Yingtong Liu

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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 (2/49) — *Aug. 2011 – July. 2015*

Interests

- **I work on the intersection of operating systems, system security and programming analysis.**

Projects

- **Macaron** (Nov. 2020 – present)
  The OS kernel can be seen as a very complex software which usually has the most complicated bugs. Dynamic fuzzing is an efficient technique to hunt hidden bugs inside the OS kernel. The state-of-the-art kernel fuzzing platform syzbot reports plenty of bugs caused by race condition constantly. But a lot of those bugs cannot be reliably reproduced because of their complexity. This work focuses on building a framework to automatically and reliably reproduce non-deterministic race condition bugs without reproducers found by Syzbot.
  Skills: LLVM, Fuzzing, Symbolic execution, Linux kernel, QEMU

- **Sifter: syscall filtering** (April. 2020 – Dec. 2021)
  We observed that there are rich patterns in how legitimate programs issue syscalls to kernel modules. By learning the behaviors of good applications, this work focuses on developing a fine-grained syscall filtering framework called Sifter to mitigate zero-day vulnerabilities that could only be exploited by the use of unorthodox syscall patterns. Sifter can be deployed in the kernel with low overhead and 0 false positives with sufficient training.
  Skills: Seccomp, ebpf, Linux kernel

- **Mousse** (June. 2018 – Dec. 2020)
  Mousse is a system for analyzing programs with untamed environments using Selective Symbolic Execution (SSE). We present new solutions to overcome important challenges stemming from the complex programs environment. Mousse can be used to perform various analyses on Android I/O services including bug and vulnerability detection, taint analysis, and performance profiling.
  Skills: Selective symbolic execution, OS services, Virtualization, Bug detection

- **Sugar** (Sep. 2016 - Sep. 2017)
  Sugar leverages modern GPU virtualization solution to provide untrusted web applications with a dedicated virtual graphics plane. Sugar enhances the system security since a virtual graphics plane from the userspace to the kernel is fully isolated from the rest of the system.
  Skills: GPU virtualization, WebGL

- **Multi-Tenant Multi-Objective Bandwidth Allocation in Datacenters** (Sep. 2015 - Dec. 2016)
  In datacenter networks, flows can have different performance objectives. Bandwidth allocation in datacenters should support not only performance isolation among divisions but also objective-oriented scheduling among flows within the same division. This work studies the Multi-Tenant Multi-Objective (MT-MO) bandwidth allocation problem.
  Skills: TCP/IP, Datacenters, NS2 simulation

Work experience

- **Microsoft Research** — Redmond, WA
  Research Intern — *June 2020 - Sep 2020*

- **New Security Ventures Team**: OneFuzz is a self-hosted Fuzzing-As-A-Service platform that can ensemble the inputs generated by different popular fuzzers. I worked on developing the benchmarks and fuzzing performance metrics in Onefuzz to guide the synchronization of different fuzzers to achieve better performance.

- **Ericsson** Shanghai, China
  Software Engineer Intern *June 2017 - Sep 2017*
  - **MME Team**: Worked on maintaining and improving Ericsson's internal Mobility Management Entity(MME) product.

Publications

- Yingtong Liu, Hsin-Wei Hung, Ardalan Amiri Sani. **Mousse: A System for Selective Symbolic Execution of Programs with Untamed Environments.** In Proceedings of the Fifteenth 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.

Services 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

Programming Languages

- **C++, C, Python, Java**