HUGO KERMABON

PHD STUDENT – INFORMATION SYSTEMS SECURITY

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I am a PhD student at Concordia University. My research interests include operating systems, container security, cloud and 5G network security. I have strong system skills and education in both engineering and research. I am currently working on a kernel-based defense mechanism for containers. I have practical experience in many security topics thanks to my partipation in CTFs. I publish in conferences such as NDSS (one of the "Big 4" security conferences) and CODASPY. I also have experience in developing AI/ML solutions and neural networks.

EDUCATION

Ph.D. INFORMATION AND SYSTEMS ENGINEERING **2023 – now**
CONCORDIA UNIVERSITY (*Montreal, CANADA*)
Supervised by Dr. Lingyu Wang & Dr. Suryadipta Majumdar.
GPA: 4.3/4.3.
- Concordia University Doctoral Fellowship ($28,000).
- Concordia International Tuition Award of Excellence.
- Concordia Conference And Exposition Allowance ($1,000).

M.A.Sc INFORMATION SYSTEMS SECURITY **2020 – 2023**
CONCORDIA UNIVERSITY (*Montreal, CANADA*)
Supervised by Dr. Lingyu Wang & Dr. Suryadipta Majumdar.
CGPA: 4.23/4.3.
Thesis: *Proactive Security Policy Enforcement for Containers.*
- Concordia Merit Scholarship Award ($5,000).

MASTER OF ENGINEERING **2018 – 2022**
IMT ATLANTIQUE *(Brest, FRANCE)*
Major: Computer Science & Electronics. School ranked 5th among French engineering schools.

EXPERIENCE

TEACHING ASSISTANT **2021 – 2023**
CONCORDIA UNIVERSITY (*Montreal, CANADA*)
Lab instructor and grader for INSE6130 – Operating Systems Security (Introduction to Linux; Password security; RBAC; Race Conditions).
Lab instructor for INSE6140 – Malware Defenses and Application Security (Remote Code Execution; Buffer Overflow; ROP).

IT SUPPORT TECHNICIAN **2021**
CONCORDIA UNIVERSITY (*Montreal, CANADA*)
Support technician in the IT department team. Problem-solving, customer service, A/V and network troubleshooting.

RESEARCH INTERN **2020**
Lab-STICC/CNRS (*Brest, FRANCE*)
Developed of a PCI-e hardware/software interface for the Forward Error Correction library AFF3CT. Kernel driver, C/C++, PCI-e interface, FPGA/VHDL development, Xilinx. See my project.

PUBLICATIONS

[1] ***ProSPEC: Proactive Security Policy Enforcement for Containers*** **April 2022**
Hugo Kermabon, Mahmood Gholipourchoubeh, Sima Bagheri, Suryadipta Majumdar, Yosr Jarraya, Makan Pourzandi, Lingyu Wang
ACM Conference on Data and Application Security and Privacy (CODASPY '22), April 24 - 26, 2022, Accepted (30/111).

[2] ***Warping the Defence Timeline: Non-disruptive Proactive Attack Mitigation for Kubernetes Clusters*** **June 2023**
Sima Bagheri, **Hugo Kermabon**, Suryadipta Majumdar, Yosr Jarraya, Lingyu Wang, Makan Pourzandi
IEEE International Conference on Communications (IEEE ICC '23), 28 May – 1 June, 2023, Accepted.

[3] ***Phoenix: Surviving Unpatched Vulnerabilities via Accurate and Efficient Filtering of Syscall Sequences*** **November 2024**
Hugo Kermabon, Yosr Jarraya, Lingyu Wang, Suryadipta Majumdar, Makan Pourzandi
Network and Distributed System Security Symposium (NDSS '24), 26 February – 1 March, 2024, Accepted (to appear).

SKILLS

Programming	C, C++, Python, LaTeX, Shell, VHDL, *seccomp*, *ptrace*, Kernel drivers, Machine Learning (PyTorch).
Network	TCP/IP stack, Socket programming, Traffic analysis, Network administration, 5G architecture.
Security	OS Security, Malware analysis, Reverse engineering, Forensics, Cryptanalysis, Web security.
System	Linux server administration, Kubernetes, Docker, GCP, Git, SSH, Prometheus/Grafana, Falco, OPA.
Languages	French (native), English (fluent), Persian (beginner).

ACTIVITIES

Capture The Flag
- 14th place, NorthSec CTF **2021 & 2022**
- 3rd place, Concordia's ECGSA CTF ($500) **2022**
- 2nd place, Concordia's JMSB CyberRoyale CTF **2020**
- 8th place, European Cyber Week (Finals) **2020**

CVE
- CVE-2021-43979, State inconsistency in OPA/Gatekeeper. **2021**
  See my Proof-of-Concept and a video.

Miscellaneous
- **AI Against Covid-19** **2021**
  4th place, online AI competition for detection of Covid-19 in chest X-rays ($2700). See our project and our submission.
- **@Hack CTF**: Infra Team Lead. See event. **2023 – 2024**

External Review
ICC, ESORICS, IEEE Transactions on Computers, Elsevier Computers & Security, Springer Peer-to-Peer Networking and Applications.

Patents
- (Pending) *A Dynamic System Calls-Level Security Defensive System for Containerized Applications* (P105751US01).
- (Pending) *A Distributed Communication and Event Dependency Model Generation for Cross-Cluster Security Verification*.

Selected Demos & Talks
- "Phoenix: Pod-Level Proactive Forensics and Universal Hardening for Service Continuity", Ericsson Steering Meeting Q2/Q3 2023.
- "ProSPEC: Learning-based Proactive Security Compliance in Container-based Environments", Ericsson Research Days 2021.

Hobbies I enjoy photography (wildlife, urban, landscape), playing and listening to music, hiking.