Hisham ElMoaqet, PhD

Curriculum Vitae

Professor
Mechatronics Engineering Department
School of Applied Technical Sciences
German Jordanian University
Amman 11180, Jordan
Mobile: (962) 79-0418107
Email: Hisham.ElMoaqet@gju.edu.jo

Education

09/2011- 12/2105 **PhD in Mechanical Engineering**, University of Michigan, Ann Arbor, MI. **Specialization: Mechatronics**-[**GPA:3.9/4**]
Dissertation Title: "A Framework for Evaluation and Identification of Time Series Models for Multi-step Ahead Prediction of Physiological Signals".

Area of Study: Dynamic System Identification, Predictive Models, Machine Learning, Model Optimization, Physiological Systems, Stochastic Processes.

Adviser: Prof. Dawn M. Tilbury.

Main Courses: Probability and Random Processes, Linear Systems Theory, Time Series Analysis & Forecasting, Machine Learning, Mechatronic Systems Design, Robot Modeling and Control, Mechanical Vibrations, Data Science, Statistical Signal Processing, System Identification, Digital Control, Discrete Optimization, Spring Doctoral School on Identification of (Non)linear Dynamic Systems (at Vrije Universiteit Brussel, Brussels, Belgium).

09/2004 –06/ 2006 **MS in Mechanical Engineering,** Jordan Uni. of Science & Technology**,** Jordan**.**
Major: Mechatronics.
Graduated first class honors.

09/1997 – 02/2002 **BS in Mechanical Engineering**, Jordan Uni. of Science & Technology, Jordan.
Major: Mechatronics.
Graduated honored student.

Publications

Submitted/Published/Accepted Peer-reviewed Journal Papers

H. ElMoaqet, M. Rashed, M. Bakr. "Multi-Stage Domain-Adapted 6D Pose Estimation of Warehouse Load Carriers: A Deep Convolutional Neural Network Approach". *Machines,* 2025*,* 13(12), 1126.
https://doi.org/10.3390/machines13121126

H, ElMoaqet, A. Ahmed, M. Ryalat, N. Almtireen, M. Salanitro, M. Glos, T. Penzel. "End of Apnea Event Prediction Leveraging EEG Signals and Interpretable Machine Learning". *Biosensors*, 2025, *15*(11), 732. https://doi.org/10.3390/bios15110732

H. ElMoaqet, R. Janini, T. Alshirbaji, N. Jalal, K. Möller, K. (2025, September). "Spatio-Temporal Transformer for Surgical Instrument Recognition in Computer Aided Surgeries". In *Current Directions in Biomedical Engineering* (Vol. 11, No. 1, pp. 536-539). De Gruyter. https://doi.org/10.1515/cdbme-2025-0236

M. Ryalat, N. Almtireen, G. Al-refai, **H. ElMoaqet,** N. Rawashdeh. "Research and education in robotics: A comprehensive review, trends, challenges, and future directions". *Journal of Sensor and Actuator Networks*, 2025, *14*(4), 76. https://doi.org/10.3390/jsan14040076

M. Ryalat, G. Al-Refai, N. Almtireen and **H. ElMoaqet**, "Design of a ROS2-Based Hybrid Aerial-Ground Robot for Autonomous Inspection Applications," in *IEEE Access*, vol. 13, pp. 109274-109293, 2025, https://doi.org/10.1109/ACCESS.2025.3582653 .

N. Almtireen, A. A. Abuhejleh, M. Ryalat, **H. ElMoaqet**, G. Al-refai. "Deep transfer learning for sustainable waste management: Real-time waste segregation apparatus using a two-phase CNN framework". *The Journal of Supercomputing*, *81*(15), 1411. https://doi.org/10.1007/s11227-025-07931-2

H. ElMoaqet, R. Janini, M. Ryalat, G. Al-refai, T. A. Alshirbaji, N. A. Jalal, T. Neumuth, K. Moeller, and N. Navab. "Using Masked Image Modelling Transformer Architecture for Laparoscopic Surgical Tool Classification and Localization". *Sensors* 2025, *25*(10), 3017. https://doi.org/10.3390/s25103017

H. ElMoaqet, H. Qaddoura, M. Ryalat, N. Almtireen**,** T. A. Alshirbaji, N. A. Jalal, T. Neumuth, and K. Moeller. "Deep Learning Architectures for Single-Label and Multi-Label Surgical Tool Classification in Minimally Invasive Surgeries". *Applied Science* 2025, *15*(11), 6121; https://doi.org/10.3390/app15116121

G. Al-refai G, **H. ElMoaqet**, A. Al-Refai, A. Alzu'bi, T. Al-Hadhrami, and A. Alkhateeb. "Two-stage object detection in low-light environments using deep learning image enhancement". *PeerJ Computer Science,* 2025, 11, e2799. https://doi.org/10.7717/peerj-cs.2799

M. Ryalat, M. Al-Faouri, M., **H. ElMoaqet**, N. Almtireen, G. Al-Refai,. (2025). The Integration of Ecomechatronics and Industry 4.0 Towards Sustainable Manufacturing. In: Hehenberger, P., Bradley, D. (eds) *Mechatronic Futures*. Springer, Cham. https://doi.org/10.1007/978-3-031-83571-1_18

G. Al-refai G, D. Karasneh, **H. ElMoaqet**, M. Ryalat, and N. Almtireen. "Surface Classification from Robot Internal Measurement Unit Time-Series Data Using Cascaded and Parallel Deep Learning Fusion Models". *Machines,* 2025, 13(3), 251. https://doi.org/10.3390/machines13030251

N. Almtireen, V. Reddy, M. Sutton, A. Nedvidek, C. Karn, M. Ryalat, **H. ElMoaqet**, and N. Rawashdeh. "PLC-Controlled Intelligent Conveyor System with AI-Enhanced Vision of Efficient Waste Sorting". *Applied Sciences*, 15(3), 2025, 1550. https://doi.org/10.3390/app15031550

T. Abdulbaki Alshirbaji, NA Jalal, H. Arabian H, A. Battistel, PD. Docherty, **H. ElMoaqet**, T. Neumuth, and K. Moeller. "Cholec80-Boxes: Bounding Box Labelling Data for Surgical Tools in Cholecystectomy Images". *Data,* 10(1):7. https://doi.org/10.3390/data10010007

H. ElMoaqet, R. Janini, T. A. Alshirbaji, N. A. Jalal, and K. Möller. "Using Vision Transformers for Classifying Surgical Tools in Computer Aided Surgeries". *Current Directions in Biomedical Engineering*, 2024, vol. 10, no. 4, pp. 232-235. https://doi.org/10.1515/cdbme-2024-2056

M. Ryalat, E. Franco, **H. ElMoaqet**, N. Almtireen N, and G. Al-Refai. The Integration of Advanced Mechatronic Systems into Industry 4.0 for Smart Manufacturing. *Sustainability*. 2024; 16(19):8504. https://doi.org/10.3390/su16198504

H. ElMoaqet, H. Qaddoura, T. Almasri, T. A. Alshirbaji, N. A. Jalal, K. Moeller. "Tool Classification in Laparoscopic Images Using Feature Fusion Convolutional Neural Networks: A Single Label Classification Approach". *IFAC-PapersOnLine,* 2024, vo. 58, no. 24, pp. 391-396. https://doi.org/10.1016/j.ifacol.2024.11.069.

T. A. Alshirbaji, N. A. Jalal, H. Arabian, P. D. Docherty, **H. ElMoaqet**, T. Neumuth, K. Moeller. "Laparoscopic Tool Classification in Gynaecological Images Using Convolutional Neural Network and Attention Modules". *IFAC-PapersOnLine,* 2024, vo. 58, no. 24, pp. 391-396. https://doi.org/10.1016/j.ifacol.2024.11.068.

H. ElMoaqet, M. Eid, M. Ryalat, T. Penzel. “A CNN-BiLSTM Deep Learning Model for Automatic Scoring of EEG Signals”. *In Current Directions in Biomedical Engineering*, 9(1), 2023, 642-645. De Gruyter. https://doi.org/10.1515/cdbme-2023-1161

M. Ryalat, **H. ElMoaqet**, M. AlFaouri. "Design of a smart factory based on cyber-physical systems and Internet of Things towards Industry 4.0". *Applied Sciences*, 13(4), 2023, 2156. https://doi.org/10.3390/app13042156

H. ElMoaqet, M. Eid, M., Ryalat, T. Penzel. “A deep transfer learning framework for sleep stage classification with single-channel EEG signals”. *Sensors*, 22(22), 2022, 8826. https://doi.org/10.3390/s22228826

G. Al-refai, **H. ElMoaqet**, M. Ryalat. “In-Vehicle Data for Predicting Road Conditions and Driving Style Using Machine Learning”. *Applied Sciences,* 12(18), 2022, 8928. https://doi.org/10.3390/app12188928

H. ElMoaqet, M. Eid, M. Ryalat, T. Penzel. “An End-to-End Deep Leaning Approach for Sleep-Wake Classification Using Single Channel EEG Signals”. *In Current Directions in Biomedical Engineering,* ,8(2), 2022, 801-804. De Gruyter. https://doi.org/10.1515/cdbme-2022-1204

A. Alrajhi, O. Alswailem, G. Wali, K. Alnafee, S. AlGhamdi, J. Alarifi, **H. ElMoaqet**, A. AbuSalah. Data-driven prediction for COVID-19 severity in hospitalized patients”. *International journal of environmental research and public health*, 19(5), 2021, 2958. https://doi.org/10.3390/ijerph19052958

O. Alswailem, B. Horanieh, K., AlAbbad, A. AlMuhaideb, S. AlMuhanna, M. AlQuaid, **H. ElMoaqet**, N. Abuzied, A. AbuSalah. “COVID-19 Intelligence-Driven Operational Response Platform: Experience of a Large Tertiary Multihospital System in the Middle East”. *Diagnostics*, 11(12), 2021, 2283. https://doi.org/10.3390/diagnostics1112228

H. ElMoaqet, J. Kim, D. M. Tilbury, S. K. Ramachandran, M. Ryalat, C. H. Chu. "Gaussian Mixture Models for Detecting Sleep Apnea Events Using Single Oronasal Airflow Record". *Applied Sciences*, 10(21), 2020, 7889. https://doi.org/10.3390/app10217889

H. ElMoaqet, M. Glos, M. Ryalat, and T. Penzel. "Deep Recurrent Neural Networks for Automatic Detection of Sleep Apnea from Single Channel Respiration Signals. *Sensors* , 20(18), 2020, 5037. https://doi.org/10.3390/s20185037

M. Ryalat, H. S. Damiri, and **H. ElMoaqet**. "Particle Swarm Optimization of a Passivity-Based Controller for Dynamic Positioning of Ships". *Applied Sciences*, 10(20), 2020, 7314. https://doi.org/10.3390/app10207314

M. Ryalat, D. S. Laila, & **H. ElMoaqet**. "Adaptive Interconnection and Damping Assignment Passivity Based Control for Underactuated Mechanical Systems". *Int. J. Control Autom. Syst. 2020*. https://doi.org/10.1007/s12555-019-1019-z

M. Ryalat, H. S. Damiri, and **H. ElMoaqet**, I. AlRabadi, Imad. "An Improved Passivity-based Control of Electrostatic MEMS Device." *Micromachines*, Vol. 11, No.7, 2020. https://doi.org/10.3390/mi11070688

M. Ryalat, D. S. Laila, **H. ElMoaqet**, and N. Almtireen. "Dynamic IDA-PBC control for weakly-coupled electromechanical systems." *Automatica,* 115, 2020, 108880. https://doi.org/10.1016/j.automatica.2020.108880

M. Ibrahim, A. Alsheikh, Q. Al-Hindawi, S. Al-Dahidi, and **H. ElMoaqet**. "Short-Time Wind Speed Forecast Using Artificial Learning-Based Algorithms". *Computational Intelligence and Neuroscience*, 2020. https://doi.org/10.1155/2020/8439719

J. Kim, **H. ElMoaqet**, D. M. Tilbury, S. K. Ramachandran, and T. Penzel. "Time domain characterization for sleep apnea in oronasal airflow signal: a dynamic threshold classification approach". *Physiological measurement*, 40(5), 2019, 054007. https://doi.org/10.1088/1361-6579/aaf4a9

N. Almtireen, **H. ElMoaqet**, and M. Ryalat. "Linearized Modelling and Control for a Twin Rotor System". *Automatic Control and Computer Sciences*, 52(6), 2018, pp. 539-551. https://doi.org/10.3103/S0146411618060020

H. ElMoaqet, D. M. Tilbury, and S.K. Ramachandran: "Multi-Step Ahead Predictions of Critical Levels in Physiological Time Series", *IEEE Transactions on Cybernetics*, Volume 46 (7), 2016, pp. 1704-1714. https://doi.org/10.1109/TCYB.2016.2561974

H. ElMoaqet, D. M. Tilbury, and S. K. Ramachandran: "Effect of Concurrent Oxygen Therapy on Accuracy of Forecasting Imminent Postoperative Desaturations", *Journal of Clinical Monitoring & Computing*, (2014), pp. 1-11. https://doi.org/10.1007/s10877-014-9629-8

H. ElMoaqet, D. M. Tilbury, and S. K. Ramachandran: "Evaluating Predictions of Critical Desaturation Events" , *Physiological Measurement*, Volume 35, 2014, pp. 639-655. https://doi.org/10.1088/0967-3334/35/4/639

Submitted/Published/Accepted Peer-reviewed Conference Papers

N. Almtireen, M. Ryalat, G. Al-Refai, and **H. ElMoaqet**. "Digital Twin of a 3-DOF Cartesian Sorting Robot: A Mechatronics Education Case Study. *2025 International Conference on Computer and Applications (ICCA)*. IEEE, 2025, Bahrain, Bahrain, pp. 1-5, https://doi.org/10.1109/ICCA66035.2025.11430816

H. ElMoaqet, A. Ahmad, M. Salanitro, M. Glos, and T. Penzel. " Using Ensemble Methods to Predict End of Apnea Episodes with EEG Signals". 2025 *IEEE EUROCON 2025-21st International Conference on Smart Technologies*. IEEE, 2025, Gdynia, Poland, pp. 1-6, https://doi.org/10.1109/EUROCON64445.2025.11073264

M. Rashed, M. Bakr, and **H. ElMoaqet**. " Domain Adaptation of 6D Pose Estimation using Unpaired Image-to-Image Translation for a Warehouse Environment." *IEEE EUROCON 2025-21st International Conference on Smart Technologies*. IEEE, 2025, Gdynia, Poland, pp. 1-6, https://doi.org/10.1109/EUROCON64445.2025.11073506

G. Al-refai, M. Al-refai, **H. ElMoaqet**, M. Ryalat and N. Almtireen, "Performance Evaluation of YOLOv7 for Object Detection in Dark Environments." *2025 IEEE International Conference on Electro Information Technology (eIT)*, IEEE, 2025, Valparaiso, IN, USA, pp. 036-041, https://doi.org/10.1109/eIT64391.2025.11103626 .

N. Almtireen, M. Ryalat, and **H. ElMoaqet**. "Real Time Infrared Distance Sensor for Cyber-physical Systems Using Arduino-LabView Integration." *IEEE International Conference on Communication, Computing, Networking, and Control in Cyber-Physical Systems*. IEEE, 2025, Dubai, UAE, pp. 31-36. https://doi.org/10.1109/CCNCPS66785.2025.11135902 .

M. Ryalat, M. Ahasan, **H. ElMoaqet** and N. Almtireen, "Mechatronics Design and Simulation of a novel Hybrid Ground/Aerial robot for Infrastructure Inspection," *2025 11th International Conference on Automation, Robotics, and Applications (ICARA)*, Zagreb, Croatia, 2025, pp. 170-177, https://doi.org/10.1109/ICARA64554.2025.10977636 .

M. Ryalat, N. Almtireen, **H. ElMoaqet,** and M. Almohammedi, "The Integration of Two Smarts in the Era of Industry 4.0: Smart Factory and Smart City," *2024 IEEE Smart Cities Futures Summit (SCFC)*, Marrakech, Morocco, 2024, pp. 9-12. https://doi.org/10.1109/SCFC62024.2024.10698351 .

H. Altaha, A. Alissa, N. Almtireen, M. Ryalat, and **H. ElMoaqet**. "*AI-Driven Mobile App for Personalized Health Monitoring*". 2024 22nd International

Conference on Research an Education in Mechatronics. IEEE, 2024, Amman, Jordan, 2024, pp. 338-342, https://doi.org/10.1109/REM63063.2024.10735595 .

S. AlRadaideh, I. Aljoan, G. Al-refai and H. ElMoaqet, "Ground Classification for Robots Navigation Using Time Series Dataset with LSTM and CNN," *2024 22nd International Conference on Research and Education in Mechatronics (REM)*, Amman, Jordan, 2024, pp. 375-380, https://doi,org/10.1109/REM63063.2024.10735655 .

G. Al-Refai, S. Qadan, M. Al-Refai, and **H. ElMoaqet**. "*Introducing Edges Density and Texture Contrast Scores as Quality Metrics for Enhanced Low Light Images*". 2024 22nd International Conference on Research an Education in Mechatronics. IEEE, 2024, Amman, Jordan, 2024, pp. 1-5, https://doi.org/10.1109/REM63063.2024.10735629 .

A. A. Abuhejleh, M. Z. Alafeshat, N. Almtireen, **H. ElMoaqet**, and M. M. Alajlouni. "*Recyclable Waste Categorization With Transfer Learning*". 2024 22nd International Conference on Research an Education in Mechatronics. IEEE, 2024, Amman, Jordan, 2024, pp. 343-348, https://doi.or10.1109/REM63063.2024.10735626

H. ElMoaqet, D. Karasneh, S. Al-Dahidi, and G. Al-Refai. "*Predicting Solar Photovoltaic Power Production Using Artificial Intelligence-Based Algorithms*". 2024 12th IEEE International Conference on Intelligent Systems. IEEE, 2024, Varna, Bulgaria, 2024, pp. 1-5, https://doi/org/10.1109/IS61756.2024.10705265 .

M. Rashed, M. Bakr, and **H. ElMoaqet**. "*A GAN-Based Domain Adapted Deep Learning Pipeline for Object Detection in an Intralogistics Warehouse Environment*". 2024 32nd Mediterranean Conference on Control and Automation (MED). IEEE, Chania - Crete, Greece, 2024, pp. 209-214. https://doi.org/10.1109/MED61351.2024.10566189

M. Ryalat, N. A. Rawashdeh, N. A. Alrub and **H. ElMoaqet**, "Mechatronics Design and Control of a Hybrid Flying-Ground Robot for Long-Endurance Mobility," 2024 12th International Conference on Control, Mechatronics and Automation (ICCMA), London, United Kingdom, 2024, pp. 336-342. https://doi.org/10.1109/ICCMA63715.2024.10843909 .

M. Ryalat, H. Alawamleh, **H. ElMoaqet**, N. Almtireen. "*Mechatronics Design and Implementation of a Smart Plastic Injection Moulding Machine*." 2023 11th International Conference on Control, Mechatronics and Automation (ICCMA). IEEE, 2023.

https://doi.org/10.1109/ICCMA59762.2023.10374750 .

H. ElMoaqet, M. Eid, M. Ryalat, N. AlMtireen, T. Penzel. *Automatic Sleep Staging for EEG Signals Using GoogLeNet Deep Architecture and Continuous Wavelet Transform*. 2023 Seventh International Conference on Advances in Biomedical Engineering (ICABME). IEEE, Beirut, Lebanon, 2023, pp.115-120. https://doi.org/10.1109/ICABME59496.2023.10293073

M. Ryalat, **H. ElMoaqet**, N. Almtireen, M. AlFaouri. "*Towards Industry 4.0: Mechatronics Design of a Smart Factory with IoT-Enabled Real-Time Control Using myRIO with LabVIEW".* 17th Mechatronics Forum International Conference. 2023
https://mechatronics2023.eu/wp-content/uploads/2023/09/MX_2023_session_2_paper_2_ryalat.pdf

H. Muhsen, A. Alkhraibat, **H. ElMoaqet**. "*Competencies of Fault Ride through in Microgrid Modeling: A case study*." 2021 IEEE Jordan International Joint Conference on Electrical Engineering and Information Technology (JEEIT). IEEE, 2021.
https://doi.org/10.1109/JEEIT53412.2021.9634152

M. Ryalat, M. Alsherqatli, and **H. ElMoaqet**. "*IoT-aided Smart Lawnmower*." Proceedings of the 3rd International Symposium on Computer Science and Intelligent Control, 2019. pp. 1-8. https://doi.org/10.1145/3386164.3387298

H. ElMoaqet, I. Ismael, F. Patzolt. "CPSI4.0: "*Design and Integration of an IoT Device for Training Purposes of Industry 4.0*". Proceedings of the 2nd International Symposium on Computer Science and Intelligent Control, 2018, pp. 1-5. https://doi.org/10.1145/3284557.3284740

S. Al-Dahidi, **H. ElMoaqet**. "*Direct and Recursive Strategies for Multi-Step Ahead Wind Speed Forecasting*". International conference on Time Series and Forecasting (ITISE), Granada, Spain, 2018

C. Maclellan, **H. ElMoaqet**, B. Porr, and K. Moeller. "*Time Series Predictions of Surgical Progress Using Logistic Regression Modelling*." AUTOMED-Automation Techniques for Medicine (2018), Villingen-Schwenningen, Germany, pp. 80-83. ISBN: 9783958533844

H. ElMoaqet, D. M. Tilbury, and S. K. Ramachandran Moeller. "*A Novel Time Series Model to Predict Critical Desaturation Events in the Blood*." AUTOMED-Automation Techniques for Medicine (2018), Villingen-Schwenningen, Germany, pp. 87-90. ISBN: 9783958533844

M. Ryalat, D. S. Laila, N. Almtireen and **H. ElMoaqet**. "*A Novel Dynamic IDA-PBC Controller for Electrostatic MEMS Devices*", American Control Conference, IEEE, 2018. https://doi.org/10.23919/ACC.2018.8431845

H. ElMoaqet, Z. Almuwaqqat, and M. Saeed. "*A new algorithm for predicting the progression from paroxysmal to persistent atrial fibrillation*." Proceedings of the 9th International Conference on Bioinformatics and Biomedical Technology. ACM, 2017. https://doi.org/10.1145/3093293.3093311

H. ElMoaqet, Z. Almuwaqat, M. Ryalat, and N. Almtireen. "*A new algorithm for short term prediction of persistent atrial fibrillation*." In Applied Electrical Engineering and Computing Technologies (AEECT), 2017 IEEE Jordan Conference on. IEEE, 2017. https://doi.org/10.1109/AEECT.2017.8257740

H. ElMoaqet, D. M. Tilbury, and S. K. Ramachandran: "*A Probabilistic Approach for Evaluating Predictions of Critical Levels in Physiological Time Series*", Proceedings of the American Control Conference, IEEE, 2016. https://doi.org/10.1109/ACC.2016.7526720

J. Kim**, H. ElMoaqet**, D. M. Tilbury, and S. K. Ramachandran: "*A New Algorithm for the Detection of Sleep Apnea Events in Respiration Signals*", In Engineering in Medicine and Biology Society (EMBC), 2016 IEEE 38th Annual International Conference of the (pp. 3199-3202). IEEE. https://doi.org/10.1109/EMBC.2016.7591409

H. ElMoaqet, D. M. Tilbury, and S. K. Ramachandran: "*A Novel Dynamic Model to Predict Abnormal Oxygen Desaturations in Blood*", Proceedings of the IEEE International Symposium on Medical Measurements and Applications- MeMeA, 2014. https://doi.org/10.1109/MeMeA.2014.6860062

H. ElMoaqet, D. M. Tilbury, and S. K. Ramachandran: "*Predicting Oxygen Saturation Levels in Blood Using Autoregressive Models: A Threshold Metric for Evaluating Predictive Models*," Proceedings of the IEEE-American Control Conference, 2013. https://10.0.4.85/ACC.2013.6579923

Professional Background

Academia

10/2025 - Now

Professor, *Mechatronics Engineering Department, School of Applied Technical Sciences*, German Jordanian University, Amman, Jordan

- **Research Themes**: Mechatronics and Artificial Intelligence (AI), AI applications in Healthcare, Robotics, and Smart Industry. Computer Vision, Sleep Medicine, Systems & Control, Physiological Systems, Internet of Things (IOT) & Industry 4.0.

- **Major Funded Research Projects:**
  1. Smart Factories and the Green Transition – Advanced Aspects of Connectivity and Network Cybersecurity
     - *Project in Collaboration with Jordan University of Science a Technology (JUST), Al Hussein Technical University (HTU) and Kasih Food Production Co.*
     - *Funded by GJU-HTU-JUST Matching Grant Program: 12/2025 – 12/2027, 80K Jordan Dinars.*

  2. Smart Artificial Intelligence Methods for Analysis and Resilient Modelling of Big Biomedical Data (SMART-AIM).
     - *Project in Collaboration with Konstanz University of Applied Sciences (HTWG Konstanz) and Reutlingen University (RU).*
     - *Funded by DAAD Ta'ziz Partnership – Short-term measures: 1/4/2025 – 31/12/2024, 40K Euros.*

  3. AI-Driven Unmanned Aerial Vehicles (UAVs) for Efficient and Safe Campus Infrastructure Inspection and Safety Enhancement at GJU.
     - *Funded by GJU Deanship of Scientific Research -Seed Grant: 02/2025 – 02/2027, 33K Jordan Dinars*.

  4. A Collaborative Visual SLAM Framework for Multi-Autonomous Mobile Robots within Industry 4.0 Environment.
     - *Funded by GJU Deanship of Scientific Research -Seed Grant: 02/2025 – 02/2027, 33K Jordan Dinars.*

  5. Automated Intelligent Transport System for Harvest Goods (ARIMASS).
     - *Project in Collaboration with Trier University.*
     - *Funded by Trier University – International Blended Mobility Projects on the Sustainable Development Goals (SDGS): 01/2025 – 12/2025, 15K Euros.*

  6. Prediction of Cardiovascular Diseases in Sleep Apnea Patients Using Deep Learning and Polysomnography (PSG) Data.
     - *Project in Collaboration with Charité – Universitätsmedizin Berlin*
     - *Funded by DAAD Study Group Mobility Fund: 1/5/2024 – 31/5/2025, 15K Euros.*

  7. Developing Deep Transformer Models for Tracking Surgical Tools in Robotic and Computer Assisted in Laparoscopic Surgeries.
     - *Project in Collaboration with Furtwangen University*
     - *Funded by DAAD Study Group Mobility Fund: 1/5/2023 – 31/5/2024, 15K Euros.*

8. Establishing a Competence Research Center for Industry 4.0 in the German Jordanian University.
   - *Project in Collaboration with Fulda University of Applied Sciences (HS-Fulda), Duale Hochschule Baden-Württemberg (DHBW)-Mosbach, Furtwangen University (HFU), and Festo Didactic SE.*
   - *Funded by GJU Deanship of Scientific Research -Research Cluster Grant: 08/2022 – 12/2024, 500K Euros.*

9. World Twin: Curriculum Development & Research Partnership in Robotics.
   - *Project in Collaboration with Technical University of Applied Sciences Würzburg-Schweinfurt (THWS-Germany) University of Applied Sciences Wiener Neustadt (FHWN-Austria), UET Lahore University of Engineering and Technology (UET-Pakistan), National Kaohsiung University of Science and Technology (NKUST-Taiwan), and Shenzhen Technology University (SZT-China).*
   - *Funded by DAAD HAW. International 1/2022 – 31/12/2025, 1Million Euros*.

10. Advanced Methods of Machine Learning for Signal and Image Processing in Healthcare.

    - *Funded by GJU Deanship of Scientific Research – Seed Grant: 10/2018 – 6/2021, 30K Jordan Dinars*.

11. Data Driven Predictive Models for Physiological Signals with Particular Emphasis on Sleep Medicine.
    - *Project in Collaboration with Humbolt University-Berlin and Charité – Universitätsmedizin Berlin.*
    - *Funded by the German Research Foundation (DFG)-Initiation of International Collaboration: 10/2017-6/2019,11K Euros.*

- **Teaching Experience:**
  1. ME0557 – Automation and Industry 4.0 (SP-24, FA-24, SP-25)
  2. ME223 – Thermo-fluids (SP-16)
  3. ME343 – Automatic Control Systems (SU-19, 20, FA-22, 23, SP-23)
  4. ME344 – Control Systems I (FA- /SP-16, 17, 18, 19, 20)
  5. ME522- Hydraulic and Pneumatic Systems (SP-20)
  6. ME555- Machine Intelligence (SP-19, 20)
  7. ME347 - Instrumentation and Measurement Lab (FA- /SP-16, 17)
  8. ME3430- Automatic Control Systems Lab (FA-/SP-17,18,19, 20)
  9. ME5220 – Hydraulics and Pneumatics Lab (SP-20)

- **Committee Service:**
  - SATS Scientific Research Committee (Member, 10/2025 – Now)
  - Mechatronics Engineering New Study Plan (Chair, 9/2023-9/2024)
  - REM2024 Organizing Committee (Chair, 9/2023-11/2024)
  - SATS School Council (Member, 9/2020 – 07/2025)
  - GJU Industrial Relations (Member, 9/2016 -9/2020)
  - IE Dual Study Committee (Member, 7/2019 – 9/2020)
  - SATS Industrial Links (d, 9/2016 -9/2020)
  - MSD Lab Upgrade (Chair, 6/2020 -9/2020)
  - Selection for ME Assistant Prof. & Lecturer (Member, 6/2020-8/2020)
  - Creativity Committee (Member, 11/2018 -9/2020)
  - SATS Scientific Research Committee (Member, 10/2019 – 9/2020)
  - ME TA / RA Selection Committee (Member, 9/2018 -12/2018)
  - Selection for the Best Industrial Professor (Chair, 6/2017 -8/2017)
  - ME Study Plan (Chair, 5/2017 – 9/2019)
  - NTP Organizing Committee (Member, 1/2017 -5/2017)
  - SATS Graduate Studies (Member, 11/2016 – 9/2018)
  - SATS Executive Council (Member, 9/2016 – 9/2017)

02/2024 - Now **Founding Director and Principal Investigator (PI) for the Industry 4.0 Lab (I4.0 Lab @ GJU),** *The Technology, Research, and Innovation Park (TRIP),* German Jordanian University, Amman, Jordan

I4.0 Lab at GJU is an industry-university collaboration research and innovation lab. The mission of the I.40 Lab is to advance manufacturing intelligence technology, including Digital Twin, Internet-of-Things (IoT), Open Process Automation (OPA), and human-robot collaboration, by bringing industry and university research together, building a collaborative plug-and-play ecosystem for rapidly advancing technology, and building a platform to enable workforce development for Industry 4.0, and beyond.
https://www.gju.edu.jo/content/labs-19904

10/2020 – 7/2025 **Chairman of the Mechatronics Engineering Department,** *School of Applied Technical Sciences (SATS),* German Jordanian University, Amman, Jordan

- Founder and Director of the GJU Industry 4.0 Competence Research Center (*500K Euros*)
- Established State of Art New Microcontroller and IoT Lab (*50K Euros*)
- Established State of Art New Actuators Lab (*50K Euros*)
- Integrated Artificial Intelligence track with Mechatronics Curriculum
- Led several department initiatives that resulted in 25% increase in the number of admitted students

12/2020 - Now **Associate Professor,** *Mechatronics Engineering Department, School of Applied Technical Sciences*, German Jordanian University, Amman, Jordan

10/2016 – 10/2020 **Assistant Dean for Industrial Links and Training,** *School of Applied Technical Sciences (SATS),* German Jordanian University, Amman, Jordan

- Coordinated academic-Industry relationship with school industry partners
- Coordinated applied research projects with industry
- Developed structured field training programs for students
- Participated in establishing Dual Study Program in IE Department.

03/2016 – 12/2020 **Assistant Professor,** *Mechatronics Engineering Department, School of Applied Technical Sciences*, German Jordanian University, Amman, Jordan

9/2017 – 3/2019 **Visiting Research Scientist,** *Non-Linear Dynamics Research Group,* Humboldt University, Berlin, Germany

- Develop novel modeling methods and interventional control systems for sleep breathing disorders
- Develop data-driven models for prediction for sleep apnea and automated treatment
- Analyzed time series using non-linear dynamical approaches for characterizing coordination and synchronization between different signals

9/2017 -10/2017 **Visiting Professor**, *Institute of Technical Medicine (ITeM),* Furtwangen University of Applied Science (HFU), Villingen-Schwenningen, Germany

- Developed machine-learning models to predict surgical progress and surgery total lengths to improve scheduling in operating room.
- Developed data fusion algorithms to detect surgery phases using recurrent and convolutional deep neural networks

7/2015 – 9/ 2016 **Postdoctoral Research Fellow,** *Department of Mechanical Engineering,* University of Michigan, Ann Arbor, MI.

- Investigated Heart Rate Variability metrics for predicting postoperative respiratory loss.
- Developed a probabilistic approach for evaluating multi-step ahead predictions of critical levels in physiological time series.
- Developed an algorithm for detecting sleep apnea using respiration signals
- Investigated multi-step ahead predictions of sleep apneic events.

9/ 2011 -12/2015 **Graduate Student Research Assistant**, *Controls Group*, University of Michigan, Ann Arbor, MI.
Advisor: Prof. Dawn M. Tilbury.

- Developed predictive models to capture the dynamics of blood oxygenation and pulse rate signals.
- Used dynamic systems models built from physiological signals to predict postoperative and respiratory complications.
- Developed new performance metrics for evaluating predictions of critical events within blood oxygenation signals.
- Identified novel modeling methodologies for predicting abnormal changes of oxygen saturation in the blood.
- Developed computational heart rate variability (HRV) markers for predicting respiratory loss in surgical obstructive sleep apnea patients.
- Developed a novel modeling framework for short term predictions of critical levels in physiological signals.

5/2014 – 7/2014 **Visiting PhD Student,** *Department of Fundamental Electricity and Instrumentation*, *Vrije Universiteit Brussel, Brussels, Belgium.*
Research Mentor: Prof. Kurt Barbe.

- Frequency domain identification of predictive models using high frequency resolution data.
- Developing predictive models over specific frequency bands.
- Improving likelihood properties of auto-regressive models constructed from short data records.
- Developing predictive dynamic models with guaranteed confidence bounds on short term predictions of critical level in physiological signals.

1/2013 - 5/2013 **Graduate Student Instructor**, *ME-395 Lab-I*, University of Michigan, Ann Arbor, MI.

- Instructor for mechanical engineering laboratory for ME undergrads.
- Responsible for teaching theoretical aspects for lab experiments.
- Directed students when performing experiments during lab sessions
- Trained students on the skills needed for experimental work including data analysis and interpretation of experimental uncertainty.

10/2010 - 7/2011 **Research and Teaching Assistant**, *Department of Mechatronics Engineering,* German-Jordanian University, Amman, Jordan

- Instructed Control and Instrumentation Lab.
- Instructed Industrial Automation Lab.
- Supervised Computer Aided Design Lab (CAD)

Industry

2006 -2010 **Control and Instrumentation Engineer**, *JBC Plant*, Albemarle Corporation, Baton Rouge, LA.

- Full responsibility for management of Control and Instrumentation Devices
- Participated in the team of bromine plant expansion
- Improved process control performance in the plant.
- Configured and commissioned Distributed Control Systems (DCS) and Programmable Logic Controllers (PLC) for new projects
- Configured Emergency Shut-down Control Loops (ESD) in the plant.
- Actively participated in root cause failure analysis (RCFA) and Process Hazardous Analysis (PHA) sessions in the plant.
- Participated in Implementing ISO-9000 and ISO-14000 in the plant.

2002-2006 **Controls Engineer**, *Electrical and Instrumentation Department*, Jordan Petroleum Refinery Company, Zarqa, Jordan.

- Configured new field instrumentation and control systems in the refinery process units, Lube Oil Plant and Liquid Petroleum Gas Filling units.
- Participated in commissioning new electromechanical equipment in refinery.
- Participated in upgrading instrumentation and control systems and updating devices' specifications.

Awards and Honors

2025 • **IEEE Regional Exemplary Student Branch Award**
(Awarded to IEEE GJU Studet Branch under my leadership)

2025 • **GJU Staff Mobility Award**
(*Awarded by GJU to visit Furtwangen University*)

2024 • **GJU Study Mobility Award**
(Awarded by DAAD to visit Charité – Universitätsmedizin Berlin)

2024 • **Best Regional IEEE-EMBS Professional Chapter Award**
(Awarded to the EMBS Jordan Chapter under my leadership)

2023 • **GJU Study Mobility Award**
(Awarded by DAAD to visit Furtwagen University)

2023 • **Erasmus Plus Staff Mobility Award**
(Awarded by EU to visit Fulda University of Applied Sciences)

2019 • **Postdoc-NeT-AI Fellowship**
(*Awarded by DAAD for a selection of outstanding scientists to visit the German hotspots in AI and industry 4.0)*

2018 • **Distinguished GJU Researcher Award**

(Awarded by GJU Deanship of Scientific Research)

2017 • **GJU Staff Mobility Award**
(*Awarded by GJU to visit Furtwangen University*)

2017 • **First Prize in 19th Arab Forum for Entrepreneurship**
(*Awarded by ACTSAU & AGYA for the best project in the track of information systems)*

2014 • **Summer Research Stay at the ELEC Dep. at VUB, Brussels, Belgium**
(Awarded by UMICH)

2013, 2014 • **Conference Travel Grants**
(Awarded by UMICH to attend International Conferences)

2013 • **Fellowship to join the ELEC Doctorl School on (Non)linear System Indetification**
(Awarded by VUB, Brussles, Belgium)

2011 • **Full PhD Scholarship at the University of Michigan, Ann Arbor, USA**
(*Awarded by GJU)*

2006 • **Distinguished Academic Performance in Graduate Studies**
(*Awarded by Ministry of Higher Education- Jordanian Government)*.

2002 • **Dean's honor list**
(*Awarded by JUST during undergraduate studies for multiple years*.)

Summary of Skills

Interpersonal Skills

Strong oral and written communication skills.
Enjoy interacting with people, flexible, self-motivating, result oriented.

Computer

Languages	MATLAB, Python, C, C++.
Platforms	Windows, UNIX, DOS.
Packages	CPLEX, Mathematica, Scipy/Numpy, Scikit-learn, Tensorflow, Keras,
Office Tools	Microsoft Office, LATEX.

Languages

Arabic	Fluent (Native language).
English	Fluent (Speaking, reading, and writing).
French	Basic (Speaking, reading, and writing).

Professional Service and Leadership

IEEE

2025 – Now
- Middle East and Africa Representative and member of the EMBS Administrative Committee
https://www.embs.org/about/embs-officers/

2024 – Now
- Associate Editor of IEEE Journal of Biomedical and Health Informatics (IEEE-JBHI – IF:7.7)
https://www.embs.org/jbhi/associate-editors/

- Co-Founder AI, Machine Learning, Deep Learning, Computer Vision and LLM Group
https://jordan.ieee.org/ai-machine-learning-deep-learning-computer-vision-and-llm-group/

2022- Now
- Chair, IEEE Jordan Section Engineering in Medicine and Biology Society (EMBS) Chapter.
https://jordan.ieee.org/communities/chapters/engineering-in-medicine-and-biology-society/

2022- Now
- Senior Member of EMBS
- Senior Member of Robotics and Automation Society (RAS)
- Senior Member of Industrial Electronics Society (IES)
- Senior Member of Industry Application Society (IAS)
- Senior Member of Power and Energy Society (PES)

2020- Now
- Counselor of the IEEE GJU Student Branch

2018- 2020
- Vice Chair, Jordan IEEE – EMBS Chapter

2017- Now **Editorial Board Member**
- Insight – Automatic Control
- Information Engineering and Applied Computing
- Progress in Human Computer Interaction
- Analytical & Bioanalytical Techniques (SMABT)
- SM Journal of Family Medicine
- Immunology Research And Therapy Journal
- EC Orthopaedics
- Annals Of Orthopaedics, Trauma And Rehabilitation

2017-Now **Conference Organizing/Scientific Committee Member**
- Conference Chair and Main Organizer, 2024 IEEE Research and Education in Mechatronics (IEEE-REM2024)
- Publication Chair, IEEE- International Biomedical Engineering Conference (JIBEC-2024)
- 2022 Jordan International Joint Conference of Electrical Engineering and Information Technology (JEEIT-2020)
- Scientific Track Chair -Mechatronics, Robotic & Controls in JEEIT2022

- 2020 Jordan International Joint Conference of Electrical Engineering and Information Technology (JEEIT-2020)
- Scientific Track Chair -Mechatronics, Robotic & Controls in JEEIT2020
- 2017 2nd International Conference on Biomedical Imaging, Signal Processing (ICBSP 2017), New Jersey, USA, Oct 18-20, 2017
- 10th International Conference of Bioinformatics and Biomedical Technology, Netherlands, May 16-17,2018
- 2018 International Conference on Bioinformatics and Neurosciences (ICoBN 2018), Las Vegas, USA, 2018 on August 27-29, 2018.
- 9th Jordanian International Mechanical Engineering Conference (JIMEC 2018), Jordan

2013-Now **Reviewer**

- IEE Transactions on Neural Systems and Rehabilitation
- IEEE-Transactions on Biomedical Engineering
- IEEE-Transactions on Biomedical and Health Informatics
- IEEE-Transactions on Instrumentation and Measurements
- IEEE-Transactions on Cybernetics
- IEEE Reviews in Biomedical Engineering
- IEEE-Access
- Digital Health
- PLOS ONE
- BMJ Open
- Journal of Neural Engineering
- Computer Methods in Biomechanics and Biomedical Engineering
- Journal of Computational Design and Engineering
- Physiological Measurement
- Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery
- Wiley: Advanced Science
- Medical & Biological Engineering & Computing
- Journal of Soft Computing
- International Journal of Intelligent Robotics and Applications
- Journal of Intelligent Manufacturing
- Scientific Reports
- American Control Conference/ IEEE- Conference on Decision & Control
- IEEE Engineering in Medicine and Biology Conference
- ASME -Dynamic Systems and Control Conferce