Bingyu Shen

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Education

University of California, San Diego **Sep 2017– Jun 2022(Expected)**
Ph.D. in Computer Science, GPA: 3.85/4.0 *La Jolla, CA*
Advisor: Prof. Yuanyuan Zhou; Research focus: System security and reliability; Mobile privacy; HCI.

Shanghai Jiao Tong University **Sep 2013– Jun 2017**
B.S. in Computer Science. GPA: 3.80/4.0 (Top 10%) *Shanghai, China*

Publications

[Security'22]: **Bingyu Shen**, Tianyi Shan, Yuanyuan Zhou. *Improving Access-Deny Logging to Reduce Permission Overgranting Mistakes*, Under major revision in the 31th USENIX Security Symposium..

[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

Program Committee: EuroSys'22 Shadow PC

Artifact Committee Member: EuroSys 2021 (Honorable mention for the Distinguished Reviewer Award), SIGCOMM 2021

Conference Volunteer: OSDI 2018, SOSP 2019

UCSD CSE Graduate Women in Computing: Mentor in diversity mentorship program 2019, 2020; Volunteer poster presenter at outreach activity in Harvey Mudd College CS summer camp 2018.

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.
- Under major revision at a top security conference: **Usenix Security 2022**

Understanding Smartphone Runtime Permission Miscomprehension **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**

Using Machine Learning to Infer Access-Control Policy Changes from Logs **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**

Professional Experience

Bytedance **Jun 2021 – Sep 2021**

Research Intern, Hybrid transactional/analytical processing(HTAP) Database group *Remote*

- Designed a compilation manager framework to execute JIT compilations in the background and store the optimized machine code into a LRU-like function cache; Integrate the framework into the OLAP columnar store.
- Profiling the scan process of column store to identify bottlenecks and summarize action items for optimization.
- Optimize the identified bottlenecks by generating LLVM optimized functions for different predicate and data types; achieves 1.5x and 3-10x improvement for table schema projection and predicate evaluation.

Amazon Web Services **Jun 2019 – Sep 2019**

Software Engineering Intern, 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.

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*

Skills

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

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

Last updated, February 19, 2022