Yunqing Sun

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Research Interests

My research interests mainly focus on security and privacy. I have experiences in network security. I am working towards a Ph.D. degree on oblivious transfer, secure multi-party computation, zero-knowledge proof, and private set intersection.

Education

- **Northwestern University** — Evanston, US
  Ph.D. student in Computer Science — *Sep 2021 - Present*
- **Xidian University** — Xi'an, China
  MS in Cyber Security — *Sep 2018 - June 2021*
- **Xidian University** — Xi'an, China
  BS in Information Security — *Sep 2014 - June 2018*

Publications

1. **Yunqing Sun**, Jin Cao, Maode Ma, Yinghui Zhang, Hui Li, Ben Niu, "EAP-DDBA: Efficient Anonymity Proximity Device Discovery and Batch Authentication Mechanism for Massive D2D Communication Devices in 3GPP 5G HetNet," *IEEE Transactions on Dependable and Secure Computing*, 2020, vol. 19, no. 1, pp. 370-387.
2. **Yunqing Sun**, Jin Cao, Maode Ma, Hui Li, Ben Niu, Fenghua Li, " Privacy-Preserving Device Discovery and Authentication Scheme for D2D Communication in 3GPP 5G HetNet," *Proceedings of IEEE ICNC'19*, Honolulu, USA, Feb. 2019, pp. 425-431.
3. Jin Cao, Maode Ma, Hui Li, Ruhui Ma, **Yunqing Sun**, Pu Yu, Lihui Xiong, "A Survey on Security Aspects for 3GPP 5G Networks," *IEEE Communications Surveys and Tutorials*, 2020, vol 22, no. 1, pp. 170-195.

Working papers

1. Hao Xu, Lei Zhang, **Yunqing Sun**, Chih-Lin I, "BE-RAN: Blockchain-enabled Open RAN with Decentralized Identity Management and Privacy-Preserving Communication," arXiv e-prints, arXiv: 2101.10856.
2. **Yunqing Sun**, Jin Cao, Xiongpeng Ren, Canhui Tang, Ben Niu, Yinghui Zhang, Hui Li, " An Anonymous and Secure Data Transmission Mechanism with Trajectory Tracking for D2D Relay Communication in 3GPP 5G networks," *On Submission.*
3. Hao Xu, **Yunqing Sun**, Zihao Li, Yao Sun, Xiaoshuai Zhang and Lei Zhang, "deController: A Web3 Native Cyberspace Infrastructure Perspective," *On Submission.*
4. Haiyang Luo, Zhe Sun, **Yunqing Sun**, Ang Li, Binghui Wang, Jin Cao, Ben Niu, "SmartCircles: A Benefit-Evaluation-Based Privacy Policy Recommender for Customized Photo Sharing," *On Submission.*

PCT patents

1. Yang Xu, Jin Cao, **Yunqing Sun**, Xumeng Bu, Hui Li, PCT/CN2020/086778, WO2021212495A1.
2. Yang Xu, Jin Cao, **Yunqing Sun**, Lihui Xiong, Hui Li, PCT/CN2020/086786, WO2021212497A1.
3. Yang Xu, Jin Cao, Lihui Xiong, **Yunqing Sun**, Hui Li, PCT/CN2020/110081, WO2022036600A1.

Chinese patents

1. Jin Cao, **Yunqing Sun**, Hui Li, Yuanyuan Yang, Xiongpeng Ren, Unified Lightweight Traceable Security Data Transmission Method for D2D Auxiliary Communication, CN113423103B.
2. Jin Cao, **Yunqing Sun**, Hui Li, Ben Niu, An Anonymous Discovery Authentication and Key Negotiation method for Massive D2D Communication Devices, CN109768861B.
3. Jin Cao, Zhenyang Guo, **Yunqing Sun**, Pu Yu, NFC-Based Secure and Smart Hotel Access Control System and Method, CN109493493A.
4. Jin Cao, Yuxiang Gong, Pengchen Wei, Hui Li, Yulong Fu, **Yunqing Sun**, A Group Handover Authentication Method for Mobile Relays, CN106961682B.

Experience

- **Summer Intern** — Jun 2016 - Aug 2016
  Institute of Information Engineering, Chinese Academy of Sciences — *Beijing, China*

Honors and Awards

- Graduated with Honors, Xidian University, 2021
- XIAOMI Scholarship, Xidian University, 2021
- National Scholarship, Ministry of Education of P.R. China, 2020
- First-class Scholarship, Xidian University, 2020

Project Experients

- **Research on Efficient Private Set Intersection** May 2022 - present

  This project try to construct the most efficient protocol for unbalanced PSI.

- **Research on Efficient MPC compiler over Boolean Circuits** Jan 2022 - April 2022

  This project tried to construct efficient and malicious secure MPC protocol in the field of F_p^r.

- **Research on Security Enhancement Based on 5G Architecture** Aug 2019 - Jun 2021

  The project is sponsered by *Guangdong Oppo Mobile Telecommunications Corp., Ltd.* I am mainly responsible for research 3GPP standards related to 5G architecture, Device-to-Device, Vehicle-to-Everything, Multimedia Broadcast Multicast Service, Generic Bootstrapping Architecture, etc. Three technical schemes for security enhancement on 5G architecture have been proposed and submitted for PCT patents.

- **Research on Privacy-Preserving Mechanisms for Picture Sharing Service** Feb 2019 - Jun 2019

  This project is based on an INFOCOM 2019 paper: "HideMe: Privacy-Preserving Photo Sharing on Social Networks". We implemented the system of the paper and further improved it in both functionality and security. I am mainly responsible for: optimization of the policy recommendation policy, implementation of the client side on android system, help with the server side code debugging.

- **Security Service Framework of Electronic Invoice** April 2018 - Jan 2019

  The project is supported by the *National Key Research and Development Program of China.* I participated in high-speed control module programming by using the epoll mechanism in Linux system.

- **NFC-Based Secure and Smart Hotel Access Control System** Oct 2016 - Mar 2018

  The project is sponsored by *National Training Program of Innovation and Entrepreneurship for Undergraduates.* The project reconstructs the hotel check-in process by applying secure NFC technique in user mobile and hotel lock. I am responsible for the following parts: design authentication and secure data transmission protocol; client side Android programming. The result of this project includes a client-server-database-FPGA system and one granted patent.

Skills

- Proficient in C/JAVA programming
- Proficient in Linux/Android system