
Positions

- 2023 — **Michigan State University.**
Assistant Professor, Center for Quantum Computing, Science, and Engineering. Departments of Computational Mathematics, Science, and Engineering; Electrical and Computer Engineering; & Physics and Astronomy.
- 2022 — 2023 **École Polytechnique Fédérale de Lausanne.**
Postdoctoral Scientist, Computational Quantum Science Lab.

Education

- 2022 **Michigan State University.**
Ph.D. in Computational Mathematics, Science, and Engineering.
- 2017 **University of Michigan, Ann Arbor.**
B.S. with Distinction in Mathematics and Physics.

Teaching

- Spring 2025 **ECE 491: Quantum information and computation**, *Michigan State University.*
- Spring 2025 **PHY 905: Quantum information and computation seminar**, *Michigan State University.*
- Fall 2024 **CMSE 890: Tensor networks**, *Michigan State University.*
- Spring 2024 **CMSE 201: Introduction to computational modeling**, *Michigan State University.*
- Fall 2023 **CMSE 201: Introduction to computational modeling**, *Michigan State University.*

Select publications

See all publications with citations at <https://scholar.google.com/citations?user=BLERseAAAAAJ>.

- 2024 **Ryan LaRose**, A brief history of quantum vs classical computational advantage, [arXiv:2412.14703](https://arxiv.org/abs/2412.14703).
- 2024 Elijah Pelofske, Vincent Russo, **Ryan LaRose**, *et al.*, Increasing the measured effective quantum volume with zero noise extrapolation *ACM Transactions on Quantum Computing* **5**, 3.
- 2022 Manqoba Q. Hlatshwayo, Yinu Zhang, Herlik Wibowo, **Ryan LaRose**, Denis Lacroix, and Elena Litvinova, Simulating excited states of the Lipkin model on a quantum computer, *Phys. Rev. C* **106**, 024319.
- 2022 **Ryan LaRose**, Eleanor Rieffel, and Davide Venturelli, Mixer-phaser ansätze for quantum optimization with hard constraints, *Quantum Mach. Intell.* **4**, 17.
- 2020 **Ryan LaRose**, Andrea Mari, *et al.*, Mitiq: A software package for error mitigation on noisy quantum computers, *Quantum* **6**, 774.
- 2020 T. Giurgica-Tiron, Y. Hindy, **R. LaRose**, A. Mari and W. J. Zeng, Digital zero noise extrapolation for quantum error mitigation, *2020 IEEE International Conference on Quantum Computing and Engineering (QCE)*, 2020, pp. 306-316.
- 2020 **Ryan LaRose** & Brian Coyle, Robust data encodings for quantum classifiers, *Phys. Rev. A* **102**, 032420.
- 2019 **Ryan LaRose**, Arkin Tikku, Étude O'Neel-Judy, Lukasz Cincio, and Patrick J. Coles, Variational quantum state diagonalization, *npj Quantum Inf* **5**, 57.
- 2019 Sumeet Khatri, **Ryan LaRose**, Alexander Poremba, Lukasz Cincio, Andrew T. Sornborger, and Patrick J. Coles, Quantum-assisted quantum compiling, *Quantum* **3**, 140.
- 2019 **Ryan LaRose**, Overview and comparison of gate level quantum software platforms, *Quantum* **3**, 130.

Grants

- 2023 — 2025 **Wellcome Leap Q4Bio**, *Leveraging Near-Term Quantum Computers and Machine Learning for the Simulation of Biomolecular Processes*.
Co-PI, \$195k. (PI: Grant Rotskoff (Stanford). Total: \$1.5M.)

Invited presentations

- 2025 **Quantum computing for nuclear physics**, *ECT**, Trento, Italy.
[Lecture] TBD.
- 2025 **Quantum computing summer school**, *Los Alamos National Lab*.
[Lecture] TBD.
- 2024 **Quantum machine learning school**, *Ukrainian Catholic University*.
[Lecture] Introduction to quantum compilation.
- 2024 **Quantum machine learning workshop**, *California State University San Marcos*.
[Lecture] The quantization and dequantization of recommendation systems.
- 2024 **Quantum numerical linear algebra**, *SIAM Annual Meeting (AN23)*, Paris, France.
Outlook for the variational quantum linear solver.
- 2024 **Physics colloquium**, *Oakland University*.
 k -commutativity and measurement reduction for expectation values.
- 2023 **Atomic, Bio, and Condensed Matter Seminar**, *Wayne State University*.
'Proof' of Martinis' conjecture in 1D.
- 2023 **USQIS Summer School**, *Fermilab*.
Quantum software, algorithms, and applications.
- 2023 **Quantum Ethics Course**, *Arizona Quantum Initiative & University of Waterloo*.
[Guest Lecture] Good practices in building quantum software.
- 2023 **Nuclear and particle physics on a quantum computer**, *ECT**, Trento, Italy.
Squeezing the most performance out of quantum computers.
- 2022 **Gemini Autumn school on quantum computation**, *Oslo, Norway*.
Quantum computing and quantum algorithms.
- 2022 **SQMS/GGI summer school on quantum simulation of field theories**, *Galileo Galilei Institute*.
Quantum error correction and quantum mitigation.
- 2022 **Control club**, *Forschungszentrum Jülich*.
Logical shadow tomography: Efficient estimation of error-mitigated observables.
- 2022 **FRIB-TA Quantum computing for nuclear physics summer school**, *Michigan State University*.
[Lecture] Quantum error correction and quantum error mitigation.
- 2022 **QC Hack 2022**, *Stanford, Yale, Duke, UC Berkeley*.
Innovations in quantum computing roundtable.
- 2022 **Quantum seminar series**, *Brookhaven National Lab*.
Quantum error mitigation.
- 2021 **Constraint solving and quantum computing (workshop)**, *27th International Conference on Principles and Practice of Constraint Programming*.
Quantum computing for computer scientists.
- 2021 **The past, present and future of quantum error correction (short school)**, *UC Berkeley*.
Decoding algorithms for quantum error correction.
- 2021 **Quantum computing meetup**, *Duke University*.
Variational algorithms and quantum error mitigation.
- 2021 **Cirq bootcamp**, *University of Tokyo, Osaka University, & QunaSys*.
Research & experiments using Cirq.

- 2021 **Quantum research seminars Toronto**, *Centre for Quantum Information and Quantum Control, University of Toronto*.
Quantum error mitigation in practice.
- 2020 **Quantum linear algebra minisymposium**, *SIAM Annual Meeting (AN20)*, Toronto, CA.
*Cancelled due to Covid-19.
- 2020 **Rigetti advantage day**, *Rigetti Computing, Sacramento, CA*.
Variational quantum linear solver on Rigetti Aspen-7.
- 2020 **FOSDEM 2020, Quantum computing devroom**, *Université Libre de Bruxelles, Brussels, Belgium*.
Quantum classifiers, robust data encodings, and software to implement them.
- 2020 **Quantum computing short course**, *Air Force Institute of Technology (AFIT), Dayton, Ohio*.
The stabilizer formalism and quantum subspace expansion.
- 2019 **CME250Q: Intro. to quantum computing and quantum algorithms**, *Stanford, Palo Alto, Ca*.
[Guest Lecture] Quantum algorithms for linear systems of equations.

Graduate student advising

- 2023 — **Ben DalFavero**, *CMSE PhD Student*, Thesis area: Quantum noise and error correction.
- 2023 — **Jeremiah Rowland**, *Physics PhD Candidate*, Thesis: Majorana bound states in Kitaev-like 1D chains.

Undergraduate student advising

- 2024 **Ethan Egger**, *CSE Undergraduate*, Topic: Quantum error mitigation, correction, and benchmarking.
- 2024 **Rauan Kaldybayev**, *MSU EnSURE Undergraduate Intern (Williams College)*,
Topic: Quantum algorithms for particle in cell methods.
- 2024 **Andrew Koren**, *Physics Undergraduate*, Topic: Low-depth quantum ansatz construction.
- 2022 — 2023 **Chirag Bhansali**, *CSE Undergraduate*, Topics: Decoding algorithms, quantum compiling.
- 2022 **Danny Samuel**, *Unitary Fund Intern*, Topic: Quantum error mitigation and benchmarking.

Experience

- 2020 & 2021 **Alphabet (Google) X**, *Quantum Resident*, Mountain View, CA.
- 2020 — 2022 **Unitary Fund**, *Technical Staff Member*.
- 2020 **Adecco @ Google Quantum AI**, *Developer III*.
- 2019 **NASA Ames**, *Intern, Quantum Artificial Intelligence Laboratory*, Mountain View, CA.
- 2019 **IBM**, *Quantum Computing Applications Researcher (Intern)*, T.J. Watson Research Center, NY.
- 2018 **Los Alamos National Laboratory**, *Quantum Computing Summer School*, Los Alamos, NM.

Software development

- 2020 — 2022 **Mitiq**, <https://github.com/unitaryfund/mitiq>, Lead developer.
Quantum error mitigation toolkit for noisy, intermediate-scale quantum computers. 125k+ downloads.

Referee for journals & conferences

QIP 2025, Quantum, Physical Review A, PRX Quantum, IEEE Transactions on Quantum Engineering, EPJ Quantum Technology, Quantum Science and Technology, IOP Publishing, Machine Learning: Science and Technology, Quantum Information and Computation (Rinton Press), PLOS ONE, IEEE Computing in Science and Engineering (CiSE), Neuromorphic Computing and Engineering, IOP Publishing.

Professional activities

- 2025 **Program committee**, *Quantum Techniques in Machine Learning*, Centre for Quantum Technologies, Singapore.
- 2025 **Microgrant Advisory Board**, *Unitary Foundation*.
- 2024 — **Steering committee**, *International conference for Young Quantum Information Scientists (YQIS)*.

- 2024 **Program committee**, *Quantum Techniques in Machine Learning*, University of Melbourne.
- 2023 **Founder and organizer**, *Frontiers in quantum information and technology seminar*, MQC.
- 2023 **Program committee**, *Quantum Techniques in Machine Learning*, CERN.
- 2023 **Organizer**, *Quantum-classical quantum simulation*, Bernoulli Center, EPFL.
- 2023 **Organizer**, *Advances in quantum algorithms for scientific computing*, SIAM CSE23 Minisymposium.
- 2021 **Lead Organizer**, *Sixth International Conference for Young Quantum Information Scientists (YQIS)*, Michigan State University, April 12-16, 2021.
- 2021 **Lecturer**, *Introduction to Cirq*, QC Talk, Faculdade de Engenharia da Universidade do Porto.
- 2020 **Lecturer**, *Tutorial on Cirq for NISQ: Research and education*, *IEEE Quantum Week*.
- 2020 **Instructional Assistant**, *Python bootcamp for non-engineers*, Google, New York, NY.
- 2019 **Lead Organizer**, *MSU-IBM Quantum Computing Bootcamp with Qiskit*, Michigan State University, Conference website: <https://egr.msu.edu/qcbq>.
Tutorials and talks: <https://github.com/rmlarose/qcbq>
- 2019 **Presenter**, *Time for Quantum*, Michigan State University Science Festival (Science outreach).
- 2019 **Presenter**, *CMSE Exhibition*, Michigan State University Science Festival (Science outreach).
- 2018 — **Co-Founder and Organizer**, *Quantum Information and Computation (QuIC) Seminar*, MSU.
Current website: <https://sites.google.com/msu.edu/quic-seminar/>

Select Distinctions

- 2020 **NASA Space Technology Graduate Research Opportunity (NSTGRO) Fellowship**.
\$80k/year for up to 4 years of PhD. Proposal: “Making quantum computers less noisy and more useful.”
- 2020 **Fitch H. Beach Award for Outstanding Graduate Research**, *College of Engineering*, MSU.
“Recognizes the most outstanding graduate researchers within the College of Engineering. Each department nominates one PhD student, and awards are based on a review of students’ academic and professional records.”
- 2019 **Disciplinary Leadership Award**, *Michigan State University, Council of Graduate Students*.
\$2k for advancing quantum information science research at Michigan State University.
- 2019 **Inaugural Qiskit Hackathon Winner**, *IBM*.
- 2017 **Engineering Distinguished Fellowship**, *Michigan State University*.
- 2017 **Phi Beta Kappa**, *Alpha of Michigan Chapter*.
- 2017 **Bachelor of Science with Distinction**, *University of Michigan*.