

Erfan Abedi

COMPUTER ENGINEERING GRADUATE

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Research Interests

Quantum Algorithms, Quantum Information Theory, Quantum Machine Learning, Quantum Networks, Quantum Cryptography.

Education

University of California, Los Angeles [UCLA]

MASTER OF QUANTUM SCIENCE AND TECHNOLOGY

Los Angeles, California, USA

Sept. 2022 - Current

Amirkabir University of Technology [AUT] (Tehran Polytechnic)

BACHELOR OF SCIENCE IN COMPUTER ENGINEERING

Tehran, Iran

Sept. 2017 - Oct. 2021

Research Experience

QuOne Lab at Phanous Research and Innovation Centre (phanous.ir)

RESEARCH ASSISTANT

- Working on the theory and numerical simulations of a paper on Quantum Lazy Training.
- Assisting the senior researchers with their ongoing research on QML.
- Reading Papers and giving talks about various QML papers at the research group's weekly meetings.
- Designing assignments and educational material for the Center's 1000qubit workshop.

Under the Supervision of

Prof. Salman Beigi

Jun. 2021 - Sept. 2022

Institute for Research in Fundamental Sciences [IPM]

RESEARCH INTERN

- Learning the basics of Quantum Mechanics and Quantum Computing by going through online tutorials and the pivotal papers of the fields.

Under the Supervision of

Prof. Dara Rahmati

Summer of 2020

Publications

2022 **E. Abedi**, S. Beigi and L. Taghavi, *Quantum Lazy Training*, arXiv preprint (Under review for publication).

2021 **E. Abedi**, *Maqenta: Generating music with Quantum Machine Learning*, BSc Thesis (in Persian).

2021 B. Bisgin, N. Oruz, J. G. Jarkovský, **E. Abedi** and M. Mauser, *QSVT in Qiskit*,

IBM's Qiskit Hackaton Europe 2021 Project Paper.

Notable Projects

QSVT in Qiskit ([On Github](#))

RESEARCHER & DEVELOPER

- Quantum Singular Value Transformation (QSVT) is a framework that allows one to apply an arbitrary polynomial transformation to the singular values of a block-encoded unitary transformation.
- QSVT-implemented quantum search was implemented utilizing Fixed-point Amplitude Amplification.
- QSVT in Qiskit was selected as one of the top 3 winning teams of the Hackaton.

IBM's Qiskit Hackaton Europe 2021

Spring of 2021

Maqenta ([On Github](#))

RESEARCHER & DEVELOPER

- Maqenta is a software for generating music using Quantum Machine Learning.
- Maqenta uses methods such as QLSTM and QGAN for generating music.
- Maqenta processes digital musical files as input and tries to compose a novel musical piece based on the said input.

AUT

Summer of 2021

Q ([On Github](#))

RESEARCHER

- Q is the progress of my early research experience in quantum computing and quantum mechanics.
- Q contains my solutions to Microsoft's quantum programming exercises in Q#.
- Q contains my solutions to the programming exercises of Prof. Peter Wittek's QML course in Qiskit.
- Q also includes the list of the quantum papers, books and online courses that I have gone through during the specified period of time.

Jul. 2020 - Jan. 2021

- AUT-ICPC's website is used by the contest's participants to register in and gather more information about the contest.
- AUT-ICPC's website is built using Django on the back-end and React.JS on the front-end.
- AUT-ICPC's website uses technologies such as Ngnix, PostgreSQL, REST framework and Redis.

Online Courses

- [Quantum Machine Learning - University of Toronto](#) (Audited)
- [Quantum Physics 1 - MIT](#) (Audited) — [Quantum Physics 2 - MIT](#) (Audited) — [Quantum Physics 3 - MIT](#) (Audited)
- [Differential Equations - MITx on edX](#) (Certificate available [on Github](#))
- [Statistics 110: Probability - HarvardX on edX](#) (Certificate available [on Github](#))
- [The Fourier Transform and its Applications - Stanford University](#) (Audited)

Teaching Experience

- Teaching Assistant**, *Signals and Systems*, under the supervision of **Prof. Mehdi Rasti**. Fall of 2020
Designing and grading assignments and projects, providing extra educational material.
- Teaching Assistant**, *Microprocessors and Assembly Language*, under the supervision of **Prof. Hamed Farbeh**. Fall of 2020
Designing lab assignments and projects, providing supplementary learning resources.
- Teaching Assistant**, *Computer Architecture and Organization*, under the supervision of **Prof. Hamed Farbeh**. Fall of 2020
Designing and grading assignments and projects.
- Teaching Assistant**, *Programming Languages*, under the supervision of **Prof. Mehran S. Fallah**. Spring of 2020
Designing lab assignments and projects, providing supplementary learning resources.
- Teaching Assistant**, *Advanced Programming*, under the supervision of **Prof. Amir Kalbasi**. Spring of 2019
Designing and grading assignments and projects, assisting lab sessions. Spring of 2020
- Teaching Assistant**, *Fundamentals of Computer and Programming*, under the supervision of **Prof. Ehsan Nazerfard**. Fall of 2019
Designing and grading assignments and projects, conducting TA sessions.

Honors & Awards

- 2021 **Top 3 Team**, IBM's Qiskit Hackaton Europe (Certificate on GitHub)
- 2017 **Top 0.8% place**, The Iranian Nationwide University Entrance Exam for BSc. in Math & Engineering.
- 2015, 2016 **Acceptance in the 1st stage**, Iran's Chemistry Olympiad.

Extracurricular Activities

Students' Scientific Chapter of AUT's Department of Computer Engineering (CEIT-SSC.ir)

BOARD MEMBER & HEAD OF CONTESTS

Mar. 2019 - Sept. 2020

- Organized and provided technical means for the 6th Amirkabir Programming League.
- Organized the 1st Amirkabir Artificial Intelligence Summer Summit. (AAISS.ceit.aut.ac.ir)
- Organized and provided technical means for the 19th Amirkabir ICPC. (ICPC.aut.ac.ir)
- Organized the 11th Amirkabir Linux Festival. (LinuxFest.aut.ac.ir)

Programming Languages and Frameworks ---

Programming Languages

PYTHON · C/C++ · RUST · Q# · C# · GO · JAVA · JAVASCRIPT/TYPESCRIPT · MATHEMATICA

Frameworks and Technologies

PENNYLANE · QISKIT · CIRQ · PYTORCH · NUMPY · SCIPY · PANDAS · CUDA · DOCKER · DJANGO ·
MONGODB · POSTGRESQL · MYSQL · REDIS · KOA.JS · EXPRESS.JS · REST · GRAPHQL

Languages ---

Persian

NATIVE

English

BILINGUAL PROFICIENCY

German

INTERMEDIATE

References ---

Salman Beigi, Associate Professor, School of Mathematics at IPM.

Email: salman.beigi@gmail.com

Hamed Farbeh, Assistant Professor, CE Department at AUT.

Email: Farbeh@aut.ac.ir

Ehsan Nazerfard, Assistant Professor, CE Department at AUT.

Email: Nazerfard@aut.ac.ir