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### Education

- 2023–Present **Ph.D. in Mathematics**, Johns Hopkins University  
(Expected 2029)
- 2022–2023 **Program Associate**, SLMath (formerly MSRI)
- 2021–2022 **M.Sc. in Mathematics**, University of Toronto
- 2017–2021 **B.Sc.**, Western University, Mathematics (Honours Spec.); Comp. Sci. (Minor)

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### Publications

**Cubical models of  $\infty$ -presheaves and the Bousfield-Kan formula**, *submitted*  
with K. Arakawa and C. Kapulkin

[arXiv](#)

**Derived mapping spaces of  $\infty$ -categories**, *submitted*

with K. Arakawa and C. Kapulkin

[arXiv](#)

**Categorical foundations of discrete dynamical systems**, *submitted*

With C. Kapulkin, N. Kershaw, R. Laubenbacher, and M. Wheeler

[arXiv](#)

**Nonexistence of colimits in naive discrete homotopy theory**, *Applied Categorical Structures*, 31 (2023), no.5, 41, 6 pp.

With C. Kapulkin and J. Kim

[arXiv](#) [Journal](#)

**Calculus of Fractions for Quasicategories**, Submitted

With C. Kapulkin and Z. Lindsey

[arXiv](#)

**Diagonal Lemma for Presheaves on Eilenberg-Zilber Categories**, *Theory and Applications of Categories*, 44 (2025), Paper No. 11, 326-343

With C. Kapulkin and L.-Z. Wong

[arXiv](#) [Journal](#)

**Cofibration category of digraphs for path homology**, *Algebraic Combinatorics*, 7 (2024), no. 2, 475–514

with B. Doherty, C. Kapulkin, M. Opie, M. Sarazola, and L.-Z. Wong

[arXiv](#) [Journal](#)

**The Hurewicz theorem for cubical homology**, *Mathematische Zeitschrift*, 305, 62 (2023)

With C. Kapulkin and A. Tonks

[arXiv](#) [Journal](#)

**Cubical setting for discrete homotopy theory, revisited**, *Compositio Mathematica*, 160, no. 12 (2024), 2856–2903.

With C. Kapulkin

[arXiv](#) [Journal](#)

**Homotopy groups of cubical sets**, *Expositiones Mathematicae*, 41 (2023) 125518, no. 4, 55 pp.

With C. Kapulkin

[arXiv](#) [Journal](#)

**2-adjoint equivalences in homotopy type theory**, *Logical Methods in Computer Science*, (2021), no. 1, Paper No. 3, 9 pp.

With J. Chang, C. Kapulkin, and R. Sandford

[arXiv](#) [Journal](#)

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## Talks

### Generalizing the Bousfield–Kan formula

December 2025 Canadian Mathematical Society Summer Meeting, Toronto, Ontario

### Weak homotopy types of finite spaces

July 2025 Mathematical Congress of the Americas, Miami, Florida

June 2025 Canadian Mathematical Society Summer Meeting, Quebec City, Quebec

### Nonexistence of colimits in naive discrete homotopy theory

November 2024 Topology and Geometry seminar, University of Florida

January 2024 Joint Mathematics Meeting, San Francisco, California

### Calculus of fractions for quasicategories

February 2025 Topology Seminar, University of Virginia

March 2024 AMS Spring Southeastern Sectional Meeting, Florida State University

December 2023 Canadian Mathematical Society Winter Meeting, Montreal, Quebec

October 2023 Geometry, Topology and Physics seminar (online), NYU Abu Dhabi

March 2023 Algebraic Topology seminar, University of California, Los Angeles

## Hurewicz Theorem in Discrete Homotopy Theory

November 2023 9th Mexican Workshop on Applied Geometry and Topology, Centro de Investigación en Matemáticas (CIMAT)

## Cubical Setting for Discrete Homotopy Theory

December 2023 Geometric, Algebraic, and Topological Combinatorics, Mathematisches Forschungsinstitut Oberwolfach

April 2023 Math & Statistics Colloquium, Reed College

April 2023 Algebraic & Geometric Topology Seminar, University of Nevada-Reno

March 2023 AIM Workshop: Discrete and Combinatorial Homotopy Theory

November 2022 Berkeley Seminar, Topos Institute

<https://youtu.be/Ns1NBLMddps?si=ILsdvwPuKDbt-o7p>

October 2022 AMS Fall Eastern Sectional Meeting, University of Massachusetts Amherst

May 2022 Ontario Combinatorics Workshop, University of Waterloo

## Formalizing 2-adjoint equivalences in homotopy type theory

August 2020 Western Homotopy theory seminar, University of Western Ontario

[https://youtu.be/BIqhGYoo\\_PU?si=bTN4uUfenqLyasP0](https://youtu.be/BIqhGYoo_PU?si=bTN4uUfenqLyasP0)

## Formal verification of Mathematics

August 2020 Canadian Undergraduate Mathematics Conference (online)

<https://youtu.be/LCW682zcEVs?si=r5530uP66Ri1dHTU>

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## Scholarships and Awards

2024-2027 **Canada Graduate Scholarship-Doctoral (CGS D)**

Summer 2021 **NSERC Undergraduate Student Research Award**, *Cubical Methods in Discrete Homotopy Theory*, Western University

Summer 2020 **NSERC Undergraduate Student Research Award**, *2-Adjoint Equivalences in HoTT*, Western University

2018-2021 **Dean's Honor List**

September 2017 **Western Scholarship of Excellence**

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## Teaching Experience

### Teaching Assistant

Winter 2022 **Math Learning Centre**, University of Toronto

Winter 2022 **Engineering Calculus 2**, University of Toronto

Fall 2021 **Engineering Linear Algebra**, University of Toronto

## Other Activities

- Summer 2025 **Fields Undergraduate Summer Research Program**, *Co-supervisor*, Project 09: Formal verification of topological combinatorics, Western University
- December 2023 **Oberwolfach Workshop 2350: Geometric, Algebraic, and Topological Combinatorics**, *Workshop Participant*, Oberwolfach Research Institute for Mathematics
- March 2023 **AIM Workshop: Discrete and Combinatorial Homotopy Theory**, *Workshop Participant*, San Jose, California
- June 2022 **Higher Categories and Categorification, Part Two**, *Program Participant*, MSRI
- February 2020 **Higher Categories and Categorification**, *Research Visit*, MSRI