

# FELIX ZHOU

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in felix-zhou

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## EXPERIENCE

### Undergraduate Research Assistant

University of Waterloo

📅 May 2020 – Present

📍 Vancouver, BC

- Researched **approximation algorithm** frameworks for a variety of NP-hard problems by employing novel **linear programming rounding** techniques
- Designed the **first** efficient constant approximation algorithm for the **minimum norm matroid median** problem

### Undergraduate Research Assistant

University of Waterloo

📅 August 2020 – April 2020

📍 Waterloo, ON

- Designed a **scheduling algorithm** to optimally allocate office time based on **3-dimensional matchings** while leveraging **integer programming** through **Gurobi**
- Produced novel results on the computational complexity of nucleolus within **cooperative b-matching games**
- Presented recent breakthroughs in **computational game theory** during weekly readings

### Software Engineering Intern

Google LLC

📅 Jan 2020 – April 2020

📍 Mountain View, CA

- Improved a **distributed graph algorithm** which pinpoints build-breaking commits, reducing engineering time
- Created a generalized **validation framework** in **C++** to evaluate improvements through statistical methods like **cross entropy**, **rank probability score**, and  **$\ell$ -p norms**, quantifying the performance of breakage finding services
- Implemented an efficient data pipeline through **BigQuery** and **MapReduce** which supports the evaluation framework using automated testing data

### IOT Engineering Intern

Level Home Inc.

📅 May 2019 – December 2019

📍 Redwood City, CA

- Designed and implemented back-end features to support an invisible **smart lock** system, allowing users to remotely control entrance to doors without affecting aesthetics of their home
- Lead an engineering team in implementing a multi-client read-write lock for **mongodb** using asynchronous networking in both **Swift** and **C** with a **Python** interface to prevent data races
- Leveraged **Elliptic-Curve Cryptography** and **Stream Cyphers** to ensure client data security

## PROJECTS

### VM

CS246E: Objected Oriented Programming (Advanced)

📅 November 2018

📍 github.com/felix990302/vm

- Actualized a **C++14** clone of the command-line text editor **vim** from scratch
- Followed **Object-Oriented Principles** and **Design Patterns** like **Decorator** and **Visitor** to produce modular and extensible code
- Implemented undos and redos through the **Command** pattern to minimize space complexity

## EDUCATION

### B.S. Combinatorics & Optimization

University of Waterloo

📅 Sept 2017 – August 2022

Double Major in Computer Science

Minor in Pure Mathematics

94% Faculty Average

## PUBLICATIONS

"On the Complexity of Nucleolus Computation for Bipartite b-Matching Games". *Submitted for Review*

## COURSEWORK

Probability, Statistics

Calculus 3, Linear Algebra 2, Graph Theory

Algorithm Design, Graph-Theoretic Algorithms  
Convex Optimization, Semidefinite Optimization  
Combinatorial Optimization

## ACHIEVEMENTS

### Mathematics Undergraduate Research Award

University of Waterloo

📅 May 2021

for excellent academic performance and research capabilities

### Howard and Marita Boyd Scholarship

University of Waterloo

📅 January 2021

for academic excellence and demonstrated commitment to volunteerism

### Undergraduate Student Research Award

NSERC

📅 September 2020

for excellent academic record and research aptitude

### President's Research Award

University of Waterloo

📅 September 2020

## PROFICIENCIES

C, C++, Python 3

Gurobi, R, MATLAB, LaTeX