

HANK CHEN

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EMPLOYMENT HISTORY

Beijing Institute of Mathematical Sciences and Applications (BIMSA)

- Assistant professorship. *Starting Jan. 2027*
- Postdoc . *Sep. 2024 — present*
Advisors: Profs. Hao Zheng & Jinsong Wu.

EDUCATION

University of Waterloo, Waterloo, Ontario *September 2020 — September 2024*

Doctorate in Applied Mathematics

Thesis: *Hopf 2-Algebras: Homotopy Higher Symmetries in Physics*

Supervisor: Prof. Florian Girelli

Department of Applied Mathematics

McMaster University, Hamilton, Ontario *September 2017 — September 2019*

Master in Physics

Thesis: *Topological Weyl Superconductivity*

Supervisor: Prof. Catherine Kallin

Department of Physics and Astronomy

Simon Fraser University, Burnaby, British Colombia *September 2012 — August 2017*

Bachelor of Science, Mathematical Physics Honours.

Thesis: *Quantum Hall Edge States in Graphene in the Presence of Electron-Electron Interactions*

Supervisor: Prof. Malcolm Kennett

Department of Physics

TEACHING EXPERIENCE

BIMSA/Tsinghua University *Mar. 2026 — June 2026*

- Special topics course: "Combinatorial Quantization of Chern-Simons theory I"

University of Waterloo *Jan. 2024 — May 2024*

- Math 138: Calculus II for Honours Mathematics

ACADEMIC AWARDS AND GRANTS

Jan. 2026 – Dec.2027: National Natural Science Foundation of China grant holder.

April 2025 – May 2025: International Youth Talent Exchange Program for Foreign Students and Scholars (CEP) funding holder.

Fall 2023 – Fall 2024: NSERC PGS-D Scholarship holder.

Fall 2022 – Fall 2023: OGS/QEII-GSST Scholarship holder.

SEMINAR/CONFERENCE (CO-)ORGANIZATION

- Anomalies, Topology and Quantum Field Theory** Sanya, China (offline)
· Feb. 22nd – Feb. 26th, 2027.
- Unbeaten Tracks in Integrability** Beijing, China (offline)
· Dec. 2nd – Dec. 4th, 2026.
- BIMSA TQFT and Higher Symmetries Seminar** Beijing, China (hybrid)
· Sept. 2024 – present

PUBLICATIONS AND PREPRINTS

- H. Chen** (2025), *Combinatorial quantization of 4d 2-Chern-Simons theory II: Quantum invariants of higher ribbons in D^4*
(submitted) arXiv:2506.05785.
- H. Chen** (2025), *Categorical quantum symmetries and ribbon tensor 2-categories*
(in revision) arXiv:2501.08041.
- H. Chen** (2025), *Combinatorial quantization of 4d 2-Chern-Simons theory I: the Hopf category of higher-graph states*
(accepted to Adv. Th. Math. Phys.) arXiv:2501.06486.
- H. Chen** and J. Liniado (2024), *Higher gauge theory and integrability* Phys. Rev. D **110**, 086017.
- H. Chen** and F. Girelli (2023), *Integrability from categorification and the 2-Kac-Moody algebra*
(accepted to Lett. Math. Phys.) arXiv:2307.03831.
- H. Chen** (2023), *Drinfel'd double symmetry of the 4d Kitaev model*
JHEP **2023**, 141.
- H. Chen** and F. Girelli (2023), *Hopf 2-Algebras and Braided Monoidal 2-Categories*
Theor. App. Cat., Vol. 45, 2026, No. 36, pp 1426-1514.
- H. Chen** and F. Girelli (2022), *Gauging the Gauge and Anomaly Resolution*
(accepted to Symmetry MDPI) arXiv:2211.08549.
- H. Chen** and F. Girelli (2022), *(2-)Drinfel'd Double and (2-)BF Theory*
Phys. Rev. D **106**, 105017.
- H. Chen** (2021), *Lieb-Schultz-Mattis Theorem and the Filling Constraint*
Lett. Math. Phys. **111**, 139.
- H. Chen**, M. R. C. Fitzpatrick, B. Roy, and M. P. Kennett (2020), *Interacting Quantum Hall states in a finite Graphene flake and at finite temperature*
Phys. Rev. B **102**, 205401.

CONFERENCE PRESENTATIONS

- Topological quantum groups, quantum symmetries and related topics** Harbin, China
June 2026 Talk
· Title: "Quantum invariants of 2-tangles and surfaces from 4d derived Chern-Simons theory".
- Holomorphic-topological field theories and representation theory** Waterloo, Canada
Nov. 2025 Talk
· Title: "Realizing a raviolo current higher-algebra of Kac-Moody type from a 3d topological-holomorphic field theory".

Advances in Quantum Algebras

Sanya, China

*February 2025**Talk*

- Title: "Combinatorial Quantization of 4d derived Chern-Simons theory and a target for ribbon 2-functors".

Integrability, Duality and Deformations

Swansea, UK

*July 2024**Talk*

- Title: "A 3d topological-holomorphic integrable field theory".

Summer school on Symmetries and Anomalies

Paris, France

*June 2024**Talk*

- Title: " L_∞ -algebras and higher anomaly cancellation mechanism".

Ontario Graduate Mathematics Conference

Waterloo, Canada

*June 2024**Talk*

- Title: "3d integrable field theory on 2-groups".

BIRS Workshop on Subfactors and Fusion (2-)Categories

Banff, Canada

*Dec. 2023**Host: prof. Terry Gannon/Dave Pennys*

- Title: "The 4d Kitaev Model".

NEAT MAPS miniconference

Boston, US (regional)

*Nov. 2023**Talk*

- Title: "Categorical Quantum Groups and Braided Monoidal 2-Categories".

PI Grad Student Conference

Waterloo, Canada

*Sept. 2023**Talk*

- Title: "Integrability from categorification".

LOOPS'22

Lyon, France

*August 2022**Talk*

- Title: "Categorified Phase Space and Spinning Geometries".

INVITED TALKS AND SEMINARS**GRIFT seminar (U. Edinburgh)**

Edinburgh, UK (offline)

*Summer 2026**Host: Yegor Zenkevich*

- Title: "Integration from categorification and Kac-Moody 2-algebras".

Mathematics seminar (Universit Catholique de Lille)

Lille, France (offline)

*Spring 2026**Host: prof. Alexis Virelizier*

- Title: "Categorical quantum symmetries and ribbon tensor 2-categories".

Disquisitions on Monoidal Categories and Operads (BIMSA)

Beijing, China (offline)

*Spring 2026**Host: prof. Slava Pimenov*

- Title: "Ribbon tensor 2-categories and a target for ribbon 2-functors".

Special seminar (SIMIS)

Shanghai, China (offline)

*Spring 2026**Host: prof. Zhengping Gui*

- Title: "Realizing a higher derived current algebra of Kac-Moody type from a 3d Lax integrable field theory".

HEP seminar and workshop (PKU)

Fall 2025

Beijing, China (offline)

Host: prof. Yinan Wang

- Title: "Combinatorial quantization of 4-dimensional higher-Chern-Simons theory".

AdS seminar (Tsinghua U.)

Fall 2025

Beijing, China (offline)

Host: prof. Junya Yagi

- Title: "Realizing a raviolo current higher-algebra of Kac-Moody type from a 3d topological-holomorphic field theory".

Representation theory seminar (Colombia U.)

Spring 2025

New York, US (online)

Host: Davis Michael Lazowski

- Title: "Combinatorial quantization of 4d derived Chern-Simons theory".

Mathematical Physics seminar (Perimeter Inst.)

Spring 2025

Waterloo, Canada (online)

Host: prof. Ben Webster

- Title: "A 3d integrable field theory with 2-Kac-Moody algebra symmetry".

Integrable systems seminar hybrid series (Leeds U.)

Fall 2024

Leeds, UK (online)

Host: prof. Vincent Caudrelier

- Title: "A 3d integrable field theory with 2-Kac-Moody algebra symmetry".

Geometry, Topology, and Physics Seminar (NYU Abu Dhabi)

Spring 2024

Abu Dhabi, UAE (online)

Host: prof. Hisham Sati

- Title: "Higher anomaly resolution from L_∞ -algebras".

Atlantic Category Theory Seminar (Dalhousie U.)

Fall 2023

Halifax, Canada

Host: prof. Theo Johnson-Freyd

- Title: "Categorical Quantum Groups and Braided Monoidal 2-Categories".

Quantum Symmetries Seminar (Ohio State U.)

Fall 2023

Columbus, USA

Host: prof. David Penneys

- Title: "Categorical Quantum Groups and Braided Monoidal 2-Categories".

Seminar on "Topological orders and category theory" (BIMSA)

Spring 2023

Beijing, China (online)

Host: prof. Liang Kong

- Title: "Categorical Quantum Groups, Braided Monoidal 2-Categories and the 4d Kitaev Model".

Grad Student Seminar (Perimeter Inst.)

Spring 2023

Waterloo, Canada

- Title: "The 4d Kitaev Model".

Lattice Seminar

Mar. 2023

International (online.)

Host: prof. Alex Bols

- Title: "Lieb-Schultz-Mattis theorem and the filling constraint".

POSTER PRESENTATIONS

QIQG 2026

June 2026

Beijing, China

Poster

- Title: "A higher-integrable derived Poisson vertex model and the Raviolo vertex algebra of currents".

GCS 2026

June 2026

Paris, France

Poster

- Title: "Aspects of 4d Derived Chern-Simons theory: higher-gauge principles and surface-holonomies".

Symmetries 2026

March 2026

Kyoto, Japan

Poster

- Title: "Aspects of 4d Derived Chern-Simons theory: higher-gauge principles and surface-holonomies".

Integrability, Dualities and Deformations 2025

Sept. 2025

Stockholm, Sweden

Poster

- Title: "A higher-integrable derived Poisson vertex model and the Raviolo vertex algebra of currents".

RTISART-25

May 2025

Beijing, China

Poster

- Title: "Invariants of decorated 2-ribbons from affine raviolo current algebras of Kac-Moody type".

TQMMSP24

July 2024

Dresden, Germany

Poster

- Title: "Generalized Lieb-Schultz-Mattis anomalies and constraints on the filling".

Integrability, Dualities and Deformations 2023

July 2023

Durham, UK

Poster

- Title: "Integrability of bulk-boundary systems".

QG2023

July 2023

Nijmegen, Netherlands

Poster

- Title: "Polyhedra 2.0; higher symmetries in quantum gravity".

LEADERSHIP EXPERIENCE

Beijing Institute of Mathematical Sciences and Applications

- Section manager for the Frontiers of Science Award of the International Congress of Basic Science (ICBS) 2026.
- CEP program project lead (Apr. 2025 – May 2025).

University of Waterloo

- SHORT Project mentor for undergrad students applying to doctoral positions (Aug. 2023 — Sep. 2024).
- Applied Math department representative for Graduate Studies Endowment Fund Committee (Mar. 2021 — Mar. 2023).

McMaster University

- Member of Graduate Liason Committee (Sep. 2017 — Sept. 2019).

- Member of Recruitment and Outreach Committee (Sep. 2018 — Sept. 2019).
- Member of Theory Journal Club (Sep. 2017 — Sept. 2019).
- Volunteer greeter at GSA Welcome Breakfast (Sep. 2018).

Simon Fraser University

- First violinist and soloist in SFU Chamber Orchestral club.
- Member of SFU Hiking club.