

Dr Jay Taylor

jay.taylor@manchester.ac.uk • personalpages.manchester.ac.uk/staff/jay.taylor/

EMPLOYMENT HISTORY

Apr 2021 – Present **Neumann Fellow**, University of Manchester (UK)
Aug 2019 – Mar 2021 **Assistant Professor (NTT)**, University of Southern California (USA)
Aug 2016 – Aug 2019 **Postdoctoral Research Associate**, University of Arizona (USA)
Feb 2015 – Aug 2016 **Marie Curie Fellow**, Università di Padova (Italy)
Sep 2014 – Jan 2015 **Postdoctoral Fellow**, EPFL (Switzerland)
Jul 2012 – Aug 2014 **Wissenschaftlicher Mitarbeiter**, TU Kaiserslautern (Germany)

VISITING POSITIONS

Sep 2020 – Mar 2021 **Member**, Institute for Advanced Study, Princeton (USA)
Jan 2020 – May 2020 **Programme Participant**, Isaac Newton Institute, Cambridge (UK)
Apr 2018 – May 2018 **Research Member**, MSRI, Berkeley (USA)

EDUCATION

2008 – 2012 **PhD Pure Mathematics**, University of Aberdeen (UK)
Thesis Title: "On Unipotent Supports of Reductive Groups With a Disconnected Centre"
Thesis Supervisor: Meinolf Geck
2004 – 2008 **MMath (Hons) Mathematics**, University of York (UK)
Degree Class: First
Thesis Supervisor: Stephen Donkin

AWARDS

2015 2 year INdAM-COFUND Marie Curie Fellowship, value €101,700, project ranked 1st
2012 Oberwolfach Leibniz Graduate Student travel grant
2008 3.5 year EPSRC Phd Scholarship covering tuition and maintenance

RESEARCH INTERESTS

- Finite Reductive Groups
- Deligne–Lusztig Theory
- Character Sheaves
- Representation Theory
- Generic Character Tables
- Coxeter Groups
- Gelfand–Graev Representations
- Unipotent Conjugacy Classes
- Kazhdan–Lusztig Theory

PUBLICATIONS

Submitted • *Harish-Chandra Cuspidal Pairs*, 15 pages, [arXiv:2012.09674](https://arxiv.org/abs/2012.09674).
 • *Galois automorphisms and classical groups*, with A. A. Schaeffer Fry, 42 pages, [arXiv:2005.14088](https://arxiv.org/abs/2005.14088).
Published [13] *Lusztig induction, unipotent supports, and character bounds*, with P. H. Tiep
 Trans. Amer. Math. Soc., 373 (2020), 8637–8676.

- [12] *Unitriangular shape of decomposition matrices of unipotent blocks*, with O. Brunat and O. Dudas,
Ann. of Math. (2), 192 (2020), no. 2, 583–663.
- [11] *The structure of root data and smooth regular embeddings of reductive groups*,
Proc. Edinb. Math. Soc. (2), 62 (2019), no. 2, 523–552.
- [10] *Principal 2-Blocks and Sylow 2-Subgroups*, with A. A. Schaeffer Fry,
Bull. Lond. Math. Soc., 50 (2018), 733–744.
- [9] *Action of automorphisms on irreducible characters of symplectic groups*,
J. Algebra 505 (2018), 211–246.
- [8] *On the Mackey formula for connected centre groups*,
J. Group Theory 21 (2018), No. 3, 439–448.
- [7] *On self-normalising Sylow 2-subgroups in type A*, with A. A. Schaeffer Fry,
J. Lie Theory 28 (2018), No. 1, 139–168.
- [6] *A note on skew characters of symmetric groups*,
Israel J. Math. 221 (2017), no. 1, 435–443.
- [5] *Generalized Gelfand–Graev representations in small characteristics*,
Nagoya Math. J. 224 (2016), no. 1, 93–167.
- [4] *Induced characters of type D Weyl groups and the Littlewood–Richardson rule*,
J. Pure Appl. Algebra 219 (2015), no. 8, 3445–3452.
- [3] *Evaluating characteristic functions of character sheaves at unipotent elements*,
Represent. Theory 18 (2014), 310–340.
- [2] *Finding characters satisfying a maximal condition for their unipotent support*,
J. Pure Appl. Algebra 218 (2014), no. 3, 474–496.
- [1] *On unipotent supports of reductive groups with a disconnected centre*,
J. Algebra 391 (2013), 41–61.

Software • *CharLiePy*, v. 0.1, available at github.com/jay-taylor/charliepy.

- Other • *Decomposition Matrices of Unipotent Blocks*,
Oberwolfach Rep. 16 (2019), no. 1, 841–895.
- *Symmetry and Characters of Finite Groups*, with E. Giannelli,
Snapshots of Modern Mathematics from Oberwolfach, (2016), no. 5.
- *Generalised Gelfand–Graev characters in small characteristics*,
Oberwolfach Rep. 12 (2015), no. 1, 235–283.

TEACHING EXPERIENCE

- 2019 Fall **Calculus I - Math 125** (USC)
Undergraduate level, 47 students, 3 contact hours per week, 15 weeks
- Fall **Algebra - Math 510A** (USC)
Graduate level, 12 students, 3 contact hours per week, 15 weeks
- Spr **Intro to Abstract Algebra - Math 415B** (University of Arizona)
Undergraduate level, 18 students, 3 contact hours per week, 16 weeks
- 2018 Fall **Intro to Abstract Algebra - Math 415A** (University of Arizona)
Undergraduate level, 23 students, 3 contact hours per week, 16 weeks
- Fall **Vector Calculus - Math 223** (University of Arizona)
For advanced high school students, 4 students, 2.75 contact hours per week, 26 weeks
- 2017 Fall **Vector Calculus - Math 223** (University of Arizona)
Undergraduate level, 2 sections, 61 students, 4 contact hours per week, 16 weeks

- Spr **Group Theory - Math 517B** (University of Arizona)
Graduate level, 6 students, 2.5 hours per week, 16 weeks, wrote course syllabus
- 2016 Fall **Vector Calculus - Math 223** (University of Arizona)
Undergraduate level, 32 students, 4 contact hours per week, 16 weeks
- Fall **Calculus 1 - Math 125** (University of Arizona)
Undergraduate level, 24 students, 3 contact hours per week, 16 weeks
- 2015 Fall **Algebraic Groups** (Università di Padova)
Graduate level, 4 students, 2 hours per week, 20 weeks, wrote course syllabus
- 2014 Fall **Undergraduate Project Supervision** (EPFL)
Undergraduate level, held weekly discussions with student lasting 1–2 hours

PROFESSIONAL SERVICE AND DEVELOPMENT

REFEREEING WORK

- Advances in Math
- Algebra & Number Theory
- Archiv der Mathematik
- Bulletin of the AMS
- Communications in Algebra
- Crelle's Journal
- Finite Fields and Their Applications
- Israel Journal of Math
- IMRN
- Journal of Algebraic Combinatorics
- Journal of Algebra
- Journal of Group Theory
- Memoirs of the AMS
- Representation Theory
- Transactions of the AMS

PHD DEFENCE COMMITTEES

- 2018 Dan Rossi, University of Arizona, Advisor: Pham Tiep
- 2017 Hyereem Lee, University of Arizona, Advisor: Pham Tiep

DEPARTMENT AND UNIVERSITY

- 2018 Fall – 2019 Spr Tucson Math Circle volunteer
- 2017 Fall – 2018 Spr Organised weekly postdoctoral tea, University of Arizona
- 2017 Judge for UoA Graduate and Professional Student Council Travel Grant

DIVERSITY

- 2018 Leader in Classroom Diversity & Inclusion Certificate, University of Arizona

OTHER

- 2015 – Present Written reviews for MathSciNet Mathematical Reviews

CONFERENCES ORGANISED

- 2017 Mar **Arizona**, Finite Simple Groups and Their Representations
Co-organisers: Klaus Lux, Pham Tiep
- 2016 Jul **York**, Representation Theory of Algebraic Groups
Co-organisers: Michael Bate, Chris Bowman, Harry Geranios, and Neil Saunders
Funding: £2,500 Heilbronn Institute Grant, £6,000 LMS Scheme 1 grant
- Apr **Padova**, An Invitation to the Representation Theory of Finite Groups
Funding: € 3,000 from INdAM-Marie-Curie Fellowship
- 2015 Aug **Les Diablerets**, Character Theory of Finite Groups of Lie type
Co-organisers: Claude Marion and Donna Testerman
- 2013 Sep **Kaiserslautern**, Character Sheaves with Applications to Representation Theory
Co-organisers: Britta Späth
Funding: € 12,000 from the DFG Schwerpunkt Darstellungstheorie

- 2011 Jun **Aberdeen**, 13th Annual Postgraduate Group Theory Conference
Funding: £4,000 LMS Scheme 8 grant (joint with Radha Kessar),
 £825 EMS RSF grant, £1,000 grant from the Representation Theory Network

SELECTED CONFERENCE TALKS

- 2020 Nov **IAS**, Recent Developments in Geometric Representation Theory
 Unitriangularity and Decomposition Matrices of Unipotent Blocks
Isaac Newton Institute, Introductory Workshop
 Representations and Unipotent Classes
- 2019 Mar **Oberwolfach**, Representations of Finite Groups
 Decomposition Matrices of Unipotent Blocks
- 2018 Apr **MSRI**, Representations of Finite and Algebraic Groups
 Deligne–Lusztig Induction and Almost Characters
- 2017 Oct **Banff**, New Perspectives in Representation Theory of Finite Groups
 Structure of Root Data and Smooth Regular Embeddings
- Jul **Kaiserslautern**, Representation Theory in Kaiserslautern
 Action of Automorphisms on Irreducible Characters of Symplectic Groups
- Jan **Atlanta**, AMS JMM - Representations and Related Geometry in Lie Theory
 Action of Automorphisms on Irreducible Characters of Symplectic Groups
- 2016 Oct **University of Denver**, AMS Sectional – Groups and Representation Theory
 Action of Automorphisms on Irreducible Characters of Symplectic Groups
- 2015 Apr **Oberwolfach**, Representations of Finite Groups
 Generalised Gelfand–Graev Characters in Small Characteristics
- 2014 Mar **Banff**, Global/Local Conjectures in Representation Theory of Finite Groups
 Character Sheaves and GGGRs
- 2013 Sep **Manchester**, Brauer’s Problems - 50 Years On
 Decomposing Generalised Gelfand–Graev Representations (GGGRs)
- Jun **Oxford**, Cohomology in Lie Theory
 On Lusztig’s Conjecture for Character Sheaves of Classical-Type Groups

SELECTED SEMINAR TALKS

- 2020 Oct **Queen Mary** (Virtual Algebra Seminar)
 Unitriangularity of Decomposition Matrices of Unipotent Blocks
- Apr **Birmingham** (Virtual Algebra Seminar)
 Unitriangularity of Decomposition Matrices of Unipotent Blocks
- Mar **Newcastle University** (Algebra Seminar)
 Unitriangularity of Decomposition Matrices of Unipotent Blocks
- Mar **City University** (LAC)
 Unitriangularity of Decomposition Matrices of Unipotent Blocks
- Feb **York** (Algebra Seminar)
 Unitriangularity of Decomposition Matrices of Unipotent Blocks
- Feb **Bristol** (Algebra Seminar)
 Unitriangularity of Decomposition Matrices of Unipotent Blocks
- 2019 Apr **Purdue** (Automorphic Forms and Representation Theory Seminar)
 Character Values at Unipotent Elements
- Feb **UC Riverside** (Lie Theory Seminar)
 Bounding Character Values of Finite Reductive Groups
- 2017 Jun **Cambridge** (Algebra Seminar)
 Action of Automorphisms on Irreducible Characters of Symplectic Groups

- Jun **City University** (LAC)
Harish-Chandra Induction and Lusztig's Jordan Decomposition of Characters
- May **UGA Georgia** (Algebra Seminar)
Action of Automorphisms on Irreducible Characters of Symplectic Groups
- 2016 May **City University** (BLOC)
Self Normalising Sylow 2-Subgroups
- Mar **CU Boulder** (Algebraic Lie Theory Seminar)
Generalised Gelfand–Graev Representations and Wave Front Sets
- Feb **MSU Denver** (Colloquium)
Computing Character Tables of Finite Groups
- 2015 Nov **Cambridge** (Algebra Seminar)
Character Values of Finite Reductive Groups at Unipotent Elements
- Oct **Bristol** (Algebra Seminar)
Character Values of Finite Reductive Groups at Unipotent Elements
- 2014 Nov **Imperial College London** (LAC)
Generalised Gelfand–Graev Representations in Small Characteristics
- May **Birmingham** (Algebra Seminar)
Decomposing Generalised Gelfand–Graev Representations
- Apr **Stuttgart** (Algebra Oberseminar)
Decomposing Generalised Gelfand–Graev Representations
- Mar **UGA Georgia** (Undergraduate Colloquium)
Groups: The Language of Symmetry
- Mar **UGA Georgia** (Algebra Seminar)
Character Sheaves and GGGRs
- 2013 Nov **EPFL** (Group Theory Seminar)
Decomposing Generalised Gelfand–Graev Representations
- Oct **NUI Maynooth** (Colloquium)
Representations of Finite Groups Through Geometry
- 2012 Oct **Paris VII** (Séminaire Claude Chevalley)
Unipotent Supports and Generalised Gelfand–Graev Representations (GGGRs)
- 2011 Nov **Oxford** (Algebra Seminar)
On Unipotent Supports for Finite Reductive Groups
- Feb **Erlangen-Nürnberg** (Emmy-Noether-Seminar)
Unipotent Supports in Finite Reductive Groups

RESEARCH VISITS

- 2017 May **TU Kaiserslautern** (2 - 3 months)
Visited Gunter Malle
- 2017 Mar **MSU Denver** (1 week)
Visited Mandi Schaeffer Fry
- 2016 Feb **MSU Denver** (2 weeks)
Visited Mandi Schaeffer Fry
- 2015 Dec **Paris VII** (1 week)
Visited Olivier Brunat and Olivier Dudas
- 2011 May **Université Montpellier 2** (2 weeks)
Visited Cédric Bonnafé
- 2010 Oct **Lehrstuhl D für Mathematik, RWTH Aachen** (6 months)
Visited Gerhard Hiß, supported by the ERASMUS exchange program

ADDITIONAL SKILLS

- Programming: Python (Advanced), C (Intermediate), GAP (Intermediate).
- Languages: English (native), German (CEFR Level B2).
- Excellent knowledge of the typesetting language \LaTeX .