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 **MongoDB** network semaphore 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

Approximation Algorithms
Computational Game Theory

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".
Submitted for 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 outstanding academic record and research aptitude

President's Research Award

University of Waterloo

📅 September 2020