Jie Xu

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Research Interests

- **Blockchain consensus**
- **Network security and data privacy**

Education

City University of Hong Kong (CityU) *Sep. 2020 - now*
PhD in Computer Science
Supervisor: Prof. Xiaohua Jia (IEEE fellow)

University of Science and Technology of China (USTC) *Sep. 2017 - Jul. 2020*
Master of Engineering in Electronics and Communication Engineering
Supervisor: Prof. Peiling Hong and Prof. Kaiping Xue

University of Science and Technology of China (USTC) *Sep. 2013 - Jul. 2017*
Bachelor of Engineering in Information Security
Bachelor of Literature in Communication

Publications and Patents

- Jie Xu, Yingying Cheng, Cong Wang and Xiaohua Jia "Occam: A Secure and Adaptive Scaling Protocol for Permissionless Blockchain," in *Proceedings of the 41st IEEE International Conference on Distributed Computing Systems (ICDCS 2021)*, July 7-10, 2021. (acceptance ratio = 19.8%) (Full paper)
- Jie Xu, Kaiping Xue, Hangyu Tian, Jianan Hong, David S.L. Wei, and Peilin Hong "An Identity Management and Authentication Scheme Based on Redactable Blockchain for Mobile Networks," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 6, pp. 6688-6698, 2020. (Full paper)
- Jie Xu, Kaiping Xue, Shaohua Li, Jianan Hong, Peilin Hong, and Nenghai Yu "Healthchain: A Blockchain-based Privacy Preserving Scheme for Large-scale Health Data," *IEEE Internet of Things Journal*, vol. 6,no. 5, pp. 8770-8781, 2019. (Full paper)
- Jie Xu, Kaiping Xue, Qingyou Yang, and Peilin Hong, "PSAP: Pseudonym-based Secure Authentication Protocol for NFC Applications," *IEEE Transactions on Consumer Electronics*, vol. 64,no. 1, pp. 83-91, 2018. (Full paper)
- Xingyi Luo, Kaiping Xue,Jie Xu, Qibin Sun, and Yongdong Zhang, "Blockchain-based Secure Data Aggregation and Distributed Power Dispatching for Microgrids," *IEEE Transactions on Smart Grid*, vol. 12, no. 6, pp. 5268 - 5279, 2021. (Full paper)
- Hangyu Tian, Kaiping Xue, Xinyi Luo, Shaohua Li, Jie Xu, Jianqing Liu, Jun Zhao, David S.L. Wei, "Enabling Cross-chain Transactions: A Decentralized Cryptocurrency Exchange Protocol," *IEEE Transactions on Information Forensics and Security*, vol. 16, pp. 3928 - 3941, 2021. (Full paper)
- Qingyou Yang, Kaiping Xue, Jie Xu, Jiajie Wang, Fenghua Li, and Nenghai Yu, "AnFRA: Anonymous and Fast Roaming Authentication for Space Information Network," *IEEE Transactions on Information Forensics and Security*, vol. 14, no. 2, pp. 486-497, 2019. (Full paper)
- Peixuan He, Kaiping Xue, Jie Xu, Qiudong Xia, Jianqing Liu, Hao Yue, "Attribute-based Accountable Access Control for Multimedia Content with In-network Caching," in *Proceedings of the 2019 IEEE International Conference on Multimedia and Expo (ICME 2019)*. (Full paper)
- Wei Meng, Kaiping Xue, Jie Xu, Jianan Hong, and Nenghai Yu, "Low-Latency Authentication Against Satellite Compromising for Space Information Network," in *Proceeding of the 15th IEEE International Conference on Mobile Ad Hoc and Sensor Systems (MASS 2018)*. IEEE, 2018, pp. 237-244. (Best paper Runner-up Award)
- Kaiping Xue, Yongjin Ma, Jianan Hong, Jie Xu, Qingyou Yang, "Secure and Efficient Token Based Roaming Authentication Scheme for Space-earth Integration Network," *Journal on Communications*, vol. 39, no. 5, pp. 48-58, 2018. (Full paper)
- Patent: "Anonymous and Fast Roaming Authentication for Space Information Network" (Details)

Professional Experience

Research on blockchain consensus protocols *Oct. 2020 - Now*

- A survey of blockchain consensus protocols.
- Designed an adaptive scaling blockchain protocol with transactions deduplications.
- Designed dynamic scaling BFT-based PoS Blockchain with decoupling functionalities and develop a theoretical model to analyze the maximum throughput under a given underlying network.
- Proposed an optimistic cross-shard transaction processing protocol and give a theoretical analysis of the effective transaction throughput of sharding system based on queue theory.

Project: Future network architecture and protocol evolution *Mar. 2018 - Sep. 2020*

- Proposed Healthchain, a large-scale health data privacy preserving scheme, where data are encrypted to conduct fine-grained access control.
- Designed a self-sovereign identity management scheme in distributed trust environment, which allows users to control their identity and personally identifying information.
- Proposed a distributed cryptocurrency trading scheme to solve the problem of centralized exchanges, and deployed it on Ethereum test network.

Project: Information security technology for Satellite Networks *Dec. 2016 - Feb. 2018*

- Provide a new authentication system model of the space information network, and proposed a secure and efficient access authentication scheme.
- Strengthened the authentication function of LEO satellites, and proposed a two-way token based roaming authentication scheme and a fast roaming authentication scheme.

Project: Lightweight remote communication on data link layer *Apr. 2016 - May. 2017*

- Constructed a remote low-power wireless information collection platform based on long-distance communication chips SX1278.
- Designed a data link layer protocol for self-organizing modules to reduce energy consumption.
- Implemented an APP to allow the user to control the sensor node to collect data.

Project: Secure and reliable control mechanism of smart home *Sep. 2015 - Oct. 2016*

- Proposed a scheme in which the home data is encrypted and transmitted to the cloud storage, and the mobile terminal can control the smart home device at the same time.
- Designed a secure authentication and key agreement protocol for preserving privacy in NFC and provide the formal security verification using AVISPA and formal security analysis using ROR model.

Other Experience

- Visiting student at Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, 2016
- Visiting student at Changchun Institute of Chinese Academy of Sciences, 2015

Honors and Awards

- CityU Presidential PhD Scholarship
- National Scholarship for Graduate Student
- Best Paper Runner Up Award of IEEE MASS 2018
- Outstanding Graduate Student Scholarship of USTC 2017, 2018, 2019
- Excellent Graduation Thesis of USTC 2017
- Honor of "Wang Daheng Talent Program in Optical and Mech-electronical Science and Technology"