Yingtong Liu

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Portfolio: https://yingtong-liu.github.io/

Education

- **University of California, Irvine (UCI)** — CA, USA
  Ph.D. of Science in Computer Science (GPA: 3.76) — *Aug. 2016 – Aug. 2022*
- **Huazhong University of Science and Technology (HUST)** — Wuhan, China
  Bachelor of Computer Science and Engineering (GPA: 3.9, Rank: 2/49) — *Aug. 2011 – July 2015*

Summary

- I have 7+ years of experience in software development, program analysis, operating systems, and system security. I earned my Ph.D. in Computer Science from UC Irvine, with my research published in top-tier conferences such as ACM EuroSys, ACM MobiCom, and ACM ASPLOS. After graduating, I worked as a Senior Software Engineer at CertiK, a leading company in Web3 security. I am passionate about designing and building high-performance, secure systems and infrastructures.

Professional skills

- **Languages**: C/C++, Python, Java, Solidity, SQL
- **Tools**: Git, AWS, QEMU, S2E, Agile
- **Security**: Blockchain Security, Fuzzing, Symbolic Execution, Static Analysis
- **Others**: Linux Kernel, Operating Systems, LLVM

Experience

- **Certik** — New York, NY
  Sr. Software Engineer, evolution team — *Sep. 2022 - Present*
  - Developed company's internal fuzzing tools for smart contracts to improve bug detection efficiency.
  - Audited customers' smart contracts and provided PoCs for vulnerabilities
- **Microsoft Research** — Redmond, WA
  Research Intern, New Security Ventures Team — *June 2020 - Sep. 2020*
  - Developed performance benchmarks for Microsoft's OneFuzz platform to improve resource allocation
  - Proposed the smart synchronization strategy of different fuzzers in OneFuzz
- **University of California, Irvine** — Irvine, CA
  Research Assistant, Trustworthy Systems Lab, Advisor: Ardalan Amiri Sani — *Sep. 2016 - Aug. 2022*
  - Led Macaron project. Led Mousse project, published on EuroSys conference
  - Member of Sifter project and Sugar project, published on MobiCom conference and ASPLOS conference
- **Ericsson** — Shanghai, China
  Software Engineering Intern, MME Team — *June 2017 - Sep. 2017*
  - Enhanced stability and performance of Ericsson's MME product by resolving many critical issues and optimizing internal processes.
- **Huazhong University of Science and Technology** — Wuhan, China
  Research Assistant, Media and Communication Lab, Advisor: Chen Tian — *Aug. 2014 - Aug. 2015*
  - Proposed and implemented stacked congestion control method for datacenter bandwidth allocation. Work published on INFOCOM conference

Research Projects

- **Macaron** (Nov. 2020 – Oct. 2022)

  Syzkaller is the most popular continuous kernel fuzzing platform developed by Google. Macaron focuses on building a framework to automatically and reliably reproduce non-deterministic race condition bugs found by syzkaller.

  Skills: C/C++, Linux kernel, QEMU, Fuzzing, Symbolic execution, Multi-threading

- **Sifter** (April 2020 – Dec. 2021)

  Sifter generates fine-grained, highly selective seccomp/eBPF filters to reduce the attack surface of security-critical Linux kernel modules and make their vulnerabilities unreachable for untrusted programs. It is capable of mitigating about half of 41 recent CVEs without a priori knowledge of these vulnerabilities.

  Skills: Go, Seccomp, ebpf, Linux kernel, Device driver

- **Mousse** (June 2018 – Dec. 2020)

  Mousse solves the challenge of analyzing programs that interact with complex external environments using Selective Symbolic Execution (SSE). Mousse includes a novel OS-level SSE design, environment aware concurrent execution, and distributed execution of program paths. It outperforms alternative solutions in terms of coverage and performance over 50%.

  Skills: C/C++, Selective symbolic execution/S2E, Mobile OS services, QEMU, LLVM

- **Sugar** (Sep. 2016 - Sep. 2017)

  Sugar leverages modern GPU virtualization solution to provide untrusted web applications with a dedicated virtual graphics plane from the browser to the kernel. Each web application is fully isolated from the rest of the system.

  Skills: C/C++, GPU virtualization, WebGL, Chromium

- **Multi-Tenant Multi-Objective Bandwidth Allocation in Data centers** (Sep. 2015 - Dec. 2016)

  Bandwidth allocation in data centers should support not only performance isolation among divisions but also objective-oriented scheduling among flows within the same division. This work solved the Multi-Tenant Multi-Objective (MT-MO) bandwidth allocation problem.

  Skills: Python, TCP/IP, Data center networks, NS2 simulation

Publications

- Hsin-Wei Hung, Yingtong Liu, Ardalan Amiri Sani. **Sifter: Protecting Security-Critical Kernel Modules in Android through Attack Surface Reduction.** In Proc. ACM Int. Conf. Mobile Computing and Networking (MobiCom), October 2022.

- Yingtong Liu, Hsin-Wei Hung, Ardalan Amiri Sani. **Mousse: A System for Selective Symbolic Execution of Programs with Untamed Environments.** In Proc. ACM European Conference on Computer Systems (EuroSys), April 2020.

- Zhihao Yao, Zongheng Ma, Yingtong Liu, Ardalan Amiri Sani, Aparna Chandramowlishwaran. **Sugar: Secure GPU Acceleration in Web Browsers.** In Proc. ACM Int. Conf. Architectural Support for Programming Languages and Operating Systems (ASPLOS), March 2018.

- Chen Tian, Ali Munir, Alex X. Liu, Yingtong Liu, Yanzhao Li, Jiajun Sun, Fan Zhang, and Gong Zhang. **Multi-Tenant Multi-Objective Bandwidth Allocation in Datacenters Using Stacked Congestion Control.** In Proceedings of IEEE INFOCOM, 2017.

Honors and Awards

- External reviewer. MobiSys'21
- Student Travel Grant. ASPLOS'18
- Deans Award Stewardship. UCI. 2016
- PhD fellowship. UCI. 2016
- Outstanding Undergraduate Thesis Award (11/440). Hubei Province. 2015
- National Grant. HUST. 2014
- Academic Excellence Scholarship. HUST. 2012 & 2013 & 2014
- Scholarship for Excellent Freshman. HUST. 2011