

# Seyed Sajjad Nezhadi

sajjad-nezhadi.github.io

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## EDUCATION

**University of Maryland**, College Park, Maryland.

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

2020 – 2025

**University of Toronto**, Toronto, Canada.

- Honours Bachelor of Science: Mathematics and Computer Science
- Advisor: Henry Yuen

2015 – 2019

## WORK

## EXPERIENCE

**Susquehanna International Group**, Philadelphia, USA.

- Quantitative Research Intern

Jun 2024 – Aug 2024

**Xanadu**, Toronto, Canada.

- Quantum Research Resident

May 2021 – Aug 2021

**University of Maryland**, College Park, Maryland.

- Graduate Research Assistant

Aug 2020 – Apr 2025

**Agnostiq**, Toronto, Canada.

- Quantum Applications Intern

Apr 2020 – Jul 2020

**University of Toronto**, Toronto, Canada.

- Predoc 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.
- arXiv:2502.06038.

**The recursive compression method for proving undecidability results.**

Andrew Marks, *Seyed Sajjad Nezhadi*, and Henry Yuen.

- In Submission.

**Quantum Perfect Matchings.**

David Cui, Laura Mančinska, *Seyed Sajjad Nezhadi*, and David E. Roberson.

- In Submission.
- arXiv:2502.05136.

**Hamiltonians whose low-energy states require  $\Omega(n)$  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 $\Omega(n)$ T gates.***

University of Ottawa, 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 Ottawa, 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
  - CMSC456 - Cryptography

*Winter 2025*

*Fall 2021*

**University of Toronto, School of Continuing Studies**

- 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,  $\text{\LaTeX}$  .