

My research is in model theory, a branch of mathematical logic, and constraint satisfaction problems (CSPs), a topic in theoretical computer science. In model theory, I work in interactions between model theory, combinatorics, and the study of probabilistic symmetries. On CSPs, I study computational problems which are naturally represented on well-behaved infinite structures.

## Positions

- 2026-present **Senior Research Associate**, Department of Computer Science. University of Oxford.  
Funded by NAASP, UKRI ERC Guarantee Grant (previously ERC Consolidator Grant).
- 2023-2026 **Postdoc**, Institut für Diskrete Mathematik & Geometrie. TU Wien. Vienna.  
Funded by POCOCOP, ERC Synergy Grant No. 101071674.

## Education

- 2019-2023 **PhD in Pure Mathematics**, Imperial College London.  
Admin Roth Scholarship. Supervisors: Prof. David Evans, Dr. Charlotte Kestner.  
Thesis: Measures and amalgamation properties in  $\omega$ -categorical structures.
- 2018 **Summer Research Project**, University of Oxford.  
Topic: The Separation of Right Angled Artin Groups (geometric group theory); with Dr. Richard Wade.
- 2015-2019 **Master of Mathematics and Philosophy**, University of Oxford, Worcester College.  
Parts A & B: First Class. Part C: First Class. (Parts A & B correspond to my undergraduate studies).  
Dissertation in mathematics: Categoricity for totally transcendental theories; with Prof. Ehud Hrushovski.  
Thesis in philosophy: The metaontology of thin objects; with Prof. James Studd.

## Articles

- 2025 **Binary symmetries of tractable non-rigid structures**.  
Joint with Michael Pinsker. Fortieth Annual ACM/IEEE Symposium on Logic in Computer Science (LICS).  
This is a conference version of "Minimal operations over permutation groups".
- 2025 **Invariant Keisler measures for  $\omega$ -categorical structures**.  
The Journal of Symbolic Logic. Volume 90, Issue 2. pp. 791-807.
- 2025 **On the non-measurability of  $\omega$ -categorical Hrushovski constructions**.  
Archive for Mathematical Logic. Volume 64, pp. 351–386.

## Preprints

- 2025 **Taking model complete cores**.  
Joint with Manuel Bodirsky and Bertalan Bodor. ArXiv: 2512.21278. Submitted.
- 2025 **A guide to reconstruction on endomorphism monoids and polymorphism clones**.  
Joint with Michael Pinsker. ArXiv:2512.01086. Submitted.
- 2024 **Minimal operations over permutation groups**.  
Joint with Michael Pinsker. ArXiv:2410.22060. The conference version of this paper, "Binary symmetries of tractable non-rigid structures" was accepted to LICS 2025. Submitted.
- 2024 **When invariance implies exchangeability (and applications to invariant Keisler measures)**.  
Joint with Samuel Braunfeld and Colin Jahel. ArXiv:2408.08370. Submitted.

## Papers in preparation

- 2025 **Minimal and intrinsic topologies on monoids of elementary embeddings**.  
Joint with J de la Nuez Gonzales, Zaniar Ghadernezhad, and Michael Pinsker. In preparation.
- 2025 **When invariance implies exchangeability II**.  
Joint with Samuel Braunfeld, Artem Chernikov, and Colin Jahel. In preparation.

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## Selected talks and posters ( $\star$ :=invited talks in person)

- Dec 2025 **Tutorial: On the topological reconstruction of endomorphism monoids of  $\omega$ -categorical structures.** Oberwolfach Workshop: Homogeneous Structures: Model Theory meets Universal Algebra. Extended abstract published in the meeting report.
- \* Nov 2025 **On topological reconstruction for monoids of elementary embeddings.** Logic Seminar. University of Leeds.
- \* Sep 2025 **Minimal operations over permutation groups.** 63rd Summer School on General Algebra and Ordered Sets (SSAOS). Blansko, Czech Republic.
- Jul 2025 **When invariance implies exchangeability.** Logic Colloquium 2025. TU Wien. An abstract of this talk will appear in the meeting report published in the Bulletin of Symbolic Logic.
- \* Jun 2025 **Binary Symmetries of tractable non-rigid structures.** 40th Annual ACM/IEEE Symposium on Logic in Computer Science (LICS). Singapore. Paper selected through peer-review.
- Nov 2024 **Minimal operations over permutation groups.** PALS, Panglobal Algebra and Logic Seminar. University of Colorado.
- Oct 2024 **When invariance implies exchangeability.** Peking University Model Theory seminar.
- Jul 2024 **Exchangeability of consistent random expansions.** Midsummer Combinatorial Workshop XXIX, Prague.
- May 2024 **Minimal operations over permutation groups.** AAA105, Prague.
- \* Mar 2024 **Minimal operations over permutation groups.** Algebra seminar. Korean Institute of Advanced Studies.
- \* Mar 2024 **When measures don't care about structure (and when they do).** Logic seminar. Yonsei University.
- \* Sep 2023 **Measures in homogeneous 3-hypergraphs.** Model Theory Workshop. Wroclaw.
- Jun 2023 **Measures in ternary homogeneous structures.** SEEMOD. University of Oxford.
- Jan 2023 **Invariant Keisler measures in simple  $\omega$ -categorical structures.** Logic seminar. Carnegie Mellon University.
- \* Nov 2022 **Universally measure zero non-forking formulas in simple omega-categorical Hrushovski constructions.** 7th French-Kazakh Colloquium in Model Theory. Institut Camille Jordan. Lyon.
- Jul-Aug 2022 Poster: **Invariant Keisler Measures in  $\omega$ -categorical Hrushovski Constructions.** UNIMOD 2022. I also contributed by typing the exercises for the problem classes.
- Mar 2022 **Non-measurability of omega-categorical Hrushovski constructions.** European Conference on Interdisciplinary Model Theory - ECIMT. Münster.
- \* Dec 2021 **Non-MS-measurability of omega-categorical Hrushovski constructions.** South and East of England Model Theory Network Conference (SEEMOD). Queen Mary University of London.

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## Long research visits

- Mar 2024 **Two weeks visit at the Korean Institute of Advanced Studies (KIAS).** Visiting J de la Nuez Gonzales. Funded by the KIAS.
- Nov 2022 **One month visit to the Institut Camille Jordan (ICJ),** Université Claude Bernard, Lyon 1, France. Funded by the ICJ.

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## Organisation of meetings and conferences

- 2026 **Arbeitstagung Allgemeine Algebra (AAA) 108 - 108th Workshop on General Algebra.** TU Wien. Organizer jointly with Michael Pinsker and Mike Behrisch.
- 2024 & 2025 **POCOCOP meeting.** TU Wien. Organiser. Room, hotel, and restaurant bookings. Schedule.
- 2025 **Shelah's 80th birthday conference & VOrST (Vienna Oracle of Set Theory).** TU Wien. Registration and coffee breaks.
- 2022 **SEEMOD.** Imperial College London.

## Organisation of reading groups involving multiple universities

- 2023-2025 **Finite Structures with Few Types**, by Cherlin and Hrushovski. Jointly with Aris Papadopoulos. TU Wien, U. Leeds, U. Notre Dame, Imperial, and U. Maryland.
- 2023-2024 **CSP reading group**. Organiser. TU Wien, TU Dresden, Charles University (Prague), U. Leeds, and U. Cambridge. Website with recordings: [cspreadinggroup.github.io](https://cspreadinggroup.github.io).
- 2023 "On NSOP<sub>2</sub> theories" by Mutchnik. Organiser. Imperial and Institut Camille Jordan.

## Awards

- 2023 **Runner-up prize for the Mathematics PhD Symposium poster competition**. Imperial College London.
- 2022 **Travel Grant from the Association for Symbolic Logic (ASL)** for Unimod 2022.
- 2017 **Gibbs Prize for FHS Mathematics and Philosophy Part A**. Best performance in Math.
- 2016 **Scholarship, Worcester College**. For performance in first year exams.

## Teaching

- 2024-2025 **Model theory II: Stability**. TU Wien. Masters' course. Designing and teaching the course. 16 lectures+problem classes & oral exam. Lecture notes and recordings available on my website.
- 2023-2025 **Supervising students** at TU Wien:
- bachelor thesis on "Automorphism groups and Ramsey properties of sparse graphs" by Evans, Hubička, and Nešetřil;
  - bachelor mini-thesis on "The CSP Dichotomy, the Axiom of Choice, and Cyclic Polymorphisms" by Kátay, Tóth, and Vidnyánszky;
  - visiting student (from ISEER Bhopal) bachelor project on Hall's universal group.
- 2024 **Model theory**. TU Wien. Masters' course. Problem classes, problem sheets, and two lectures.
- 2022 **Associate Fellowship of the Higher Education Academy**. Approved through the Imperial College London STAR Framework.
- 2019-2023 **Graduate Teaching Assistant** at Imperial College London: Introduction to University Mathematics (2020, 2022); Introduction to University Mathematics re-sit exam preparation (2021, 2023); Linear Algebra and Groups (2019-2022); Latex workshops for first year projects (2020-2022); Mathematics Pre-Arrival Course (2021-2022); Commutative Algebra (2020).
- 2020-2022 **Senior Graduate Teaching Assistant**: Analysis II (metric spaces and topology).
- 2020-2021 **Personal tutoring** in mathematics and philosophy. Grosvenor Tutors.

## Professional development courses

- 2019-2023 Graduate School and Department of Mathematics of Imperial College London: Teaching: Maths GTA training; Intro to Assessment and Feedback for Learning; Intro to Learning and Teaching; Performative Aspects of Teaching; Microteaching; GTA Retreat for Associate Fellowship to the Higher Education Academy. Management Skills: Time Management for your Doctorate.

## Other skills and interests

- Languages:** Fluent: Italian, Spanish, English. Elementary (A1): German, French.
- Software:** **For mathematics:** L<sup>A</sup>T<sub>E</sub>X. Lean, GAP, and MAGMA.
- Graphics:** Adobe Creative Cloud: Illustrator; Photoshop; InDesign. Inkscape.
- Piano:** Recently playing: Brahms' Intermezzo Op.118 No.2. and Schumann's Arabeske. Op.18.
- Philosophy:** Early analytic philosophy (Frege, Russell, Wittgenstein, and Ramsey). Philosophy of logic, mathematics, and quantum physics. Ethics (Anscombe, Murdoch, Foote, and Midgley).
- Origami:** Advanced practitioner and creator. Interested in uses of origami for mathematics education.