

Shihan Lin

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EDUCATION

Duke University, Durham, NC, USA

Aug. 2019 – 2024 (expected)

PhD candidate in Computer Science, Networks and Distributed Systems Lab

- GPA: 3.90 / 4.00
- Advisor: **Prof. Xiaowei Yang**
- Research Interests: **Networked systems, Network measurement, Network security**

Fudan University, Shanghai, China

Sep. 2015 – Jun. 2019

Undergraduate in Computer Science, Honor Class, Denghui Scholar

- GPA: 3.56 / 4.00, Ranking: 10 / 117
- Advisor: **Prof. Yang Chen**
- Bachelor thesis: **Comparing HTTP/2 and QUIC Through Network Measurement**

PUBLICATIONS

InviCloak: An End-to-End Approach to Privacy and Performance in Web Content

- **Shihan Lin**, Rui Xin, Aayush Goel, Xiaowei Yang
- To appear on **CCS 2022**

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 **EuroSys 2022**

A Case Study of the Security Vetting Process of Smart-home Assistant Applications

- Hang Hu, Limin Yang, **Shihan Lin**, Gang Wang
- Proc. of Workshop on **SafeThings 2020**, co-located with **S&P 2020**

An Empirical Study of the Usage of the Swarm App's Cross-Site Sharing Feature

- **Shihan Lin**, Rong Xie, Yang Chen, Yu Xiao, Pan hui
- Proc. of Workshop on **AppLens 2018**, co-located with **UbiComp 2018**

LBSLab: A User Data Collection System in Mobile Environments

- Qingyuan Gong, Xinlei He, Qinge Xie, **Shihan Lin**, Guozhen She, Ruiyu Fang, Rui Han, Yang Chen, Yu Xiao, Xiaoming Fu, Xin Wang
- Proc. of Workshop on **MHC 2018**, co-located with **UbiComp 2018**

Understanding Skout Users' Mobility Patterns on a Global Scale: A Data-Driven Study

- Rong Xie, Yang Chen, **Shihan Lin**, Tianyong Zhang, Yu Xiao, Xin Wang
- World Wide Web Journal (**WWWJ**), Springer, 2018

Understanding User Activity Patterns of the Swarm App: A Data-Driven Study

- **Shihan Lin**, Rong Xie, Qinge Xie, Hao Zhao, Yang Chen
- Proc. of **UbiComp 2017**, Poster Session

HONORS AND AWARDS

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

RESEARCH PROJECTS

- 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.
 - Compared to a state-of-the-art TEE solution, the proposed system achieves **300%** higher CDN throughput and **32%** lower page load times.
 - Developed an NGINX module to simplify the system's deployment at the server side.
 - Developed a JavaScript library with Service Worker to simplify the system's deployment at the client side.
 - Developed a browser extension to preserve the integrity of web resources in the system.
 - Developed a patch for Chromium to enable browser extensions to read the response body.
 - Paper will appear on **CCS 2022**.
- 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.
 - Developed a framework to crawl and mirror websites in controllable network conditions on Emulab.
 - 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 **EuroSys 2022**.
- Exploration of IoT service security** **Advised by Prof. Gang Wang** **Jul. 2018 – Oct. 2018**
- Investigated potential security issues in the authentication between the IoT cloud and third-party servers.
 - Validated the attack model through proof-of-concept experiments on Google Home.
 - Found out a vulnerability in Google Home's implementation of the OAuth protocol.
 - Paper published in Workshop on **SafeThings 2020**, co-located with **S&P 2020**.
- Analysis of Swarm users' share-to-Twitter behavior** **Advised by Prof. Yang Chen** **Jan. 2018 – Aug. 2018**
- Developed a framework to crawl the check-ins and tweets of 6,000 Swarm users.
 - 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 **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 **UbiComp 2018**.
- Measurement of 4G networks on high-speed rails** **Advised by Prof. Chenren Xu** **Jul. 2017 – Sep. 2017**
- Measured the performance of TCP with CUBIC, TCP with BBR, MPTCP in the high-speed environment.
 - Developed a tool to split the mixed TCP packets into independent TCP flows.
 - Developed a tool to match the data packets collected from mobile phones with those from clients and servers.
 - Utilized BladeRF to collect data of the link layer to find out the reason of performance changes.

SKILLS

Internet architecture, network protocols, and cybersecurity

- Proficient in network protocols (TCP/IP, DNS, HTTP, QUIC, etc.) design and implementation.
- Experienced in cyber attack defense (TLS 1.2/1.3, DNSSEC, PAKE, TEE, etc.).

Web server and cloud application development

- Languages and tools: C/C++, Python, Java, Rust, HTML, CSS, JavaScript, Node.js, MySQL, NGINX
- Programmed with C++ in programming contests since the middle school.