Shihan Lin

✉ shihan.lin@duke.edu · ⌨ SHiftLin

EDUCATION

Duke University, Durham, NC, USA **Aug. 2019 – Jun. 2025 (expected)**
PhD candidate in Computer Science, Networks and Distributed Systems Lab
- Advisor: **Prof. Xiaowei Yang**
- Research Interests: **Internet architecture, Internet security, Network measurement, Networked systems**

Fudan University, Shanghai, China **Sep. 2015 – Jun. 2019**
Undergraduate in Computer Science, Honor Class, Denghui Scholar
- Advisor: **Prof. Yang Chen**
- Bachelor thesis: **Comparing HTTP/2 and QUIC Through Network Measurement**

EXPERIENCE

Google, Sunnyvale, CA, USA **May 2023 – Aug. 2023**
PhD Software Engineering Intern, hosted by Austin Barket and David Zimmermann
- Investigated the root cause of the BGP detour from Internet to Google Cloud.
- Designed and implemented a stable and efficient key-value map to assign egress points to the cloud's egress traffic.

Google, Durham, NC, USA **May 2022 – Aug. 2022**
PhD Software Engineering Intern, hosted by Sergey Sorokin and Sanjay Khanna
- Investigated the existing design and implementation of IKE and PKI.
- Implemented PKI in Google Cloud VPN so that two VPN endpoints can authenticate by certificates.

SELECTED PUBLICATIONS

InviCloak: An End-to-End Approach to Privacy and Performance in Web Content Distribution
- **Shihan Lin**, Rui Xin, Aayush Goel, Xiaowei Yang
- Proc. of ACM **CCS 2022**

Remote Procedure Call as an OS-Managed Service
- Jingrong Chen, Yongji Wu, **Shihan Lin**, Yechen Xu, Xinhao Kong, Thomas Anderson, Matthew Lentz, Xiaowei Yang, Danyang Zhuo
- Proc. of USENIX **NSDI 2023**

Quantifying User Password Exposure to Third-Party CDNs
- Rui Xin, **Shihan Lin**, Xiaowei Yang
- Proc. of Springer **PAM 2023**

FlexHTTP: An Intelligent and Scalable HTTP Version Selection System
- Mengying Zhou, Zheng Li, **Shihan Lin**, Xin Wang, Yang Chen
- Proc. of Workshop on **EuroMLSys 2022**, co-located with ACM **EuroSys 2022**

SELECTED RESEARCH PROJECTS

RPC as an OS service **Advised by Prof. Danyang Zhuo, etc** **Nov. 2021 – Sep. 2022**
- Developed the TCP backend of a proposed RPC system, *mRPC*, which significantly reduces serialization overhead and enables L7 policy enforcement and live upgrade.
- The proposed RPC outperforms the existing method (gRPC+Envoy) by **200%** higher goodput and **83%** lower latency.
- Paper published on USENIX **NSDI 2023**.

Protecting users' privacy from third-party CDNs **Advised by Prof. Xiaowei Yang** **Sep. 2019 – Sep. 2021**
- Developed a system, *InviCloak*, to prevent users' private data from sharing to third-party CDNs when websites share TLS private keys to CDNs. It adopts DNS-over-HTTPS and DNSSEC for new public key distribution.
- The proposed system achieves **300%** higher throughput and **32%** lower page load times than the SOTA TEE solution.
- Paper published on ACM **CCS 2022** and Springer **PAM 2023**.

Measurement of QUIC and HTTP/2 Advised by Prof. Yang Chen Sep. 2018 – Jun. 2019

- Measured the performance of QUIC and HTTP/2 on Alexa top 500 websites under different network conditions.
- Concluded that both network conditions and web page structures affect optimal protocol selection.
- Adopted machine learning to validate the effect of network conditions and web page structures.
- **Bachelor thesis**: Comparing HTTP/2 and QUIC Through Network Measurement.
- Paper published in Workshop on **EuroMLSys 2022**, co-located with ACM **EuroSys 2022**.

Exploration of IoT service security Advised by Prof. Gang Wang Jul. 2018 – Oct. 2018

- Investigated vulnerabilities in the authentication between the IoT cloud and third-party servers.
- Validated the attack model through proof-of-concept experiments on Google Home.
- Paper published in Workshop on **SafeThings 2020**, co-located with IEEE **S&P 2020**.

Analysis of Swarm users' share-to-Twitter behavior Advised by Prof. Yang Chen Jan. 2018 – Aug. 2018

- Investigated the factors that impact Swarm users' behavior of sharing their check-ins to Twitter. The results can help researchers identify whether their Twitter-collected check-ins can represent the user behavior on Swarm.
- Adopted statistical analysis and machine learning to evaluate the influence of factors.
- Paper published in Workshop on **Applens 2018**, co-located with ACM **UbiComp 2018**.

Mobile user data collection system: *LBSLab* Advised by Prof. Yang Chen Jun. 2017 – Aug. 2018

- Developed the entire server of a WeChat mini-program, *LBSLab*, which allows users to make check-ins, record emotions, and check the weather. It also serves as a user data collection system for researchers.
- The number of registered users has reached 2510 by Nov. 2018.
- Honored as Denghui Project of Fudan Undergraduate Research Opportunities Program in 2020.
- Honored as National Innovation and Entrepreneurship Training Program for College Students in 2019.
- Paper published in Workshop on **MHC 2018**, co-located with ACM **UbiComp 2018**.

SKILLS

Internet architecture, network protocols, and cybersecurity

- Proficient in network protocols (TCP/IP, DNS, HTTP, QUIC, etc.) design and implementation.
- Experienced in cybersecurity analysis (TLS 1.2/1.3, DNSSEC, IPsec, OAuth, PAKE, TEE, etc.).

Networked system development

- Languages and tools: C/C++, Rust, Python, Java, JavaScript, SQL, Node.js, NGINX

HONORS AND AWARDS

Denghui Scholar of Fudan Undergraduate Research Opportunities Program	2020
National Innovation and Entrepreneurship Training Program for College Students	2019
Meritorious Winner (top 10%) of Mathematical Contest in Modeling	2018
First Prize of Fudan Collegiate Programming Contest	2017
Second Prize, Scholarship for Students in Honor Class	2017
Second Prize, Scholarship for OutStanding Students	2016 & 2018
First Prize of National Olympiad in Informatics in Provinces	2014