

Daniel Carranza

Curriculum Vitae

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)

Publications

- Discrete homotopy hypothesis for n -types**, *submitted*
with C. Kapulkin
[arXiv](#)
- Cubical models of ∞ -presheaves and the Bousfield-Kan formula**, *submitted*
with K. Arakawa and C. Kapulkin
[arXiv](#)
- Derived mapping spaces of ∞ -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](#) [Journal](#)
- 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](#)

Talks

Generalizing the Bousfield–Kan formula

December 2025 Canadian Mathematical Society Winter 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=bTN4uUfenqLyasPO
Formal verification of Mathematics
- August 2020 Canadian Undergraduate Mathematics Conference (online)
<https://youtu.be/LCW682zcEVs?si=r5530uP66Ri1dHTU>

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**

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