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**
  Mathematics Institute University of St Andrews.
- July 2022-Janurary 2024 : **Lecturer**
  School of Computer Science and Mathematics Keele University.
- October 2020-June 2022 : **Associate Lecturer**
  Mathematics Institute University of St Andrews.
- September 2020 - October 2020: **LMS Early Career Fellow**
  Mathematics 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. *Isreal 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.*

Invited Talks

- 18/09/2023: GoTh Workshop: Groups of Thompson and their relatives. Title: "Automorphisms of the Higman–Thompson groups".
- 30/03/2021: Pure Math 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`

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

July 2023 - January 2024: **Deputy director of recruitment**, Keele University.
September 2022 - January 2024: **Academic mentor** for ∼15 students.
July 2022 - January 2024: **Member of the Equality Diversity and Inclusivity committee** with a particular focus on Decolonising The Curriculum (DTC) initiatives.

I have refereed papers for the following journals:

- 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/Turorials

- September 2022 - January 2024: **Coordinator** for the third year Group Theory (MAT-30013) module, the third year Linear Algebra and Rings module (MAT-30045) and for the second year Abstract Algebra module (MAT-20025). Delivered lectures, tutorials, and set and graded formative and summative assessments in all modules.

- 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.

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

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

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

- September 2013 - June 2018 : **Teaching assistant**, University of St Andrews.
  Duties include tutorials, examples classes, coursework marking, and computer project supervision and marking. Courses taken:

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

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**.

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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