

Joey Ah-kiow

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Education

University of Calgary

B.Sc. in Electrical Engineering, GPA 3.75

Sep 2018 – Present

Expected Graduation: May 2023

- Minor in Computer Engineering
- Relevant coursework: Digital Systems Design, Data Structures and Algorithms, Computer Organization, Electronic Circuits

Experience

University of Calgary

Calgary, AB

Research Assistant

Feb 2022 – Present

- Working on ways to improve the detection of possible security concerns and mitigations earlier in the design cycle (RTL) in Dr. Benjamin Tan's research group
- 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, communication protocols, access control, authentication and cryptography

TC Energy

Calgary, AB

Field Data Program Management Intern

May 2021 – Present

- Communicating with internal and external stakeholders to ensure adherence to official specifications and provide support
- Reviewing and correcting NDE inspection data quality using SQL scripts and manual corrections
- Created a Power BI report to visualize and easily identify issues in cathodic protection data, saving \$180000 per year
- Implemented a new reporting tool adopted by the Pipe Integrity department (~200 employees) to automate the escalation of reporting, resulting in a 60-70% time-saving for management per week
- Automated the pre-population of web-based forms for integrity excavations, resulting in ~150 hours saved yearly
- Developed a Python script to automate the data extraction of ~150 Excel-based forms, reducing manual effort by 80 hours

Canadian Natural Resources Limited (CNRL)

Calgary, AB

Data Provisioning Intern

May 2020 – Aug 2020

- 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

Projects

Hack@DAC 2022

May 2022 – Jun 2022

Competition

- Found 7 possible security bugs/concerns, exploits and mitigations in the Verilog/SystemVerilog code of the AES cores, register locks, CSR registers, access control registers, performance counters and the JTAG debug modules
- Completed security verification of a compromised RISC-V SoC using manual code reviews and simulation with C code
- Reviewed the RISC-V unprivileged, privileged and debug specifications to understand and define security requirements
- Explored specifications and RTL implementations of common digital system modules such as AES cores, JTAG, AXI

Proximity-controlled System | GitHub

Jan 2021 – Apr 2021

Course Project

- Designed and simulated a proximity-controlled system using VHDL and implemented on the Terasic DE10-Lite FPGA board
- Used an ADC to interface a proximity sensor and output the readings to seven-segment displays in voltage or distance
- Controlled the frequency of a buzzer and the brightness of an LED array from the proximity sensor output using PWM
- Averaged the last 256 sensor readings using a pipelined adder tree to smooth system input with minimal performance hit
- Developed self-checking VHDL testbenches for all modules to verify functional correctness

Skills

Programming: C, C++, Java, Python, C#, SQL, MATLAB, VHDL, Verilog/SystemVerilog

Hardware: FPGA, PIC, Arduino, MIPS, RISC-V

Software: Quartus Prime, ModelSim, Verilator, GTKWave, GitHub, LTSpice, NI Multisim, Bash scripting