

# Peterson Jr. Yuhala

POSTDOCTORAL RESEARCHER · TRUSTED COMPUTING

IIUN, Neuchâtel, Switzerland

☎ (+41) 79 683 95 57 | ✉ peterson.yuhala@unine.ch | 🏠 yuhala.github.io | 🐙 github.com/Yuhala | 🔗 gitlab.com/Yuhala | 🌐 peterson-yuhala-14009411a



## Education

### University of Neuchâtel

PhD in Computer Science

- *Thesis:* Enhancing security and performance in trusted execution environments
- *Advisors:* Pascal Felber, Alain Tchana, Valerio Schiavoni

Neuchâtel, Switzerland

April 2019 - March 2024

### National Advanced School of Engineering (ENSP)

Masters of Engineering in Computer Science

- *Thesis:* Memory address translation optimization in virtualized systems
- *Advisor:* Alain Tchana

Yaounde, Cameroon

Sept. 2013 - Sept. 2018

### Sacred Heart College

GCE Advanced Level

- 25/25 points (perfect score)

Bamenda, Cameroon

Sept. 2011 - June 2013

### Sacred Heart College

GCE Ordinary Level

- 33/33 points (perfect score)

Bamenda, Cameroon

Sept. 2006 - June 2011

## Research and Work Experience

### Postdoctoral researcher

Computer Science Institute - UniNE

- Accelerating homomorphic encryption algorithms with in-memory processing
- Securing real-time applications with trusted execution environments (TEEs)

Neuchâtel, Switzerland

April 2024 - Present

### Research Assistant/PhD Candidate

Computer Science Institute - UniNE

- Program partitioning for TCB reduction in TEE programs
- Adding TEE support in GraalVM CE for sensitive data protection in the cloud
- IoT security and privacy with TEEs and machine learning

Neuchâtel, Switzerland

April. 2019 - March 2024

### Teaching Assistant

Faculty of Science - UniNE

- Discrete Mathematics for Computer Science
- Networking and Web Technologies

Neuchâtel, Switzerland

April. 2019 - Present

### Research Intern

Toulouse Institute of Computer Science Research (IRIT)

- Memory address translation optimization in virtualization systems

Toulouse, France

March. 2018 - Sept. 2018

## Projects

### Securing IoT peripherals TEEs and ML

VEDLIoT project

- Porting peripheral device drivers to Arm TrustZone with OP-TEE OS
- Using ML classification techniques to filter out sensitive information from data streams

Neuchâtel, Switzerland

Feb. 2023 - Nov. 2023

### Multilanguage program partitioning for TEEs

Collaboration with Oracle labs Zürich

- Using GraalVM Truffle framework to implement generic AST nodes that encapsulate sensitive information in polyglot programs
- Building taint analysis tool to analyze the AST and partition the program for TEEs
- See: <https://gitlab.com/Yuhala/generic-tools>

Neuchâtel, Switzerland

Sept. 2021 - Dec 2022

### Developing configless approach for Intel SGX switchless call framework

University of Neuchâtel

- Design of dynamic worker thread scheduling system for switchless enclave routines
- See: <https://gitlab.com/Yuhala/zc-switchless>

Neuchâtel, Switzerland

Aug. 2021 - Feb. 2022

## Partitioning Java programs for TEEs

Collaboration with Oracle labs Zürich

- Java program partitioning with annotations and byte-code transformations for TCB reduction
- Implemented with GraalVM CE
- See: <https://github.com/Yuhala/montsalvat>

Neuchâtel, Switzerland

July 2020 - June 2021

## Improving fault tolerance guarantees for TEE programs

University of Neuchâtel

- Leveraging persistent memory (PM) to provide efficient fault-tolerance guarantees TEE programs
- Use case: secure machine learning
- See: <https://github.com/Yuhala/plinius>

Neuchâtel, Switzerland

April 2019 - June 2020

## Memory address translation optimization in virtualization systems

Institut de Recherche en Informatique de Toulouse (IRIT)

- Modifying the Xen hypervisor to provide contiguous memory to paravirtual guest VMs
- See: <https://github.com/Yuhala/xen>
- Building a VM placement simulator
- See: <https://github.com/Yuhala/placement-simulator>

Toulouse, France

March. 2018 - Sept. 2018

## SIMbox fraud detection.

National Advanced School of Engineering

- Developing a tool for SIMbox fraud detection based on the ELK stack
- See: <https://github.com/Yuhala/elk-fraud-detection>

Yaounde, Cameroon

Sept. 2017 - Jan. 2018

## Embedded electronics

National Advanced School of Engineering

- Design and implementation of embedded software for domotic systems
- Microcontroller platforms: Arduino, MSP-430, ESP32
- See: <https://github.com/Yuhala/embedded-design>

Yaounde, Cameroon

July. 2016 - Sept. 2016

# Publications

## CONFERENCE PROCEEDINGS

Fortress: Securing IoT Peripherals with Trusted Execution Environments

Peterson Yuhala, Jâmes Ménétrey, Pascal Felber, Marcelo Pasin, Valerio Schiavoni  
. SAC 2024 (2024). Association for Computing Machinery, 2024

A Holistic Approach for Trustworthy Distributed Systems with WebAssembly and TEEs

Jâmes Ménétrey, Aeneas Grüter, Peterson Yuhala, Julius Oeftiger, Pascal Felber, Marcelo Pasin, Valerio Schiavoni  
CoRR abs/2312.00702 (2023). 2023

SecV: Secure Code Partitioning via Multi-Language Secure Values

Peterson Yuhala, Pascal Felber, Hugo Guiroux, Jean-Pierre Lozi, Alain Tchana, Valerio Schiavoni, Gaël Thomas  
Proceedings of the 24th International Middleware Conference, 2023, Bologna, Italy

SGX Switchless Calls Made Configless

Peterson Yuhala, Michael Paper, Timothée Zerbib, Pascal Felber, Valerio Schiavoni, Alain Tchana  
2023 53rd Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN), 2023

(No)Compromis: Paging Virtualization is Not a Fatality

Boris Teabe, Peterson Yuhala, Alain Tchana, Fabien Hermenier, Daniel Hagimont, Gilles Muller  
International Conference on Virtual Execution Environments (VEE), 2021, Virtual, USA

Plinius: Secure and Persistent Machine Learning Model Training

Peterson Yuhala, Pascal Felber, Valerio Schiavoni, Alain Tchana  
2021 51st Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN), 2021

Montsalvat: Intel SGX Shielding for GraalVM Native Images

Peterson Yuhala, Jâmes Ménétrey, Pascal Felber, Valerio Schiavoni, Alain Tchana, Gaël Thomas, Hugo Guiroux, Jean-Pierre Lozi  
Proceedings of the 22nd International Middleware Conference, 2021, Québec city, Canada

# Talks

## Secure computation with trusted execution environments

Guest speaker at Privacy Reunion 3

La Chaux-de-Fonds, Switzerland

June 2024

## Securing IoT peripherals with Trusted Execution Environments

39th ACM/SIGAPP Symposium on Applied Computing

Avila, Spain

April 2024

## SecV: secure code partitioning using multi-language secure values

24th ACM/IFIP International Middleware Conference

Bologna, Italy

Dec. 2023

## SGX switchless calls made configless

53rd International Conference on Dependable systems and Networks

Porto, Portugal

June 2023

## Enhancing IoT security and privacy with TEEs and machine learning

53rd International Conference on Dependable systems and Networks (Doctoral Forum)

Porto, Portugal

June 2023

## Partitioning Java programs for Intel SGX

Huawei Research Center Zürich

Zürich, Switzerland

Dec. 2022

## Secure code partitioning via multi-language secure types

EuroSys Doctoral Workshop 2022

Rennes, France

April. 2022

## Montsalvat: Intel SGX shielding for GraalVM Native Images

22nd ACM/IFIP International Middleware Conference

Virtual Event, Québec, Canada

Dec. 2021

## Secure and efficient learning: approaches, techniques and threats

Conférence Universitaire de Suisse Occidentale (CUSO)

Neuchâtel, Switzerland

Dec. 2021

## Secure and persistent ML model training with persistent memory and Intel SGX.

51st International conference on Dependable systems and Networks

Virtual Event, Taipei, Taiwan

June. 2021

## Paging virtualization is not a fatality.

Conférence francophone d'informatique en Parallélisme, Architecture et Système (COMPAS)

Biarritz, France

July. 2019

## Honors & Awards

---

### DOMESTIC

2018	<b>Salutatorian</b> , Computer Engineering class of 2018, ENSP Yaounde	Yaounde, Cameroon
2013	<b>Valedictorian</b> , Class of 2013, Sacred Heart College	Bamenda, Cameroon
2013	<b>Ralph C. Okwen Award</b> , Overall best high school science student, Sacred Heart College	Bamenda, Cameroon
2013	<b>2nd Award</b> , Academic Excellence Award for a perfect score at the Cameroon GCE A-Level 2013 session (25/25 points)	Cameroon
2011	<b>1st Award</b> , Academic Excellence Award for a perfect score at the Cameroon GCE O-Level 2011 session (33/33 points)	Cameroon

## Academic service

---

### Scientific volunteering

University of Neuchâtel

- Organizing a STEM bootcamp: <https://scienceprojectscmr.github.io/>
- Writing scientific articles for LexTech institute blog: <https://www.lextechinstitute.ch/blog>
- University media presence: secure data processing in the cloud

### Scientific peer reviewing

University of Neuchâtel

- Artifact Evaluation Committee ASPLOS 2024
- Artifact Evaluation Committee OSDI 2021
- Artifact Evaluation Committee EuroSys 2021
- Sub-reviewer IC2E21

## Conference volunteering

University of Neuchâtel

- Student Volunteer OPODIS 2019
- Student Volunteer COMPAS 2018

## Skills

---

<b>Programming Languages</b>	C/C++, Java, Python
<b>Systems Security</b>	Intel SGX, ARM TrustZone, OP-TEE
<b>Web Development</b>	HTML5/CSS, JavaScript, SQL, Laravel with PHP, Flask
<b>Miscellaneous</b>	Linux, Git, Shell(Bash), Docker, LaTeX

## Languages

---

<b>English</b>	Native proficiency
<b>French</b>	Native proficiency

## Interests

---

<b>Reading</b>	I love books on politics, economics, and personal development.
<b>Sports</b>	Football, Biking
<b>Music</b>	Piano, Singing
<b>Board games</b>	Chess

## References

---

### Pascal Felber

- Professor  
pascal.felber@unine.ch  
University of Neuchâtel, Switzerland

### Alain Tchana

- Professor  
alain.tchana@ens-lyon.fr  
ENS Lyon, France

### Valerio Schiavoni

- Assistant Lecturer  
valerio.schiavoni@unine.ch  
University of Neuchâtel, Switzerland