

# Ronghua Xu, Ph.D Candidate.

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🌐 <https://www.linkedin.com/in/ronghua-xu-bu/>



## Biographical Sketch

### About me

- ◇ Ronghua Xu is a PhD candidate of Electrical and Computer Engineering at the Binghamton University - State University of New York (SUNY). He earned B.S. on Mechanical Engineering from Nanjing University of Science & Technology, China in 2007, and received M.S. degree in Mechanical and Electrical Engineering from Nanjing University of Aeronautics & Astronautics in 2010. Prior to joining Binghamton, He has been working in Siemens on software development, system integration, and test automation from June.2010 to June.2016.

### Research Interests

- ◇ Machine Learning; Blockchain, Algorithm Design; Cloud/Fog/Edge Computing Paradigm.
- ◇ Blockchain and smart contract enabled security solutions to Internet of Things (IoTs)
- ◇ Intelligence, assurance and resilience of next generation network.

## Education

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|-------------|---|
| 2018 – 2023 | ◇ <b>Ph.D Candidate, Electrical Engineering</b> , Binghamton University-SUNY, Binghamton, NY, USA.<br>Dissertation title: <i>A Secure-by-Design Federated Microchain Fabric for Internet-of-Things(IoT) System.</i>                           |
| 2016 – 2018 | ◇ <b>MS, Computer Engineering</b> , Binghamton University-SUNY, Binghamton, NY, USA.<br>Thesis title: <i>Capability Based Access Control Strategies to Deter DDoS Attacks Exploiting IoT Devices.</i>   |
| 2007 – 2010 | ◇ <b>MS, Mechanical and Electrical Engineering</b> , Nanjing University of Aeronautics & Astronautics, Nanjing, China.<br>Thesis title: <i>Research on Form-to-function Mapping and Re-creative Design Method Based on Function Ontology.</i> |
| 2003 – 2007 | ◇ <b>BS, Mechanical Engineering</b> , Nanjing University of Science & Technology, Nanjing, China.   |

## Employment History

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|-------------|---|
| 2021 – 2021 | ◇ <b>Technical Intern</b> . PSE System & Hardware Division, ZF North America, Inc., MI, USA.  |
| 2010 – 2016 | ◇ <b>Software Engineer</b> . Department of Software Development, Research & Development Division, Siemens Numerical Control Ltd., Nanjing, China. |

## Teaching Experience

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|--------------------|---|
| Teaching Assistant | ◇ <b>Digital Logic Design (EECE-251)</b> , Fall 2018, 2019.<br>◇ <b>Sophomore Design (EECE-287)</b> , Spring 2019, 2020.  |
| Guest Lecturer     | ◇ <b>Senior Design I (EECE 487)</b> , Fall 2022.<br>◇ <b>Computer Network Architecture (EECE-453/553)</b> , Fall 2018 - 2022.<br>◇ <b>Network Security (EECE-658)</b> , Spring 2018 - 2019. |

## Skills

- Languages     ♦ Strong reading, writing and speaking competencies for English, Mandarin Chinese.
- Coding       ♦ C/C++, Java, Python, C#, VB, tclsh, bash, powershell, SQL, XML/XSL,  $\LaTeX$ , ...
- Databases     ♦ MySQL, PostgreSQL, SQLite.
- Web Dev       ♦ HTML, CSS, JavaScript, Flask Web Server.
- Misc.          ♦ Academic research, teaching, training, consultation.

## Research Publications

### Journal Articles

- 1     Nagothu, D., **Xu, R.**, Chen, Y., Blasch, E., & Aved, A. (2022). Deterring deepfake attacks with an electrical network frequency fingerprints approach. *Future Internet*, 14(5), 125. [doi:10.3390/fi14050125](https://doi.org/10.3390/fi14050125)
- 2     **Xu, R.**, & Chen, Y. (2022a).  $\mu$ Dfl: A secure microchained decentralized federated learning fabric atop iot networks. *IEEE Transactions on Network and Service Management*. [doi:10.1109/TNSM.2022.3179892](https://doi.org/10.1109/TNSM.2022.3179892)
- 3     **Xu, R.**, Chen, Y., Chen, G., & Blasch, E. (2022). Sausa: Securing access, usage, and storage of 3d point cloud data by a blockchain-based authentication network. *Future Internet*, 14(12), 354. [doi:10.3390/fi14120354](https://doi.org/10.3390/fi14120354)
- 4     **Xu, R.**, Wei, S., Chen, Y., Chen, G., & Pham, K. (2022). Lightman: A lightweight microchained fabric for assurance-and resilience-oriented urban air mobility networks. *Drones*, 6(12), 421. [doi:10.3390/drones6120421](https://doi.org/10.3390/drones6120421)
- 5     Qu, Q., **Xu, R.**, Chen, Y., Blasch, E., & Aved, A. (2021). Enable fair proof-of-work (pow) consensus for blockchains in iot by miner twins (mint). *Future Internet*, 13(11), 291. [doi:10.3390/fi13110291](https://doi.org/10.3390/fi13110291)
- 6     **Xu, R.**, Nagothu, D., & Chen, Y. (2021a). Decentralized video input authentication as an edge service for smart cities. *IEEE Consumer Electronics Magazine*, 10(6), 76–82. [doi:10.1109/MCE.2021.3062564](https://doi.org/10.1109/MCE.2021.3062564)
- 7     **Xu, R.**, Nagothu, D., & Chen, Y. (2021b). Econledger: A proof-of-enf consensus based lightweight distributed ledger for iot networks. *Future Internet*, 13(10), 248. [doi:10.3390/fi13100248](https://doi.org/10.3390/fi13100248)
- 8     **Xu, R.**, Nikouei, S. Y., Nagothu, D., Fitwi, A., & Chen, Y. (2020). Blendsps: A blockchain-enabled decentralized smart public safety system. *Smart Cities*, 3(3), 928–951. [doi:10.3390/smartcities3030047](https://doi.org/10.3390/smartcities3030047)
- 9     **Xu, R.**, Chen, Y., Blasch, E., & Chen, G. (2019). Exploration of blockchain-enabled decentralized capability-based access control strategy for space situation awareness. *Optical Engineering*, 58(4), 041609. [doi:10.1117/1.OE.58.4.041609](https://doi.org/10.1117/1.OE.58.4.041609)
- 10    **Xu, R.**, Chen, Y., Blasch, E., & Chen, G. (2018c). Blendcac: A smart contract enabled decentralized capability-based access control mechanism for the iot. *Computers*, 7(3), 39. [doi:10.3390/computers7030039](https://doi.org/10.3390/computers7030039)

### Conference Proceedings

- 1     **Xu, R.**, & Chen, Y. (2022b). Fairledger: A fair proof-of-sequential-work based lightweight distributed ledger for iot networks. In *2022 IEEE International Conference on Blockchain (Blockchain)* (pp. 348–355). IEEE. [doi:10.1109/Blockchain55522.2022.00055](https://doi.org/10.1109/Blockchain55522.2022.00055)
- 2     **Xu, R.**, Chen, Y., Li, X., & Blasch, E. (2022). A secure dynamic edge resource federation architecture for cross-domain iot systems. In *2022 International Conference on Computer Communications and Networks (ICCCN)* (pp. 1–7). IEEE. [doi:10.1109/ICCCN54977.2022.9868843](https://doi.org/10.1109/ICCCN54977.2022.9868843)

- 3 Nagothu, D., **Xu, R.**, Chen, Y., Blasch, E., & Aved, A. (2021a). Defake: Decentralized enf-consensus based deepfake detection in video conferencing. In *2021 ieee 23rd international workshop on multimedia signal processing (mmsp)* (pp. 1–6). IEEE.  doi:10.1109/MMSP53017.2021.9733503
- 4 Nagothu, D., **Xu, R.**, Chen, Y., Blasch, E., & Aved, A. (2021b). Detecting compromised edge smart cameras using lightweight environmental fingerprint consensus. In *Proceedings of the 19th acm conference on embedded networked sensor systems* (pp. 505–510). ACM.  doi:10.1145/3485730.3493684
- 5 **Xu, R.**, & Chen, Y. (2021). Fed-ddm: A federated ledgers based framework for hierarchical decentralized data marketplaces. In *2021 international conference on computer communications and networks (icccn)* (pp. 1–8). IEEE.  doi:10.1109/ICCCN52240.2021.9522359
- 6 Qu, Q., **Xu, R.**, Nikouei, S. Y., & Chen, Y. (2020). An experimental study on microservices based edge computing platforms. In *Ieee infocom 2020-ieee conference on computer communications workshops (infocom wkshps)* (pp. 836–841). IEEE.  doi:10.1109/INFOCOMWKSHP50562.2020.9163068
- 7 **Xu, R.**, Chen, Y., Blasch, E., Aved, A., Chen, G., & Shen, D. (2020). Hybrid blockchain-enabled secure microservices fabric for decentralized multi-domain avionics systems. In *Sensors and systems for space applications xiii* (Vol. 11422, 114220J). International Society for Optics and Photonics.  doi:10.1117/12.2559036
- 8 **Xu, R.**, Chen, Y., & Li, J. (2020). Poster: Microfl: A lightweight, secure-by-design edge network fabric for decentralized iot systems. In *The network and distributed system security symposium (ndss)*. Retrieved from  [https://www.ndss-symposium.org/wp-content/uploads/2020/02/NDSS2020posters\\_paper\\_19.pdf](https://www.ndss-symposium.org/wp-content/uploads/2020/02/NDSS2020posters_paper_19.pdf)
- 9 **Xu, R.**, Zhai, Z., Chen, Y., & Lum, J. K. (2020). Bit: A blockchain integrated time banking system for community exchange economy. In *2020 ieee international smart cities conference (isc2)* (pp. 1–8). IEEE.  doi:10.1109/ISC251055.2020.9239045
- 10 Blasch, E., **Xu, R.**, Nikouei, S. Y., & Chen, Y. (2019). A study of lightweight dddas architecture for real-time public safety applications through hybrid simulation. In *2019 winter simulation conference (wsc)* (pp. 762–773). IEEE.  doi:10.1109/WSC40007.2019.9004727
- 11 Lin, X., **Xu, R.**, Chen, Y., & Lum, J. K. (2019). A blockchain-enabled decentralized time banking for a new social value system. In *2019 ieee conference on communications and network security (cns)* (pp. 1–5). IEEE.  doi:10.1109/CNS.2019.8802734
- 12 Nikouei, S. Y., **Xu, R.**, Chen, Y., Aved, A., & Blasch, E. (2019). Decentralized smart surveillance through microservices platform. In *Sensors and systems for space applications xii* (Vol. 11017, 110170K). International Society for Optics and Photonics.  doi:10.1117/12.2518999
- 13 **Xu, R.**, Chen, S., Yang, L., Chen, Y., & Chen, G. (2019). Decentralized autonomous imaging data processing using blockchain. In *Multimodal biomedical imaging xiv* (Vol. 10871, pp. 72–82). SPIE.  doi:10.1117/12.2513243
- 14 **Xu, R.**, Nikouei, S. Y., Chen, Y., Blasch, E., & Aved, A. (2019). Blendmas: A blockchain-enabled decentralized microservices architecture for smart public safety. In *2019 ieee international conference on blockchain (blockchain)* (pp. 564–571). IEEE.  doi:10.1109/Blockchain.2019.00082
- 15 **Xu, R.**, Ramachandran, G. S., Chen, Y., & Krishnamachari, B. (2019). Blendsm-ddm: Blockchain-enabled secure microservices for decentralized data marketplaces. In *2019 ieee international smart cities conference (isc2)* (pp. 14–17). IEEE.  doi:10.1109/ISC246665.2019.9071766
- 16 Nagothu, D., **Xu, R.**, Nikouei, S. Y., & Chen, Y. (2018). A microservice-enabled architecture for smart surveillance using blockchain technology. In *2018 ieee international smart cities conference (isc2)* (pp. 1–4). IEEE.  doi:10.1109/ISC2.2018.8656968
- 17 Nikouei, S. Y., Chen, Y., Song, S., **Xu, R.**, Choi, B.-Y., & Faughnan, T. (2018). Smart surveillance as an edge network service: From harr-cascade, svm to a lightweight cnn. In *2018 ieee 4th international*

*conference on collaboration and internet computing (cic)* (pp. 256–265). IEEE.

doi:10.1109/CIC.2018.00042

- 18 Nikouei, S. Y., Chen, Y., Song, S., **Xu, R.**, Choi, B.-Y., & Faughnan, T. R. (2018). Real-time human detection as an edge service enabled by a lightweight cnn. In *2018 ieee international conference on edge computing (edge)* (pp. 125–129). IEEE. doi:10.1109/EDGE.2018.00025
- 19 Nikouei, S. Y., **Xu, R.**, Nagothu, D., Chen, Y., Aved, A., & Blasch, E. (2018). Real-time index authentication for event-oriented surveillance video query using blockchain. In *2018 ieee international smart cities conference (isc2)* (pp. 1–8). IEEE. doi:10.1109/ISC2.2018.8656668
- 20 **Xu, R.**, Chen, Y., Blasch, E., & Chen, G. (2018a). A federated capability-based access control mechanism for internet of things (iots). In *Sensors and systems for space applications xi* (Vol. 10641, 10641oU). International Society for Optics and Photonics. doi:10.1117/12.2305619
- 21 **Xu, R.**, Chen, Y., Blasch, E., & Chen, G. (2018b). Blendcac: A blockchain-enabled decentralized capability-based access control for iots. In *2018 ieee international conference on internet of things (things) and ieee green computing and communications (greencom) and ieee cyber, physical and social computing (cpscom) and ieee smart data (smartdata)* (pp. 1027–1034). IEEE. doi:10.1109/Cybermatics\_2018.2018.00191
- 22 **Xu, R.**, Lin, X., Dong, Q., & Chen, Y. (2018). Constructing trustworthy and safe communities on a blockchain-enabled social credits system. In *Proceedings of the 15th eai international conference on mobile and ubiquitous systems: Computing, networking and services* (pp. 449–453). doi:10.1145/3286978.3287022
- 23 **Xu, R.**, Nikouei, S. Y., Chen, Y., Polunchenko, A., Song, S., Deng, C., & Faughnan, T. R. (2018). Real-time human objects tracking for smart surveillance at the edge. In *2018 ieee international conference on communications (icc)* (pp. 1–6). IEEE. doi:10.1109/ICC.2018.8422970

## Books and Chapters

- 1 **Xu, R.**, Nagothu, D., & Chen, Y. (2023). Ecom: Epoch randomness-based consensus committee configuration for iot blockchains. In *Principles and practice of blockchains* (pp. 135–154). doi:10.1007/978-3-031-10507-4\_7
- 2 **Xu, R.**, Chen, Y., & Blasch, E. (2021). Microchain: A light hierarchical consensus protocol for iot systems. In *Blockchain applications in iot ecosystem* (pp. 129–149). Springer.
- 3 Nagothu, D., **Xu, R.**, Nikouei, S. Y., Zhao, X., & Chen, Y. (2020). Smart surveillance for public safety enabled by edge computing. In *Edge computing: Models, technologies and applications* (pp. 409–433). doi:10.1049/PBPC033E\_ch19
- 4 **Xu, R.**, Chen, Y., & Blasch, E. (2020). Decentralized access control for iot based on blockchain and smart contract. In *Modeling and design of secure internet of things* (pp. 505–528). doi:10.1002/9781119593386.ch22
- 5 Nikouei, S. Y., **Xu, R.**, & Chen, Y. (2019). Smart surveillance video stream processing at the edge for realtime human objects tracking. In *Fog and edge computing: Principles and paradigms* (pp. 319–346). doi:10.1002/9781119525080.ch13

## Conference Technical Program Committee (TPC)

### IEEE International Conference on Blockchain (IEEE-Blockchain)

- ◇ **Blockchain 2022.** The 5rd IEEE Internal Conference on Blockchain Conference.
- ◇ **Blockchain 2021.** The 4rd IEEE Internal Conference on Blockchain Conference.
- ◇ **Blockchain 2020.** The 3rd IEEE Internal Conference on Blockchain Conference.

## Conference Technical Program Committee (TPC) (continued)

- ◇ **LightChain 2019.** The 1st International Workshop on Lightweight Blockchain for Edge Intelligence and Security.

### IEEE International Smart Cities Conference (ISC2)

- ◇ **BLESS 2020.** The 3rd International Workshop on BLockchain Enabled Sustainable Smart Cities.
- ◇ **BLESS 2019.** The 2rd International Workshop on BLockchain Enabled Sustainable Smart Cities.

### IEEE International Conference on Computer Communications and Networks (ICCCN)

- ◇ **BLESS 2022.** The 5rd International Workshop on BLockchain Enabled Sustainable Smart Cities.
- ◇ **BLESS 2021.** The 4rd International Workshop on BLockchain Enabled Sustainable Smart Cities

### IEEE WiMob

- ◇ **WiMob-SPPDT'2022.** WiMob Short Papers, Posters and Demos Track.

## Miscellaneous Experience

### Awards and Achievements

- 2019 ◇ **2019 Computers Best Paper Award**, MDPI.
- 2018 ◇ **Outstanding MS Research**, Department of Electrical and Computer Engineering, Binghamton University.

### On campus Services

- ◇ **Fall 2018 Leadership Volunteers**, ISSS.