ROBERT GERSTNER

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Personal Website ◇ LinkedIn ◇ Google Scholar ◇ arXiv ◇ GitHub

EDUCATION

Master of Science, Physics (Thesis-Based) 2024 - 2026
McGill University — 4.0/4.0 *Montréal, QC*

Bachelor of Science, Honours Specialization in Integrated Science with Physics 2020 - 2024
University of Western Ontario — 3.98/4.0 *London, ON*

RESEARCH EXPERIENCE

Graduate Researcher, **Prof. Bill Coish's Group** Sep. 2024 - Present
McGill University *Montréal, QC*

- Using neural networks to improve the simulation of spin qubit systems and study quantum integrability.

Undergraduate Thesis Student, **Prof. Mahi Singh's Group** Sep. 2023 - May 2024
University of Western Ontario *London, ON*

- Contributed to a theory of harmonic generation in plasmonic nanohybrid materials.

Undergraduate Research Assistant, **Prof. Jesko Sirker's Group** May 2023 - Jan. 2024 / May - Aug. 2024
University of Manitoba *Winnipeg, MB*

- Used operator growth to provide evidence for an absence of many-body localization in spin models.

PUBLICATIONS

[1] A. Weisse, **R. Gerstner**, & J. Sirker. Operator Growth in Disordered Spin Chains: Indications for the Absence of Many-Body Localization. Physical Review Research (2025). DOI: 10.1103/wgss-nt8t (accepted article). Available at arXiv:2401.08031.

[2] Q. Meng, **R. Gerstner**, Y. Yan, J. E. MacDonald, R. F. Haglund, & M. Singh. Study of Nonlinear Plasmonic Properties of Metallic Nanohybrids. Physica Scripta (2025). DOI: 10.1088/1402-4896/ade1ae (accepted article).

TALKS AND POSTERS

APS Global Physics Summit, Anaheim, CA Mar. 17-21, 2025
Oral presentation: *Operator Growth and the Absence of Many-Body Localization*

CAP Congress, London, ON May 27-31, 2024
Oral presentation: *Second and Third Harmonic Generation in CuS/Au/Al Nanohybrids* (3rd prize in AMO)

Undergraduate Honours Thesis Presentations, London, ON Feb. 16, Mar. 22, Apr. 24, 2024
Oral presentation: *Harmonic Generation in Metallic Nanohybrids*

Integrated Research Presentation, London, ON Mar. 22, 2024
Poster: *Second and Third Harmonic Generation in Metallic Nanohybrids*

Sirker Group Seminar, Virtual Nov. 29, 2023
Oral presentation: *Operator Growth in Lattice Models and Connections to Anderson and Many-Body Localization*

Canadian Undergraduate Physics Conference, Waterloo, ON Oct. 28, 2023
Poster: *Operator Growth and Many-Body Localization via Graphs and Nested Commutators*

Singh Group Seminar, London, ON Various

University of Manitoba USRA Poster Competition, Winnipeg, MB Aug. 17, 2023
Poster: *Operator Growth and Many-Body Localization via Graphs and Nested Commutators*

SCHOLARSHIPS & AWARDS

FRQNT Master's Research Scholarship, Fonds de recherche du Québec (rank 3/29) — Apr. 2025
NSERC CGS-M, University of Manitoba (Declined), McGill University (Accepted) — Apr. 2024
NSERC USRA, University of Manitoba — Feb. 2024
S.R. Valluri Scholarship in Mathematical or Theoretical Physics, Western University — Nov. 2023
Kyle Brandon Traves Memorial Scholarship in Science, Western University — Nov. 2023
Dr. Gérard Hébert Scholarship in Physics, Western University — Nov. 2023
Faculty of Science USRA, University of Manitoba — Mar. 2023
Andrew and Sarah Hamilton Scholarship, Western University — Nov. 2022
Class of '49 Prize, Western University — Nov. 2022
Faculty Association Award, Western University — Nov. 2021
Chancellors' Scholarship, University of Manitoba (Declined) — Aug. 2020
Governor General's Medal, St. Paul's High School — Jun. 2020
President's Entrance Scholarship, Western University — Apr. 2020

SIDE PROJECTS

Band Structures with Graph Theory — Nov. - Dec. 2024
Paper | **GitHub Repository**

- Devised and analyzed a graph theory method for computing band structures of arbitrary 1D periodic materials.

WORK EXPERIENCE

Teaching Assistant — Sep. - Dec. 2024
McGill University — *Montréal, QC*
Membership, Sales, and Experience Associate — Jun. - Aug. 2021 / May - Aug. 2022
YMCA-YWCA of Winnipeg — *Winnipeg, MB*
General Store Employee — Jul. - Aug. 2020
Hnausa General Store — *Hnausa, MB*
Mathematics and Chemistry Tutor — Jun. 2017 - Jun. 2020
St. Paul's High School — *Winnipeg, MB*

SERVICE

Conference Volunteer. Will volunteer at the 2025 Conference on Strongly Correlated Electron Systems in Montréal.
Mentorship. Mentored four younger undergraduate students over two years.
Event Lead. Organized and led an information session about undergraduate summer research in science.
EnviroUSC Collaboration. As part of a group of students in Western's Integrated Science program, collaborated with campus environmental organization EnviroUSC to create an extensive study on Western's environmental policies and performance in comparison to other schools.

CERTIFICATIONS

Deep Learning Specialization, DeepLearning.AI — Jan. 2025
Advanced Badge, IBM Quantum Challenge Fall 2022 — Nov. 2022

SKILLS

- Programming with Python (proficient); additional experience with C++, Julia, Mathematica, and Maple.
- Experience with JAX, Flax, TensorFlow, PyTorch, Qiskit, and NetKet.
- Experience with Git/GitHub, LaTex, and SLURM.
- Soft skills: scientific writing, public speaking, problem solving, critical thinking, communication.
- Time management: balancing academics with being a high-level **track and field athlete**.