

# William Findlay

SECURITY RESEARCHER · SYSTEMS PROGRAMMER · KERNEL HACKER

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## Education

### Carleton University

MASTER OF COMPUTER SCIENCE

Ottawa, Canada

Sept. 2020 – Present

- Current CGPA: 12.00 (A+) (Some course work completed during undergrad)
- Accelerated Master's Program

### Carleton University

B.SC. COMPUTER SCIENCE, HONOURS

Ottawa, Canada

Sept. 2015 – Apr. 2020

- CGPA: 11.05 (A)
- Accelerated Master's Program
- Graduated with High Distinction, Dean's Honour List
- Thesis: [Host-Based Anomaly Detection with Extended BPF](#)

## Skills

<b>Linux Kernel</b>	Kernel Hacking, Kernel Module Development, eBPF, XDP, bcc, libbpf
<b>Systems Programming</b>	C, C++, Rust
<b>Data Science</b>	Pandas, Numpy, Scipy, R
<b>Research</b>	Applied Security, Operating System Security, Sandboxing, Intrusion Detection

## Languages

<b>Programming</b>	C, Python, Rust, C++, Java, Javascript, R
<b>Markup</b>	TeX, HTML, CSS
<b>Human</b>	English, French

## Academic Experience

### Carleton University

RESEARCH ASSISTANT

Ottawa, Canada

Apr. 2019 – Present

- Member of the [CCSL/CISL](#) research group.
- Researching Extended BPF for runtime security implementations under the Linux kernel.
- Co-supervised by [Dr. Anil Somayaji](#) and [Dr. David Barrera](#).
- Designed and developed ebpfH, an anomaly detection system for Linux, using eBPF.
  - This work was the subject of my undergraduate [Honours Thesis](#).
- Designed and developed bpfbox, a process confinement tool for Linux, using eBPF.
  - This work was [published at ACM CCSW'2020](#).

### Carleton University

TEACHING ASSISTANT, COMP3000 OPERATING SYSTEMS

Ottawa, Canada

Sept. 2018 – Present

- Nominee for the [Outstanding Teaching Assistant Award](#) in both the 2018/2019 and 2019/2020 academic years.
- Ran tutorial sessions for groups of 50 students.
- Took a leadership role to ensure tutorials proceeded smoothly.
- Held weekly office hours and workshops for students.
- Graded assignments and tests and gave appropriate feedback.
- Developed a [Discord bot](#) to help manage the class Discord server, used during the COVID-19 pandemic.
- Developed new tutorials which are now used each semester:
  - [Concurrency tutorial](#)
  - [Kernel memory management tutorial](#)
  - [eBPF tutorial](#)
  - [Rootkit tutorial](#)

## Other Experience

### Metro Ontario, Inc.

CUSTOMER SERVICE SUPERVISOR

Ottawa, Canada

Apr. 2014 – Jan. 2018

- Managed day-to-day operations in the front end service department.
- In charge of store payroll and accounting on a part-time basis.
- Exhibited superior customer service skills as required.

## Awards and Nominations

### ACCOLADES

2020	<b>Nominee</b> , Outstanding Teaching Assistant Award, Carleton University	Ottawa, Canada
2019	<b>Nominee</b> , Outstanding Teaching Assistant Award, Carleton University	Ottawa, Canada
2020	<b>Recipient</b> , Dean's Honour List, Carleton University	Ottawa, Canada
2019	<b>Recipient</b> , Dean's Honour List, Carleton University	Ottawa, Canada

### SCHOLARSHIPS

2020	<b>Recipient</b> , Domestic Entrance Masters (\$2,000 CAD), Carleton University	Ottawa, Canada
2020–2021	<b>Recipient</b> , Departmental Scholarships (\$6,000 CAD / year), Carleton University	Ottawa, Canada
2020–2021	<b>Recipient</b> , Research Assistants (\$6,000 CAD / year), Carleton University	Ottawa, Canada
2020–2021	<b>Recipient</b> , Teaching Assistants (\$11,000 CAD / year), Carleton University	Ottawa, Canada
2015–2019	<b>Recipient</b> , Entrance Scholarship (\$2,000 CAD / year), Carleton University	Ottawa, Canada

## Presentations and Invited Talks

### Invited Talk, IBM Research – Security and Privacy

Virtual Event, USA

BPFBX: SIMPLE PRECISE PROCESS CONFINEMENT WITH EBPF

Dec. 2020

- Invited guest speaker for the IBM Security and Privacy research group.
- Discussed my work on bpfbox, a process confinement mechanism for Linux using eBPF.
- Presented an overview of process confinement, eBPF, and its applications to security.

### Conference Presentation, ACM CCSW'2020

Virtual Event, USA

BPFBX: SIMPLE PRECISE PROCESS CONFINEMENT WITH EBPF

Nov. 2020

- Presented my work and accompanying paper on bpfbox, a process confinement mechanism for Linux using eBPF.

### Seminar Presentation, CCSL/CISL Seminar

Ottawa, Canada

BPFBX: SIMPLE PRECISE PROCESS CONFINEMENT WITH EBPF

Oct. 2020

- Speaker at a seminar for the CCSL/CISL research group.
- Discussed my work on bpfbox, a process confinement mechanism for Linux using eBPF.
- Presented an overview of process confinement, eBPF, and its applications to security.

### Lightning Talk, First Annual eBPF Summit

Virtual Event, USA

BPFBX: SIMPLE PRECISE PROCESS CONFINEMENT WITH EBPF AND KRSI

Oct. 2020

- Invited to give a lightning talk for the [inaugural eBPF summit](#), hosted by Cilium.
- Gave a brief talk about my work on bpfbox, a process confinement mechanism for Linux using eBPF.

### Seminar Presentation, CCSL/CISL Seminar

Ottawa, Canada

EXTENDED BPF PROCESS HOMEOSTASIS

Apr. 2020

- Speaker at a seminar for the CCSL/CISL research group.
- Discussed my work on ebpfH, an anomaly detection system for Linux using eBPF.
- Presented an overview of anomaly detection, eBPF, and its applications to security.

## Publications

### CONFERENCE PROCEEDINGS

- [1] William Findlay, Anil Somayaji, and David Barrera. “bpfbox: Simple Precise Process Confinement with eBPF”. In: *Proceedings of the 2020 ACM SIGSAC Conference on Cloud Computing Security Workshop. CCSW'20*. Virtual Event, USA: Association for Computing Machinery, 2020, pp. 91–103. doi: [10.1145/3411495.3421358](#).

### TECHNICAL REPORTS, ARCHIVES, AND THESES

- [1] William Findlay. “Host-Based Anomaly Detection with Extended BPF”. Honours Thesis. Carleton University, 2020. URL: <https://williamfindlay.com/written/thesis.pdf>.

### **bpfbox**

EBPF-BASED PROCESS CONFINEMENT MECHANISM

- Project is available: <https://github.com/willfindlay/bpfbox>.
- TODO

### **ebpH**

EBPF-BASED INTRUSION DETECTION SYSTEM

- Project is available: <https://github.com/willfindlay/ebpH>.