

Mojtaba Sadafi

CONTACT INFORMATION

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RESEARCH PROFILE

Final-year Computer Engineering B.Sc. student working at the intersection of graph machine learning, optimization, and power-system monitoring. Research focuses on GNN-based PMU placement under network contingencies, power-system observability, and optimization for resilient monitoring. First author of one peer-reviewed IEEE conference paper and a GNN-based PMU-placement manuscript submitted to ICCKE 2026, with an extended journal study in preparation; co-author of two additional IEEE conference papers.

EDUCATION

B.Sc. in Computer Engineering	09.2021 – Expected 09.2026
Esfarayen University of Technology, Iran	
GPA: 16.49/20.00	

RESEARCH INTERESTS

- Graph neural networks and machine learning for power systems
- Optimal PMU placement, observability, and contingency-aware monitoring
- Optimization algorithms for smart grids and cyber-physical energy systems
- Power-system cybersecurity and resilient state monitoring
- Scientific computing, graph-based modeling, and reproducible simulation workflows

PUBLICATIONS AND MANUSCRIPTS

Journal Manuscripts

- **M. Sadafi**, M. Bagheri Hashkavayi, A. Hassannia, S. M. Barakati: Graph-Neural-Network-Based Contingency-Aware PMU Placement and Power-System Observability. *Journal manuscript in preparation*, 2026.

Conference Papers

Submitted

- **M. Sadafi**, M. Bagheri Hashkavayi, A. Hassannia, S. M. Barakati: Greedy-Supervised Graph Neural Network Framework for Fault-Aware PMU Placement in Power Transmission Networks. *Submitted to the International Conference on Computer and Knowledge Engineering (ICCKE 2026), Ferdowsi University of Mashhad*, 2026.
Code and reproducibility package: <https://doi.org/10.5281/zenodo.21765781>

Peer-Reviewed Proceedings

- **M. Sadafi**, M. Bagheri Hashkavayi, S. M. Barakati, F. Padidaran Moghaddam, A. Hassannia: New Evaluation of Genetic Algorithm (GA) for Optimized Phasor Measurement Unit (PMU) Allocation in Power Networks and Comparative Performance Analysis with Dynamic Programming (DP) for Cybersecurity Enhancement. *IEEE 29th International Electrical Power*

Distribution Conference (EPDC), Tehran, Iran, 10/2025.

<https://doi.org/10.1109/EPDC67173.2025.11278270>

- M. Bagheri Hashkavayi, S. M. Barakati, S. S. Mohtavipour, **M. Sadafi**: Disparate Scenarios for Reduction of Voltage and Current Sensors in Nested Neutral Point Clamped (NNPC) Converter. *IEEE 16th Power Electronics, Drives Systems and Technologies Conference (PEDSTC)*, Tabriz, Iran, 03/2025.
<https://doi.org/10.1109/PEDSTC65486.2025.10911941>
- M. Bagheri Hashkavayi, S. M. Barakati, S. S. Mohtavipour, **M. Sadafi**: Different Schemes for Reducing the Number of Measurement Components in Alternate Arm Multilevel Converter (AAMC). *IEEE 16th Power Electronics, Drives Systems and Technologies Conference (PEDSTC)*, Tabriz, Iran, 03/2025.
<https://doi.org/10.1109/PEDSTC65486.2025.10911990>

RESEARCH EXPERIENCE

- **GNN-Based PMU Placement under Network Contingencies** 2025–present
Developing a greedy-supervised GNN framework for PMU placement under intact and N-1 network conditions, including Zero-Injection Bus observability. Implemented graph-based simulation and learning workflows using Python, PyTorch Geometric, pandapower, and NetworkX. Conference manuscript submitted to ICCKE 2026; extended journal study in preparation.
- **Cybersecurity-Aware PMU Placement Using DP and GA** 2024–2025
Authored a study comparing Dynamic Programming (DP) and Genetic Algorithm (GA) approaches for optimized PMU allocation in power networks, with emphasis on observability, cybersecurity enhancement, and attack-resilience evaluation.
- **Sensor Reduction in Multilevel Converters** 2024–2025
Co-authored two papers on measurement-component reduction in Nested Neutral Point Clamped (NNPC) and Alternate Arm Multilevel Converter (AAMC) systems. Contributed to modeling, algorithm prototyping, simulation studies, and manuscript preparation.
- **Reproducible Simulation and Research Workflows** 2023–present
Developed version-controlled MATLAB/Python workflows for simulation studies, parameter documentation, result organization, figure generation, and reproducible research reporting.

TEACHING EXPERIENCE

Teaching Assistant

09.2025 – 12.2025

Esfarayen University of Technology, Iran

Selected Courses

- Operating Systems; Logic Circuits; Computer System Architecture (Dr. Farhang Padidaran)
- Technical English for Computer Engineering (Dr. Mohsen Mohammadi)

Conducted practical problem-solving sessions and supported students in course-related technical exercises.

TECHNICAL SKILLS

Programming: Python, MATLAB, C/C++

Machine Learning & Graph Learning: PyTorch, PyTorch Geometric, graph neural networks, supervised learning, regression/classification

Power Systems: pandapower, NetworkX, PMU placement, power-system observability, contingency analysis

Optimization: genetic algorithms, dynamic programming, greedy optimization

Scientific & Research Tools: NumPy, pandas, matplotlib, Jupyter, Git/GitHub, Linux, L^AT_EX, MATLAB/Simulink

Languages: Persian (native), English (fluent), Arabic (basic), German (basic)

SELECTED COURSEWORK

Compiler Design	20/20	Theory of Languages & Automata	19.5/20
Information Retrieval	19/20	Design of Algorithms	17.5/20
Advanced Programming Workshop	20/20	Computer Networks	18/20
Special Topics: Event Log & Data Analysis	20/20	Signals & Systems	18/20