

# FELIX ZHOU

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in felix-zhou

felix990302

## EXPERIENCE

### Undergraduate Research Assistant

#### University of Waterloo

May 2021 – August 2021

Waterloo, ON

- Researched **approximation algorithm** frameworks for a variety of NP-hard problems by employing novel **linear programming rounding** techniques
- Explored the **minimum norm matroid median** problem which generalizes the  $k$ -medians and  $k$ -centre problems

### Undergraduate Research Assistant

#### University of Waterloo

August 2020 – April 2021

Waterloo, ON

- Designed a **scheduling algorithm** to optimally allocate office time through **3-dimensional matchings** modelled by **integer programming** with **Gurobi**
- Produced novel results on the computational complexity of nucleolus within **cooperative  $b$ -matching games** (manuscript under review)
- Presented results 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 bug-finding time by to 50%
- 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 backend features for an invisible **smart lock** system, allowing users to remotely unlock doors without sacrificing aesthetics
- Lead the implementation of a network semaphore for **mongodb** using asynchronous networking in both **Swift** and **C** to prevent data races
- Leveraged **elliptic curve cryptography** and **stream cyphers** to ensure client data security against adversarial attacks

## 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

## PROFICIENCIES

C, C++, Python 3

TeX, MATLAB, Gurobi

Git, MapReduce, MongoDB

## EDUCATION

### Honours Bachelor of Mathematics

#### University of Waterloo

Sept 2017 – August 2022

Double Major in Combinatorics & Optimization and Computer Science

Minor in Pure Mathematics

94% Average

## PUBLICATIONS

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

## COURSEWORK

Probability, Statistics

Real Analysis, Linear Algebra 2, Graph Theory

Lebesgue Integration & Fourier Analysis

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