

Jeffrey Kam

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INTERESTS

I am mainly interested in graph theory and its algorithmic implications, such as algorithm design, coding theory, and discrete optimization. I am also keen on various topics in computer algebra.

EDUCATION

University of Waterloo

Sep 2017 - Present

Currently in fourth year

- Double major in Combinatorics & Optimization and Computer Science
- Minor in Pure Mathematics
- Dean's Honours List

Relevant Courses

- Graduate: graph-theoretic algorithms, algorithms for graph minors
- Undergraduate: algebraic graph theory, matroid theory, network flow theory, coding theory, algebraic number theory, graph theory, neural networks, algorithms

Relevant Projects and Talks

- **CS762: Graph-theoretic Algorithms**
"Bounding queue-number in planar graphs" (23 pages)
A written report of a recent proof by Dujmović et al. for a 20-year old conjecture on the queue-number of planar graphs, accompanied with lecture videos.
- **CO749: Algorithms for graph minors**
"Deciding tangles with weighted vertex sets and certifying large branchwidth" (14 pages)
An exploration of Elbracht et al.'s partial solution to finding a vertex subset characterization of a tangle, and Oum and Seymour's paper on certifying large branch-width in polynomial time with tangle-kits.
- **CO331: Coding Theory**
"Connections between network coding and matroid theory" (10 pages)
An investigation on the link between the study of network coding and matroid theory to better understand the limits of network coding.
- **CO444: Algebraic Graph Theory**
"Eigenvalues and Graph Bisection" (13 pages)
A presentation on the proof of 2 claims from Boppana's work "Eigenvalues and Graph Bisection: An Average-case Analysis", where the details are omitted from the original paper.

RESEARCH EXPERIENCE

University of Waterloo - Software REBELs

May 2021 - present

Undergraduate Research Fellow

Supervised by Prof. Shane McIntosh

Waterloo, Canada

- Analyzing features within a code graph. (details to be included)

University of Waterloo - Symbolic Computation Group

May 2020 - present

Undergraduate Research Assistant (Part-time)

Supervised by Dr. Armin Jamshidpey

Waterloo, Canada

- Investigate new efficient methods of finding normal bases in \mathbb{F}_{p^n} and connections between circulant matrices and primitive elements.
- Researched different methods to find Smith Normal Form over \mathbb{Z}_{p^2} efficiently, such as experimenting with J -ideal.

BlackBerry - Security Research Group

January 2020 - April 2020

Security Researcher Intern

Supervised by Shay Berkovich and Dr. Glenn Wurster

Waterloo, Canada

- Researched and designed a universal benchmark to quantitatively measure the effectiveness and accuracy of container image scanners.
- Analyzed techniques of image inspection and vulnerability scanning through open source technologies.
- Researched on utilizing machine learning for fuzzing algorithmic complexity vulnerabilities.

PUBLICATIONS

- **UBCIS: Ultimate Benchmark for Container Image Scanning**,
with Shay Berkovich and Glenn Wurster
Published in 13th USENIX Workshop on Cyber Security Experimentation and Test (CSET 20).
- **bioSyntax: Syntax Highlighting For Computational Biology**,
with A. Babaian, et al.
Published in BMC Bioinformatics 19, 303 (2018).

AWARDS AND DISTINCTIONS

University of Waterloo

May 2021

Undergraduate Research Fellowship

- Based on academic performance and research potentials.

University of Waterloo

Dec 2020

Frank Lun Scholarship for Excellence

- Based on academic performance and demonstrated leadership abilities

University of Hong Kong and University of Waterloo

Mar 2017

Honourable Mention in Canadian Computing Competition Hong Kong

- Based on performance in the Canadian Computing Competition

PROFESSIONAL EXPERIENCE

GTS

Sep 2020 - Dec 2020

Software Engineering Intern

New York, US

- Worked on the core trading engine involving code generation. (details undisclosed)

Zenefits

May 2019 - Aug 2019

Software Engineering Intern

Vancouver, Canada

- Developed new permission guards in Python involving distributed message queue systems

Horizn

May 2018 - Aug 2018

Software Developer Intern

Toronto, Canada

- Wrote automation scripts and queries to streamline clients' data transfer to AWS services

TECHNICAL SKILLS

Programming	Python, C++ (Boost), SAGE, Scheme, L ^A T _E X
Tools	Git, C++ tools (GCC, GDB), Docker, Linux, PLY, ANTLR