

# Jingwen Shi

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## EDUCATION

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### 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: Security of Multimedia Communication Services in 5G/4G Network
- **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

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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

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### 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

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### 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*] Discovered vulnerabilities in 5G/4G radio protocols (PHY/MAC/RLC/PDCP), and designed overshadowing and privacy inference attacks. Implemented radio sniffer and overshadow tools over wireless communications. Integrated Mask R-CNN, DSFD, and ResNet50 for privacy inference.
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.