Cem Topcuoglu

Cybersecurity Researcher/Software Engineer

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EDUCATION

Northeastern University, Boston, MA — Sep 2020 – Present
- Ph.D. in Cybersecurity

Sabancı University, Istanbul, Turkey. — Sep 2014 – Jan 2020
- B.S. in Computer Science and Engineering
- B.A. in Economics

The University of Hong Kong, Hong Kong — Jan 2018 – Jun 2018
- Exchange program

WORK EXPERIENCE

Northeastern University SecLab, Cybersecurity Researcher — Sep 2020 – Present
- Leading and collaborating on systems security, web security, and usable security projects.
- Teaching Assistant for the Software Vulnerabilities and Security class during Summer 2023.

Institut Eurécom, France, Cybersecurity Research Intern — Jul 2019 – Sep 2019
- Developed a prototype for verifiable matrix computation, executed over partially homomorphic encrypted data to overcome the security and privacy problems of outsourcing machine learning.
- Worked on SNARKs and Partially homomorphic crypto-systems.

Accenture, Turkey, Software Engineer — Jul 2018 – Feb 2019
- Developed web applications using Angular and Spring Boot frameworks, and Java and TypeScript languages.

SELECTED PROJECTS

Multi-layer Web Server Fingerprinting
- Designed and implemented Untangle, a tool that can fingerprint multi-layered web servers.
- Untangle fingerprints all web servers in the first layer, 90.3% of the second layer, and 50.7% of the third layer.
- Used differential fuzzing to trigger discrepancies among different web servers.
- Used Python language and gained experience on HTTP, web servers, and differential fuzzing.

Securing Phones Against Zero-click Attacks
- Enumerated the experiences in securing smartphones against zero-click attacks using off-the-shelf components.
- Designed a security architecture that seamlessly shifts the attack surface from the user's device to a sandboxed virtual smartphone ecosystem where apps and services run in isolation.

MacOS vs. Microsoft Windows: A Study on the Cybersecurity and Privacy User Perception
- Designed and conducted detailed surveys to understand the perceived differences among MacOS and Windows users with respect to the cybersecurity and privacy of these operating systems.
- Used Amazon Mechanical Turk and R.

ML chain: A Secure Environment to Make ML Models Sharable via Blockchain
- Built a secure, trusted, and distributed environment to make data and models sharable among multiple entities with financial protection and security of blockchain.
- Used Paillier crypto-system, Solidity, and Angular.

PUBLICATIONS

C. Topcuoglu, K. Onarlioglu, B. Jabiyev, E. Kirda, "Untangle: Multi-Layer Web Server Fingerprinting", *Annual Network and Distributed System Security Symposium (NDSS), 2024*

C. Topcuoglu, A. Martinez, A. Acar, S. Uluagac, E. Kirda, "MacOS versus Microsoft Windows: A Study on the Cybersecurity and Privacy User Perception of Two Popular Operating Systems", *Symposium on Usable Security and Privacy (USEC) co-located with NDSS, 2024*

N. Shafqat*, **C. Topcuoglu***, E. Kirda, A. Ranganathan, "Experience Report on the Challenges and Opportunities in Securing Smartphones Against Zero-Click Attacks", *Hawaii International Conference on System Sciences (HICSS), 2024.* *equal contribution

C. Topcuoglu, K. Kaya, and E. Savaş, "A generic Private Information Retrieval scheme with parallel multi-exponentiations on multicore processors", *Journal of Concurrency and Computation Practise and Experience*.

SKILLS

Programming Languages: Python, C++14, C, Java, TypeScript, JavaScript

Tools and Skills: Nmap, WireShark, Metasploit Burp Suite, sqlmap, Ghidra, AIDE, fail2ban, Stata, Git, Latex, Docker, Azure, Elastic, Systems Security, Web Security, Network Security, Agile, HTML

GRADUATE CLASSES

Software Vulnerabilities and Security - Network Security - Web Security - Fundamentals of Computer Networking - Intensive Computer Systems - Cyberlaw - Adversarial Machine Learning