Curriculum Vitae

AHMAD MOHAMMAD SABER ABDELSAMIE

I work on AI, Cybersecurity, Smart Grids and Quantum Tech

Contact Information

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Education

Ph.D. in Engineering with concentration in Electrical & Computer Engineering	01/2020 - 05/2024
Institution: Khalifa University of Science and Technology, UAE	Click here to Verify!
Thesis Title: Developing Cyber-Immune Line Current Differential Relays Using the Relay	Measurements,
Machine Learning, and Physical Models	
Advisors: Professors Ehab El-Saadany, Hatem Zein Eldin, and Davor Svetinovic	
International Visiting Graduate Student (Non-Degree)	08/2023 - 12/2023
Institution: Department of Electrical & Computer Engineering, University of Toronto, Car	nada
Advisor: Professor Deepa Kundur	
M.Sc. in Electrical Power & Machines Engineering	03/2017 - 10/2019
Institution: Faculty of Engineering, Cairo University, Egypt	
Thesis Title: A Hybrid Wind-Wave Energy System with Batteries for Offshore Oil and Ga	s Platforms
Advisors: Professor Doaa K. Ibrahim, and Associate Professor Tarek A. Boghdady	
B.Sc. in Electrical Power & Machines Engineering	09/2011 - 07/2016
Institution: Faculty of Engineering, Ain Shams University, Egypt	

Work Experience

Postdoctoral Fellow, University of Toronto, Toronto, Canada 07/2024 – Present
Supervisor: Deepa Kundur (Professor and Chair, The Edward S. Rogers Sr. Department of Electrical & Computer Engineering, University of Toronto)
Leading and contributing to cutting-edge research projects in collaboration with Hydro-Québec Research Institute (IREQ) and Xanadu Quantum Technologies.
Preparing and submitting high-quality research papers to reputable journals and conferences.
Supervision: 1) mentoring 4 graduate students, 2) supervising one undergrad student with their B.Sc. thesis, and 3) co-supervising a research associate at another university.
Teaching Assistant Service: ECE 1508 - Special Topics in Communications: Applied Deep Learning, instructed by Dr. Ali Bereyhi, Fall 2024: supervising a group of grad students with the coursework projects.

Graduate Research and Teaching Assistant, Khalifa University, UAE 01/2020 – 5/2024

- Contributed to the university's international ranking through rigorous research and publication.

- Assisted with teaching several courses with the ECE Department.

Electrical & Controls Engineer, Veolia Water Technologies, Cairo, Egypt 11/2018 – 12/2019 - Took part in doing all the electrical and control engineering work in both tendering and engineering (contract) phases of the Water/Waste treatment/desalination plants.

- Drew up plans using computer-assisted engineering and design software.

- Estimated material, construction, and labor costs, and project timescales.
- Coordinated draftsmen and technicians writing reports and documentation.
- Attended meetings and giving presentations.

- Supported the implementation of the QHSE Management System as per standards (ISO 9001, 14001, and OHSAS 18001).

Worked with: Ahmed Kamar (Electrical Manager)

Business Development Engineer, AHRAM Security Group (ASG), Cairo, Egypt

02/2018 - 11/2018

- Led initiatives to drive organizational growth and increase profitability.
- Managed cross-functional projects to improve internal operations and engage key market influencers.
- Expanded new business opportunities across Egypt.
- Established strategic partnerships and collaborations.
- Supported sales and marketing for new product launches.
- Developed and maintained corporate databases.

Worked with: Amr Rabea (Business Development Manager)

Electrical Design and Quality Control Engineer, Elsewedy Electric, Egypt 02/2017 – 02/2018

- Designed dry-type transformers up to 15 MVA, including detailed drawings, bills of quantity, and cost sheets.
- Conducted quality control and material inspections for large transformers (40, 125, 175 MVA).
- Coordinated with various departments to address technical issues.
- Participated in root-cause analysis and investigations of problems.

Worked with: Mostafa Yousif (Quality Control Manager) and Enas Amer (Dry-type Design Director)

Publications

Peer-Reviewed Journal Articles

- A. M. Saber, A. Youssef, D. Svetinovic, H. H. Zeineldin and E. F. El-Saadany, "Unmasking Covert Intrusions: Detection of Fault-Masking Cyberattacks on Differential Protection Systems," in *IEEE Transactions* on Systems, Man, and Cybernetics: Systems, 2024, doi: 10.1109/TSMC.2024.3456810.
- [2] D. M. Manias, A. M. Saber, M. I. Radaideh et al., "Trends in Smart Grid Cyber-Physical Security: Components, Threats and Solutions," in *IEEE Access*, 2024, doi: 10.1109/ACCESS.2024.3477714.
- [3] A. M. Saber, A. Youssef, D. Svetinovic, H. H. Zeineldin and E. F. El-Saadany, "Cyber-Immune Line Current Differential Relays," in *IEEE Transactions on Industrial Informatics*, vol. 20, no. 3, pp. 3597-3608, Mar. 2024, doi: 10.1109/TII.2023.3310769.
- [4] A. M. Saber, A. Youssef, D. Svetinovic, H. H. Zeineldin and E. F. El-Saadany, "Anomaly-Based Detection of Cyberattacks on Line Current Differential Relays," in *IEEE Transactions on Smart Grid*, vol. 13, no. 6, pp. 4787-4800, Nov. 2022, doi: 10.1109/TSG.2022.3185764.
- [5] A. M. S. Abdelsamie, T. A. Boghdady and D. Ibrahim, "Multi-objective Sizing of a Standalone Renewable Power System for Offshore Oil and Gas Applications," *International Journal of Renewable Energy Research* (*IJRER*), vol. 11, no. 2, pp. 456-468, June 2021.

Conference Proceedings

- A. M. Saber, MMD Santos, MA Janaideh, A. Youssef and Deepa Kundur, "A Kolmogorov-Arnold Network for Explainable Detection of Cyberattacks on EV Chargers," 2025 IEEE Power & Energy Society General Meeting (PESGM), Austin, Texas, USA, 2025, pp. 1-5, URL: https://arxiv.org/pdf/2503.02281
- [2] N. Shabar, A. M. Saber, and D. Kundur, "Machine Learning-Based Cyberattack Detection and Identification for Automatic Generation Control Systems Considering Nonlinearities," accepted to IEEE Canadian Conference on Electrical and Computer Engineering (CCECE), 2025.
- [3] A. M. Saber, A. Selim, M. H. Hammad, A. Youssef, D. Kundur and E. F. El-Saadany, "A Novel Approach to Classify Power Quality Signals Using Vision Transformers," *IECON 2024 - 50th Annual Conference of the IEEE Industrial Electronics Society*, Chicago, IL, USA, 2024, pp. 1-6, doi: 10.1109/IECON55916.2024.10905293.

- [4] A. Kemmeugne, A. S. Mohamed, A. M. Saber and D. Kundur, "Integration of Software-Defined Networking and Line Outage Distribution Factors for Enhancing the Cyber Resilience of Modern Transmission Systems," *IECON 2024 - 50th Annual Conference of the IEEE Industrial Electronics Society*, Chicago, IL, USA, 2024, pp. 1-4, doi: 10.1109/IECON55916.2024.10905232.
- [5] A. M. Saber, A. Youssef, D. Svetinovic, H. H. Zeineldin, Deepa Kundur and E. F. El-Saadany, "Enhancing Power Quality Event Classification With AI Transformer Models," 2024 IEEE Power & Energy Society General Meeting (PESGM), Seattle, WA, USA, 2024, pp. 1-5, doi: 10.1109/PESGM51994.2024.10688689.
- [6] A. M. Saber, A. Youssef, D. Svetinovic, H. Zeineldin and E. El-Saadany, "Learning-Based Detection of Malicious Volt-VAr Control Parameters in Smart Inverters," *IECON 2023- 49th Annual Conference of the IEEE Industrial Electronics Society, Singapore, Singapore, 2023*, pp. 1-6.
- [7] A. M. Saber, A. Selim, V. Kadkikar, H. Zeineldin and E. El-Saadany, "Fast Deep-Learning-Based Recognition of Multiple Power Quality Events Under Noise and DC Offset," 2023 IEEE Conference on Power Electronics and Renewable Energy (CPERE), Luxor, Egypt, 2023, pp. 1-6.
- [8] M. E. Kotb, A. M. Saber and T. A. Boghdady, "Simple Robust Line Current Differential Protection Against Cyberattacks," 2022 23rd International Middle East Power Systems Conference (MEPCON), Cairo, Egypt, 2022, pp. 1-7, doi: 10.1109/MEPCON55441.2022.10021802.

Supervision and Mentorship

Grad Students:

- Taha Hammadia PhD Student, University of Toronto *ECE Department* Research Area: Quantum Technologies for Enhanced Cyberattack Detection in Smart Grids Role: PhD research mentor; co-authored one conference paper Period: August 2024 – Present
- Saeed Jafari PhD Student, University of Toronto *ECE Department* Research Area: Quantum Technologies for Enhanced Cyberattack Detection in Smart Grids Role: PhD research mentor; submitted two papers Period: August 2024 – Present
- Aditi Maheshwari MASc Candidate, University of Toronto *MASc Student, ECE Department* Research Area: Applied ML Security in Smart Grids Role: Ongoing MASc research mentor; co-authored two papers Period: 2023–Present
- Mohamed E. Kotb Police-Engineering Officer, Egyptian Ministry of Interior *MSc Student, Cairo University* Research Area: Smart Grid Cyber-Physical Security Role: Primary mentor during MSc research; co-authored a conference paper Period: 2022

Undergrad Students:

- Armita Khashayardoost Final Year Student, University of Toronto Engineering Science Department Research Area: Planning for Smart Grid Cybersecurity Role: Co-supervisor for year-long undergraduate thesis; submitted a conference paper Period: August 2024 – April 2025
- Noor Elyas Undergraduate Student, University of Toronto Summer Intern Research Area: Applied AI in Mental Health Prediction Role: Co-mentor during summer internship; guided on dataset cleaning and ML classifiers Period: Summer 2024

• Cantona Bolokang — Project Coordinator, KAPP Infrastructure Undergraduate Student, University of Toronto Research Area: Applied AI in Mental Health Prediction Role: Co-mentor during summer internship; guided on dataset cleaning and ML classifiers Period: Summer 2024

Digital and Technical Skills

- Software tools: PSCAD/EMTDC, MATLAB/SIMULINK, Python, C++, OPAL-RT, RT-LAB, LAteX.
- AI assistant tools: ChatGPT, Claude, Geminni, Microsoft Copilot, Jasper.
- Smart Grid-related skills: Differential Protection, Power Systems Protection, Power Systems Modelling, DER Modelling, Distributed Generation.
- Security-related skills: Power Systems cybersecurity, Intrusion Detection, Cyber-Physical Security.
- AI-related skills: Applied Machine Learning, Deep Learning, Time Series Analysis, Sequential Data Analysis.

Language Skills

English: Fluent | Arabic: Native | French & German: Elementary

Invited Seminar

"How to Use Machine & Deep Learning to Secure Vulnerable Power System Components Against Cyberattacks" 29 April 2024, invited by the Advanced Power and Energy Center, Khalifa University, UAE

Scholarships and Fellowships

- 07/2024 present: Postdoctoral Fellow, with Professor Deepa Kundur, University of Toronto, Toronto, Canada.
- 01/2020 05/2024: Khalifa University's Graduate Research/Teaching Assistant Scholarship (for international students).

Awards and Recognition

In Academia:

- 2023: Outstanding Graduate Student (for publishing in a top 1% venue as ranked by Scopus) by Khalifa University's Graduate Studies Office.
- 2022: Outstanding Graduate Student (for high GPA and for publishing in a top 2% venue as ranked by Scopus) by Khalifa University's Graduate Studies Office.

Recognition by Governments:

• UAE: received the UAE's Golden Residency, for specialized talent of national interest.

Organizational Memberships

- 2021 present: Member, Institute of Electrical and Electronics Engineers (IEEE)
- 2024 present: Member, IEEE Power & Energy Society
- 2024 present: Member, IEEE Industrial Electronics Society

Voluntary Service As An Academic Reviewer

Reviewed papers for reputable journals and conferences such as: IEEE Transactions on Smart Grid, IEEE Transactions on Industrial Informatics, IEEE Transactions on Information Forensics and Security, IEEE Transactions on Secure and Dependable Computing, IEEE Internet of Things Journal, IEEE Transactions on Power Delivery, IEEE systems journal, IEEE Power and Energy Society General Meeting, IEEE ISGT, IEEE Access, and IET Cyber-Physical Systems: Theory & Applications.

References are available upon request.