

Shaun Allison

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Education and Employment

Sessional Lecturer I, University of Toronto, [September 1, 2025 -]

Postdoctoral fellow, University of Toronto, [August 1, 2022 - July 31, 2025]

Postdoctoral fellow, Hebrew University of Jerusalem, [July 1, 2021 to June 30, 2022].

Ph.D. Mathematics, Carnegie Mellon University, May 2021. 4.07 GPA

Dissertation: Classification of equivalence relations by Polish group actions

Advisor: Clinton Conley

B.S. Computer Science, Carnegie Mellon University, May 2015. 3.97 GPA

Thesis: A secure human-computable authentication scheme from the k-Junta problem

Advisors: Manuel Blum and Jeremiah Blocki

B.S. Mathematics (Discrete Mathematics and Logic), Carnegie Mellon University, May 2015. 3.97 GPA

Other Employment

Full-time software engineer at Meta, June 2015- August 2016.

Software engineering internship at Meta, Summer 2014.

Research and development internship at VMware, Summer 2013.

Internship at Cisco, Summer 2012.

Publications and Preprints

1. *The class and dynamics of α -balanced Polish groups*, with Aristotelis Panagiotopoulos
Accepted **Journal of the European Mathematical Society**, 2026
Available from <https://arxiv.org/abs/2406.06082>
2. *Countable treeable Borel equivalence relations are classifiable by ℓ_1*
Advances in Mathematics, 2025
Available from <https://arxiv.org/abs/2305.01049>
3. *Classification strength of Polish groups: Involving S_∞*
Accepted **Journal of Mathematical Logic**, 2026
Available from <https://arxiv.org/abs/2304.00139>

4. *Actions of tame abelian product groups*, with Assaf Shani
Journal of Mathematical Logic, 2023
 Available from <https://arxiv.org/abs/2105.05144>.
5. *Dynamical obstructions for classification by (co)homology and other TSI-group invariants*, with Aristotelis Panagiotopoulos
Transactions of the American Mathematical Society, 2021
 Available from <https://arxiv.org/abs/2004.07409>.
6. *Non-Archimedean TSI Polish groups and their potential Borel complexity spectrum*
 Submitted 2020
 Available from <https://arxiv.org/abs/2010.05085>.

Talks

- Polish automorphism groups that don't involve S_∞* , University of Vienna, Set Theory Seminar (May 7, 2026)
- Revisiting Knight's model and its generalizations*, University of Vienna, Logic Colloquium (April 30, 2026)
- A formalization of a construction due to Julia Knight in the Lean 4 theorem prover with Mathlib*, Cornell, Logic Seminar (March 20, 2026)
- A formalization of a construction due to Julia Knight in the Lean 4 theorem prover with Mathlib*, Fields Institute, Set Theory Seminar (March 27, 2026)
- The algebra of Knight models*, Fields Institute, Set Theory Seminar (January 23, 2026)
- The Class of CLI Polish Groups is Coanalytic-Complete*, North American Descriptive Set Theory Meeting, Brin Mathematics Research Center (October 8, 2025)
- Automorphisms with Knight rank and bounds on cardinalities of potential Scott sentences*, Cornell Logic Seminar (April 24, 2025)
- Automorphisms with Knight rank and bounds on cardinalities of potential Scott sentences*, University of Maryland Logic Seminar (April 22, 2025)
- Automorphisms with Knight rank and bounds on cardinalities of potential Scott sentences*, CMU Logic Seminar (April 8, 2025)
- Ulm-like invariants for "almost smooth" Polish group actions*, Fields Institute, Set Theory Seminar (February 14, 2025)
- Treeable CBERs are classifiable by an abelian Polish group*, Fields Institute, Set Theory Seminar (November 22, 2024)
- A hierarchy of cli Polish groups and non-reducibility results*, Caltech logic seminar (November 6, 2024)
- A rank determining when a Polish automorphism group has less-than-maximal classification strength*, 2024 European Set Theory Conference (September 20, 2024)
- Lower bounds in potential Borel complexity, I and I*, Fields Institute, Set Theory Seminar (January 19 and 26, 2024)
- A hierarchy of cli Polish groups*, Fields Institute, Set Theory Seminar (November 10 and 17, 2024)

Treeable CBERS are classifiable by an abelian Polish group, Cornell Logic Seminar (November 3, 2023)

Treeable CBERS are classifiable by an abelian Polish group, Descriptive Dynamics and Combinatorics Seminar, Montréal (October 24, 2023)

Polish groups involving S_∞ , Structures: Descriptive Set Theory and Dynamics, Institute of Mathematics of the Polish Academy of Sciences (August 15, 2023)

Polish groups which don't involve S_∞ , 2023 North American Annual Meeting of the Association for Symbolic Logic, Descriptive Dynamics Special Session, University of California Irvine (March 27, 2023)

Classification strength of Polish groups and involving S_∞ , Caltech logic seminar (January 31, 2023)

Polish groups involving S_∞ , 2022 CMS Winter Meeting, Session on set theory and its applications (December 3, 2022)

Classification strength of Polish groups I and II, Fields Institute, Set Theory Seminar (October 7 and 14, 2022)

Polish groups with the pinned property I and II, Hebrew University, Set Theory Seminar (May 11 and 18, 2022)

Applications of the Hjorth analysis of Polish group actions, Hebrew University, Set Theory Seminar (December 22, 2021)

Potential Borel complexity and tame abelian product groups, Cornell Logic Seminar (March 26, 2021)

Polish groups with the pinned property, CMS 2020 Winter Meeting, Canadian Mathematical Society (December 8, 2020)

Potential Borel complexity and tame abelian Polish groups, Set Theory Reading Group, Carnegie Mellon University (November 24, 2020)

An anticlassification result for TSI Polish groups, Mathematical Logic Seminar, Carnegie Mellon University (November 24, 2020)

Classification by TSI Polish groups, Logic Seminar, University of Illinois at Chicago (September 1, 2020)

Non-Archimedean TSI Polish groups and obstructions to Borel reducibility, Logic Seminar, California Institute of Technology (February 12, 2020)

An effective proof of the (Go, Ho) dichotomy I and II, Mathematical Logic Seminar, Carnegie Mellon University (November 5, 2019 and November 12, 2019)

Applications of the Gandy-Harrington topology, Boise Extravaganza in Set Theory, AAAS Pacific Division Annual Meeting, (June 20, 2019)

Generic preturbulence and forcing, Mathematical Logic Seminar, Carnegie Mellon University (April 30, 2019)

Hjorth isomorphism and orbit equivalence relations, Mathematical Logic Seminar, Carnegie Mellon University (April 23, 2019)

Model theory and the Glimm-Effros property, Graduate Students Conference in Logic, University of Wisconsin-Madison (April 21, 2018)

Teaching

At University of Toronto:

1. *Instructor of record*, MAT135 Differential Calculus (Fall 2025) approx. 400 students
2. *Instructor of record*, MAT405 Introduction to Topology (Winter 2025) approx. 19 students
3. *Instructor of record*, MAT309 Introduction to Logic (Fall 2024) approx. 16 students
4. *Instructor of record*, MAT401 Polynomial Equations and Fields (Winter 2023) approx. 15 students
5. *Instructor of record*, MAT309 Introduction to Logic (Fall 2023) approx. 11 students
6. *Instructor of record*, MAT244 Differential Equations (Winter 2023) approx. 110 students
7. *Instructor of record*, MAT102 Introduction to Proofs (Fall 2022) approx. 80 students

At Carnegie Mellon University:

1. *Instructor of record*, 21-127 Concepts of Mathematics (Summer 2018) approx. 20 students
2. *Teaching assistant*, Matrices and Linear Transformations (Fall 2020), Concepts of Mathematics (Fall 2019 and Fall 2016), Matrix Theory (Fall 2018), Calculus in Three Dimensions (Spring 2018 and Fall 2017), Calculus I (Spring 2017)
3. *Grader*, Linear Algebra (Spring 2020), and Set Theory (Spring 2020 and Spring 2019)

Other Activities

Formalized the construction of Knight's model in Lean

Lead an independent study with an undergraduate on model theory during the Winter 2023 semester

Organized a reading seminar on the manuscript "Geometric Set Theory" by Paul Larson and Jindrich Zapletal, and related works, during the Fall 2019 semester

Created a new informal weekly seminar for graduate students in set theory and model theory at Carnegie Mellon University in 2019, still running as of 2023.

Patents

I have two patents with a colleague during my time at Meta that involve machine learning.

Automatic recipient targeting for notifications (US10506055B2) with L. Foged (*Granted*)

Selecting assets (US20180027092A1) with L. Foged (*Granted*)