Paul Crews

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Education

Stanford University — Stanford, CA

- *Master of Science in Computer Science; GPA: 4.039* — *Jan. 2018 - June 2019*
  Bachelor of Science in Computer Science; GPA: 3.809 — *Sept. 2014 - June 2018*
  - **Relevant Courses**: Operating systems, computer security, cryptography, networking, and distributed systems.

Experience

- **AT&T Foundry** — Palo Alto, CA
  HPP Project — *June 2018 - Aug 2018*
  - **Proxy**: Developed a proxy for the Hyper Precise Positioning (HPP) Project which broadcasts GPS correction data over AT&T's cellular network, improving positioning accuracy by two orders of magnitude.
  - **Efficiency**: Defined and implemented a custom compression algorithm and queuing system that reduced the overall message size by more than 35% and reduced the total message count by about 40%.
  - **Security**: Implemented a security overlay to restrict who can receive the correction data, while also providing message authentication and support for periodic key rotations. Submitted a patent to AT&T's patent team.
- **Stanford University** — Stanford, CA
  TockOS Project — *March 2017 - June 2018*
  - **6LoWPAN**: Implemented 6LoWPAN compression, decompression, and fragmentation, bringing IPv6 networking over low-power wireless links to the Tock platform, substantially increasing the viability of the system.
  - **Wireless Updating**: Implemented the Deluge protocol for sending binary updates over low-power wireless networks, allowing userland programs to be updated remotely on the Tock platform.
  - **SPI**: Extended the existing Serial Peripheral Interface (SPI) codebase to support running Tock as an SPI Slave device, enabling the use of Tock with peripherals that operate only in SPI Master mode.
- **The Raytheon Company** — Melbourne, FL
  Hypervisor Vulnerability Research — *June 2016 - Sept 2016*
  - **Static and Dynamic Analysis**: Performed static and dynamic analysis on a widely used commercial hypervisor, using industry-standard reversing tools along with custom written drivers for dynamic analysis and fuzzing.

Extracurricular Organizations

- **Applied Cybersecurity Club** — Stanford, CA
  Club Leader, Project Team Lead — *Oct 2015 - June 2019*
  - **Leadership**: Responsible for organizing and leading workshops, technical demonstrations, and competition trainings. Focused on teaching both high-level security concepts and analyzing real-world security vulnerabilities.
  - **Projects**: Led a group of club members interested in development related to computer security. Projects include fuzzer development, exploit writing, and security tool development.
  - **Competitions**: Participated in several collegiate computer security competitions, both as part of an offensive team (CPTC) and as a defensive team (CCDC). Placed first in the 2017 and 2018 CPTC National competitions.

Workshops and Publications

- **SenSys 2018 Poster**: Submitted a poster to SenSys titled *Design Considerations for Low Power Internet Protocols*, highlighting some challenges found in implementations of low-power internet protocols.
- **SOSP 2017 Tutorial**: Helped present the TockOS tutorial at SOSP 2017, which provided an opportunity to introduce conference attendees to the Tock platform and how to develop on it.
- **Security Patent Application**: Developed and submitted a patent through the AT&T patent application system for a cellular broadcast security mechanism. Currently being processed by the AT&T patent team.

Honors and Awards

- **Siebel Scholar, 2019**: Selected by the Siebel Scholars Foundation as a member of the class of 2019.

Programming Skills

- **Languages (Ordered by Experience)**: Java, Rust, C, Python, C++