

# JEFFREY KAM

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## INTERESTS

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I am interested in graph theory and graph algorithms research, with a particular interest in the graph minor project and graph colouring. In addition, I am also keen on quantum computing and am hoping to explore topics in the intersection of graph theory and quantum computation.

## EDUCATION

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### University of Waterloo

Sep 2017 - Present

*Currently in term 4A*

- Candidate for BMath. Combinatorics & Optimizations and Computer Science
- Minor in Pure Mathematics

### Relevant Courses

- Graph-theoretic Algorithms - CS762
- Algorithms for Graph Minors - CO749
- Algebraic Graph Theory - CO444
- Network Flow Theory - CO351
- Introduction to Graph Theory - CO342

### Relevant Projects

- **Bounded Queue-number in Planar Graphs (CS762)** - [Project Page](#)  
Explore a recent proof by Dujmović et al for a 20-year old conjecture on whether the queue-number of planar graph is bounded.
- **Tangles are Decided by Weighted Vertex Sets (CO749)** - [Project Page](#)  
Explore a partial solution by Elbracht et al to an open problem by Diestel, who asked whether we can find a vertex subset  $X$  that can definitively characterize a tangle by seeing which side of a low order separation has more vertices in  $X$ . We further explore the possibility improving the weight function to be polynomially-bounded by the number of vertices.

## PUBLICATION

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- **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).  
<https://www.usenix.org/conference/cset20/presentation/berkovich>
- **bioSyntax: Syntax Highlighting For Computational Biology**,  
with A. Babaian, et al.  
Published in BMC Bioinformatics 19, 303 (2018).  
<https://doi.org/10.1186/s12859-018-2315-y>

## RESEARCH EXPERIENCE

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### University of Waterloo - Symbolic Computation Group

May 2020 - Sep 2020

*Undergraduate Research Assistant*

*Supervised by Armin Jamshidpey*

*Waterloo, Canada*

- Experimented with  $J$ -ideal and Smith Normal Form using SAGE
- Researched different methods to find Smith Normal Form over  $\mathbb{Z}_{p^2}$  efficiently, such as probabilistic algorithm
- Read about methods to find normal bases in  $\mathbb{F}_{p^n}/\mathbb{F}_p$  and revisited various topics in algebra and Galois theory

## BlackBerry - Security Research Group

January 2020 - April 2020

*Security Research Intern*

*Supervised by Shay Berkovich and 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
- Designed a universal import framework for Anchore Engine to extend our scanning capabilities
- Researched on utilizing machine learning for fuzzing algorithmic complexity vulnerabilities (ACV) by reading multiple security-related journals and conference papers
- Presented to the security research group on current developments of ML-based fuzzing and fuzzing techniques for ACVs, along with potential problems, experiments, and optimizations

## WORK EXPERIENCE

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### GTS

Sep 2020 - Present

*Software Engineering Intern*

*New York, US*

- Working on performant C++ and Python code for the core trading engine (NDA)

### Zenefits

May 2019 - Aug 2019

*Software Engineering Intern*

*Vancouver, Canada*

- Developed new permission services in Django to guard against unauthorized review editing
- Designed a sequential document update service using a distributed message queue system

### Horizn

May 2018 - Aug 2018

*Software Developer Intern*

*Toronto, Canada*

- Wrote automation scripts in Python to scrape data from files and database into JSON files
- Learned foundational object-oriented programming skills, such as factory and observer pattern

## AWARDS

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- First place in HackSeq 2017 bioinformatics competition in UBC
- Honourable mention in Canadian Computing Competition Hong Kong 2017

## SKILLS

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### Programming Tools

Python, C++, SAGE, Scheme  
Git, C++ tools (i.e. GCC, GDB, Valgrind), Docker, Linux, Jupyter