

Joey Ah-kiow

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Education

University of Calgary

B.Sc. in Electrical Engineering, GPA 3.75

- Minor in Computer Engineering

Sept 2018 – Present

Expected Graduation: May 2023

Research Experience

University of Calgary

Research Assistant

Feb 2022 – Present

Calgary, AB

- Working in the area of hardware security in Dr. Benjamin Tan's research group
- Collaborating with a PhD student from NYU to explore the security implications of High-Level Synthesis (HLS) tools
- Developing HLS-synthesizable C/C++ code for cryptographic algorithms like SHA3 and AES, to resulting RTL design, identify security vulnerabilities and determine systematic ways to detect and mitigate them
- Investigating static analysis methods to automate the detection of security vulnerabilities at the RTL design stage
- Reviewed and simulated RTL code for RISC-V SoCs and currently writing custom IP to voluntarily introduce security vulnerabilities to use as a "testbed" for vulnerability detection tools
- Exploring hardware security literature on state-of-the-art topics like IFT, fuzzing, and security property mining
- Learned foundational security concepts such as confidentiality, integrity, availability, access control, and cryptography

University of Calgary

Research Assistant

May 2019 – Aug 2019

Calgary, AB

- Researched the set of parameters that would yield the most accurate output when completing least-squares adjustments for stereo-photogrammetry purposes
- Funded by the University of Calgary's Program for Undergraduate Research Experience (PURE)

Teaching Experience

Self-Employed

Mathematics Tutor

Oct 2019 – Mar 2020

- Supported and mentored students from grades 7 to 11 in one-on-one settings

St. Francis High School

Volunteer Mathematics Tutor

Sept 2019 – Jan 2020

- Assisted students in a classroom setting to complete assignments and improve subject understanding
- Worked with struggling students one-on-one to support their development

Professional Experience

TC Energy

Field Data Program Management Intern

May 2021 – Present

Calgary, AB

- Supported internal and external stakeholders to ensure adherence of Non-Destructive Examination (NDE) inspection and reporting procedures, to company specifications and regulatory requirements as outlined in CSA Z662:19
- Communicated with SMEs to revise official engineering documents to reflect updates to processes/requirements
- Created a Power BI report to visualize and easily identify issues in cathodic protection data, saving \$180000 per year
- Automated the pre-population of web-based forms for integrity excavations, saving \$400000 per year
- Implemented a new reporting tool for the Pipe Integrity department (~200 employees) to automate the escalation of reporting, resulting in a 60-70% time-saving for management per week

Canadian Natural Resources Limited (CNRL)

Data Provisioning Intern

May 2020 – Aug 2020

Calgary, AB

- Developed and implemented SQL scripts to load, transform, and correct data for internal stakeholders
- Developed two applications using C# and .NET 4.8 to automate (1) the deployment of SSRS reports, and (2) the management of our Tableau server groups and users

Extracurricular Activities

Hack@DAC 2022

May 2022 – July 2022

Hardware Security Competition

- Competed against predominantly graduate students in one of the world's biggest hardware security competitions
- Completed security verification of the RTL designs of a security-enhanced CVA6/OpenPiton RISC-V SoC during phase 1 and Google's OpenTitan SoC during phase 2 by reviewing specifications of various IP like RISC-V, AES, scan chain, etc., understanding and defining security requirements, finding security vulnerabilities and proposing mitigations
- Placed 3rd in the first phase and invited to the 2022 Design Automation Conference (DAC) to participate in the second phase as one of the top 3 finalists, eventually finishing the competition in 2nd place
- Presented at the conference, in front of industry professionals and academia, to demonstrate the strengths and limitations of current tools, resources, and strategies, and the complexity of finding security vulnerabilities in RTL designs

Team Zeus Electric Motorsport

Oct 2019 – Oct 2021

Electrical Engineering Team

- Developed an in-house telemetry unit using Arduino to create a point-to-point LoRa module to collect and transmit vehicle data, and monitor performance remotely

Embedded in Embedded

Sept 2019 – Apr 2020

Member

- Developed and debugged user-level applications for bare-metal embedded systems using embedded C
- Interfaced with common peripherals such LEDs, pushbuttons, switches, and LCD displays

Honors and Awards

Schulich School of Engineering Dean's List

2018 – Present

HACK@DAC Second Place

2022

Jason Lang Scholarship

2019 – 2021

Program for Undergraduate Research Experience

2019

Alexander Rutherford Scholarship

2018

Presentations

Ah-kiow, J., "Hack@DAC 2022", Design Automation Conference, San Francisco, July 2022

Memberships

Student Member, Institute of Electrical and Electronics Engineers

2022 – Present