

# NATE STEMEN

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## SUMMARY

Research engineer experienced in quantum error mitigation, circuit compilation, and translating quantum research into practical tools for near-term devices. Lead developer of `mitiq`, a widely-used open-source Python library for error mitigation.

## EDUCATION

**University of Waterloo** MMath in Applied Mathematics 2020–2022

- Thesis: *Quantum Circuit Compilation from the Ground Up* advised by Joel Wallman

**New York University** B.Sc. in Mathematics and Physics 2013–2017

- Thesis: *An Investigation of  $Q$ -Balls* advised by Luciano Medina

## EMPLOYMENT

**Visiting Researcher** QuSoft / University of Amsterdam Jan–March 2026

- Working to understand limits of compiling parametrized circuits.
- Mentoring students on quantum computing software project.

**Member of Technical Staff** Unitary Foundation Mar 2022–Dec 2025

- Technical lead and maintainer of the open-source **Python** library `mitiq` for quantum error mitigation (350k+ downloads, 170+ citations), responsible for core architecture, API design, 20+ releases, and review and integration of contributions from 90+ contributors.
- Designed and implemented a modular, two-step application API for error-mitigation techniques, informed by user interviews, making mitigation circuits and experimental overhead explicit and inspectable.
- Delivered 10+ talks and tutorials at major conferences and research institutions (PyData, SciPy, IEEE QCE, QuSoft), accelerating adoption of `mitiq` by quantum software engineers and researchers.

**Software Developer** Overleaf 2017–2021

- Improved  $\text{\LaTeX}$  autocomplete using statistical analysis of 40,000 open-source documents, enhancing user experience for 300,000+ daily users.
- Monitored and supported data migration from PostgreSQL to MongoDB.

**Summer Researcher** New York University 2016

- Used **Python** to numerically solve nonlinear Schrödinger equations modeling electromagnetic pulse propagation in nonlinear media.

**Summer Researcher** Yale University (PROSPECT Experiment) 2014 & 2015

- Built an optical simulation in **C++** to optimize detector design and study light collection and uniformity.
- Implemented pulse-shape discrimination techniques in **Python** to improve neutrino event selection.

## PUBLICATIONS

1. LaRose, R. et al. (Aug. 2022). Mitiq: A software package for error mitigation on noisy quantum computers. *Quantum* 6, p. 774. URL: <https://doi.org/10.22331/q-2022-08-11-774>.

2. McDonough, B. et al. (2022). “Automated quantum error mitigation based on probabilistic error reduction”. In: *2022 IEEE/ACM Third International Workshop on Quantum Computing Software (QCS)*, pp. 83–93. arXiv: [2210.08611 \[quant-ph\]](#).
3. Ashenfelter, J. et al. (2016). Background Radiation Measurements at High Power Research Reactors. *Nucl. Instrum. Meth. A*806, pp. 401–419. arXiv: [1506.03547 \[physics.ins-det\]](#).
4. Ashenfelter, J. et al. (2015). Light Collection and Pulse-Shape Discrimination in Elongated Scintillator Cells for the PROSPECT Reactor Antineutrino Experiment. *JINST* 10.11, P11004. arXiv: [1508.06575 \[physics.ins-det\]](#).

## SERVICE

<b>Graduate Student Mentor</b>	University of Amsterdam	2025 & 2026
<b>Graduate Student Mentor</b>	University of Washington	2024 & 2025
<b>IEEE QCE 2025 Workshop organizer</b>	Quantum Software 2.1	2025
<b>WERQSHOP Chair Organizer</b>	<a href="https://werq.shop">https://werq.shop</a>	2025
<b>Quantum Computing Devroom Chair</b>	FOSDEM	2025
<b>SciPy 2025 Reviewer</b>		2025
<b>QED-C mentor</b>		2023–2024
<b>Equity, Diversity and Inclusion Committee</b>	University of Waterloo; IQC	2021–2022
<b>Strategic Plan Implementation Working Group</b>	University of Waterloo	2021

## CONTINUING

## EDUCATION

<b>Advanced Representation Theory and Applications</b>	University of Amsterdam (audit)	<i>Feb–Mar</i> 2026
<b>Advanced Quantum Algorithms</b>	University of Amsterdam (audit)	<i>Feb–Mar</i> 2026
<b>Hands-on quantum error correction with Google Quantum AI</b>	Coursera	<i>Feb</i> 2026
<b>CSE 599C: Quantum Learning Theory</b>	University of Washington (audit)	<i>Jan–Mar</i> 2025
<b>CSE 534: Quantum info. and computation</b>	University of Washington (audit)	<i>Sep–Dec</i> 2024
<b>Quantum Machine Learning Workshop</b>	<a href="#">QSciTech-QuantumBC</a>	<i>Jan–Feb</i> 2022
<b>Presenting Data and Information</b>	Edward Tufte	<i>Nov</i> 2019

## TOOLS

### Languages

- Python, JavaScript, SQL, Ruby, bash

### Software

- git/GitHub, docker, Linux, MacOS, L<sup>A</sup>T<sub>E</sub>X

### Quantum

- SDKs: Cirq, Qiskit, pyQuil, Qibo