# Ran Tao

ran.tao6@mail.mcgill.ca | generantao.github.io

## EDUCATION

**McGill University**                                                             2021 – 2023

*Master of Science, Mathematics*                                     *Advised by Anush Tserunyan*

- **Research interests:** countable Borel equivalence relations, descriptive set theory, descriptive graph combinatorics, measured group theory, logic, geometric group theory, theoretical computer science.
- **GPA**: 4.0/4.0

**McGill University**                                                             2018 – 2021

*Bachelor of Arts, Honours Mathematics and Computer Science*

- Dean's Honours List, First Class Honours
- Exchange at École polytechnique fédérale de Lausanne (EPFL)

## WORKS

**On the multiplicative independence between $n$ and $\lfloor \alpha \rfloor$,** on [ArXiv]

with David Crnčević, Felipe Hernández, Kevin Rizk and Khunpob Sereesuchart.

**Lower bound methods for sign-rank and their limitations,** Submitted [ECCC]

with Hamed Hatami, Pooya Hatami, William Pires, Rosie Zhao.

**Separations in Proof Complexity and TFNP,** FOCS 2022 [ECCC]

with Mika Göös, Alexandros Hollender, Siddhartha Jain, Gilbert Maystre, William Pires, Robert Robere.

**Further collapses in TFNP,** CCC 2022 [DROPS]

with Mika Göös, Alexandros Hollender, Siddhartha Jain, Gilbert Maystre, William Pires, Robert Robere.

**On public-coin zero-error randomized communication complexity,** IPL 2021 [ECCC]

with Ben Davis, Hamed Hatami, William Pires, Hamza Usmani.

## RESEARCH PROJECTS

**Bayesian inversion in categorical logic**                                         Winter 2021

Supervised by Prakash Panangaden.

**The undecidability of the word problem**                                            Fall 2019

Supervised by Marcin Sabok.

**Gödel's Constructible Universe**                                                    Fall 2019

Mentored by Michael Wolman.

## TEACHING AND MENTORING

| | |
|---|---|
| Algebra 1 \| *Teaching Assistant* | Fall 2022 |
| Descriptive Set Theory \| *Mentee: Tasmin Chu* | Winter 2022 |
| Algorithm Design \| *Head TA* | Winter 2022, 2021 |
| Calculus II \| *Teaching Assistant* | Fall 2021 |
| Advanced Theory of Computation \| *Teaching Assistant* | Fall 2021 |
| Mathematical Logic \| *Course Assistant* | Fall 2020 |

## AWARDS AND SCHOLARSHIPS

| | |
|---|---|
| NSERC Master's scholarship | 2022-2023 |
| FRQNT Master's training | 2022-2023 |
| Bourse du Ministère de l'éducation supérieure | 2021 |
| NSERC Summer Research | 2021 |
| Jiuding Science Scholarship | 2020 |
| University of Toronto Scholar | 2018 |

## Graduate Coursework

Measure Group Theory

Ergodic Theory

Geometric Group Theory

Geometry and Topology

Advanced Real Analysis

Geometry and Topology

Advanced Probability

Honours Set Theory

## Service

| | |
|---|---|
| Graduate Student Association of Mathematics Students \| *Executive* | 2021-present |
| Centre de karaté Shotokan Laval \| *Assistant instructor* | 2021-2022 |
| McGill Karateka \| *Instructor, Founder* | 2019-present |
| Society of Undergraduate Mathematics Students \| *Executive* | 2018-2020 |