

Lei XUE (薛磊)

Research Assistant Professor, Ph.D. Supervisor

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Employment History

- 2020.04 – Now **Research Assistant Professor**
Department of Computing, The Hong Kong Polytechnic University.
- 2017.12 – 2020.03 **Postdoc Research Fellow**
Department of Computing, The Hong Kong Polytechnic University.

Education

- 2013.07 – 2017.10 **Ph.D.** in Computer Science, The Hong Kong Polytechnic University.
Thesis title: *Cross-layer Dynamic Analysis of Android Applications*
- 2010.06 – 2013.04 **M.S.** in Information Security, Nanjing University of Posts and Telecommunications.
Thesis title: *Trojan Detection Based on Network Behaviors*
- 2006.09 – 2010.06 **B.S.** in Information Security, Nanjing University of Posts and Telecommunications.
Thesis title: *Active Forensic System Based on Honeypot Technology*

Research Interests

- 📌 Mobile Application/System and IoT Security
- 📌 Automotive Security and Autonomous Driving Security
- 📌 Static and Dynamic Program Analysis
- 📌 System and Software Vulnerability/Bug Detection
- 📌 Network Security and Measurement

Research Publications

(# indicates co-first author)

- 1 **Lei Xue**, Yangyang Liu, Tianqi Li, Kaifa Zhao, Jianfeng Li, Le Yu, Xiapu Luo, Yajin Zhou, and Guofei Gu, “SAID: State-aware Defense Against Injection Attacks on In-vehicle Network,” in Proc. of the 31st USENIX Security Symposium (USENIX Security), Conditionally Accepted, 2022. (*CCF-A, Top-4 security conference*)
- 2 **Lei Xue**, Yuxiao Yan, Luyi Yan, Muhui Jiang, Xiapu Luo, Dinghao Wu, and Yajin Zhou, “Parema: An

- Unpacking Framework for Demystifying VM-based Android Packers,” in Proc. of 30th ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA), 2021. *(CCF-A, Top software engineering conference)*
- 3 **Lei Xue**[#], Hao Zhou[#], Xiapu Luo, Yajin Zhou, Yang Shi, Guofei Gu, Fengwei Zhang, and Man Ho Au, “Happer: Unpacking Android Apps via a Hardware-Assisted Approach,” in Proc. of 42nd IEEE Symposium on Security and Privacy (IEEE S&P), 2021. *(CCF-A, Top-4 Security Conference)*
 - 4 **Lei Xue**, Hao Zhou, Xiapu Luo, Le Yu, Dinghao Wu, Yajin Zhou, and Xiaobo Ma, “PackerGrind: An Adaptive Unpacking System for Android Apps,” IEEE Transactions on Software Engineering (TSE), 2020. *(CCF-A, JCR-Q1)*
 - 5 Qiao Kang[#], **Lei Xue**[#], Adam Morrison[#], Yuxin Tang, Ang Chen, and Xiapu Luo, “Programmable In-Network Security for Context-aware BYOD Policies,” in Proc. of the 29th USENIX Security Symposium (USENIX Security), 2020. *(CCF-A, Top-4 security conference)*
 - 6 **Lei Xue**, Chenxiong Qian, Hao Zhou, Xiapu Luo, Yajin Zhou, Yuru Shao, and Alvin T.S. Chan, “NDroid: Towards Tracking Information Flows across Multiple Android Contexts,” IEEE Transactions on Information Forensics and Security (TIFS), 2019. *(CCF-A, JCR-Q1)*
 - 7 Adam Morrison[#], **Lei Xue**[#], Ang Chen, and Xiapu Luo, “Enforcing Context-Aware BYOD Policies with In-Network Security,” in Proc. of USENIX Workshop on Hot Topics in Cloud Computing (HotCloud), 2018.
 - 8 **Lei Xue**, Xiaobo Ma, Xiapu Luo, Edmond W.W. Chan, Tony T.N. Miu, and Guofei Gu, “LinkScope: Towards Detecting Target Link Flooding Attacks,” IEEE Transactions on Information Forensics and Security (TIFS), 2018. *(CCF-A, JCR-Q1)*
 - 9 **Lei Xue**, Yajin Zhou, Ting Chen, Xiapu Luo, and Guofei Gu, “Malton: Towards On-Device Non-Invasive Mobile Malware Analysis for ART,” in Proc. of the 26th USENIX Security Symposium (USENIX Security), 2017. *(CCF-A, Top-4 security conference)*
 - 10 **Lei Xue**, Xiapu Luo, Le Yu, Shuai Wang, and Dinghao Wu, “Adaptive Unpacking of Android Apps,” in Proc. of 39th International Conference on Software Engineering (ICSE), 2017. *(CCF-A, Top software engineering conference)*
 - 11 **Lei Xue**, Xiaobo Ma, Xiapu Luo, Le Yu, Shuai Wang, and Ting Chen, “Is What You Measure What You Expect? Factors Affecting Smartphone-Based Mobile Network Measurement,” in Proc. of IEEE International Conference on Computer Communications (INFOCOM), 2017. *(CCF-A)*
 - 12 **Lei Xue**, Chenxiong Qian, and Xiapu Luo, “AndroidPerf: A Cross-layer Dynamic Profiling System for Android,” in Proc. of IEEE/ACM International Symposium on Quality of Service (IWQoS), 2015. *(CCF-B)*
 - 13 **Lei Xue**, and Guozi Sun, “Design and Implementation of A Malware Detection System Based on Network Behavior,” Security and Communication Networks (SCN), 2015. *(CCF-C)*
 - 14 **Lei Xue**, Xiapu Luo, Edmond W. W. Chan, and Xian Zhan, “Towards Detecting Target Link Flooding Attack,” in Proc. of 28th USENIX Large Installation System Administration Conference (LISA), 2014. *(CCF-B)*
 - 15 Xiapu Luo, **Lei Xue**, Cong Shi, Yuru Shao, Chenxiong Qian, and Edmond W. W. Chan, “On Measuring One-Way Path Metrics from a Web Serve,” in Proc. of IEEE International Conference on Network Protocols (ICNP), 2014. *(CCF-B)*

- 16 **Lei Xue**, Xiapu Luo, and Yuru Shao, “kTRxer: A portable toolkit for reliable internet probing,” in Proc. of IEEE/ACM International Symposium on Quality of Service (IWQoS), 2014. *(CCF-B)*
- 17 **Lei Xue**, Ricky K. P. Mok, and Rocky K. C. Chang, “OMware: an open measurement ware for stable residential broadband measurement (poster),” in Proc. of Proceedings of ACM Special Interest Group on Data Communication (SIGCOMM), 2013.
- 18 Le Yu, Yangyang Liu, Pengfei Jing, Xiapu Luo, **Lei Xue**, Kaifa Zhao, Yajin Zhou, Ting Wang, Guofei Gu, Sen Nie, and Shi Wu, “Towards Automatically Reverse Engineering Vehicle Diagnostic Protocols,” in Proc. of the 31st USENIX Security Symposium (USENIX Security), 2022. *(CCF-A, Top-4 security conference)*
- 19 Pengfei Jing, Qiye Tang, Yuefeng Du, **Lei Xue**, Xiapu Luo, Ting Wang, Sen Nie, and Shi Wu, “Too Good to Be Safe: Tricking Lane Detection in Autonomous Driving with Crafted Perturbations,” in Proc. of the 30th USENIX Security Symposium (USENIX Security), 2021. *(CCF-A, Top-4 security conference)*
- 20 Hao Zhou, Haoyu Wang, Yajin Zhou, Xiapu Luo, Yutian Tang, **Lei Xue**, and Ting Wang, “Demystifying Diehard Android Apps,” in Proc. of the 35th IEEE/ACM International Conference on Automated Software Engineering (ASE), 2020. *(CCF-A, Top software engineering conference)*
- 21 Jiali Wei, Ming Fan, Xi Xu, Ang Jia, Zhou Xu, and **Lei Xue**, “Interpretation Area-Guided Detection of Adversarial Samples,” in Proc. of IEEE 20th International Conference on Software Quality, Reliability and Security Companion (QRS-C), 2020.
- 22 Xiaobo Ma, Jiahao Peng, **Lei Xue**, and Xiaohong Guan, “Integrated security of cyber-physical vehicle networked systems in the age of 5G,” SCIENTIA SINICA Informationis (SSI), 2019. *(CCF-A Chinese Journal)*
- 23 Xiaobo Ma, Bo An, Mengchen Zhao, Xiapu Luo, **Lei Xue**, Zhenhua Li, TungNgai Miu, and Xiaohong Guan, “Randomized Security Patrolling for Link Flooding Attack Detection,” IEEE Transactions on Dependable and Secure Computing (TDSC), 2019. *(CCF-A, JCR-Q1)*
- 24 Jiahao Peng, Xiaobo Ma, Jianfeng Li, **Lei Xue**, and Wenjun Hu, “Shoot at A Pigeon And Kill A Crow: On Strike Precision of Link Flooding Attacks,” in Proc. of 12th International Conference on Network and System Security (NSS), 2018.
- 25 Ting Chen, Wanyu Huang, Muhui Jiang, Xiapu Luo, **Lei Xue**, Ying Wang, and Xiaosong Zhang, “PERDICE: Towards Discovering Software Inefficiencies Leading to Cache Misses and Branch Mispredictions,” in Proc. of 42nd Annual Computer Software and Applications Conference (COMPSAC), 2018. *(CCF-C)*
- 26 Le Yu, Tao Zhang, Xiapu Luo, **Lei Xue**, and Henry Chang, “Towards Automatically Generating Privacy Policy for Android Apps,” IEEE Transactions on Information Forensics and Security (TIFS), 2017. *(CCF-A, JCR-Q1)*
- 27 Xiapu Luo, Haochen Zhou, Le Yu, **Lei Xue**, and Yi Xie, “Characterizing mobile *-box applications,” Computer Networks (Computer Networks), 2016. *(CCF-B)*
- 28 Le Yu, Tao Zhang, Xiapu Luo, and **Lei Xue**, “AutoPPG: Towards Automatic Generation of Privacy Policy for Android Applications,” in Proc. of 6th Annual ACM CCS Workshop on Security and Privacy in Smartphones and Mobile Devices (SPSM), 2015.

Patents

- 1 Network Attack Detection Method, **Lei Xue**, Zhiwei Liu, Xianneng Zou, Jingang Hou, Xiapu Luo, Edmond W. W Chan, Pei Tu, and Yuru Shao, Patent number: US9876807B2, USA
- 2 Information Processing Method and Device, Xiapu Luo, Jingang Hou, Zhiwei Liu, Xianneng Zou, Juhong Wang, **Lei Xue**, Yajuan Tang, and Weigang Wu, Patent number: US10178204B2, USA
- 3 A Method for Detecting DDoS Attack, **Lei Xue**, Zhiwei Liu, Xianneng Zou, Jingang Hou, Xiapu Luo, Edmond W. W Chan, Pei Tu, and Yuru Shao, Publication number: CN104506482A, CN
- 4 An E-mail Forensic Analysis Method Based on Community Classification, Guozi Sun, **Lei Xue**, Yitao Yang, Xiaolong Zhu, and Rui Wang, Patent Grant number: CN102842078B, CN

Funds

- 1 **PI**, "Cross-component Security Assessing of Firmware Update in Appified IoT Systems," NSFC/Young Scholar Fund, RMB 240K, 2021 - 2023.
- 2 **PI**, "Technical Cooperative Research of Fuzzing for Embedded CT," Huawei, HKD 1.53M, 2021 - 2023.
- 3 **PI**, "Deep Program Synthesis Based Hardened Code Analysis," Tencent Gift Fund, HKD 173.8K, 2021 - 2021.
- 4 **PI**, "Context-aware Defense against Message Injection Attacks on In-vehicle Network," PolyU Start-up Fund, 2020 - 2022.
- 5 **Co-PI**, "Checking Privacy Compliance of Mobile Apps via Synthesizing NLP and Program Analysis," Huawei, HKD 1.42M, 2020 - 2021.

Awards

- Best Proposal Award (Group), Third Place of COMP, 2017
- Tencent Security Response Award, 2016
- Student Grant for ACM CCS, 2015
- Student Grant for USENIX LISA, 2014.
- The National Scholarship Award, 2012.
- The Excellent Graduate Student Award, 2012.
- The Research and Innovation Award (4 in NJUPT), 2009.

Professional Services

TPC Member

- 2018: NSS
- 2019: SocialSec | SANER Blockchain Workshop | CoNEXT Student Workshop
- 2020: SocialSec | NSS
- 2021: SANER IBF Workshop | DSA | SocialSec | CSS

Journal Reviewer (Selected)

- IEEE Transactions on Dependable and Secure Computing (TDSC)
- IEEE Transactions on Information Forensics and Security (TIFS)

- IEEE Transactions on Mobile Computing (TMC)
- IEEE Transactions on Industrial Informatics (TII)
- ACM Transactions on Multimedia Computing, Communications, and Applications (TOMM)
- IEEE Communication Magazine
- Security and Communication Networks

Teaching

- Capstone Project (COMP4913), Spring 2021, Co-examiner
- Big Data Computing (COMP5434), Summer 2020, Summer 2021, Lecturer
- Computer Communications Networks (COMP312), Spring 2016, TA
- Distributed Computing (COMP5325), Spring 2015, TA
- Internet Security: Principles and Practice (COMP5353), Spring 2014, Spring 2015, TA
- Web Services and Project Development (COMP5332), Fall 2013, Fall 2014, TA

Students under Supervision

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|-----------------|---|
| 2021 Feb. – Now | 📖 Luyi Yan, RA (PhD from 2021 Fall), The Hong Kong Polytechnic University. |
| | 📖 Tianqi Li, RA (PhD from 2021 Fall), The Hong Kong Polytechnic University. |
| | 📖 Zhihao Wang, RA, The Hong Kong Polytechnic University. |
| 2021 Jan. – Now | 📖 Yangyang Liu, RA (MPhil from 2021 Fall), Hunan University. |
| 2020 Jan. – Now | 📖 Yuxiao Yan, RA (Graduate), Xi'an Jiaotong University. |