

Bingyu Shen

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Education

University of California, San Diego

Sep 2017– Jun 2022(Expected)

Ph.D. in Computer Science, GPA: 3.9/4.0

La Jolla, CA

Advisor: Prof. Yuanyuan Zhou; Research focus: System security and reliability; Mobile privacy

Shanghai Jiao Tong University

Sep 2013– Jun 2017

B.S. in Computer Science. GPA: 3.8/4.0 (Top 10%)

Shanghai, China

Skills

Langages: C/C++, python, Java, HTML, SQL, Matlab, OCaml

Tools: LLVM, Android Studio, Docker, Spark, MongoDB, MySQL, PostgreSQL, Git, NumPy, Pandas

Professional Experience

Bytedance

Jun 2021 – Sep 2021

Research Intern, HTAP Database group

Remote

- Researched on the techniques of LLVM Just-In-Time (JIT) to compile SQL queries into LLVM IR code.
- Designed a JIT-optimized function cache to store optimized functions with query-specific information into a LRU-like function cache; Integrate the cache framework into the OLAP engine.
- Identify components that require runtime-dependent data and transform them into LLVM IR code for further optimization. (Currently in progress)

Amazon Web Services

Jun 2019 – Sep 2019

Software Engineering Intern in Aurora Database group

East Palo Alto

- Performed measurement of failure detection and recovery time for masters and replicas under different failure modes, updated internal manuals and design docs.
- Designed and implemented cron jobs to fetch monitoring metrics such as heartbeat, transaction log ID and replication log ID for the health monitoring of secondary replicas.
- Integrated with cluster manager to monitor health status of master and replica, which improved the failure detection time less than 1 second on all failure modes.

Research Experience

Improving Access-denied Issues Diagnosis with Enhanced Logs

Oct 2019 – May 2021

- Analyzed the access control related log messages of five server software and characterized the common logging practices for access control.
- Developed a tool to automatically extract relevant information at the access-denied location with static analysis based on LLVM, and automatically enhance or insert the log messages.
- Performed user study to show the improved diagnostic information can effectively **reduce sysadmins' security mistakes by 93.3% and diagnosis time by 66.1%**.
- More than 60 enhanced log messages have been **accepted** by the server software developers.

Smartphone Runtime Permission Comprehension

May 2018 – June 2020

- Analyzed the prevalence of Android applications with low target SDK versions based on real user permission settings; disclosed the misunderstanding of the permission model change.
- Investigated whether current system-provided information can help users understand the scope of permissions and their potential risks with large scale user study using Amazon Mturk and Qualtrics.
- Explored how different information including background access, brand reputation to help users make more informed permission decisions.
- Published paper at a top security conference: **Usenix Security 2021**

Access Control Validation and Forensics

Oct 2017 – May 2018

- Proposed a novel time-changing decision tree algorithm to represent and infer policy changes from access logs. (Python, Spark, scikit-learn, NumPy, pandas)

- Built a framework to help system admins validate if the detected policy changes are intended.
- Evaluated with access logs from five real-world systems and showed that our new algorithm improved the inference accuracy (F-score) by 17.3%, comparing with the traditional decision tree.
- Published paper at a top security conference: **ACM CCS 2019**

Publications

[Security'21]: Bingyu Shen, Lili Wei, Chengcheng Xiang, Yudong Wu, Mingyao Shen, Yuanyuan Zhou, Xinxin Jin. *Can Systems Explain Permissions Better? Understanding Users' Misperceptions under Smartphone Runtime Permission Model*, In the 30th USENIX Security Symposium.

[CCS'19]: Chengcheng Xiang, Yudong Wu, **Bingyu Shen**, Mingyao Shen, Tianyin Xu, Yuanyuan Zhou, Cindy Moore, Xinxin Jin, Tianwei Sheng. *Towards Continuous Access Control Validation and Forensics*, In 2019 ACM SIGSAC Conference on Computer and Communications Security.

[TWC'17]: Yuqing Li, **Bingyu Shen**, Jinbei Zhang, Xiaoying Gan, Jingchao Wang, Xinbing Wang. *Offloading in HCNs: Congestion-Aware Network Selection and User Incentive Design*, In IEEE Transactions on Wireless Communications (**TWC**) (Volume: 16, Issue: 10, Oct. 2017)

Service

Artifact Committee Member: EuroSys 2021, SIGCOMM 2021

Conference Volunteer: OSDI 2018, SOSP 2019

UCSD CSE Graduate Women in Computing Volunteer: Mentor in diversity mentorship program 2019; Poster presenter at outreach activity in Harvey Mudd College CS summer camp.

Teaching Experience

Fall 2019: Graduate Operating Systems, Teaching assistant

Fall 2018: Principles of Computer Operating Systems, Teaching assistant

Awards & Honors

EuroSys: Honorable mention for the Distinguished AEC Reviewer Award	2021
UCSD: Department Fellowship	2017
SJTU: Outstanding Graduate	2017
SJTU: Mitacs Globalink Scholarship	2016
SJTU: Academic Excellence Scholarship	2014 – 2016
SJTU: ABB Dormann Scholarship	2014 – 2016
SJTU: Samsung Scholarship	2015
SJTU: Tung OOCL Scholarship	2014

Last updated, June 27, 2021