

MUSA SADIK UNAL

Turkey, 34956, Istanbul, Orhanli - Tuzla github.com/m8

EDUCATION

Sabanci University

B.Sc. in Computer Science and Engineering

2019 – 2023 (Expected)

GPA 3,91 / 4.00

PUBLICATIONS

Conference Papers

- Rishabh Iyer, [Musa Unal](#), Marios Kogias, George Candea. “Achieving Micro-second Tail Latencies With Practical Cooperative Scheduling”. 17th USENIX Symposium on Operating Systems Design and Implementation (OSDI’23), 2023, *Under Submission*, Title Anonymized
- [Musa Unal](#), Arsalan Javeed, Cemal Yilmaz, Erkay Savas “HyperDetector: Detecting, Isolating, and Mitigating Timing Attacks in Virtualized Environments” 21st International Conference on Cryptology and Network Security (CANS), 2022
- [Musa Unal](#), Ersin Erturk, Mustafa C. Kasapbasi, Erdem Yavuz, Ufuk Sanver, “Real-time Remote Control of Robotic Hand System - TeleTouch” , International Conference on Engineering Technologies (ICENTE), 2017

Books

- [Musa Unal](#), Cocuklar Icin Scratch Ile Arduino Programlama (Arduino Programming with Scratch for Kids) ISBN: 978-605-4898-28-2, Turkey Dikeyksen Yayinlari, 16 February 2018, Book, [\[link\]](#)

RESEARCH EXPERIENCE

EPFL - [Dependable Systems Lab](#)

Supervised by Prof. George Candea

Jun 2022 – Present

Lausanne, Switzerland

- I have been working on implementing a practical cooperative scheduling system to avoid the overhead of forced preemptions for microsecond-scale applications.
- I developed an LLVM compiler pass that instruments a given program by adding yield functions. Moreover, I created a separate dispatcher library that periodically schedules the workers.
- I developed a static + dynamic analysis tool that finds the number of unbounded loops in a given program and says from which functions these loops are accessible.
- Worked with previous ground-breaking projects such as Shinjuku and Persephone. Reproduced their results and implemented our approach into them.

Sabanci University

Supervised by Prof. Erkay Savas, Prof. Cemal Yilmaz

Oct 2021 – Present

Istanbul, Turkey

- **Hyperdetector**: I implemented and designed a system for detecting timing-based side-channel attacks in virtualized environments. Implemented inside Linux Kernel (inside Kvm) and trapped each timing instruction at the hypervisor level. If an anomaly is detected, we introduced noise to that reading. I presented the findings at CANS’22.
- **TimeInspector**: Implemented a binary static analyzer for detecting timing-based side-channel attacks. Reverse-engineered timing-based side-channel attacks and observed patterns inside of them. Currently we’re writing the paper of that research.
- **State2vec**: Joint work with Ericsson Research to detect well-known attacks with hardware features like last branch records and Intel-PT. Worked with Linux Perf and modified its source code.

INDUSTRIAL RESEARCH EXPERIENCE

Tübitak Bilgem - [Project GIS](#)

Feb 2021 - Feb 2022

Research student

Istanbul, Turkey

- I was a part of a real-time operating system project. I worked on hardware and software virtualization (both for x86 and aarch64) and hypervisors. Also worked with QEMU, XtratuM, and KVM.
- Developed [mumu-visor](#): which is KVM based hypervisor, which can run on multicore systems, runs 64bit x86 assembly and C programs in virtual machines, and statically schedules virtual machines.
- Developed [arm-visor](#): which is a bare-metal hypervisor designed for the 64-bit ARM architecture, capable of stage 2 address translation, hypervisor interrupts, gicv3, timers for el1 and el2.

AWARDS & HONOURS

Awards

- **CANS 2022 - Travel Grant**, I got a full grant from TII to attend CANS2022 in person.
- **High Honor Student** I was on the dean's list for the years 2020, 2021, and 2022 at Sabanci University.
- **Tübitak 2247-C Scholar** I received a one year scholarship (for 2021) from the Scientific and Technological Research Council of Turkey for research on Operating Systems.
- **Tübitak 2205 Scholar** Undergraduate Scholarship for achievements on international competitions.
- **1st place** in Tübitak Undergraduate Research Project Competition (2021)
- **4th place** in Intel ISEF Robotics category with "[Pictalk - Open source shape display for visually impaired individuals](#)" (2019)
- **1st place** in [Robot-SM](#) at Sweden, [Robochallenge](#) at Romania and [15. Robotic Day](#) at the Czech Republic with "[Tele-Touch: Real-time Remote Control of Robotic Hand System](#)".
- For the full list please visit [\[awards\]](#)

EXTRACURRICULAR

Programming Instructor

Fall 2021

At local high-school

Istanbul, Turkey

- I gave lectures for 8 weeks to high-school students which covers: introduction to programming, fundamentals of computers, programming with python
- All materials are accessible from this [link](#)