Mengxiang Liu

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Work Experiences

University of Sheffield, UK   **01/09/2023–Now**
Research Associate, Department of Automatic Control and Systems Engineering
Managed by Prof. **Xin Zhang**

Imperial College London, London, UK   **01/04/2023–31/08/2023**
Research Associate, Department of Electrical and Electronic Engineering
Managed by Dr. **Fei Teng**

Imperial College London, London, UK   **01/12/2022–30/01/2023**
Visiting Scholar, Department of Electrical and Electronic Engineering
Managed by Dr. **Fei Teng**

Zhejiang University, Hangzhou, China   **01/10/2022–31/03/2023**
Research Associate, College of Control Science and Engineering
Managed by Prof. **Jiming Chen**

Education Experiences

Zhejiang University, Hangzhou, China   **01/09/2017–30/09/2022**
PhD, Cyberspace Security
Thesis "Proactive Detection and Localization Against Stealthy Attacks in Power Distribution Grid"
Co-supervised by Prof. **Jiming Chen**, Prof. **Peng Cheng**, and Prof. **Ruilong Deng**

Tongji University, Shanghai, China   **01/09/2013–30/06/2017**
B.E, College of Control Science and Engineering
Thesis "The Design of Industrial Honeypot Based on Programmable Logic Controller"
Supervised by Dr. Jiwei Wu

Research Interests

Cyber Resiliency of Cyber-Physical Power Systems, Active Defense, Attack Detection, Impact Mitigation, Recovery Schedule

Publications

	First-Author	Co-Supervision	Others	Total
Journal	7 (Trans.)	3 (Trans.)	1	11
Conference	4	2	1	7
Patent	1	0	0	1

*: Co-supervised PhDs, #: Co-supervised Masters

Preprint..

[J] **M. Liu**, H. Zhu, Z. Zhang, R. Deng, and X. Zhang "Physics-Aware Watermarking Embedded in Unknown Input Observers for Detecting False Data Injection Attacks in Microgrids," submitted to *IEEE Transactions on Information Forensics and Security*.

[J] **M. Liu**, F. Teng, Z. Zhang, P. Ge, R. Deng, M. Sun, and J. Chen "Enhancing Cyber-Resiliency of DER-based Smart Grid: A Survey," *IEEE Transactions on Smart Grid*, Major Revision Submitted.

[J] **M. Liu**, Z. Chu, and F. Teng "Cyber Recovery from Dynamic Load Altering Attacks: Linking Electricity, Transportation, and Cyber Networks," submitted to *IEEE Transactions on Smart Grid*.

[J] H. Zhu*, **M. Liu**, B. Chen, P. Cheng, and R. Deng "*HoneyJudge*: A PLC Honeypot Identification Framework Based on Device Memory Testing," submitted to *IEEE Transactions on Information Forensics and Security*.

[J] B. Xu*, **M. Liu**, and R. Deng "Optimal Defense Resource Allocation Considering Nonlinear Attack Cost in Smart Grid," submitted to *IEEE Transactions on Smart Grid*.

[J] Z. Zhang, **M. Liu**, M. Sun, R. Deng, P. Cheng, D. Niyato, M. Chow, and J. Chen "Vulnerability of Machine Learning Approaches Applied in IoT-based Smart Grid: A Review," submitted to *IEEE Internet of Things Journal*.

Journal ....

[J] **M. Liu**, C. Zhao, Z. Zhang, R. Deng, P. Cheng, and J. Chen, "Converter-based Moving Target Defense Against Deception Attacks in DC Microgrids," *IEEE Transactions on Smart Grid*, vol. 13, no. 5, pp. 3984-3996, Sept. 2022.

[J] **M. Liu**, C. Zhao, Z. Zhang, and R. Deng, "Explicit Analysis on Effectiveness and Hiddenness of Moving Target Defense in AC Power Systems," *IEEE Transactions on Power System*, vol. 37, no. 6, pp. 4732-4746, Nov. 2022.

[J] **M. Liu**, P. Cheng, C. Zhao, R. Deng, W. Wang, and J. Chen, "False Data Injection Attacks and the Distributed Countermeasure in DC Microgrids," *IEEE Transactions on Control of Network Systems*, vol. 9, no. 4, pp. 1962-1974, Dec. 2022.

[J] **M. Liu**, C. Zhao, Z. Zhang, R. Deng, P. Cheng, and J. Chen, "PDDL: Proactive Distributed Detection and Localization Against Stealthy Deception Attacks in DC Microgrids," *IEEE Transactions on Smart Grid*, vol. 14, no. 1, pp. 714-731, Jan. 2023.

[J] H. Zhu*, **M. Liu**, C. Fang, R. Deng, and P. Cheng, "A Practical Watermarking Method Considering Noises in Industrial Control Systems," *IEEE Transactions on Information Forensics & Security*, vol. 18, pp. 2780-2793, Apr. 2023.

Conference ....

[C] **M. Liu**, C. Zhao, Z. Zhang, R. Deng, and P. Cheng, "Analysis of Moving Target Defense in Unbalanced and Multiphase Distribution Systems Considering Voltage Stability," *IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm)*, 2021, pp. 207-213.

[C] **M. Liu**, Z. Jin, J. Xia, M. Sun, R. Deng, and P. Cheng, "Demo Abstract: A HIL Emulator-Based Cyber Security Testbed for DC Microgrids," *IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS)*, 2021, pp. 1-2.

[C] **M. Liu**, Z. Cheng, Z. Zhang, M. Sun, R. Deng, P. Cheng, and M. Chow, "A Multi-Agent System Based Hierarchical Control Framework for Microgrids," *IEEE Power & Energy Society General Meeting (PESGM)*, 2021, pp. 1-5.

[C] **M. Liu**, C. Zhao, R. Deng, P. Cheng, W. Wang, and J. Chen, "Nonzero-Dynamics Stealthy Attack and its Impacts Analysis in DC Microgrids," *IEEE American Control Conference (ACC)*, 2019, pp. 3922–3927.

[C] S. Peng*, **M. Liu**, and R. Deng. Stealthy Data Integrity Attacks Against Grid-tied Photovoltaic Systems, International Conference on Industrial Cyber-Physical Systems (ICPS), Wuhan, China, 2023, pp. 1-7. (**Best Student Paper Award**)

[C] Z. Jin#, **M. Liu**, R. Deng, and P. Cheng. Distributed Data Recovery Against False Data Injection Attacks in DC Microgrids, *IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm)*, 2022.

[C] W. Ma#, **M. Liu**, G. Hong, S. Yang, and R. Deng. Grid-Metaverse: The Path From Digital Twins and Prototype Tests on DC Microgrids, accepted by *IEEE International Conference on Metaverse Computing, Networking and Applications (MetaCom)*, 2023.

[C] X. Li, **M. Liu**, R. Zhang, P. Cheng, and J. Chen, Demo Abstract: An Industrial Control System Testbed for the Encrypted Controller, *ACM/IEEE 9th International Conference on Cyber-Physical Systems (ICCPS)*, 2018, pp. 343-344.

Patent ....

[P] **M. Liu**, P. Cheng, J. Pan, and J. Chen, A False Data Injection Attack against DC Microgrids and Corresponding Countermeasures, China, ZL201910917002.X, 2021-01-01, Granted.

Awards

Best Student Papers Award (2/123), IEEE ICPS	2023
Graduate Scholarship (Top 5%), Zhejiang University	2022
Outstanding Graduate Student Award (Top 20%), Zhejiang University	2018, 2019
National Inspirational Scholarship (Top 3%), Ministry of Education of China	2013, 2014

Second-Class Scholarship (Top 10%), Tongji University   2013, 2014

Competitions

First prize-East China Region, National College Student Intelligent Vehicle Competition   2016
First prize-Shanghai Region, National College Student Mathematical Modeling Competition   2015

Professional Presentation

ZJU National Academic Forum for PhD Candidates
"Proactive Detection and Identification against Stealthy Attacks in Power Distribution Systems"   Dec. 2022
Online Workshop

IEEE SmartGridComm
"Moving Target Defense in Unbalanced and Multiphase Distribution Systems"   Oct. 2021
Virtual Conference

IEEE PES General Meeting
"A Multi-Agent System Based Hierarchical Control Framework for Microgrids"   Jul. 2021
Virtual Conference

IEEE INFOCOM WKSHPS
"A HIL Emulator-Based Cyber Security Testbed for DC Microgrids"   May. 2021
Virtual Conference

IEEE American Control Conference
"Nonzero-Dynamics Stealthy Attack and Its Impacts Analysis in DC Microgrids"   Jul. 2019
Philadelphia, USA

Academic Services

Reviewer for Journals
Automatica, IEEE TAC, IEEE TCNS, IEEE TCST, IEEE TSG, IEEE TPS, IEEE TII, IET Generation, Transmission & Distribution, Wireless Networks

Co-organizer for Special Session
○ "Cybersecurity of the Future DER-based Power Grid" in IEEE International Conference on Industrial Cyber Physical System, 2023

TPC Member for Conferences
○ IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm), 2022
○ IEEE Global Communications Conference (GLOBECOM), 2021

Reviewer for Conferences
IEEE EPEC, IFAC World Congress, IEEE PESGM, IEEE ACC, IEEE CDC

Hardware and Software Skills

Emulator: Typhoon HIL 602+
Embedded Hardware: Raspiberry Pi, MCS 51
Programming : C/C++, MATLAB, Latex
OS: Windows, Linux