

Joseph Li

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<https://jli0108.github.io/>

Office: ATL 3258 in QuICS

I am a graduate student in computer science at the University of Maryland, advised by Professor Xiaodi Wu. I am also part of the Joint Center for Quantum Information and Computer Science (QuICS).

I am interested in the theory of quantum information and practical applications of quantum computing, especially quantum algorithms and optimization.

Education

January 2022 - Present

University of Maryland, College Park - *Ph.D. student in Computer Science*

August 2018 - December 2021

University of Maryland, College Park - *B.S. in Mathematics, B.S. in Computer Science, Physics Minor*

Graduate Coursework

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|---------------------------------------------------------------------------------------|-------------|
| – CMSC660 Scientific Computing I with Professor Howard Elman | Fall 2022 |
| – CMSC858O The Foundation of End-to-End Quantum Applications with Professor Xiaodi Wu | Fall 2022 |
| – CMSC764 Advanced Numerical Optimization with Professor Tom Goldstein | Spring 2022 |
| – CMSC828L Deep Learning with Professor David Jacobs | Spring 2022 |
| – BMGT830 Operations Research: Linear Programming with Professor Raghu Raghavan | Autumn 2021 |
| – STAT650 Applied Stochastic Processes with Professor Eric Slud | Spring 2020 |
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Experience

February 2021 - May 2021

University of Maryland - Grader for STAT410 Introduction to Probability Theory

September 2020 - December 2020

University of Maryland - Grader for MATH402 Algebraic Structures

February 2020 - May 2020

University of Maryland - Grader for STAT410 Introduction to Probability Theory

September 2019 - December 2019

University of Maryland - Grader for MATH310 Introduction to Mathematical Proof

February 2019 - December 2019

University of Maryland - Undergraduate Research Assistant

FIRE: The First-Year Innovation & Research Experience

Engineering Biosensors Lab

Research Advisor: Dr. Catherine Spirito

- Constructed a chemostat to test microcompartment formation in pdu *E. coli* in continuous culture
- Assisted in the development of an aptamer-based biosensor for detection of *E. coli* in water samples using gold nanoparticles
- Developed professional lab procedures and reports for operation of chemostat

February 2019 - May 2019

University of Maryland - Grader for STAT410 Introduction to Probability Theory

Projects

- Developed a simulation that approximates the distribution for the number of matches of 3 or more orbs in a line in any $m \times n$ board, inspired by the mobile game *Puzzle and Dragons*. Designed a dynamic programming algorithm to count matches in $O(mn)$ time. Computed combinatorially the exact distribution for a 2×2 board with matches of 2 orbs in a line and verified correctness using simulation.
<https://jli0108.github.io/pazudora-simulation/>
- Implementation of Gale-Shapley algorithm for stable matching in Ruby
<https://github.com/jli0108/gale-shapley>
- Undergraduate course projects and assignments covering various topics (can be made available upon request)
 - Object-oriented programming (Java)
 - Systems programming (C, MIPS assembly)
 - Regular expressions, finite automata, lexical analysis (OCaml)
 - Signal processing transforms, including DFT, FFT, Haar wavelet (MATLAB)
 - Machine learning algorithms, including decision trees, perceptron, gradient descent, etc. (Python)
 - Data structures, including AVL trees, AA trees, k-d trees (Java)
 - Simulation of Hadamard walk with Qiskit (Python)
 - Diamond-square algorithm, Loop subdivision algorithm, shader programming (Java, GLSL)
- Implementation of simplex algorithm for linear programs in Python
<https://github.com/jli0108/simplex>
- Graduate course projects and assignments
 - Basic implementation of fully connected neural network, convolutional neural network

Skills · Tools · Miscellaneous

- Java, C/C++, Python, MATLAB, HTML, JavaScript, Ruby
- MPI, OpenMP, Eigen
- CPLEX, Gurobi
- Participated in 2021 ICPC Quantum Computing Challenge - 79th best score of 246 participants
- Contributed to open-source quantum information toolkit `toqito`.