Mariam Wajdi Ibrahim, IEEE member

Dept. of Mechatronics Engineering, German Jordanian University

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Educational Background

- Ph.D. in Electrical Engineering, Iowa State University, Department of Electrical and Computer Engineering, Iowa, USA, August/2016 (GPA: 3.93/4.0), Excellent.
- Master Degree in Mechatronics Engineering, Al Balq'a Applied University, Faculty of Engineering Technology, Amman, Jordan, July/2011 (GPA: 3.82/4.0), Excellent (First on my class).
- Bachelor Degree in Electrical and Computer Engineering, Hashemite University, Zarqa, Jordan, June/2008 (GPA: 3.51/4.0), Excellent. The 10th among the country for the Jordanian Universities Achievements Test.
- The General Secondary Education Certificate Examination, North Latin School, Jordan, June/2004 (91.2%).

Work Experience

- Head of Mechatronics Engineering Department, German Jordanian University, July/2025- Present.
- Associate Professor, Department of Mechatronics Engineering, German Jordanian University, July/2021- Present.
- Assistant Professor, Department of Mechatronics Engineering, German Jordanian University, October/2016- June/2021.
- Research and Teaching Assistant, Department of Mechatronics Engineering, German Jordanian University, August/2011- August/2012.
- Laboratory Supervisor, Electrical Engineering Department, Hashemite University, June/2008- August/ 2011.
- Trainee at Jordan Telecom Group in Amman, February/2008 – April/2008.

Skills and Programming

Architecture Analysis and Design Language (AADL), AADL Annex AGREE (Assume Guarantee Reasoning Environment) plug-in, OPNET Network simulator, NuSMV Symbolic Model Checker, Spin model checker, OpenText Forensic (EnCase), Forensic Toolkit (FTK), Cisco Certified Network Associate (CCNA) Exploration, Embedded System Design Using PIC MCUs. Microbasik (C-Sharp), Cisco Packet tracer, Mplab, MATLAB, MULTISIM, Auto Cad (2D), LaTex, ICDL, Computer Maintenance, the Successful Skills from Junior Achievement (Injaz/ Hashimaite university), Online and Blended Learning (First Level).

Journal Publications

- **Mariam Ibrahim** and Abdallah Ebdah, "Security Analysis of Electrical Vehicle Systems". *KSII Transactions on Internet and Information Systems 2025*, *19* (2), 572-588. DOI: 10.3837/tiis.2025.02.011
- **Mariam Ibrahim**, Abdallah Al-Wadi, "Enhancing IoMT network security using ensemble learning-based intrusion detection systems", *Journal of Engineering Research,* 2024 (In press), https://doi.org/10.1016/j.jer.2024.12.003
- **Mariam Ibrahim**, Abdallah Al-Wadi, and Ruba Elhafiz, "Security Analysis for Smart Healthcare Systems" *Sensors* 2024, *24*(11), 3375. https://doi.org/10.3390/s24113375

- **Mariam Ibrahim**, and Ruba Elhafiz, "Security Assessment of Industrial Control System Applying Reinforcement Learning" *Processes* 2024, *12*(4), 801. https://doi.org/10.3390/pr12040801
- **Mariam Ibrahim**, Shuruq Shawish, Sabri Aldroubi, Ali Dawoud, and Walid Abdin, "Airbag Protection and Alerting System for Elderly People". *Applied Sciences* 2023, *13*(16), 9354. https://doi.org/10.3390/app13169354
- **Mariam Ibrahim**, Ruba Elhafiz, Abdallah Al-Wadi, "Reinforcement Learning-Based Attack Graph Analysis for Wastewater Treatment Plant". *IEEE Transactions on Industry Application* 2023, 59 (6), pp. 7858-7867. DOI: 10.1109/TIA.2023.3298289
- **Mariam Ibrahim**, Ruba Elhafiz, "Security Analysis of Cyber-Physical Systems Using Reinforcement Learning". *Sensors* 2023, *23*(3), 1634. https://doi.org/10.3390/s23031634
- **Mariam Ibrahim**, Ruba Elhafiz, "Modeling an intrusion detection using recurrent neural networks". *Journal of Engineering Research* 2023, *11*(1), 100013. https://doi.org/10.1016/j.jer.2023.100013
- **Mariam Ibrahim**, Abdallah Al-Wadi, "Attack Graph Utilization for Wastewater Treatment Plant". *Information* 2022, *13(10)*, 494. https://doi.org/10.3390/info13100494
- **Mariam Ibrahim**, Ruba Elhafiz, "Integrated Clinical Environment Security Analysis Using Reinforcement Learning". *Bioengineering* 2022, 9(6):253. https://doi.org/10.3390/bioengineering9060253
- Flores, Miguel, Diego Heredia, Roberto Andrade, and **Mariam Ibrahim**. "Smart Home IoT Network Risk Assessment Using Bayesian Networks" *Entropy* 2022, 24(5) 668. https://doi.org/10.3390/e24050668
- **Mariam Ibrahim**, Ahmad Alsheikh, Feras M. Awaysheh, and Mohammad Dahman Alshehri, "Machine Learning Schemes for Anomaly Detection in Solar Power Plants", *Energies* 2022, 15(3), 1082-1093. https://doi.org/10.3390/en15031082
- **Mariam Ibrahim**, Ruba Elhafiz, "Security Analysis of Smart Grids", *Security and Communication Networks* 2022, *2022*(1), 7199301. https://doi.org/10.1155/2022/7199301
- **Mariam Ibrahim**, Ahmad Alsheikh, Ruba Elhafiz, "Resiliency Assessment of Power Systems Using Deep Reinforcement Learning", *Computational Intelligence and Neuroscience*, Hindawi, 2022, 2022(1), 2017366. https://doi.org/10.1155/2022/2017366
- Soumyabrata Talukder, **Mariam Ibrahim**, and Ratnesh Kumar, "Resilience Indices for Power/Cyberphysical Systems*", IEEE Transactions on Systems, Man, and Cybernetics: Systems 2020, 51*(4), pp. 2159-2172, doi: 10.1109/TSMC.2020.3018706
- **Mariam Ibrahim,** Ahmad Alsheikh, Qays Al-Hindawi, Sameer Al-Dahidi and Hisham ElMoaqet, "Short-Time Wind Speed Forecast Using Artificial learning-based Algorithms", *Computational Intelligence and Neuroscience* 2020, Hindawi, Volume 2020, Article ID 8439719
- **Mariam Ibrahim**, Asma Alkhraibat, "Resiliency Assessment of Microgrid Systems", *Applied Sciences* 2020*, 10* no. 5, pp.1824-1839
- **Mariam Ibrahim**, Ahmad Alsheikh, and Aseel Matar, "Attack Graph Modeling for Implantable Pacemaker." *Biosensors* 2020, 10, no. 2, pp.14-25.
- **Mariam Ibrahim**, Qays Al-Hindawi, Ruba Elhafiz, Ahmad Alsheikh, and Omar Alquq. "Attack Graph Implementation and Visualization for Cyber Physical Systems", *Processes* 2020, 8, no. 1, pp.12-33.
- **Mariam Ibrahim**, and Ahmad Alsheikh. "Automatic Hybrid Attack Graph (AHAG) Generation for Complex Engineering Systems." *Processes* 2019, 7, no. 11, pp.787-801.
- Hani Muhsen, **Mariam Ibrahim**, Ahmad Alsheikh, Mohammed Qanadilo, and Abdallah Karadsheh. "Turbine Design and Its Impact on Energy Harvesting from In-Pipe Hydro Systems", *International Journal of Mechanical Engineering and Robotics Research* 2019, 8, no. 5, pp. 685-690.
- Alaa Al Ghazo, **Mariam Ibrahim**, Hao Ren, and Ratnesh Kumar. "A2G2V: Automatic Attack Graph Generation and Visualization and Its Applications to Computer and SCADA Networks",

IEEE Transactions on Systems, Man, and Cybernetics: Systems 2020, Volume. 50, no. 10, pp. 3488-3498, doi: 10.1109/TSMC.2019.2915940

- **Mariam Ibrahim**, "Level of Resilience Measure for Communication Networks'', *Journal of Information and Communication Technology (JICT)* 2020,17, no. 1, pp. 115-139.
- Jun Chen, **Mariam Ibrahim**, and Ratnesh Kumar, "Quantification of Secrecy in Partially Observed Stochastic Discrete Event Systems'', *IEEE Transactions on Automation Science and Engineering 2017*, Volume. 14, no. 1, pp. 185-195, doi: 10.1109/TASE.2016.2604222

Book Chapters

- **Mariam Ibrahim**, "Security threats modeling. Concepts and trends. Case study - Analysis of security threats in industrial systems using attack graphs". In Industrial Infrastructure Resilience: Cyber-Based and Classical Approaches, Sanda Florentina Mihalache, Mariam Ibrahim, Emil Pricop, Sudeep Tanwar, and Andrey V. Timofeev (eds), accepted for publication, CRC Taylor & Francis Group.
- **Mariam Ibrahim,** "AI Applications in Industrial Systems Resilience. Case studies". In Industrial Infrastructure Resilience: Cyber-Based and Classical Approaches, Sanda Florentina Mihalache, Mariam Ibrahim, Emil Pricop, Sudeep Tanwar, and Andrey V. Timofeev (eds), accepted for publication, CRC Taylor & Francis Group.
- **Mariam Ibrahim**, Haneen Okasha, and Ruba Elhafiz, "Security Analysis of Integrated Clinical Environment Using Attack Graph". In Intelligent Sustainable Systems. Lecture Notes in Networks and Systems, Nagar A.K., Jat D.S., Marín-Raventós G., Mishra D.K. (eds) vol 334, pp. 75-83. Springer, Singapore (2022). https://doi.org/10.1007/978-981-16-6369-7_7.
- **Mariam Ibrahim**, Ahmad Alsheikh, and Qays Al-Hindawi, "Automatic Attack Graph Generation for Industrial Controlled Systems." In *Recent Developments on Industrial Control Systems Resilience*, pp. 99-116. Springer, Cham, 2020.
- Sanda Florentina Mihalache, **Mariam Ibrahim**, Emil Pricop, Sudeep Tanwar, and Andrey V. Timofeev, *Industrial Infrastructure Resilience: Cyber-Based and Classical Approaches*, CRC Taylor & Francis Group, UK, 2024.
- **Mariam Ibrahim**, and Ahmad Alsheikh, "Determining Resiliency Using Attack Graphs." In *Recent Developments on Industrial Control Systems Resilience*, pp. 117-133. Springer, Cham, 2020.
- Emil Pricop, Jaouhar Fattahi, Nitul Dutta, and **Mariam Ibrahim**, *Recent Developments on Industrial Control Systems Resilience*. Springer, 2020.
- **Mariam Ibrahim**, Jun Chen and Ratnesh Kumar, "Quantification of Centralized/Distributed Secrecy in Stochastic Discrete Event Systems", In Recent Advances in Systems Safety and Security, Editors Emil Pricop, and Grigore Stamatescu, Volume 62, Chapter 2, ISBN: 978-3-319-32523-1, Springer International Publishing, 2016.

Conferences

- **Mariam Ibrahim** and Ruba Elhafiz, "Fleet Management System's Attack Graph", 17th International Conference on Electronics, Computers and Artificial Intelligence (ECAI), (accepted), Targoviste, Romania, (June 2025).
- **Mariam Ibrahim**, Ruba Elhafiz and Haneen Okasha, "Autoencoder-Based Image Steganography with Least Significant Bit Replacement", 16th International Conference on Electronics, Computers and Artificial Intelligence (ECAI), pp. 1-6. IEEE, Iasi, Romania, (June 2024), doi: 10.1109/ECAI61503.2024.10607537.
- **Mariam Ibrahim**, Ruba Elhafiz, Haneen Okasha, and Abdallah Al-Wadi, "Securing the Internet of Medical Things: AI-Based Intrusion Detection", 16th International Conference on Electronics, Computers and Artificial Intelligence (ECAI), pp. 1-6, Iasi, Romania, (June 2024), doi: 10.1109/ECAI61503.2024.10607556.

- **Mariam Ibrahim** and Abdallah Al-Wadi, "Wastewater Treatment Plant Security Analysis", 14th International Conference on Electronics, Computers and Artificial Intelligence (ECAI), pp. 1-6. IEEE, Ploiesti, Romania, (June 2022), doi:10.1109/ECAI54874.2022.9847468
- **Mariam Ibrahim** and Intisar Nabulsi, "Security Analysis of Smart Home Systems Applying Attack Graph", 2021 Fifth World Conference on Smart Trends in Systems Security and Sustainability (WorldS4), pp. 230-234, IEEE, London, United Kingdom, (July 2021), doi:10.1109/WorldS451998.2021.9514050
- **Mariam Ibrahim** and Qays Al-Hindawi, "Attack Graph Modeling For Nuclear Power Plant", 10th International Conference on Electronics, Computers and Artificial Intelligence (ECAI), Iasi, Romania, (June 2018).
- **Mariam Ibrahim** and Ahmad Al-Sheikh, "Assessing Level of Resilience Using Attack Graphs", 10th International Conference on Electronics, Computers and Artificial Intelligence (ECAI), pages: Iasi, Romania, (June 2018).
- Alaa Al-Ghazo, **Mariam Ibrahim**, Hao Ren, and Ratnesh Kumar, "A2G2V: Automated Attack Graph Generator and Visualizer", ACM MobiHoc Workshop on Mobile IoT Sensing, Security, and Privacy, Los Angeles, CA, (June 2018).
- Hani Muhsen, **Mariam Ibrahim**, Ahmad Alsheikh, Mohammed Qandadilo and Abdallah Karadsheh, "Turbine Design and Its Impact on Energy Harvesting from In-Pipe Hydro Systems", 2018 International Conference on New Energy and Environment Engineering (ICNEE), Singapore, (May 2018).
- **Mariam Ibrahim**, "A Resiliency Measure for Communication Networks", IEEE 8th International Conference on Information Technology, Amman, Jordan, (May 2017).
- **Mariam Ibrahim**, Jun Chen and Ratnesh Kumar, "A Resiliency Measure for Electrical Power Systems", IEEE International Workshop on Discrete Event Systems, pages: 385 - 390, Xi'an, China, (May 2016).
- **Mariam Ibrahim**, Jun Chen and Ratnesh Kumar, "Quantification of Distributed Secrecy Loss in Stochastic Discrete Event Systems under Bounded-Delay Communications", IEEE International Workshop on Discrete Event Systems, pages: 373 - 378, Xi'an, China, (May 2016).
- **Mariam Ibrahim**, Jun Chen and Ratnesh Kumar, "An Information Theoretic Measure for Secrecy Loss in Stochastic Discrete Event Systems'', 7th International Conference on Electronics, Computers and Artificial Intelligence (ECAI), pages: 1 – 6, Bucharest, Romania, (Jun 2015).
- **Mariam Ibrahim**, Jun Chen, and Ratnesh Kumar, "Secrecy in Stochastic Discrete Event Systems'', IEEE International Conference on Networking, Sensing and Control, pages 48-53, Miami, FL, (April 2014).

Research Funds

- RA Grant/ German Jordanian University, Security Analysis for Smart Healthcare Systems, 7,680 JD, 29/10/2023- 29/10/2024.
- Seed Grant/German Jordanian University, Security Analysis of Cyber Physical Systems, 16,660 JD, 13/12/2020- 13/12/2022.
- Seed Grant/German Jordanian University, Attack Graph Modeling, 16,500 JD, 15/2/2018-17/8/2020.

Professional Activities

- Session Co-chair entitled "Advanced Tools and Methods for Cybersecurity and Digital Forensics" in 18th International Congress on Advanced Applied Informatics, (IIAI AAI 2025) in Kitakyushu, Japan.
- Session Chair of 17th Edition of International Conference on Electronics, Computers and Artificial Inteelligence - ECAI-2025, in Targoviste, ROMANIA.

- Session Chair of 16th Edition of International Conference on Electronics, Computers and Artificial Intelligence - ECAI-2024, in Iasi, ROMANIA
- Session Co-chair entitled "Recent advancements in cybersecurity and digital forensics landscape" in 4. Interdisciplinary Conference on Electrics and Computer (INTCEC 2024), in Romeoville, Illinois, USA
- Organizing Committee member in the 22nd International Conference on Research and Education in Mechatronics (REM 2024)
- Scientific Reviewer for Journal of Information Security and Applications, 2025.
- Scientific Reviewer for IEEE Transactions on Systems, Man and Cybernetics, 2022.
- Scientific Reviewer for IEEE Access Journal, 2020.
- Scientific Reviewer for journal of Intelligent & Fuzzy Systems, 2020.
- Scientific Reviewer in the International Conference on Electronics, Computers and Artificial Intelligence, 2020.
- Scientific Reviewer in the international scientific committee of the international workshop on Systems Safety and Security (IWSSS), 2017-present.
- Scientific Reviewer for Sensors Journal, 2022.
- Scientific Reviewer for Applied sciences Journal, 2022.
- Scientific Reviewer for Frontiers in Neurorobotics Journal, 2022.
- Scientific Reviewer for journal IET Cyber-Physical Systems: Theory & Application, 2018.
- Scientific Reviewer for IEEE Network Magazine, 2018.
- Member of Iowa Section IEEE Control Systems Society Technical Chapter, 2016-present.
- Co-editor of the book Recent Advances in Systems Safety & Security, Springer, 2020.
- Organizing Committee Member\Session Co-Chair on "Emergent Methods, Techniques and Tools for Cyber-Security (EMTTCS)" for the International Conference on **Co**ntrol, **D**ecision and **I**nformation **T**echnologies (CODIT'20), Prague, Czech Republic, June 29 - July 2, 2020.
- Participated in a workshop on "Proposal Writing for H2020 EU Funding Opportunities", Amman 17-19 January 2017.
- S2ERC (NSF's Research Center) meetings in Fall 2014, Spring 2015, Fall 2015, Spring 2016, Summer 2016.
- Poster Presentation in "4th Midwest Workshop on Control and Game Theory", Iowa State University, Ames, Iowa, (Apr. 25-26 2015).
- Graduate Seminar and graduate poster on Fall 2015.
- Scientific Committee Member in the international conference on Emerging Trends and Technologies in Mechanical and Electrical Engineering - ETTMEE 2025.

Recognitions Awards

- A letter of Recognition from GJU for receiving an Award in Nov, 2024 from Naseej Company (IEEE's Partner) in recognition for her active publishing efforts with IEEE journals and conferences.
- An Award from Naseej Company in recognition for her active publishing efforts with IEEE journals and conferences 17/11/2024.
- Bronze Medal, EUROINVENT BOOK SALON, 12 Edition of European Exhibition of Creativity and Innovation 2020, IASI-Romania.
- Nomination to the Final Assessment stage for Abdul Hameed Shoman Arab Researchers Award 2020.
- Best paper award according to the paper contents and presentation on-site in the International Conference on New Energy and Environmental Engineering ICNEE 2018.
- Best Project Poster Award, Open day of Faculty of Applied technical sciences, German Jordanian University, 2018.

- Invitation to join the Iowa State University Chapter of The Honor Society of Phi Kappa Phi, In recognition of hard work and superior scholarship, 2015.
- A recognition letter from the Hashemite University for achieving the 10th place among the country for the Jordanian Universities Achievements Test, 2008.