



CyberSEA Research Lab
Carleton University
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🐦 @CyberSEA_Lab

Systems and Computer Engineering
Carleton University
1125 Colonel By Drive
Ottawa, ON K1S 5B6

August 18, 2021

Position Available: M.A.Sc. Candidate

Comprehensive Security Assurance Solutions for Software-Dependent Systems

The **Cyber Security Evaluation and Assurance (CyberSEA) Research Lab** at Carleton University is actively looking for multiple graduate students at the Master's level to contribute to a funded research program developing *Comprehensive Security Assurance Solutions for Software-Dependent Systems* starting in September 2022.

Project Description

The overall aim of this research program is to establish comprehensive security assurance solutions by enhancing security-by-design approaches for engineering secure software-dependent systems. More specifically, it aims to develop more incremental, modular, and compositional solutions for securing systems from the outset and for generating sufficient evidence of their built-in resilience to a range of cyber-attacks and failures. This requires the integration of formal (mathematically rigorous) methods and security-by-design approaches to provide verifiable evidence to support security assurance claims from early stages of system development. We will achieve this by:

- (1) Developing formal modeling and analysis frameworks with which we can provide mathematical proofs of assurance of security properties of software-dependent systems at early stages of development;
- (2) Establishing system-level security evaluation methods and techniques for understanding and mitigating the risks to system assets posed by identified security vulnerabilities; and
- (3) Advancing techniques to support the management, evaluation, and presentation of sufficient evidence for developing incremental security assurance cases.

Duties and Responsibilities

As part of the Master's Program requirements, candidates will complete a dissertation on a topic aligned with the research mission of the CyberSEA Research Lab including but not limited to: cybersecurity evaluation and assurance, threat modeling, risk assessment and management, modelling and simulation for security, software engineering, distributed systems, and/or formal methods for security.

Desired Skills/Qualifications

Suitable candidates will have a Bachelor's degree in Software Engineering, Computer Science, or a related field. Ideal candidates will be self-motivated with an ability to work independently and to communicate effectively in a team environment. A background in computer security, software engineering concepts, and logic and discrete mathematics is highly desirable. Experience with formal specification and verification using fundamental tools such as first-order or temporal logic, model checkers, and/or theorem provers is considered an asset.

All candidates must satisfy the **Minimum Admission Requirements for Master's Programs** at Carleton University. International candidates must also ensure that they satisfy the **English as a Second Language Requirements**. In all cases, these requirements will be strictly enforced when evaluating an application for admission.

Funding

Successful candidates for this position will be *eligible for funding* in the form of a research assistantship. Specific funding details are determined at the time of offer and consider numerous factors such as academic standing, research potential, availability of funds, eligibility for teaching assistantship and/or scholarships, etc.

Host Research Institute Information

Carleton University is a public comprehensive university, founded in 1942, in Ottawa, Ontario, Canada. The research-intensive Faculty of Engineering and Design at Carleton University is recognized as one of Canada's leading institutions in the study and research of engineering, architecture, industrial design and information technology. Since the inception of engineering at Carleton in 1945, our experts have pushed the bounds of innovation and discovery. Carleton focuses on anticipating the needs of industry and society, and offers forward-thinking programs with real world application and produces research that is helping to shape our present and future. The **Department of Systems and Computer Engineering** is a recognized world-class institution in software engineering, computer systems engineering, communications engineering, and biomedical engineering. Together with the Department of Electronics, the Department of Systems and Computer Engineering constitutes one of the largest and most research-intensive centres for Electrical and Computer Engineering and Software Engineering education and research in Canada. The **Cyber Security Evaluation and Assurance (CyberSEA) Research Lab** conducts advanced academic research to develop systematic and rigorous approaches for evaluating and assuring the cyber security of software-dependent systems.

Further Information

For more information about Graduate Studies at **Carleton University** and the **Department of Systems and Computer Engineering**, please visit: <https://carleton.ca/sce/graduate-studies/>. For more information about applying for Graduate Studies at Carleton University, please visit: <https://graduate.carleton.ca/apply-online/>. For more information about funding for Graduate Studies, please visit: <https://graduate.carleton.ca/financial-assistance/admissions-funding/>.

How to Apply

Interested applicants are to send a **CV** and **Statement of Interest** detailing your research interests, background, and experience **by email** to the CyberSEA Lab Director:

Jason Jaskolka, Ph.D., P.Eng.

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For more information about how to apply, please visit: <https://carleton.ca/cybersea/positions-available/>

Application Deadline

Applications will be reviewed as they arrive until a suitable candidate is found.