

Jingwen Shi

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EDUCATION

Research Area: Mobile Systems and Network, Security, Cloud Computing

- **Michigan State University** Michigan, USA
Ph.D. Candidate, Computer Science Aug. 2019 - Dec. 2024 / Apr. 2025 (Expected)
Thesis: Exploring and Addressing the Vulnerabilities of Multimedia Services over Mobile Networks: From Infrastructure to Devices
- **University of Chinese Academy of Sciences** Beijing, China
M.S., Applied Computer Technology Sept. 2016 - May 2019
Thesis: Traffic Prediction and Uncertainty Interval Estimation for E-commerce Clusters
- **Hunan University** Hunan, China
B.S., Information Security Sept. 2012 - May 2016
Thesis: Visual Search Engine with Crawler System for Information Security Laws

SKILLS

Python, C/C++, Java, Matlab, Android, Tensorflow, Keras, scikit-learn, Linux, 3GPP Standards, srsRAN, USRP, QXDM, Wireshark, Julia, Hadoop, MongoDB, HBase, PostgreSQL, OpenSSL, D3.js, Django, Scrapy, MySQL

RESEARCH INTERNSHIP

- AT&T Lab** Jun. 2024 - Aug. 2024, USA
 - **AI-Based Traffic Monitoring in 5G/4G IoT and IoV Networks:** Developed an advanced AI-driven framework for traffic analysis and anomaly detection in 5G/4G networks, integrating machine learning, statistical analysis, and signal processing techniques. Submitted **one patent**. Assisted with the productization.
- Los Alamos National Lab** Jun. 2021 - Aug. 2021, USA
 - **Privacy of Cyber-Physical System (CPS):** Built a CPS simulation testbed. Developed an automated framework with SVM/SVD/FSM to re-construct the CPS from observation. Achieved an accuracy of **97%**.
- Alibaba** Jan. 2019 - Jun. 2019, China
 - **Cloud Traffic Prediction:** [JST'19] Designed Bayesian Neural Networks to enhance CNN and LSTM for query (QPS) prediction at Taobao, achieving **99.8%** accuracy and contributing to **one patent**.
 - **Virtual Machines Anomaly Detection:** Invented a framework based on isolation forest, 3-sigma, and KDE for clusters over 1000 virtual machines. Reduced **95%** of false alarms. Contributed to **one patent**.

SELECTED PROJECTS

Wireless Network and Mobile System

1. **Mobile System Security:** [ACM Mobicom'24, ACM TON'24 Under Review] Discovered vulnerabilities in mobile systems and 5G/4G standards. Devised three attacks: DoS on cellular connection, SMS spoofing, and video call service abuse. Proposed defenses for each. Invited as Co-PI for a Google ASPIRE proposal.
2. **Radio Access Network Security:** [IEEE CNS'23] Identified vulnerabilities in 5G/4G radio protocols (PHY/MAC/RLC/PDCP) and designed overshadowing and privacy attacks. Developed radio sniffer and overshadow tools for wireless communications, integrating Deep Learning models like ResNet50, Mask RCNN.
3. **Mobile Payment Security:** [Mobicom'24, Under Review] Inferred user payment and bank information during customer service calls from the wireless channel by Deep Siamese Neural Network and LSTM.
4. **Cellular Network Infrastructure Security:** [ACM Mobicom'22 (Best Community Paper, AT&T Security Award), ACM GetMobile'23, IEEE TON'24] Constructed an entire cellular network simulation testbed including device, radio access network, 5G/4G core network, and IP Multimedia Subsystem. Successfully defended DoS and free-data attacks against 911 services.
5. **User Authentication in Cellular Network:** [IEEE TMC'22] Participated in designing a new user authentication mechanism on the top of cellular infrastructures.
6. **IMS Signaling Auto-Checking:** [USENIX Security'25, Under Submission] Responsible for implementing the IMS signaling testing tool in C++ for 5G/4G phones.

Cloud Computing

1. **Distributed Spatial Index:** [IEEE IPCCC'18] Created a spatial index reducing I/O traffic by up to **70%**. Evaluated on Hbase and MongoDB.
2. **Distributed Storage:** Created a data pipeline connecting HDFS to PostgreSQL for satellite images.