), *Order*, Vol. 25, 2008, pp. 349–357.
- [37] Hall’s condition and idempotent rank of ideals of endomorphism monoids, *Proceedings of the Edinburgh Mathematical Society*, Vol. 51, 2008, pp. 1–16.
- [38] Largest subsemigroups of the full transformation monoid (with J. D. Mitchell), *Discrete Mathematics*, Vol. 308, 2008, pp. 4801–4810.
- [39] Idempotent rank in endomorphism monoids of finite independence algebras, *Proceedings of the Royal Society of Edinburgh: Section A Mathematics*, Vol. 137A, 2007, pp. 303–331.
- [40] Generating sets of completely 0-simple semigroups (with N. Ruskuc), *Communications in Algebra*, Vol. 33, 2005, pp. 4657–4678.

Preprints and Papers in Preparation

- [41] Crystal bases, finite complete rewriting systems, and biautomatic structures for Plactic monoids of types A_n , B_n , C_n , D_n , and G_2 (with A. J. Cain and A. Malheiro). Submitted, 83 pages. [arXiv:math.GR/1412.7040](https://arxiv.org/abs/math/1412.7040).
- [42] On finite complete rewriting systems, finite derivation type, and automaticity for homogeneous monoids (with A. J. Cain and A. Malheiro). Submitted, 30 pages. [arXiv:math.GR/1407.7428](https://arxiv.org/abs/math/1407.7428).
- [43] Universal locally finite maximally homogeneous semigroups and inverse semigroups (with I. Dolinka). Submitted, 27 pages. [arXiv:math.GR/1704.00641](https://arxiv.org/abs/math/1704.00641).
- [44] Topological finiteness properties of monoids and equivariant discrete Morse theory (with B. Steinberg). In preparation, ~60 pages.
- [45] Topological finiteness properties of monoids: amalgamated free products, HNN extensions and special monoids (with B. Steinberg). In preparation, ~30 pages.
- [46] On cogrowth and the spectral radius of random walks on semigroups (with M. Kambites). In preparation, ~27 pages.
- [47] Permutation monoids and MB-homogeneous structures (with T. Coleman and D. Evans). In preparation, ~25 pages.
- [48] On units, boundaries and Schützenberger graphs of special monoids (with N Ruskuc). In preparation, ~30 pages.
- [49] Crystal monoids (with A. J. Cain and A. Malheiro). In preparation, ~30 pages.

Selected Talks and Invited Participations

- Invited speaker at “All Kinds of Mathematics Reminds me of You”, Conference to celebrate the 70th Anniversary of Peter J Cameron, Gathering excellence where Cameron excels: Combinatorics, Groups, Model Theory, Number Theory, Semigroups, Statistics, and more..., Lisbon, 24-27 July 2017.
- Invited to give a three-lecture minicourse at the “LMS Undergraduate Summer School 2017”, University of Manchester, July 2017.
- Invited to give a Pure Maths Colloquium at the University of St Andrews, April 2017.
- Algebra Seminar, University of Lisbon, March 2017.
- Algebra and Logic Seminar, Universidade Nova de Lisboa, Lisbon, March 2017.
- Algebra Seminar, University of York, York, February 2017.
- Algebra Seminar, University of Colorado Boulder Algebra Seminar, Boulder, USA, February 2017.
- Invited talk at “Special Session on Recent Trends in Semigroup Theory” at the Fall Western Sectional Meeting of American Mathematical Society, University of Denver, Denver, CO on October 8-9, 2016.
- Invited four-lecture minicourse at *Escola de Álgebra, XXIV Brazilian Algebra Meeting*, Diamantina, Brazil 31st July–5th August, 2016.

- Invited speaker at *CSA 2016, International Conference on Semigroups and Automata* (in celebration of the 60th birthdays of Prof. Jorge Almeida and Prof. Gracinda Gomes), Lisbon, 20–24th June 2016.
- Invited talk at *North British Semigroups and Applications Meeting*, University of York, May 2016.
- Algebra seminar, University of Manchester, April 2016
- Algebra and Logic Seminar, Universidade Nova de Lisboa, Lisbon, April 2016.
- Invited talk at the *Open University Winter Combinatorics Meeting*, The Open University, Milton Keynes, January 2016.
- Invitation to participate and give a one-hour talk at the workshop *Homogeneous Structures*, Banff International Research Station, Banff, Canada, November 2015.
- Invitation to participate and give a one-hour talk at the LMS Durham Research Symposium *Permutation groups and transformation semigroups*, Durham University, July 2015.
- Invited speaker at *The Algebraic Theory of Semigroups and Applications* special session at a joint meeting of the American, European and Portuguese Mathematical Societies, Porto, Portugal, June 2015.
- Invited talk, and member of the Scientific Committee for, the international conference *AAA90, 90th Workshop on General Algebra - 90. Arbeitstagung Allgemeine Algebra*, Novi Sad, Serbia, June 2015.
- Invited talk at *North British Semigroups and Applications Meeting*, University of St Andrews, April 2015.
- Algebra and Logic Seminar, Universidade Nova de Lisboa, Lisbon, January 2015.
- Invited participation at *Algebraic and Model Theoretical Methods in Constraint Satisfaction*, Banff International Research Station, Banff, Canada, November 2014.
- Logic Seminar, University of Leeds, November 2014.
- Algebra Seminar, University of Lisbon, June 2014.
- Pure Mathematics Seminar, University of York, May 2014.
- Algebra Colloquium, University of Linz, Austria, April 2014.
- Pure Mathematics Seminar, University of Essex, March 2014.
- Invited talk at *North British Semigroups and Applications Meeting*, York, November 2013.
- Geometry and Topology Seminar, University of Warwick, October 2013
- Invited speaker at the international conference *Geometric, Combinatorial & Dynamics Aspects of Semigroups and Groups, On the occasion of the 60th birthday of Stuart Margolis Bar-Ilan*, Israel, June 2013.
- Invited speaker at the international conference *The 4th Novi Sad Algebraic Conference*, Novi Sad, June 2013.
- Invited speaker at *Semigroup Representations*, ICMS, Edinburgh April 2013.
- Invited speaker at *Workshop on Semigroups (To remember John M. Howie on the occasion of his 76th birthday)*, University of Lisbon, May 2012.
- Pure Mathematics Seminar, University of York, May 2012.

- Invited speaker at the international conference *AAA workshop in general algebra and related fields*, University of Novi Sad, Serbia, March 2012.
- Centre of linear and combinatorial structures seminar, (CELC) University of Lisbon, February 2012.
- Semigroups, automata and languages seminar, (CAUL) University of Lisbon, November 2011.
- Pure Mathematics Colloquium, University of Novi Sad, Serbia, November 2011.
- Invited talk at *North British Semigroups and Applications Meeting*, University of Manchester, August 2011.
- Invited speaker at the international conference *Groups and Semigroups: Interactions and Computations*, University of Lisbon, July 2011.
- Invited talk at *LMS Northern Regional Meeting and Workshop on Homogeneous Structures*, University of Leeds, July 2011.
- Pure Mathematics Colloquium, University of Novi Sad, Serbia, March 2011.
- Pure Mathematics Colloquium, University of Essex, January 2011.
- Semigroups, automata and languages seminar, University of Lisbon, November 2010.
- Semigroups, automata and languages seminar, University of Porto, October 2010.
- Contributed talk at *International Conference on Geometric and Combinatorial Methods in Group Theory and Semigroup Theory*, University of Nebraska-Lincoln, USA, May 2009.
- Invited talk at *North British Semigroups and Applications Meeting*, St Andrews, April 2009.
- Invited talk at the international conference *Groups and Infinite Graphs*, Erwin Schrodinger International Institute, Vienna, Austria, September 2008.
- Contributed talk at *ROGICS - International Conference on Relations, Orders and Graphs: Interaction with Computer Science*, Mahdia, Tunisia, May 2008.
- Invited talk at *Algebra Workshop*, Centre of Algebra of the University of Lisbon, April 2008.
- Invited talk at *Splinter Group on Semigroup Theory, 60th British Mathematical Colloquium*, University of York, March 2008.
- Invited talk at *International Conference on Infinite Graph Theory*, Banff International Research Station, Canada, October 2007.
- Invited talk at *Combinatorics of Arc-Transitive Graphs and Partial Orders*, University of Leeds, August 2007.
- Contributed talk at *21st British Combinatorial Conference*, University of Reading, July 2007.
- Invited talk at *One-day meeting of the Cambridge/Leeds/Norwich Set Theory Group (CAMELEON)*, University of Leeds, June 2007.
- Model Theory Seminar, University of Leeds, May 2007.
- Leeds Algebra Seminar, University of Leeds, January 2007.
- Glasgow Algebra Seminar, University of Glasgow, November 2006.

- MAXIMALS Algebra Seminar, University of Edinburgh, November 2006.
- Model Theory Seminar, University of Leeds, May 2006.
- Invited talk at *Splinter Group on Semigroup Theory, 58th British Mathematical Colloquium*, University of Newcastle, April 2006.
- Contributed talk at *International Conference on Semigroups and Languages*, University of Lisbon, July 2005.
- Contributed talk at *PoPMiNE Postgraduate Conference in Pure Mathematics*, University of Newcastle, June 2004.
- Contributed talk at *Splinter Group on Group Theory, 56th British Mathematical Colloquium*, Queens University Belfast, March 2004.

Research Visits

Obtained external funding to support the following research visits:

- University of Novi Sad, Serbia (March 2011, October 2011, March 2015),
- University of Manchester (several visits during 2006–present),
- University of St Andrews (several visits during 2006–present),
- The Erwin Schrödinger International Institute for Mathematical Physics, Vienna, Austria (September 2008),
- University of Iceland (June 2007 and June 2008),
- University of Lisbon (several visits during 2008–2014),
- New University of Lisbon (several visits during 2015–present).

Teaching

Teaching qualifications

2015 **Fellow of the Higher Education Academy**

2013–2015 **Postgraduate Certificate in Higher Education Practice**
The University of East Anglia, UK.

Modules completed: Module 1 (2013/14) Exploring the academic role, Module 2 (2014/15) Evaluating teaching, Module 3 (2014/15) Academic practice and technology.

Teaching award nominations

- 2015: Shortlisted for the *Transforming Teaching Award*, in the category *Inspiring Teaching* (Teaching which inspires students to get involved in their education, either through student representation or through shaping their own learning and their degree.), 2015. This awards programme is organised by UEA SU, and staff are nominated, shortlisted and awarded by students in recognition of outstanding teaching and support at UEA.
- 2014: Nominated for an *Excellence in Teaching Award*, University of East Anglia, 2014.

Lecturing

At the University of East Anglia I have lectured the following modules:

- *Ring Theory* (Spring 2013, 2014), a 2nd year undergraduate module;
- *Sets, Numbers and Proof* (Autumn 2013, 2014, 2015), a 1st year undergraduate course. I was module organiser for this module in each of these years;
- *Semigroup Theory and Semigroup Theory with Advanced Topics* (Spring 2015, Autumn 2016); a 3rd year undergraduate course which I designed entirely myself. In 2015, this module was chosen by a large number of students (79 + 9 advanced topics students). I was module organiser for this module.
- *Linear Algebra* (Spring 2016), a 1st year undergraduate course. I was the module organiser for this module.

Lectured the following final year undergraduate course in group theory at the University of Leeds.

- *Groups and Symmetry* (Autumn 2007)

Tutoring, advising, and pastoral care

Have tutored, and run problems classes, for numerous undergraduate courses in mathematics, at the University of East Anglia, University of Leeds, University of St Andrews, and the University of Lisbon (including giving classes in Portuguese). I have also acted as advisor / personal tutor for numerous undergraduate students both at the University of Leeds (Spring 2007 and Autumn 2007) and the University of East Anglia (2013-present). This involved providing both academic guidance and pastoral care.

Innovative teaching methods

- Mathematical Problem Solving module (autumn 2016).
 - Involved in the oral assessment of students (a novel assessment in mathematics).
 - Set up group chat on Facebook with mathematical problem solving group to share photographs of whiteboards on which students had written up their solutions and corrections to other students' solutions on whiteboard walls in the UEA enterprise centre.
- Semigroup Theory and Semigroup Theory with Advanced Topics (autumn 2016).
 - Encouraged group work as part of Formative Assessment Coursework in the first two weeks of the module. The class was split into teams and worked on a series of thought provoking question. The last question was quite difficult, and related to my research interests. Each group submitted a photograph of their group working on the problems (for extra points). Then they marked each others' work (peer marking).
 - We also did group work in the advanced topic. I gave incomplete lecture notes (proof of some lemmas missing). The class was split into teams, and each week one team prepared the solution to one set of lemmas, and then during the lecture they were invited to the board to explain their solutions. They submitted their written solutions which were appended to "complete" the lecture notes.

Professional development

- Completed EPSRC Online Training course which provided valuable information on EPSRC and our strategies and priorities, and essential guidance on best practice on reviewing proposals as well as training on roles and responsibilities for being part of an EPSRC peer review panel.
- I have attended the following CSED professional development courses at the University of East Anglia:
 - Best Practice in Research Supervision: SCI/FMH.
 - Interviewing University Applicants.
 - Training session on Equality and Diversity.
- I allowed a PhD student in mathematics education at UEA (Ms Athina Thoma) to use my module Sets, Numbers and Proof (2014–2015) as part of a case study in her PhD looking at examination questions of undergraduate mathematics modules and their relationship with the students approaches to learning and views of mathematics. This involved providing her with materials related to my exams, and being interviewed by her about the way I designed my exam questions.
- Attended “Introduction to Unconscious Bias” session run by Helen Murdoch (January 2016).
- Attended meeting of UEA Research Executive Members with School Research Directors in place of Mirna Dzamonja (January 2016).

Research Supervision

- Currently supervising the PhD student Thomas Coleman at the University of East Anglia.
- Currently supervising the PhD student Diane Lubbock at the University of East Anglia.
- I have supervised 8 undergraduate and 5 MMTH-level projects at the University of East Anglia between 2013 and 2015.
- Obtained funding for and supervised a London Mathematical Society Undergraduate Research Bursary project on Amenability at the University of East Anglia, Summer 2014.
- Devised an undergraduate summer project “Synchronizing automata and the Cerny conjecture” at the University of East Anglia, Summer 2015. I supervised a student who worked on this project. This student has gone on to study for a PhD at the University of Manchester.
- Assisted with the supervision of two PhD students, Simon Craik and Jay McPhee, at the university of St Andrews, 2008–2010.

External Examination

- External examiner for PhD candidate Chwas Ahmed (University of Leeds, 2016).
- External examiner for PhD candidate Dandan Yang (University of York, 2014).
- External examiner for PhD candidate Yanhui Wang (University of York, 2012).
- External examiner for PhD candidate Imtiaz Ahmad (University of Essex, 2011).

Refereeing and Reviewing

- EPSRC Peer Review Associate College Member (2016-present).
- Grant proposal reviewer for EPSRC.
 - I have reviewed both Standard Proposals and EPSRC Fellowship Proposals.
- Referee for journals including: *Proceedings of the London Mathematical Society*, *Proceedings of the American Mathematical Society*, *Forum Mathematicum*, *Journal of Algebra*, *AMS - Contemporary Mathematics*, *Demonstratio Mathematica*, *International Journal of Algebra and Computation*, *Glasgow Mathematical Journal*, *Journal of the Australian Mathematical Society*, *Linear Algebra and its Applications*, *Combinatorica*, *Journal of Graph Theory*, *Designs Codes and Cryptography*, *Order*, *European Journal of Combinatorics*, *Discrete Mathematics*, *Communications in Algebra*, *Australasian Journal of Combinatorics*, *Semigroup Forum*, *Ars Combinatoria*, *Advances in Pure and Applied Mathematics*, and *Publicationes Mathematicae Debrecen*.
- Regular article reviewer for *Mathematical Reviews* and *MathSciNet*.

Event Organisation

- Organised the event “Tomorrow’s Mathematicians Today at UEA”, Thursday 11th February 2016, talks by students who were invited to speak at the event <http://mathsoc.cms.gre.ac.uk/tmt/>.
- Organised a two-day meeting of the North British Semigroups and Applications Network (NBSAN) at the University of East Anglia, 14th–15th April 2014.
- Organiser of the Semigroups, Automata and Languages seminar (CAUL) University of Lisbon, Spring 2012.

Mentoring

- School Mentor for new lecturer at UEA, Mr T. Coleman, 2016-2017.

Administrative roles and other contributions

- Member of the panel involved in deciding which undergraduate students are to put forward for LMS Summer Bursary applications for projects in summer 2017.
- *UEA applicant days*: I have agreed to give the maths talk for several of the UEA applicant days in the spring semester 2017.
- *UEA open days*: Helper for several open days (Saturdays), summer and autumn 2016.
- I ran a PPD course, jointly with Robert Whittaker, for PhD students to give them guidance on marking and assessment, UEA, October 2016.
- Jointly with Dr Mark Cooker, I gave the First Year Induction Lecture, UEA, autumn 2016.
- Library Liaison Officer, Bookshop liaison, Mathematics Reading Room, Autumn semester 2016-2017.

- Organiser of the University of East Anglia pure mathematics seminar, autumn semester, 2016–2017.
- Science Faculty representative for UEA Senate, academic year 2016–2017.
- Library Liaison Officer, Bookshop liaison, Mathematics Reading Room, Spring semester 2015–2016.
- Member of the Maths Engagement Team, 2015–2016.
- Member of the BSc Project Moderation Panel, 2015–2016.
- Nominated member of the UEA School of Mathematics Promotions Committee, 2014–2015.
- Member of the MMTH Project Moderation Panel, 2013–2014 and 2014–2015.
- I ran a PPD course, jointly with Robert Whittaker, for PhD students to give them guidance on marking and assessment, UEA, autumn 2015.
- Jointly with Dr Mark Cooker, I gave the First Year Induction Lecture, UEA, autumn 2015.
- Co-organiser of the University of East Anglia pure mathematics seminar, 2013–2015.
- Have acted as secondary supervisor for numerous PhD students at the University of East Anglia, and I have been on the panel (upgrade from MPhil to PhD) of several UEA PhD students including: Mr Andrew Langworthy and Mrs Abeer Al Balahi.
- I am the UEA British Combinatorial Committee representative.
- *UEA applicant days*: On numerous occasions during 2013–present gave interactive session which I devised called “The Futurama problem” with students attending UEA Applicant Days. I ran this session on every applicant day of the autumn 2014– spring 2015 period.
- Organised the “UEA Maths Leaver’s Party”, both in July 2015 and in July 2016. An event for all maths staff, lecturers, postdocs, postgrads, and 3rd and 4th year undergraduates to get together for drinks in celebration of those students who were graduating.

Outreach and Engagement

- UEA summer school, July 2016. I gave a session (twice) on modular arithmetic and cryptography, joint with Dr Helen Crowley and Prof Shaun Stevens.
- UKMT Summer School for Girls Oxford, August 2015, one hour session on permutations, combinatorics, and group theory.
- *Essex higher education convention 30 June - 01 July 2015 — Anglia Ruskin University, Chelmsford Campus*. Presented four UCAS Open day sessions, talking to A-level students about reasons for studying mathematics at university, and what the experience of doing a maths degree is like.
- Following a request from the UEA Outreach Office, I invited a group of three bright Year 13 students studying A-Level mathematics at Taverham Sixth Form to attend one of my first year lectures for the course Sets Numbers and Probability (4th December, 2014). These students were interested in applying to study mathematics at UEA, but had no family history of attending university, so wanted to find out more about it before fully deciding whether to apply.
- UKMT Summer School for Girls Oxford, August 2014, gave one hour session on permutations.

- Gave a talk at the “Meet the lecturer”, UEA Mathematics Society event (11th November, 2014). At this event several lecturers and I gave talks about how we ended up becoming university mathematics lecturers.
- UKMT Summer School for Girls Oxford, August 2013. Gave a one hour session “How not to lose your mind using group theory”.
- Gave an invited presentation entitled “Homogeneous Structures” at the two day *Fronteiras da Matemática* workshop at the University of Lisbon in April 2010 (<http://fronteirasmat.fc.ul.pt/informacoes.php>). The aim of the conference was to give the students a flavour of some current research topics in mathematics, and to encourage them to become involved in masters and PhD programmes in mathematics in the future.
- Gave a series of lectures entitled “Residual Finiteness of Algebraic Structures” as part of the *St Andrews Summer Research School 2008*. The aim of the summer school was to give talented undergraduate students (going into the last year of their degree) a chance to spend a few weeks over the summer getting a flavour of what research level mathematics is like, and to encourage them to go on to Masters and PhD level studies in mathematics.
- Wrote a report on the London Mathematical Society Northern Regional Meeting 2011, and three day workshop on Homogeneous Structures, which was published in the London Mathematical Society newsletter 3 October 2011.

Professional Affiliations

- Member of the London Mathematical Society.
- Member of the Edinburgh Mathematical Society.

Referees

Available on request.