Curriculum Vitae

Feyishayo Olukoya

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Research Interests

My interests include combinatorial and geometric group theory and their applications to dynamical systems. Particular groups of interest are the Higman–Thompson groups $G_{n,r}$, their automorphism groups $\mathrm{Aut}(G_{n,r})$, the automorphism group $\mathrm{Aut}(X_n^{\mathbb{Z}}, \sigma_n)$ of the two-sided shift dynamical system, groups and semigroups generated by finite transducers and more generally groups of homeomorphisms of Cantor space. I am also interested in connections between group theory and formal languages.

Employment

- February 2024 - : **Engineering and Physical Sciences Research Council postdoctoral fellow**
  Mathematical Institute University of St Andrews.
  Supported by EPSRC Postdoctoral grant EP/X02606X/1.

- July 2022-January 2024 : **Lecturer**
  School of Computer Science and Mathematics Keele University.

- October 2020-June 2022 : **Associate Lecturer**
  Mathematical Institute University of St Andrews.

- September 2020 - October 2020: **LMS Early Career Fellow**
  Mathematical Institute University of St Andrews.
  Supported by LMS Early Career Fellowship Covid-19 Response ECF-1920-105.

- September 2018 - August 2020: **Research Fellow**
  Institute of mathematics University of Aberdeen.
  Supported by Leverhulme Trust Research Project Grant RPG-2017-159 PI Jarek Kędra.

Education

- December 2018: **PhD in Pure Mathematics**
  School of Mathematics and Statistics University of St Andrews.

Fully funded by The Carnegie Trust for the Universities of Scotland
Thesis: *"Decision problems in groups of homeomorphisms of Cantor Space"*.
Advisors: Collin Bleak and Martyn Quick.

- July 2014: **MMath Mathematics (Fast Track), First Class Honours**
  School of Mathematics and Statistics University of St Andrews.
  Dissertation: *"The conjugacy problem in groups"*.
  Advisor: Collin Bleak.

- August 2010: **Advance Higher** grades A1 Mathematics, A1 Physics, A English.

Publications

Jointly authored articles have equal contribution from all authors listed.

Accepted/Appeared

(1) C. Donoven, and F. Olukoya, Conjugate subgroups and overgroups of V_n. *International Journal of Algebra and Computation* Vol. 30, No. 6 (2020) 1129–1160. arXiv:1710.00913

(2) F. Olukoya, Automorphism tower of groups of homeomorphism of Cantor space. *Israel Journal of Mathematics* Vol. 244, 883–899 (2021). arXiv:1908.03815.

(3) F. Olukoya, The growth rate of automata groups generated by reset automata. *To appear, Groups Geometry and Dynamics* 1-37. arXiv: 1709.07209.

(4) C. Bleak, P. Cameron, F. Olukoya, Automorphisms of shift spaces and the Higman–Thompson groups: the one-sided case. *Discrete Analysis 2021:15, 35pp.* arXiv:2004.08478.

(5) C. Bleak, P. Cameron, Y. Maissel, A. Navas, F. Olukoya, The further chameleon groups of Richard Thompson and Graham Higman: automorphisms via dynamics for the Higman groups $G_{n,r}$. *To appear, Memoirs of the AMS* 1-96. arXiv :1605.09302.

(6) F. Olukoya, Automorphisms of the Generalised Thompson groups $T_{n,r}$ and the R-infinity property in $T_{n,r}$. *To appear, Transactions of the LMS* 1-46. arXiv:1908.03816.

Submitted/under review

(7) F. Olukoya, An automata theoretic proof that $Out(T_2)$ is isomorphic to $\mathbb{Z}/2\mathbb{Z}$ and some embedding results for $Out(V)$. *Submitted* 1-21. arXiv:2003.14372 .

(8) F. Olukoya, The core growth of strongly synchronizing transducers. *Submitted* 1-12. arXiv:2004.00516.

(9) C. Bleak, P. Cameron, F. Olukoya, Automorphisms of shift spaces and the Higman–Thompson groups: the two-sided case. *Submitted* 1-46. arXiv:2006.01466.

(10) F. Olukoya, Automorphisms of shift spaces and the Higman–Thompson groups: extensions. *Submitted* 1-50.

(11) C. Bleak, F. Olukoya, Conjugacy for certain automorphisms of the one-sided shift via transducers *Submitted* 1-53. arXiv:2301.13570.

In preparation, draft available on request.

(12) C. Bleak, F. Olukoya, Conjugacy for the full one-sided shift: torsion elements. *In preparation.*

(13) F. Olukoya, Automorphisms of the generalised Thompson's group F_n. *In preparation.*

(14) F. Olukoya, The mapping class group of the full shift and the Higman-Thompson groups. *In preparation*.

(15) J. Belk, F. Olukoya, Isomorphisms of the generalised Thompson group $T_{n,r}$. *In preparation*

Invited Talks

- 13/05/2024: Glasgow Geometry and Topology seminar.
  Title: "The mapping class group of a shift and the outer automorphism group of the Higman-Thompson groups".

- 18/09/2023: GoTh Workshop: Groups of Thompson and their relatives.
  Title: "Automorphisms of the Higman–Thompson groups".

- 30/03/2021: Pure Mathematics Seminar UNSW Sydney
  Title: "Automorphism tower of groups of homeomorphism of Cantor space".

- 2 October 2020: Symmetry in Newcastle.
  Title: "The group of automorphisms of the shift dynamical system and the Higman-Thompson groups".

- 23 June 2020: St Andrews Analysis seminar.
  Title: "The automorphisms of the shift dynamical system and the Higman–Thompson groups".

- 16 January 2019: Groups, Generalisations and Applications, University of Aberdeen.
  Title: "Outer automorphisms of the Higman–Thompson groups $G_{n,r}$ and $T_{n,r}$".

- 5 December 2017: Group Theory Seminar, École Normale Supérieure, Paris, France.
  Title: "The growth rates of groups generated by reset automata".

Other Talks

- University of Aberdeen algebra seminar

  - 19/11/2018: "Automorphisms of the full two-sided shift and $Out(G_{n,n-1})$".
  - 08/10/2018 - 22/11/2018: A series of weekly seminars on Rational group $\mathcal{R}_n$

- The University of Aberdeen undergraduate maths club

  - 30/10/2019: "Infinite simple groups"

- St Andrews algebra seminar and the Centre for Interdisciplinary Research in Computational Algebra (CIRCA) seminar:

  - 28 September 2017: "Overgroups and subgroups of V_n".
  - 12 April 2017: "The rational group and some of its subgroups".

- Talks at conferences and workshops

  - 26 August 2021: World of Group Craft
    Title: "Automorphism tower of groups of homeomorphism of Cantor space".
  - 23 June 2020: Geometric and Asymptotic Group Theory with Applications (GAGTA) 2020 one day workshop.
    Title: "Simple overgroups of generalized Thompson groups V_n from asynchronous transducers".

- – 3 August 2017: *Young Researchers in Mathematics*, University of Kent, Canterbury, United Kingdom.
  Title: "Growth rates of automata groups generated by reset automata".
  - – 28 July 2017: *Symmetry in Finite and Infinite Structure*, Faculty of Sciences, University of Lisbon, Portugal.
  Title: "Growth rates of automata groups generated by reset automata".
  - – 21 January 2017: *Postgraduate Interdisciplinary Mathematical Symposium*, The Burn House, Brechin, United Kingdom.
  Title: "A class of automata groups generalising the lamplighter groups".
  - – 2 August 2017: *Young Researchers in Mathematics*, University of St Andrews, St Andrews, United Kingdom.
  Title: "Algorithmic problems in the group $\mathcal{P}_n$".
  - – 1 July 2016: *Postgraduate Group Theory Conference*, Imperial College, London, United Kingdom
  Title: "The order problem in the subgroup $\mathcal{P}_n$ of the rational group".
  - – 26 January 2016: *Postgraduate Interdisciplinary Mathematical Symposium*, The Burn House, Brechin, United Kingdom.
  Title: "Detecting synchronicity in synchronous transducers".

- Pure Postgraduate Seminar at the University of St Andrews:

  - – 24 April 2017: "Through the *looking glass*: some *reflections* on a couple of rabbit holes I have encountered".

  - – 10 November 2016: "Subgroups and overgroups of V_n via topological conjugation".

  - – 4 December 2015: "Dynamics and decision problems in V".

  - – 14 April 2015: "Homotopy, Homology and the fundamental group".

- University of St Andrews research day:

  - – 11 January 2016: On The Order Problem In $Out(G_{n,r})$

Selected list of conferences and workshops

- 23–28 November 2014: *All Kinds of Mathematics Remind me of You* conference at Universidade de Lisboa, Lisbon, Portugal.
  http://cameron17.campus.ciencias.ulisboa.pt/

- 26–30 June 2014: *Applications of operator algebras: order, disorder, symmetry* workshop at ICMS, Edinburgh, United Kingdom.
  http://www.icms.org.uk/workshop.php?id=426

- 9 November 2016: *North British geometric group theory network* at University of St Andrews, St Andrews,United Kingdom.
  http://www-groups.mcs.st-and.ac.uk/~colva/nbggt.html

- 20–21 May 2016: *Groups in Galway 2016* at NUI Galway, Galway, Ireland.
  http://www.maths.nuigalway.ie/conferences/gig16/

- 29 Jun–3 July 2015: *Group representations in Dynamical Systems and Geometry* in Marseilles, France.
  https://old.i2m.univ-amu.fr/~paoluzzi/bufetov.html

- 10-13 June 2019: *SandGal 2019 semigroups and Groups, Automata, Logics* conference at Politecnico di Milano, campus of Cremona, Cremona, Italy.
  `https://www.sandgal19.cremona.polimi.it/`

- 23 June 2020: *Geometric and Asymptotic Group Theory with Applications (GAGTA) 2020 one day workshop* online workshop.
  `https://sites.google.com/view/gagta2020`

- 23 August 2021: World of group craft: Geometric theory online. Online conference.
  `https://sites.google.com/view/world-of-ggt`

- 18-22 September 2023: GoTh Workshop: Groups of Thompson and their relatives.
  `https://trr358.math.uni-bielefeld.de/workshops/view/146` at Otto-von-Guericke Universität Magdeburg, Magdeburg, Germany.

- 17-20 June 2024: 75th British Mathematical Colloquium.
  `https://sites.google.com/view/bmc2024/home?authuser=0` at University of Manchester, Manchester, England.

Awards received

- Nominated for a Teaching Excellence award for the 2019/2020 session at the University of Aberdeen.

- Awarded a Carnegie scholarship for the duration of the PhD.

- Awarded first prize in the poster competition at the Groups in Galway conference.

- University of St Andrews Dean's list both semesters of every academic year from 09/2010 - 09/2014.

- Awarded Cormack Vacation Research Scholarship summer 2013.

Administration/Service

- February 2024 -: **Mentor/Reviewer** for the St Andrews Recognition Scheme, University of St Andrews.

- July 2023 - January 2024: **Deputy director of recruitment** at Keele University.

- September 2022 - January 2024: **Academic mentor** for ∼15 students.

- July 2022 - January 2024: **Member of the Equality Diversity and Inclusion committee** with a particular focus on Decolonising The Curriculum (DTC) initiatives at Keele University.

I have refereed papers for the following journals:

- Archiv der Mathematik

- Bulletin de la Société Mathématique de France

- Groups Geometry and Dynamics.

I regularly contribute reviews to Mathematical Reviews.

Conference organisation

In 2017 I co-organised the Postgraduate Inter-disciplinary Mathematics symposium at the University of St Andrews'.

Grants and Stipends Awarded

- (February 2024) Engineering and Physical Sciences Research Council Postdoctoral Fellow.

- (September 2020) London Mathematical Society Early Career Fellowship Covid-19 Response.

Teaching

Coordinator/Lectures/Tutorials

- September 2022 - January 2024: **Coordinator** for the third/fourth year Group Theory (MAT-30013) module, the third/fourth year Linear Algebra and Rings module (MAT-30045), the third/fourth year Guided Studies in Mathematics 2 module (MAT-30055) and for the second year Abstract Algebra module (MAT-20025). Delivered lectures, tutorials, and set and graded formative and summative assessments in all modules. Examined final year projects and MSc dissertations.

- September 2021 - 2022: Lecturer for the 1st year mathematics module (MT1002); **coordinator** and co-lecturer on the third year complex analysis module (MT3503); **coordinator** and sole lecturer for the level 4 Dynamical systems module. Delivered tutorials, set and graded formative and summative assessments in all modules. Examined final year projects and MSc dissertations.

- October 2020 - June 2021: **Co-lecturer** on 1st year pure and applied mathematics module (MT1003); delivered tutorials and marked assessments and exams for several 1st to 3rd year mathematics modules at the University of St Andrews:

    - MT1001 (Introductory 1st year mathematics),
    - MT1002 (General 1st year mathematics),
    - MT2501 (2nd year linear algebra),
    - MT2503 (2nd year multivariate calculus)
    - MT3501 (3rd year linear algebra)
    - MT3503 (3rd year complex analysis)

- September 2019 - December 2019: **Module coordinator** for the 2019/2020 session at the University of Aberdeen for the 2nd year linear algebra module MA2008. Duties included delivering lectures, setting tutorial questions, coursework and exams, monitoring students attendance and performance.

- September 2014 - June 2018 : **Teaching assistant**, University of St Andrews.
Duties include tutorials, examples classes, coursework marking, and computer project supervision and marking. Modules taken:

    - MT1002 (General 1st year mathematics module),
    - MT1003 (Introduction to pure and applied mathematics),
    - MT2501 (2nd year linear algebra module).

Supervision

BSc Mathematics student projects

- September 2022 - June 2023: A topic in the history of mathematics.

Teaching qualifications

- March 2022: **Fellow of HEA**.

- March 2021: **Associate fellow of HEA**.

- February 2021 - June 2021: **Postgraduate certificate in curriculum design and assessment**.

Development/Training

- June 2024: Race and mathematics, hybrid workshop at King's College London.

- May 2024: LMS Mathematics Communications Workshops 2024 (online).

Non-mathematical interests

I am a keen tennis fan and love both to play and watch. I also play football though I am not so keen on watching it. When I am not doing either of these things, or thinking about a problem, I can be found unwinding with a literary classic.

References

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