FELIX ZHOU

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EXPERIENCE

Undergraduate Research Assistant
University of Waterloo
May 2021 – August 2021 Waterloo, ON

- Researched **approximation algorithm** frameworks for NP-hard problems by employing novel **linear programming rounding** methods
- Explored the **minimum norm matroid median** problem which generalizes the k-medians and k-center problems

Undergraduate Research Assistant
University of Waterloo
August 2020 – April 2021 Waterloo, ON

- Designed a **scheduling algorithm** to optimally allocate office time under social distancing constraints based on **3-dimensional matchings** modeled with **integer programming** through **Gurobi**
- Produced novel results on the computational complexity of nucleolus within **cooperative** b**-matching games** (manuscript under review)
- Presented **computational game theory** papers in 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++** based on statistical methods like **cross entropy, rank probability score**, and ℓ**-p norms**, quantifying the performance of breakage finding services
- Implemented a data pipeline using **BigQuery** and **MapReduce** which supports the evaluation framework with automated testing data

IOT Engineering Intern
Level Home Inc.
May 2019 – December 2019 Redwood City, CA

- Built backend features for a discreet **smart lock** system, allowing users to remotely unlock doors without affecting 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 ciphers** 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 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
LaTeX, MATLAB, Gurobi

Git, MapReduce, MongoDB

EDUCATION

Honours Bachelor of Mathematics
University of Waterloo
Sept 2017 – August 2022

Double Major in Computer Science and Combinatorics & Optimization
Minor in Pure Mathematics
94% Average
Dean's Honours List

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
Combinatorial Optimization
Semidefinite and Convex 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