SHITONG ZHU

900 University Ave, Riverside, CA 92521

shitong.zhu@email.ucr.edu ⋄ **shitong.me**

EDUCATION

University of California, Riverside   Sep 2016 - Jun 2021 (expected)
Ph.D. in **Computer Science** - CGPA: <u>3.67</u>/4.00   *Riverside, CA*
Advisor: Zhiyun Qian

Chongqing University of Posts and Telecommunications   Sep 2012 - Jun 2016
BEng. in Telecoms Engineering (**with Honors**) - CGPA: <u>3.73</u>/4.00 - Top 6%   *Chongqing, China*

PRE-PRINTS

[A1] **A4: Evading Learning-based Adblockers**
      Shitong Zhu, Zhongjie Wang, Xun Chen, Shasha Li, Umar Iqbal, Zhiyun Qian, Kevin S Chan,
      Srikanth V Krishnamurthy, Zubair Shafiq
      arXiv:2001.10999

PUBLICATIONS

[C8] **You Do (Not) Belong Here: Detecting DPI Evasion Attacks with Context Learning**
      Shitong Zhu, Shasha Li, Zhongjie Wang, Xun Chen, Zhiyun Qian, Srikanth V. Krishnamurthy, Kevin S. Chan,
      Ananthram Swami
      To appear in *Conference on emerging Networking EXperiments and Technologies* (**CoNEXT '20**)

[C7] **Connecting the Dots: Detecting Adversarial Perturbations Using Context Inconsistency**
      Shasha Li, **Shitong Zhu**, Sudipta Paul, Amit Roy-chowdhury, Chengyu Song, Srikanth V. Krishnamurthy,
      Ananthram Swami, Kevin S Chan
      European Conference on Computer Vision (**ECCV '20**)

[C6] **AdGraph: A Graph-Based Approach to Ad and Tracker Blocking**
      Umar Iqbal, Peter Snyder, **Shitong Zhu**, Benjamin Livshits, Zhiyun Qian and Zubair Shafiq
      IEEE Symposium on Security & Privacy (**S&P '20**)

[C5] **SymTCP: Eluding Stateful Deep Packet Inspection with Automated Discrepancy Discovery**
      Zhongjie Wang, **Shitong Zhu**, Yue Cao, Zhiyun Qian, Chengyu Song, Srikanth V. Krishnamurthy,
      Tracy D. Braun and Kevin S. Chan
      Network & Distributed System Security Symposium (**NDSS '20**)

[C4] **ShadowBlock: A Lightweight and Stealthy Adblocking Browser**
      Shitong Zhu, Umar Iqbal, Zhongjie Wang, Zhiyun Qian, Zubair Shafiq, and Weiteng Chen
      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
      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
      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
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

SELECTED PROJECTS

ML-based Intrusion Detection System for Stealthy Attacks [C8]
· Improving the detection accuracy/efficiency by constructing ML-based representations

Detecting Adversarial Perturbations Using Context Consistency [C7]
· Defined, extracted and formulated context information from clean images to detect adversarially perturbed samples

Adversarial Examples Under Restricted Conditions [A1]
· Improved the performance of adversarial machine learning under special requirements/circumstances

ML-based Automatic and Effective Adblocking [C6]
· 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

Evading Deep Packet Inspection Systems Using Symbolic Execution [C5]
· 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 middleboxses that target Zeek (formerly Bro), Snort and GFW within an hour

Stealthy Adblcoking [C4]
· 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

Anti-Adblocker Measurement and Disruption via Dynamic Program Analysis [C3]
· 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

PhD ML Software Engineer Intern @ Facebook   Jul 2020 - Present
Business Integrity Team (Host: Abdel Baligh)   *Remote*
· Fighting bad advertisers

Research Intern @ Samsung Research America   Jan 2020 - Mar 2020
KNOX Security Team (Host: Xun Chen)   *Remote*

· ML-based cyber-security infrastructure

Research Intern @ Samsung Research America   Jun 2019 - Sep 2019
KNOX Security Team (Host: Xun Chen)   *Mountain View, CA*

· Adversarial machine learning

Graduate Student Researcher @ UCR CSE   Sep 2016 - Present
UCR SecLab   *Riverside, CA*

· Pursued research on computer security and fulfilled the entire cycle of projects
· Published/co-authored papers accepted by or submitted to top-tier venues

Consulting Intern @ Deloitte TTL   Jan 2016 - Mar 2016
ERS - Technology Risk   *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	PyTorch, Chromium, Selenium/Puppeteer, NodeJS, Hadoop/Spark, Git

HONORS & AWARDS

Dissertation Year Program (DYP) Award	UC Riverside CSE, 2020-2021
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