YINQIU LIU

PhD Student, Nanyang Technological University, Singapore
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EDUCATION

College of Computing and Data Science, Nanyang Technological University (NTU) **Singapore**
Ph.D., Computer Science and Engineering Jan. 2023-Jan. 2027 (expected)

- **Advisor:** *Prof.* Dusit Niyato *(IEEE Fellow, IET Fellow)* **GPA:** 4.5/5

Dept. of Electrical and Computer Engineering, University of California, Los Angeles (UCLA) **USA**
M.Sc., Electrical and Computer Engineering Sep. 2021-Dec. 2022

- **Advisor:** *Prof.* Lei He *(IEEE Fellow)* **GPA:** 3.933/4

College of Internet of Things, Nanjing University of Posts and Telecommunications (NJUPT) **China**
B.Eng., Internet of Things Engineering Sep. 2016-Jun. 2020

- **Advisor:** *Prof.* Kun Wang *(IEEE Senior Member)* **GPA:** 3.96/5, **rank:** 5/96

RESEARCH INTERESTS

Blockchain	Lightweight IoT Blockchains; Sharding blockchains
Generative AI	Diffusion Models; Mobile AIGC
Communications	Network Economics, Internet of Things

SELECTED PUBLICATIONS (* means co-first author)

Journal papers

[1] **Yinqiu Liu**, Hongyang Du, Dusit Niyato, Jiawen Kang, Zehui Xiong, Abbas Jamalipour, and Xuemin (Sherman) Shen. "ProSecutor: Protecting Mobile AIGC Services on Two-Layer Blockchain Through Reputation and Contract Theoretic Approaches." in *IEEE Transactions on Mobile Computing*, accepted.

[2] **Yinqiu Liu**, Kun Wang, Yun Lin, and Wenyao Xu. "LightChain: A Lightweight Blockchain System for Industrial Internet of Things." in *IEEE Transactions on Industrial Informatics*, 15(6), 3571-3581.
[Google Scholar citations: 260+ times, ESI highly-cited paper, TII popular paper: June 2019]

[3] **Yinqiu Liu**, Kai Qian, Kun Wang, and Lei He. "BCmaster: A Compatible Framework for Comprehensively Analyzing and Monitoring Blockchain Systems in IoT." in *IEEE Internet of Things Journal*, 9(22), 22529-22546.

[4] **Yinqiu Liu**, Kai Qian, Kun Wang, and Lei He. "Effective Scaling of Blockchain Beyond Consensus Innovations and Moore's Law: Challenges and Opportunities." in *IEEE Systems Journal*, 16(1), 1424-1435.

[5] **Yinqiu Liu**, Kun Wang, Kai Qian, Miao Du, and Song Guo. "Tornado: Enabling Blockchain in Heterogeneous Internet of Things through a Space-structured Approach." in *IEEE Internet of Things Journal*, 7(2), 1273-1286.

[6] **Yinqiu Liu**, Hongyang Du, Dusit Niyato, Jiawen Kang, Zehui Xiong, Dong In Kim, and Abbas Jamalipour. "Deep Generative Model and Its Applications in Efficient Wireless Network Management: A Tutorial and Case Study." in *IEEE Wireless Communications*, accepted.

[7] **Yinqiu Liu**, Hongyang Du, Dusit Niyato, Jiawen Kang, Zehui Xiong, Chunyan Miao, Xuemin (Sherman) Shen, and Abbas Jamalipour. "Blockchain-Empowered Lifecycle Management for AI-Generated Content (AIGC) Products in Edge Networks." in *IEEE Wireless Communications*, accepted.

[8] **Yinqiu Liu**, Hongyang Du, Dusit Niyato, Jiawen Kang, Shuguang Cui, Xuemin (Sherman) Shen, and Ping Zhang. "Optimizing Mobile-Edge AI-Generated Everything (AIGX) Services by Prompt Engineering: Fundamentals, Framework, and Case Study." in *IEEE Network*, accepted.

[9] Kai Qian*, **Yinqiu Liu***, Xiaoming He, Miao Du, Suofei Zhang, and Kun Wang. "HPCchain: A Consortium Blockchain System based on CPU-FPGA Hybrid PUF for Industrial Internet of Things." in *IEEE Transactions on Industrial Informatics*, 19(11), 11205-11215.

[10] Kai Qian*, **Yinqiu Liu***, Chaoran Shu, Yanfei Su, and Kun Wang. "Fine-grained Benchmarking and Targeted Optimization: Enabling Green IoT-oriented Blockchain in the 6G Era." in *IEEE Transactions on Green Communications and Networking*, 7(2), 1036-1051.

[11] Ruichen Zhang*, Hongyang Du*, **Yinqiu Liu***, Jiawen Kang, Sumei Sun, Xuemin (Sherman) Shen, and Vincent Poor. "Interactive AI with Retrieval Augmentation Generation for Next Generation Networking." in *IEEE Network*, accepted.

[12] Hongyang Du*, Ruichen Zhang*, **Yinqiu Liu***, Jiacheng Wang, Yijing Lin, Zonghang Li, Dusit Niyato, Jiawen Kang, Zehui Xiong, Shuguang Cui, Bo Ai, Haibo Zhou, and Dong In Kim. "Enhancing Deep Reinforcement Learning: A Tutorial on Generative Diffusion Models in Network Optimization." in *IEEE Communication Surveys & Tutorials*, accepted.

Conference papers

[1] Xiaoming He, Yingchi Mao, **Yinqiu Liu**, Benteng Zhang, Yunzhe Jiang, and Yan Hong. (2024). Green Resource Allocation with DDPG for Knowledge Learning in Digital Twin-enabled Edges. *2023 IEEE 98th Vehicular Technology Conference: VTC2023-Fall*, pp. 1-6.

[2] Kai Qian, **Yinqiu Liu**, Zeyu Zhang, Kun Wang. (2023). Efficient Implementation of Activation Function on FPGA for Accelerating Neural Networks. *IEEE International Symposium on Circuits and Systems (ISCAS)*, pp. 1-5.
[3] Kai Qian*, **Yinqiu Liu***, Yamin Han, and Kun Wang. (2022). BCadvisor: Enabling Green Blockchain Systems Through Resource-Oriented Benchmarking. *2022 IEEE International Conference on Communications*, pp. 4031-4036.

Pre-prints

[1] **Yinqiu Liu**, Hongyang Du, Dusit Niyato, Jiawen Kang, Zehui Xiong, Shuguang Cui, Ping Zhang, and Xuemin (Sherman) Shen. (2024). Cross-Modal Generative Semantic Communications for Mobile AIGC: Joint Semantic Encoding and Prompt Engineering. *IEEE Transactions on Mobile Computing*, in major revision. arXiv
[2] **Yinqiu Liu**, Ruichen Zhang, Hongyang Du, Dusit Niyato, Jiawen Kang, Zehui Xiong, and Dong In Kim. (2024). Defining Problem from Solutions: Inverse Reinforcement Learning (IRL) and its Applications in Next-Generation Networking. *IEEE Network*, under review. arXiv
[3] Yi Rong*, Yingchi Mao*, **Yinqiu Liu***, Ling Chen, Xiaoming He, and Dusit Niyato. (2024). ICST-DNET: An Interpretable Causal Spatio-Temporal Diffusion Network for Traffic Speed Prediction. *IEEE Transactions on Intelligent Transportation Systems*, under review. arXiv
[4] Cong T Nguyen, **Yinqiu Liu**, Hongyang Du, Dinh Thai Hoang, Dusit Niyato, Diep N Nguyen, and Shiwen Mao. (2024). Generative AI-enabled Blockchain Networks: Fundamentals, Applications, and Case Study. *IEEE Network*, in major revision. arXiv

ACADEMIC INTERNSHIP

Sun Yat-sen University *(Work Remotely)* Guangzhou, China
Research Intern, Inplus Lab., Sch. of Software Eng. | Advisor: Prof. Huawei Huang Jan. 2022-Dec. 2022

- Developed the scheduling algorithm and incentive mechanisms to ensure low-latency processing of cross-shard blockchain transactions
- Participated in implementing BlaockEmulator, a general-purpose platform for establishing customized sharding-based blockchain systems

Southern University of Science and Technology Shenzhen, China
Research Intern, EDA Lab, Sch. of Microelectron. | Advisor: Prof. Quan Chen Mar. 2021-June 2021

- Learned knowledge about circuit simulation, multi-thread programming in C++, etc.
- Participated in the development of BTDsim, an RF simulator for large-scale IC circuits, mainly responsible for the performance testing and optimization of the sparse matrix LU solver

UCLA *(Work Remotely)* Los Angeles, USA
Research Intern, EDA Lab, ECE Dept. | Advisor: Prof. Lei He July 2020-Feb. 2021

- Assisted in developing the smart Prognostic and Health Management (PHM) system for high-speed railway, mainly responsible for data cleaning and cloud server deployment
- Developed a K8S-based cloud platform, enabling users to deploy PHM clusters automatically and allocate the resources

REASEARCH EXPERIENCE

Research on Mobile AIGC NTU
PhD student | Advisor: Prof. Dusit Niyato 2023-Present

- Explored the application of blockchain system for protecting mobile AIGC (WCM 2023, TMC 2023)
- Explored the application of deep generative models in intelligent network management and optimization (WCM 2023, COMST 2023)
- Explored the application of prompt engineering in optimizing the mobile-edge AIGC services (Network 2023)
- Designed a generative Semantic Communication (G-SemCom) framework for reducing the communication overhead of mobile AIGC (TMC 2023, submitted)
- Designed an interactive mobile AIGC framework to perform prompt engineering (TMC, submitted)

Research on IoT-Oriented Blockchains NJUPT & UCLA
Student Researcher | Advisor: Prof. Kun Wang & Prof. Lei He 2018-2022

- Developed LightChain, a lightweight blockchain system with a green consensus mechanism and data filter, in order to reduce the resource and energy consumption of IoT devices for running blockchains (TII 2019)
- Designed Tornado, a space-structured blockchain system accommodating both high- and low-end IoT devices, to overcome the IoT heterogeneity when deploying blockchains (IoT J 2020)
- Conducted a survey, systemically reviewing the blockchain scaling proposals in the past 10 years and discussing the next-generation blockchain scaling techniques (ISJ 2021)
- Designed BCmaster, a benchmarking tool for IoT-oriented blockchains, using 12 metrics to comprehensively evaluate blockchains running in IoT and provide valuable insights for developers (ICC 2022, IoT J 2022)
- Presented HPCchain, a Physical Unclonable Function (PUF)-based blockchain system for authentication in industrial IoT (TII 2023)

SERVICES FOR JOURNALS/CONFERENCES

Reviewer, *IEEE Internet of Things Journal*
Reviewer, *IEEE Communications Surveys and Tutorials*
Reviewer, *IEEE Transactions on Information Forensics and Security*
Reviewer, *IEEE Transactions on Network Science and Engineering*
Reviewer, *IEEE Transactions on Communications*
Reviewer, *IEEE Transactions on Vehicular Technology*
Reviewer, *IEEE Transactions on Service Computing*
Reviewer, *IEEE Network*
Reviewer, *IEEE Wireless Communications*
Reviewer, *ACM Computing Survey*
Reviewer, *IEEE Systems, Man, and Cybernetics Magazine*
Reviewer, *IEEE Internet of Things Magazine*
Reviewer, *IEEE Transactions on Green Communications and Networking*
Reviewer, *Journal of Systems Architectures*
Reviewer, *2021 IEEE Global Communications Conference*
Reviewer, *Scientific Reports*
TPC member, *2024 IEEE International Symposium on Personal, Indoor and Mobile Radio Communications*
TPC member, *2024 IEEE Global Communications Conference*
TPC member, *2024 IEEE/CIC International Conference on Communications in China*
Local volunteer, *2024 ACM Web Conference*

TEACHING

TA (*for course SC3010-Computer Security*), NTU — Spring Semester, 2024
Grader (*for course ECE 188.1-Engineering Interactive Systems*), UCLA — Fall Quarter, 2022

AWARDS

2024 SocMeta IEEE ComSoc SNTC Student Competition 2023
First Prize
2023 IEEE ComSoc Student Competition 2023
Honorary Mention Award, (16/72)
NTU Research Scholarship 2023-2027
S$2700/month, S$3200/month after QE
UCLA ECE 209-Engineering Interactive System Project 2022
Honorable Mention Award, (2/16)
First-class Outstanding Undergraduate Thesis, Jiangsu Province, China 2020
Only three NJUPT students in class 2020, (3/5000)
"Internet +" Entrepreneurship Competition 2018
Grand Prize, NJUPT
Merit Student 2018
Top 3%, NJUPT
First-class Scholarship 2018
Top 3%, NJUPT

REFERENCES

Prof. Dusit Niyato
FIEEE, Professor & President's Chair, College of Computing and Data Science, Nanyang Technological University, Singapore
Relationship: Ph.D Supervisor E-mail: dniyato@ntu.edu.sg Scholar Profiles: Homepage/ Google Scholar

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Prof. Lei He
FIEEE, Professor, Department of Electrical and Computer Engineering, UCLA, Los Angeles, USA
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