CV

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Can Aknesil

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EDUCATION

Doctoral Study in Information and Communication Technology *2021 – Present*
KTH Royal Institute of Technology, Stockholm
School of Electrical Engineering and Computer Science
Specialization: Electronic Systems
Title: Protecting Remote FPGAs and Embedded Devices from Non-Invasive Physical Attacks
Supervisor: Prof. Elena Dubrova

Master of Science in Embedded Systems (Platform track) *2018 – 2020*
KTH Royal Institute of Technology, Stockholm
School of Electrical Engineering and Computer Science

Bachelor of Science in Electrical & Electronics Engineering *2013 – 2018*
Double Major in Computer Engineering
Koç University, Istanbul
College of Engineering
(25% Scholarship)
GPA: 3.44 / 4
Vehbi Koç Scholar in 2014 and 2016
Member of Koç University - Parallel and Multicore Computing Laboratory

High School *2008 – 2013*
Notre Dame de Sion French High School, Istanbul

PUBLICATIONS

Can Aknesil, Elena Dubrova, Niklas Lindskog, Jakob Sternby, Håkan Englund. "Hybrid Fingerprinting for Effective Detection of Cloned Neural Networks". Accepted to 2025 IEEE 55th International Symposium on Multiple-Valued Logic (ISMVL). 2025.

Can Aknesil, Elena Dubrova. "Circuit Disguise: Detecting Malicious Circuits in Cloud FPGAs without IP Disclosure". 2024 27th Euromicro Conference on Digital System Design (DSD). 2024.

Can Aknesil, Elena Dubrova, Niklas Lindskog and Håkan Englund. "A Near-Field EM Sensor Implemented in FPGA Configurable Fabric". 2023 IEEE 22nd International Conference on Trust, Security and Privacy in Computing and Communications (TrustCom). 2023.

Can Aknesil, Elena Dubrova, Niklas Lindskog and Håkan Englund. "Is Your FPGA Transmitting Secrets: Covert Antennas from Interconnect". 2023 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW). 2023.

Can Aknesil and Elena Dubrova. "Towards Generic Power/EM Side-Channel Attacks: Memory Leakage on General-Purpose Computers". 2022 IFIP/IEEE 30th International Conference on Very Large Scale Integration (VLSI-SoC). 2022.

Can Aknesil and Elena Dubrova. "An FPGA Implementation of 4x4 Arbiter PUF". 2021 IEEE 51st International Symposium on Multiple-Valued Logic (ISMVL). 2021.

Can Aknesil. "An FPGA Implementation of Arbiter PUF with 4x4 Switch Blocks". Master's Thesis, KTH (Royal Institute of Technology), Stockholm, Sweden. 2020.

Can Aknesil and Didem Unat. "MAM: A Memory Allocation Manager for GPUs". 5. Ulusal Yüksek Başarımlı Hesaplama Konferansı, Istanbul, Turkey. September, 2017.

PROFESSIONAL EXPERIENCE

Doctoral Student *March 2021 – Present*
KTH (Royal Institute of Technology), Stockholm
School of Electrical Engineering and Computer Science
Department of Electrical Engineering
Division of Electronics and Embedded Systems

Research Engineer *June 2020 – January 2021*
KTH (Royal Institute of Technology), Stockholm
School of Electrical Engineering and Computer Science

Intern *June 2019 – November 2019*
Telefonaktiebolaget LM Ericsson, Stockholm
High Performance Broadband/Radio Software Department

Intern *July 2017 – September 2017*
CTech Bilişim Teknolojileri San. ve Tic. A.Ş., Istanbul
Hardware Department

Mentor Student *February 2017 – June 2017*
Koç University, Instanbul
IT Department

Communication and Infrastructure Services

Intern *July 2016 – August 2016*
OBSS, Istanbul
Technology Department

TEACHING EXPERIENCE

Teaching Assistant (during doctoral studies) *March 2021 - Present*
KTH (Royal Institute of Technology), Stockholm
School of Electrical Engineering and Computer Science
Department of Electrical Engineering
Division of Electronics and Embedded Systems

Undergraduate Teaching Assistant *September 2017 – January 2018*
Koç University, Istanbul
College of Engineering
Supervisor: Deniz Yüret

Section Leader *June 20 – 30, 2016*
Stanford University & Koç University, Istanbul
CS Bridge Program

LANGUAGE SKILLS

Turkish: Native language

English: IELTS in 2018 (Overall: 6.0, Listening: 6.0, Reading: 6.5, Writing: 5.0, Speaking: 5.5), TOEFL IBT in 2017 (Overall: 88, Listening: 27, Reading: 22, Writing: 22, Speaking: 17)

French: DELF B2 in 2012 (Overall: 57.5/100, Listening: 11/25, Reading: 12.5/25, Writing: 18/25, Speaking: 16/25)

Swedish: SFI Course C in 2021 (roughly corresponds to CEFR A2/A2+), KTH Swedish B2 for Employees in 2024

PROFESSIONAL SKILLS

Hardware security

- Power/EM side-channel attacks (simple, differential, ML-based, and remote power analysis on FPGAs and microcontrollers)
- FPGA security

- Machine learning security

Computer security

- Machine learning security
- Penetration testing
- Networking and network security

Hardware design & development

- FPGA design and verification with VHDL and SystemVerilog (using Xilinx and Intel (Altera) design tools)
- Tcl scripting in Xilinx Vivado environment
- RTL synthesis with Yosys
- Graph-bases analysis of digital circuits

Embedded systems design & development

- Embedded real-time platform and software development with Nios II soft-processor and MicroC/OS
- Embedded software development with Linux
- Embedded software development directly on processor in AVR Assembly, MIPS Assembly, ARM Assembly, C, and C++
- Fault-tolerant systems design

High-performance computing (HPC)

- Parallel programming with pthread library, MPI, CUDA, and MicroC/OS

Computer science

- Scientific programming
- Machine Learning (supervised and unsupervised)
- Proficiency in Linux (personal use, system administration, driver and application development)
- Compiler and interpreter design with Lex (Lexical Analyzer), Yacc (Parser), and PLY (Python Lex-Yacc)
- Version control with Git and Subversion
- Build automation with GNU Make
- Proficiency in Office Programs
- LaTeX

Programming/scripting languages

- C, C++, Rust, Java, Julia, Python, Matlab, Lisp, Haskell, Bash, PowerShell

Various other areas I have experimented

- PCB design using KiCad
- Mixed-signal IC design using Cadence Virtuoso
- Image analysis and computer vision
- Mobile application development for IOS (Objective – C) and Android (Java)
- Web development with HTML, JavaScript, CSS, PHP, Java EE, and Django
- Database design with SQL and MongoDB
- Circuit development for audio applications

- Electronic circuit simulation with PSpice and LTspice
- Emacs lisp programming

PROJECTS

(From the most recent to the earliest)

- Go (board game, not the programming language) computer game in Rust *(Independent)*
- Circuit Disguise: Detecting Malicious Circuits in Cloud FPGAs without IP Disclosure *(Doctoral Study)*
- Near-field EM sensor implementations in FPGA configurable fabric *(Doctoral Study)*
- Covert antenna implementations on FPGA interconnect *(Doctoral Study)*
- Side-channel attacks on memory operations of general purpose computers *(Doctoral Study)*
- Side-channel attacks on Xilinx Artix-7 FPGA bitstream encryption engine *(Doctoral Study)*
- Bitstream Extraction from SPI Flash Communication *(Doctoral Study)*
- Breaking Advanced Encryption Standard (AES) on FPGA via power side-channel attack combined with deep learning *(KTH Employment)*
- Machine Learning modeling attacks on Physically Unclonable Functions (PUFs) *(KTH Employment)*
- FPGA implementation and statistical analysis of Arbiter PUF with 4x4 Switch Blocks *(MSc. Embedded Systems thesis, under the supervision of Elena Dubrova)*
- Single-Event Upset Detector (SEUD) Experiment in the Miniature Student Satellite (MIST) *(MSc. Embedded Systems final project)*
- Robust Header Compression (RoHC) for Profile 6 (TCP/IP) *(Ericsson internship)*
- Interfacing C++ high-performance radio simulation libraries from Julia, using Cxx.jl *(Ericsson summer internship)*
- CUDA Compilation Support for Snowflake DSL *(Computer Engineering Final Project)*
- Limon: A simple and powerful general purpose programming language *(Independent)*
- Programmable clock generator chip, RF receiver chip, and RF transmitter chip programming via BeagleBone Black *(CTech internship)*
- FPGA C++ Framework for FIR Filtering Applications *(Electrical & Electronics Engineering Final Project)*
- MAM: A Memory Allocation Manager for GPUs, in C, compatible with C++ and CUDA *(ParCoreLab)*
- HR Job Advert & Application Management Web Application, in Java *(OBSS Summer Internship)*
- Cannon's matrix multiplication algorithm, in C, using MPI library *(Independent)*

- Unix-style operating system shell, in C, on Linux *(During undergraduate study)*
- Air traffic control simulator, in C++, using pthread.h library *(During undergraduate study)*
- Cache simulator, in C *(During undergraduate study)*
- Sound Transmission via Amplitude Modulation of Light, electronic circuit and simulation on PSpice *(During undergraduate study)*
- Digital clock, on FPGA board using VHDL *(During undergraduate study)*

A subset of my projects can be found here.

AWARDS

- Vehbi Koç Scholar 2014, 2016
- International mathematical competition named "Le Kangourou des mathématiques", 22th among 10627 participants, 2011

CONFERENCES & WORKSHOPS

- 27th Euromicro Conference Series on Digital System Design. Presented a research paper. *(2024)*
- Cybersecurity and Privacy (CySeP) Summer School. *(2024)*
- 30th Reconfigurable Architectures Workshop (RAW). Presented a research paper. *(2023)*
- 30th IFIP/IEEE International Conference on Very Large Scale Integration (VLSI-SoC). Presented a research paper. *(2022)*
- FPGAworld Conference in Stockholm. *(2022)*
- IEEE 51st International Symposium on Multiple-Valued Logic (ISMVL). Presented a research paper. *(2021)*
- Solid-State Circuits Directions Inaugural Workshop: Hardware Security. *(2020)*
- TECoSA Federated Learning Workshop. *(2020)*
- FPGAworld Conference in Stockholm. *(2019)*
- FPGAworld Conference in Stockholm. *(2018)*
- National High Performance Computing Conference (BAŞARIM) (Ulusal Yüksek Başarımlı Hesaplama Konferansı). Presented a research paper. *(2017)*
- Training named "Neuroscience for Leadership" at Kariyer.Net *(2017)*

- Training named "Idea Production Techniques" at Kariyer.Net *(2017)*
- Training named "Communication Mastery" at Kariyer.Net *(2017)*
- Training named "Personal Quality" at Kariyer.Net *(2017)*
- Training named "Sustainable Motivation" at Kariyer.Net *(2017)*
- Training named "Gamification" at Kariyer.Net *(2017)*
- Participated to workshop organized by NDS to "Istanbul Technical University Energy Institute Nuclear Researches Division". Observation of "ITU TRIGA Mark-II Training and Research Reactor". *(2012)*

HOBBIES & INTERESTS

- Music: Piano, Oud (A Classical Turkish Musical Instrument), and Guitar
  - London College of Music Piano Examinations, Grade 5
  - Koç Orchestra, piano and keyboard, during 3 years. Performed 7 concerts
  - Water Clock (band), keyboard, during 1 year. Performed 2 concert
- Summer sports: Sailing, Windsurfing
  - Have an Amateur Yacht Captain License
  - Participated to optimist courses at Ataköy Marine
  - Participated to sailing education at Istanbul Sailing Club
  - Officially licensed, intermediate level windsurfer registered with the Turkish Sailing Federation.
- Tennis, Table tennis, Badminton
  - Table tennis team member in Notre Dame de Sion (high school)
- Winter sports: Skiing, Ice skating