Seyed Sajjad Nezhadi

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EDUCATION

University of Maryland, College Park, Maryland.

- Doctor of Philosophy: Computer Science — 2020 – 2025
  - Advisor: Matthew Coudron
  - Thesis: Quantum Games, Graphs, and Gödel

University of Toronto, Toronto, Canada.

- Honours Bachelor of Science: Mathematics and Computer Science — 2015 – 2019
  - Advisor: Henry Yuen

WORK EXPERIENCE

Susquehanna International Group, Philadelphia, USA.

- Quantitative Research Intern — Jun 2024 – Aug 2024

Xanadu, Toronto, Canada.

- Quantum Research Resident — May 2021 – Aug 2021

Agnostiq, Toronto, Canada.

- Quantum Applications Intern — Apr 2020 – Jul 2020

University of Toronto, Toronto, Canada.

- Research Assistant — May 2019 – Apr 2020

Recycle Coach, Toronto, Canada.

- Software Engineer Intern — May 2017 – Aug 2017

Kik Interactive, Toronto, Canada.

- Software Developer — May 2016 – Aug 2016

PUBLICATIONS

Provably Overwhelming Transformer Models with Designed Inputs.
Lev Stambler, *Seyed Sajjad Nezhadi*, and Matthew Coudron.
- In Submission.

The recursive compression method for proving undecidability results.
Andrew Marks, *Seyed Sajjad Nezhadi*, and Henry Yuen.
- In Submission.

Quantum and non-signalling graph planarity games.
Bea Fatima, Jakin Ng, Jon Nelson, and *Seyed Sajjad Nezhadi*.
- In Submission.

Quantum Perfect Matchings.
David Cui, Laura Mančinska, *Seyed Sajjad Nezhadi*, and David E. Roberson.
- In Submission.

Hamiltonians whose low-energy states require Ω(n) T gates.
Nolan J. Coble, Matthew Coudron, Jon Nelson, and *Seyed Sajjad Nezhadi*.
- In Submission.
- arXiv:2310.01347.

Local Hamiltonians with no low-energy stabilizer states.
Nolan J. Coble, Matthew Coudron, Jon Nelson, and *Seyed Sajjad Nezhadi*.
- In proceedings of *Theory of Quantum Computing* (*TQC*) 2023.
- arXiv:2110.4761692.

Nonlocal Games, Compression Theorems, and the Arithmetical Hierarchy.
Hamoon Mousavi, *Seyed Sajjad Nezhadi*, and Henry Yuen.
- In Proceedings of *Symposium on Theory of Computing* (*STOC*) 2022.
- Presented as a **Plenary talk** at *Quantum Information Processing* (*QIP*) 2022.
- Presented at the *Tsirelson Memorial Workshop* 2022.

- arXiv:2110.04651.

Synchronous Values of Games.
J. William Helton, Hamoon Mousavi, *Seyed Sajjad Nezhadi,* Vern I. Paulsen, Travis B. Russell
- In Annales Henri Poincaré, 1-41 (2024).
- Presented at the *Tsirelson Memorial Workshop* 2022.
- arXiv:2109.14741.

On the complexity of zero gap MIP*.
Hamoon Mousavi, *Seyed Sajjad Nezhadi*, and Henry Yuen.
- In proceedings of *International Colloquium on Automata, Languages, and Programming* (*ICALP*) 2020.
- Presented at *Theory of Quantum Computing* (*TQC*) 2020.
- arXiv:2002.10490

A generalization of CHSH and the algebraic structure of optimal strategies.
David Cui, Arthur Mehta, Hamoon Mousavi, and *Seyed Sajjad Nezhadi*.
- In *Quantum **4**, 346* (2020).
- Presented at *Quantum Information Processing* (*QIP*) 2020.
- arXiv:1911.01593

TALKS

Quantum Perfect Matching Games.
International Workshop on Operator Theory and its Applications, Kent, Aug 2024.

Hamiltonians whose low-energy states require Ω(n) T gates.
University of Ottowa, Nov 2023.

The compression paradigm.
Hot Topics: MIP* = RE and the Connes' Embedding Problem, MSRI, Oct 2023.

Compression of nonlocal games.
Workshop on Algebraic Complexity Theory (WACT), Warwick, Mar 2023.

Computability and compression of nonlocal games.
Georgetown University, Oct 2022.

Nonlocal Games, Compression Theorems, and the Arithmetical Hierarchy.
Symposium on Theory of Computing (*STOC*), Rome, Jun 2022.

Nonlocal Games, Compression Theorems, and the Arithmetical Hierarchy.
Tsirelson Memorial Workshop, Vienna, Apr 2022.

Synchronous Values of Games.
Tsirelson Memorial Workshop, Vienna, Apr 2022.

Quantum computing for the gifted amateur.
Kurius, Mar 2022.

Generalization of CHSH.
University of Copenhagen, Jan 2022.

Computability and compression of nonlocal games.
University of Ottowa, Oct 2021.

Computability and compression of nonlocal games.
IQC-QuICS Math and Computer Science seminar, Mar 2021.

Quantum computing: why you should care!
Isfahan University of Technology, Mar 2021.

On the complexity of zero gap MIP*.
Theory of Quantum Computing (*TQC*), Jun 2020.

WORKSHOPS

International Workshop on Operator Theory and its Applications.
University of Kent, Aug 2024.

Post-quantum group-based cryptography.
American Institute of Mathematics, Apr 2024.

Hot Topics: MIP* = RE and the Connes' Embedding Problem.
MSRI, Oct 2023.

Workshop on Algebraic Complexity Theory (WACT).
University of Warwick, Mar 2023.

Quantum Error Correction Summer School.
IBM, Jul 2022.

Analysis on the hypercube with applications to quantum computing.
American Institute of Mathematics, Jun 2022.

Tsirelson Memorial Workshop.
IQOQI - Vienna, Apr 2022.

Non-local games in quantum information theory.
American Institute of Mathematics, May 2021.

ADVISING

Jakin Ng (REU-CAAR Summer 2024, Currently an undergrad at MIT)

Bea Fatima (REU-CAAR Summer 2024, Currently an undergrad at Kenyon College)

Kevin Yao (High School REU Summer 2022, Currently an undergrad at UPenn)

TEACHING

University of Maryland

- Teaching Assistant
  - CMSC457 - Introduction to Quantum Computing *Winter 2025*
  - CMSC456 - Cryptography *Fall 2021*

University of Waterloo, Centre for Extended Learning

- Assistant Instructor
  - DS2 - Statistics for Data Science *Winter, Summer, Fall 2020*

University of Toronto

- Teaching Assistant
  - CSC343 - Introduction to Databases *Winter 2019*

REVIEWING

QIP 2025, Journal of ACM, TQC 2024, Annales Henri Poincaré, STOC 2023, QIP 2023, QIP 2022, QCrypt 2022

LANGUAGES

English, Persian and French.

SKILLS

Python, Matlab, C++, SQL, Qiskit, Numpy, Pandas, PyTorch, TensorFlow, LaTeX .