

QISHEN LIANG

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SUMMARY

Graduate student at the University of Southern California due to graduation in 2025 with a Master of Science in Computer Science. Seeking a software development internship or full-time position in order to enter the industry. Currently working as a researcher at the USC Information Sciences Institute with experience in software development, networking, and security.

TECHNICAL SKILLS

- C++, C, Java, Python, SQL, Rust, MIPS, Bash, POSIX, JavaScript, React, Ansible, Git, OOP, LaTeX
- Docker, Kubernetes, AWS, InfluxDB, PostgreSQL, CI/CD, Unit Testing, Debugging, Troubleshooting, Distributed Systems
- TCP/IP, P4, SDN, BBR, BGP, RED, CoDel, Mininet, NS-3, PKI, PBFT, Blockchain, WebRTC, WireShark, TC, iptables
- RTOS, Cryptography, Computer Security, Sandboxing, Agile, Computer Architecture (x86, arm64), Algorithms, Data Structure

PROFESSIONAL EXPERIENCE

University of Southern California Examining Loss Models Under Contemporary Networks and Modern Routing Mechanisms
Graduate Researcher September 2024-December 2024

- Designed and constructed **10000** pipelined network simulations to impact on **TCP Reno** and **BBR** loss patterns under Controlled Delay (**CoDel**) and Fair Queue CoDel (**FQ-CoDel**) router policies
- Wrote systems that generated data and used **Mininet** and **NS-3** simulators to send packets over simulated links with Active Queuing Management (**AQM**) policies to a receiver, and analyze results using **scapy**, **pandas**, **Matplotlib**
- Learned **TCP congestion control algorithms**, **C socket programming**, and **NS-3** through independent research

USC Information Sciences Institute DISCERN: Datasets to Illuminate Suspicious Computations on Engineering Research Networks
Graduate Research Assistant May 2024-Present

- Discovered and fixed reverse shell root access and other serious vulnerabilities in **Kubernetes**-based testbed
- Co-developed and tested **5** testbed sensors with DISCERN researchers, incorporating **InfluxDB** and **PostgreSQL**, monitor testbed operation, providing **2** new facets of metrics to monitor malicious activities, improving system security and reliability by **30%**
- Constructed knowledge graphs for the SPHERE testbed, enabling security posture and structure visualization, increasing analysis efficiency by **10%**, and vulnerability detection rate by **10%**
- Applied and documented important security analysis to the testbed, addressing vulnerabilities, simulated attacks, and patching suggestions, lower attack surface by more than **15%**
- Developed a new security framework based on STPA-Sec and Mission Centric that estimates security postures of cyber systems

USC Information Sciences Institute Lightscope: The Network Security Analysis Tool for Raw Packet
Graduate Research Assistant March 2024-Present

- Implemented a honeypot IP forwarding system to intercept and forward malicious traffic
- Reduced false positive rates by **20%** in network flow analysis backend system and implemented port scanning detection
- Optimized packet analysis pipeline, reducing CPU utilization by **10%** and memory utilization by **15%**
- Designed real-time monitoring dashboard using **Python** and **Eel** to provide actionable insights

UCSB Systems and Networking Lab WebRTC Data Collection and Analysis on NetUnicorn
Researcher Assistant September 2021-July 2023

- Used **Python** and **Selenium** to automate Google Meets video conferences for data collection using **FFmpeg** and **v4l2loopback** kernel module over a cluster of headless Raspberry Pis, aggregating **7TB** over 30 nodes within **10 Hours**
- Containerized data collection pipeline using **Docker** to speed up deployment by **60%**
- Independently learned the WebRTC standard and applied it to analyzing collected dataset using **NumPy**, **pandas**, **SQLite**

EDUCATION

University of Southern California Los Angeles, CA
Master of Science in **Computer Science** August 2023-May 2025

University of California, Santa Barbara Santa Barbara, CA
Bachelor of Science in **Computer Science** September 2019-June 2023
Bachelor of Arts in **Asian American Studies**

INTEREST

I am an avid entry level audiophile, and I love reading books while listening to music. I also enjoy outdoor and PC gaming.

REFERENCES AVAILABLE UPON REQUEST