

SHITONG ZHU

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EDUCATION

- University of California, Riverside** Sep 2016 - Jun 2021 (expected)
Ph.D. in Computer Science - CGPA: 3.67/4.00 *Riverside, CA*
Advisor: Zhiyun Qian
- Chongqing University of Posts and Telecommunications** Sep 2012 - Jun 2016
BEng. in Telecoms Engineering (with Honors) - CGPA: 3.73/4.00 - Top 6% *Chongqing, China*

PUBLICATIONS

- [C6] **SymTCP: Eluding Stateful Deep Packet Inspection with Automated Discrepancy Discovery**
Zhongjie Wang, **Shitong Zhu**, Yue Cao, Zhiyun Qian, Chengyu Song, Srikanth Krishnamurthy,
Tracy D. Braun and Kevin S. Chan
To appear in the *Proceedings of the 2020 Network & Distributed System Security Symposium (NDSS '20)*
- [C5] **AdGraph: A Graph-Based Approach to Ad and Tracker Blocking**
Umar Iqbal, Peter Snyder, **Shitong Zhu**, Benjamin Livshits, Zhiyun Qian and Zubair Shafiq
To appear in the *Proceedings of the IEEE Symposium on Security & Privacy (S&P '20)*
- [C4] **ShadowBlock: A Lightweight and Stealthy Adblocking Browser**
Shitong Zhu, Umar Iqbal, Zhongjie Wang, Zhiyun Qian, Zubair Shafiq, and Weiteng Chen
In the *Proceedings of The Web Conference (WWW '19)*
- [C3] **Measuring and Disrupting Anti-Adblockers Using Differential Execution Analysis**
Shitong Zhu, Xunchao Hu, Zhiyun Qian, Zubair Shafiq, and Heng Yin
In *Proceedings of the 2018 Network & Distributed System Security Symposium (NDSS '18)*
- [C2] **Source-location Privacy Protection Strategy via Pseudo Normal Distribution-based Phantom Routing in WSNs**
Jun Huang, Meisong Sun, **Shitong Zhu**, Yi Sun, Cong-cong Xing, and Qiang Duan
In the *Proceedings of the 30th Annual ACM Symposium on Applied Computing (SAC '15)*
- [C1] **On Selecting Composite Network-Cloud Services: A Quality-of-Service Based Approach**
Minkailu Mohamed Jalloh, **Shitong Zhu**, Fang Fang, and Jun Huang
In the *Proceedings of the 2015 Conference on Research in Adaptive and Convergent Systems (RACS '15)*
- [J2] **A Defense Model of Reactive Worms Based on Dynamic Time**
Haokun Tang, **Shitong Zhu**, Jun Huang, and Hong Liu
Journal of Software, 2778-2788, Sep 2014
- [J1] **Propagation of Active Worms in P2P Networks: Modeling and Analysis**
Haokun Tang, Yukui Lu, **Shitong Zhu**, Jun Huang
Journal of Computers, 2514-2524, Sep 2014

PROJECTS

ML-based Intrusion Detection System for Stealthy Attacks
Python

[WIP]
UCR SecLab/Samsung

- Improving the detection accuracy/efficiency by constructing ML-based representations

Adversarial Examples Under Restricted Conditions

Python

[WIP]

UCR SecLab/Samsung

- Improved the performance of adversarial machine learning under special requirements/circumstances

Evading Deep Packet Inspection Systems Using Symbolic Execution

KLEE, C++/Python

[C6]

UCR SecLab

- Used symbolic execution to guide the generation of insertion and evasion packets at the TCP level for automated testing against DPI middleboxes
- Discovered over 20 strategies to elude DPI middleboxes that target Zeek (formerly Bro), Snort and GFW within an hour

Stealthy Adblocking

Chromium (Blink/V8), C++

[C4]

UCR SecLab/UIowa

- Built invisible adblocker that evades current generation of anti-adblockers with 100% of success rate in manual evaluation
- Replicated 98.2% of ad coverage achieved by popular adblocking extensions, while causing minor visual breakage on less than 0.6% of Alexa top 1K websites. In the meantime, page loads are sped up by over 5% on average

ML-based Automatic and Effective Adblocking

Chromium (Blink/V8), C++/Python/JavaScript

[C5]

UCR SecLab/UIowa/Brave

- Leveraged multiple layers of the web stack (HTML/HTTP/JavaScript) to train a classifier for blocking ads/trackers
- Replicated state-of-the-art filter lists with high accuracy (97.7%)
- Enhanced filter lists by automatically correcting their errors

Anti-Adblocker Measurement and Disruption via Dynamic Program Analysis

Chromium (V8), C++/Python

[C3]

UCR SecLab/UIowa

- Modified V8 engine to apply differential execution trace analysis in Chromium
- Launched large-scale (Alexa top 10K) measurement, revealed 5-52 times more anti-adblockers than reported in prior literature
- Experimented with countermeasures against anti-adblockers, achieved promising effectiveness

WORK EXPERIENCE

Research Intern @ Samsung Research America

KNOX Security Team (Host: Xun Chen)

Jan 2020 - Present

Remote

- ML-based cyber-security infrastructure

Research Intern @ Samsung Research America

KNOX Security Team (Host: Xun Chen)

Jun 2019 - Sep 2019

Mountain View, CA

- Adversarial machine learning

Graduate Student Researcher @ UCR CSE

UCR SecLab

Sep 2016 - Present

Riverside, CA

- Pursued research on web privacy (adblocking/anti-adblocking) and fulfilled the entire cycle of projects
- Published/co-authored papers accepted by or submitted to top-tier venues

Consulting Intern @ Deloitte TTL

ERS - Technology Risk

Jan 2016 - Mar 2016

Shenzhen, China

- Advised tech organizations to avoid being victim of a security breach through big data analytics
- Assisted team of a major bank in designing reliable identity and access management framework

SKILLS

Languages Python, C/C++, JavaScript, MATLAB

Others Chromium, Selenium/Puppeteer, NodeJS, Hadoop/Spark, Git

HONORS & AWARDS

Dean's Distinguished Fellowship (full scholarship)

UC Riverside CSE, 2016-2017

2nd Class University Scholarship

CUPT, 2015-2016

National 2nd Prize @ National Olympiad in Informatics

China Computer Federation, 2009