Shannon Veitch

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Education

University of Waterloo BMath, Combinatorics and Optimization *2016 – 2020*

Research Experience

Dept. of Combinatorics and Optimization, University of Waterloo *Sept. – Dec. 2019*
Undergraduate Research Assistant, Supervised by Professor David Jao
- Optimized implementations of isogeny-based cryptosystems in ARM assembly language.
- Achieved 10x speed improvement of SIKE (Supersingular Isogeny Key Encapsulation) on ARM Cortex-M3 microcontroller.

David R. Cheriton School of Computer Science, University of Waterloo *May – Aug. 2019*
Cryptography, Security and Privacy (CrySP) Lab
Undergraduate Research Assistant, Supervised by Professor Douglas Stinson
- Investigated variations on the problem of sequencing triple systems.
- Developed and analyzed algorithms for constructing sequencings.
- Proved new existence results of sequencings via recursive and direct constructions.
- Implemented a hill-climbing algorithm to construct examples of sequenceable designs.

David R. Cheriton School of Computer Science, University of Waterloo *Sept. – Dec. 2018*
Cryptography, Security and Privacy (CrySP) Lab
Undergraduate Research Assistant, Supervised by Professor Douglas Stinson
- Researched properties of orthogonal arrays with repeated rows.
- Proved new results about optimal orthogonal arrays.
- Implemented a backtracking algorithm to construct examples of combinatorial designs.

Publications

1. C. J. Colbourn, D. R. Stinson and S. Veitch. Constructions of optimal orthogonal arrays with repeated rows. *Discrete Mathematics* **342** (2019), 2455-2466.

Papers Submitted or Accepted for Publication

2. D. R. Stinson and S. Veitch. Block-avoiding point sequencings of arbitrary length in Steiner triple systems.

3. D. Kreher, D. R. Stinson and S. Veitch. Block-avoiding point sequencings of directed triple systems. To appear in *Discrete Mathematics*.

4. D. Kreher, D. R. Stinson and S. Veitch. Block-avoiding point sequencings of Mendelsohn triple systems. To appear in *Discrete Mathematics*.

Technical Reports

5. D. Kreher, D. R. Stinson and S. Veitch. Good sequencings for small directed triple systems. 305 pages. July 2019.

6. D. Kreher, D. R. Stinson and S. Veitch. Good sequencings for small Mendelsohn triple systems. 121 pages. September 2019.

Industry Experience

ISARA Corporation *Jan. – Apr. 2019*
Security Developer
- Implemented quantum-safe cryptographic algorithms in C and SageMath.
- Optimized implementations of multivariate and lattice-based cryptosystems.

Cisco Systems *May – Aug. 2018*
Software Developer
- Performed tests on the Cisco enterprise networking operating system using Python.
- Developed features in an internal test framework using Python, Bash, and JavaScript.

Volunteering

CSGirls at UWaterloo *2019*
Workshop Assistant
- Assisted in running a cryptography and security session for high school girls.
- Answered questions about network security and guided students through a network simulation game.

StarCon *2018 – 2019*
Speakers Team Member
- Collaborated with a team to run a two-day, single-track, software engineering conference.
- Researched and documented potential frameworks for the call for proposals.
- Developed a review process that minimizes bias via anonymization and bidding of submissions.

University of Waterloo Faculty of Mathematics *2017 – 2019*
Math Faculty Ambassador
- Participated in student panel as a representative for Combinatorics and Optimization.
- Answered questions from prospective students about mathematics at Waterloo.

University of Waterloo Faculty of Mathematics *2017 – 2018*
Undergraduate Teaching Assistant
- Led tutoring sessions to answer questions and provide feedback to students.
- Marked assignments and provided instructors with feedback on student performance.

UW Capture the Flag (CTF) Club *2017*
Workshop Presenter
- Designed and presented a workshop on computer networks, covering the 4 Layer Internet Model, DNS, IP/TCP protocols, and link layer responsibilities.

Awards

CRA Outstanding Undergraduate Researcher Award (Honorable Mention) *2020*

NSERC Undergraduate Student Research Award *2020*

President's Research Award University of Waterloo *2020*

NSERC Experience Award *2019*

President's Research Award University of Waterloo *2019*

President's Scholarship of Distinction University of Waterloo *2017*