Yusef Karim
Security & Embedded Systems Enthusiast

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Education

Carleton University   *Ottawa, Ontario*
Master of Computer Science   *Sept. 2020 – Present*

Trent University   *Peterborough, Ontario*
B.Sc. Computer Science and Physics, Honours   *Sept. 2015 – Apr. 2019*
- Dean's Honour Roll
- Breukelaar Prize for Laboratory Proficiency

Technical Skills

Programming	Python3, Rust, C, ARM Assembly, Bash/ksh, HTML5/CSS3, Javascript/Node.js
Development	Vim, GNU Development Tools (Make, GCC, GDB, etc), Git, OpenOCD
Operating Systems	GNU/Linux (Arch, Alpine, Ubuntu, etc), OpenBSD, ARM Linux, pfSense,
Systems Administration	Docker, Docker Compose, Kubernetes (kubeadm, kubectl), Proxmox VE, Cisco Switches
Writing	LaTeX, LibreOffice/Microsoft Suite

Academic Experience

Carleton University   *Ottawa, Ontario*
Research Assistant   *Sept. 2020 – Present*
- Supervised by Dr. Lianying Zhao
- Member of the CCSL research group

Teaching Assistant, COMP4109 Applied Cryptography   *Jan. 2021 – Present*
- Developed weekly challenges
    - Maintained and hosted course challenges website
    - Helped author and develop code for each weekly challenge
- Held weekly office hours
- Graded weekly challenges

Teaching Assistant, COMP3000 Operating Systems   *Sept. 2020 – Dec. 2020*
- Ran tutorial sessions for groups of up to 50 students
- Held weekly office hours
- Graded assignments and tests with appropriate feedback

Notable Undergraduate Coursework

Trent University   *Peterborough, Ontario*
Advanced Reading Course: Exploit Development & Mitigation   *Sept. 2018 – Dec. 2018*
- Explored how software interacts directly with operating systems and underlying hardware
- Handcrafted compact and concise assembly programs for ARM and x86 based architectures to create portable payloads (shellcode)
- Learned common techniques to exploit stack/heap overflow and format string vulnerabilities
    - Learned how to mitigate and defend against such vulnerabilities
- Wrote formal reports detailing reasearch outcomes and noteworthy technical findings

INTERNSHIP PROJECT COURSE   *Sept. 2018 – Dec. 2018*

- Collaborated with a Professor from York University, further developing past electronic art projects
- Built prototypes involving single-board computers (Raspberry Pi) and simple electronic components
- Explored agent-based modeling using Java, Python, Max/MSP, and Netlogo software

Work Experience

Completely Managed   *Newmarket, Ontario*

SYSTEMS & EMBEDDED DEVELOPER   *May 2019 – July 2020*

- Successfully pitched Rust for developement of company STM32-based embedded projects
    - Researched and wrote the initial Rust code, utilized the RTIC concurrency framework
    - Explored memory-safety and concurrency for resource-constrained devices
- Primary system administrator for the company's Public Key Infrastructure and Egress VPN implementation
    - Ensured confidentiality, integrity, and availability at all times
- Played large role in driving an SNMP network monitoring project
    - Setup systems and wrote documentation
    - Automated various data collection tasks via Python
    - Helped network engineers deploy to customer networks
- Researched, implemented, and configured network infrastructure such as firewalls, VPNs, web proxies, and code management tools
    - Assisted in network security, connectivity, and developmental workflows
- Helped transition the company into the Industrial Internet of Things (IIoT) industry
    - Integrated LoRa modules with both Python3 and embedded Rust codebases
- Maintained Python3 codebase, reducing complexity and adding functionality where needed
- Developed a Python3 RESTful API using the Flask framework
    - Enabled primary cloud servers to securely query and configure VPN clients
- Educated team members about Docker or Docker Compose
    - Maintained all Docker Compose related *YAML* files

SYSTEMS PROGRAMMER   *April 2018 – Aug. 2018*

- Rewrote a large systems level project from the ground up to use Python3, supporting new hardware, and improving upon legacy code
- Used open-source tools such as tcpdump, nmap, and OpenVAS to collect data and do various Linux configuration
- Carried out "real-time" communication to centralized servers via websockets and REST APIs
- Wrote Arduino firmware to display text on LCD screens and receive push-button events via serial communication
- Gained in-depth knowledge about networking concepts and practical hands-on experience with various industrial networks

Extracurricular Activity

RISC-V International   *Global*

INDIVIDUAL MEMBER   *Nov. 2020 – Present*

- Keep up to date with the TEE TG, Security Standing Committee, and more

CCSL Research Lab, Carleton University   *Ottawa, Ontario*

MEMBER   *Sept. 2020 – Present*

- Attend bi-weekly research meetings and seminars

Trent Computing Systems Society   *Peterborough, Ontario*

DIRECTOR OF HARDWARE   *Sept. 2016 – Sept. 2018*

- Contributed to event ideation and organization
- Educated members and students about computer hardware

Electric City Hacks, Trent University   *Peterborough, Ontario*

EVENT ORGANIZER   *Sept. 2016 & Sept. 2017*

- Helped organize and prepare for annual Trent University hackathon
- Helped debug/troubleshoot single-board computers and related hardware