Jumana Ma'touq, Ph.D.

Associate Professor
Department of Biomedical Engineering
German Jordanian University
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PO Box 35247, Amman 11180
Jordan

Education

10.2015 - 10.2019 **Ph.D. Biomedical Engineering**
Faculty of Electrical Engineering and Informatics,
Leibniz Universität Hannover,
Hanover, Germany
Dissertation: Human Hand Neuromechanics for the Design of Robotic Intelligent Upper Limb Prostheses
Grade: Magna cum laude (very good)
The first female doctoral graduate from the Institute of Automatic Control since its establishment in 1963

09.2011 - 09.2012 **M.Sc. Medical Engineering**
School of Mechanical Engineering,
University of Leeds,
Leeds, United Kingdom
Grade: Distinction

09.2003 - 02.2008 **B.Sc. Biomedical Engineering**
Faculty of Engineering,
Jordan University of Science and Technology,
Irbid, Jordan
Grade: Very good
Ranked as the second-best student

Professional Experience

02.2025 - Present **Associate Professor**
Department of Biomedical Engineering,
School of Applied Medical Sciences,
German Jordanian University,
Amman, Jordan

09.2022 - Present **Exchange Coordinator**
Department of Biomedical Engineering,
School of Applied Medical Sciences,
German Jordanian University,
Amman, Jordan

09.2024 - 09.2025 **Vice Dean**
Deanship of Innovation, Technology Transfer and Entrepreneurship (DI-TECH),
German Jordanian University,
Amman, Jordan

02.2021 - 02.2025 **Assistant Professor**
Department of Biomedical Engineering,
School of Applied Medical Sciences,
German Jordanian University,
Amman, Jordan

10.2020 - 02.2021 **Part-time Lecturer**
Department of Biomedical Engineering,
School of Applied Medical Sciences,
German Jordanian University,
Amman, Jordan

02.2014 - 08.2015 **Lecturer**
Department of Biomedical Engineering,
School of Applied Medical Sciences,
German Jordanian University,
Amman, Jordan

01.2010 - 09.2011 **Teaching and Research Assistant**
Department of Biomedical Engineering,
School of Applied Medical Sciences,
German Jordanian University,
Amman, Jordan

Taught Courses and Laboratories

- Medical Signal Processing
- Medical Signal Processing LAB
- Medical Instrumentation I
- Medical Instrumentation II
- Signals and Systems
- Electrical Circuits LAB
- Digital Image Processing
- Medical Image Processing LAB
- Automatic Control Systems for Medical Applications
- Introduction to Biomedical Engineering
- Artificial Organs and Limbs
- Biomechanics and Rehabilitation I
- Biomechanics and Rehabilitation II
- Biomechanics and Rehabilitation LAB
- Biomaterials
- Biomaterials LAB
- Prosthetics and Artificial Organs
- Computer Application in Biomedical Engineering

Research Interests

- Biomechanics and Neuromusculoskeletal Modelling
- Medical/Rehabilitation Instrumentation and Technology
- Artificial Intelligence and Machine Learning
- Virtual Reality in Healthcare and Education
- Medical Signal and Image Processing

Funded Projects and Research Activities

- Research and Mobility Project, Co-PI, Project: Biomedical Engineering Innovation and Technology (MEDiTech 2025), ≈40K EURO, DAAD, Sep-Dec 2025
- Research and Mobility Project, Co-PI, Project: Biomedical Engineering Innovation and Technology (MEDiTech 2024), ≈40K EURO, DAAD, Sep-Dec 2024

- Research and Mobility Project, Co-PI, Project: Sensor Technology for Advanced Biomedical Engineering and Smart Systems (SENSET), ≈40K EURO, DAAD, Jun-Dec 2024
- Professional Development Grant, ≈3K GBP, Mar-Dec 2024, British Council, Jordan
- Research Stay, Jun 2022, Leibniz-Institute for Analytical Science (ISAS), Germany
- SEED Grant, Principal Investigator, Project: The Association Between Mobile Phone Usage and The Neuromusculoskeletal Complaints of The Upper Extremity, ≈36K EURO, 2022-2024, German Jordanian University, Jordan
- DAAD Research Grants - German-Arab Transformation Partnership, Co-investigator and Jordan Coordinator, Project: Modernization and Enabling Advanced Research/Higher Education via Transferring and Implementing Planar Waveguide NMR Spectroscopy for Real-time Investigation of Living 3D Cardiomyocyte Stem Cells, ≈177K EURO, 2021-2023, DAAD, Germany
- DAAD Research Grants - Doctoral Programmes in Germany, 2015, Germany

Selected Supervised Theses

- Development of a Real-time Monitoring System for Microwave Liver Ablation using the Phase Shift Method Applied to Ex-vivo Bovine Liver Measurements (MSc), 04.2024-10.2024, RheinMain Hochschule, Germany (Co-advisor)
- Hybrid RF/FSO Links in Wireless Sensor Networks (MSc), 02.2024-Present, Al-Hussein Bin Talal University, Jordan (Co-advisor)
- Investigation of Foot Pressure Measurement using Strain Gauge Sensors (BSc), 2024, German Jordanian University
- Investigation of Heart Rate Measurements for Wearable Devices (BSc), 2024, German Jordanian University
- High-Fidelity 3D Printing Approach for Pancreatic Models (BSc), 2024, German Jordanian University and apoQlar, Hamburg, Germany
- Gait Cycle Assessment Using Dual Mobile Phone Cameras (BSc), 2023, German Jordanian University
- Investigation of Foot Pressure Measurement (BSc), 2023, German Jordanian University
- Modelling of Knee Ligaments (BSc), 2023, German Jordanian University and Forschungslabor für Biomechanik und Implantattechnologie (FORBIOMIT), Rostock, Germany
- Knee Assistive Device (BSc), 2022, German Jordanian University
- Virtual Rehabilitation of Children with Cerebral Palsy (BSc), 2022, German Jordanian University
- Virtual Biomechanics Lab: Human Gait Analysis (BSc), 2022, German Jordanian University
- Investigations of Designing an Automated Medical Dispenser (BSc), 2021, German Jordanian University
- Tremor Detection and Suppression in Parkinson's Patients (BSc), 2021, German Jordanian University
- Human Hand Dynamics Modelling: Implementation and Evaluation of Muscle Activation Estimation (BSc), 2019, Leibniz Universität Hannover
- Investigating the Implementation of Pneumatic Rubber Muscles in Upper Limb Exoskeleton Suit Controlled by Electromyography Signals (BSc), 2015, German Jordanian University
- Robotic Gripper Arm Based on Voice Recognition (BSc), 2014, Amman Al-Ahliyyah University
- Muscle Controlled Upper Limb Prosthesis (BSc), 2014, German Jordanian University
- Blind Assistive Technology Based on Android Platform (BSc), 2014, Amman Al-Ahliyyah University

Awards and Honors

- Winner of the Study UK Alumni Award 2023-2024 in Science and Sustainability, British Council, 2023-2024, Jordan
- Said Foundation Achievement Prize 2024 (shortlisted), Said Foundation, 2024, United Kingdom
- Study UK Alumni Award 2022-2023 (shortlisted), British Council, 2022-2023, Jordan
- Selected as Inspiring and Successful Women, IEEE GJU, 2022, Jordan
- DAAD Research Grants - Doctoral Programmes in Germany, 2015, Germany
- The 8th National Technology Parade Award, 2015, Jordan
  The awarded project is "Investigating the Implementation of Pneumatic Rubber Muscles in Upper Limb Exoskeleton Suit Controlled by Electromyography" with rank one in the health and biomedical technology track.
- The 7th National Technology Parade Award, 2014, Jordan
  The awarded project is "Robotic Gripper Arm Based on Voice Recognition" with rank one in the health and biomedical technology track.
- Said Foundation Scholarship, 2011, United Kingdom
  I was awarded the scholarship as one of the top three students out of 100 applicants in Jordan.
- The Hisham Hijjawi Award, 2010, Jordan

Academic Services and Other Activities

- Member of the Creativity Award for Children and Youth Committee, Jun-Sep 2024, Abdul Hameed Shoman Foundation (AHSF), Jordan
- Member of the DAAD in Region Scholarship Committee, May 2024, DAAD (Jordan Office), Germany
- Assessor for Saïd Foundation Scholarship, Dec 2023, Saïd Foundation, United Kingdom
- Member of Erasmus+ Scholarship Selection Committee (European seats), Nov 2023, Erasmus+ Assessment Center, German Jordanian University, Jordan
- Member of the Scientific Research Committee, 2023-2024, Department of Biomedical Engineering, German Jordanian University, Jordan
- Member of Erasmus+ Scholarship Selection Committee (German seats), Sep 2023, Erasmus+ Assessment Center, German Jordanian University, Jordan
- Member of the DAAD PhD Scholarship Committee, Oct 2023, DAAD (Jordan Office), Germany
- Member of the Creativity Award for Children and Youth Committee, Feb-Sep 2023, Abdul Hameed Shoman Foundation (AHSF), Jordan
- Member of the DAAD in Region Scholarship Committee, Sep 2023, DAAD (Jordan Office), Germany
- Developing a new study plan for the BSc Biomedical Engineering program, 2023, Department of Biomedical Engineering, German Jordanian University
- Invited Speaker: With a DAAD scholarship to Germany how was it and what is next?, Information and Networking Dinner, Mar 2023, DAAD (Jordan Office), Germany

- Member of the Selection Panel of Saïd Foundation Scholarship, 2023, Saïd Foundation, United Kingdom
- Member of the DAAD Scholarship Extension Committee, May 2023, DAAD (Jordan Office), Germany
- Member of Erasmus+ Scholarship Selection Committee, Feb 2023, Erasmus+ Assessment Center, German Jordanian University, Jordan
- Member of the School Council, 2022-20223, School of Applied Medical Sciences, German Jordanian University, Jordan
- Member of the Creativity Award for Children and Youth Committee, 2022, Abdul Hameed Shoman Foundation (AHSF), Jordan
- Member of the Scientific Research Committee, 2022-2023, School of Applied Medical Sciences, German Jordanian University, Jordan
- Member of the Curriculum Committee, 2022-2023, School of Applied Medical Sciences, German Jordanian University, Jordan
- Member of New Programme Committee (Health Intelligence), 2022, School of Applied Medical Sciences, German Jordanian University, Jordan
- Academic advisor for Biomedical Engineering students (Batch of 2019), Department of Biomedical Engineering, German Jordanian University, Jordan
- Attending Meet the Researchers: Immersive Technology - The New Reality (Online), 2021, Webinar, University of Leeds, United Kingdom
- Member of the School Council, 2021-2022, School of Applied Medical Sciences, German Jordanian University, Jordan
- Member of the Accreditation and Curriculum Committee, 2021-2022, Department of Biomedical Engineering, German Jordanian University, Jordan
- Member of the Scientific Research Committee, 2021-2022, Department of Biomedical Engineering, German Jordanian University, Jordan
- Preparing for the German Accreditation Committee meeting, 2021, Department of Biomedical Engineering, German Jordanian University, Jordan
- Assessor for Saïd Foundation Scholarship, 2018, Saïd Foundation, United Kingdom
- Member of the jury in the 8th National Technology Parade, 2015, University of Jordan, Jordan
- Graduation Projects Coordinator, 2014-2015, Department of Biomedical Engineering, German Jordanian University, Jordan
- Member of the Accreditation Committee, 2014, Department of Biomedical Engineering, German Jordanian University, Jordan

- Member of the Tender Committee of Biomechanics and Biomaterials Labs, 2014, Department of Biomedical Engineering, German Jordanian University, Jordan
- Academic advisor for Biomedical Engineering students (Batch of 2013), Department of Biomedical Engineering, German Jordanian University, Jordan
- Pre-departure briefing for Saïd Foundation Scholars, 2013, British Council and Saïd Foundation, Jordan and United Kingdom
- Member of the Selection Panel of Saïd Foundation Scholarship, 2013, British Council and Saïd Foundation, Jordan
- Student Representative, 2011-2012, School of Mechanical Engineering, University of Leeds, United Kingdom

Courses and Training

- Strategic Thinking for the CXO, 2024, University of Cambridge, UK
- Guideline for Preparing e-Learning Assessment on Moodle, 2024, CeLAPI, German Jordanian University, Jordan
- AI in Higher Education Workshop, 2024, DAAD Amman, Jordan
- New Trend in Transplantation and Transplant Diagnostics, 2024, Medical Technology & Laboratory Society, Jordan
- Grant Proposal Writing Workshop, 2024, DAAD Amman, Jordan
- Mini MBA in Business Leadership, 2024, Salford Professional Development (SPD), University of Salford, UK
- Innovation Management Level 1: Innovation Associated, 2024, German Jordanian University, Jordan
- Artificial Intelligence in Medical Diagnosis and Therapy Workshop, 2023, Hochschule RheinMain, Germany
- Complete C# Unity Game Developer 3D (Online), 2023, Udemy
- Online and Blended Learning Workshop, 2024, Consultation and Training Center, German Jordanian University, Jordan
- Robotics (Online), 2018, Columbia University, USA
- Robotics: Kinematics and Mathematical Foundations (Online), 2018, University of Pennsylvania, USA
- Machine Learning, 2017, Leibniz Universität Hannover, Germany

Other Skills

Languages

Arabic: Mother tongue

English: Fluent

German: Intermediate Level (B1)

Programming Skills

MATLAB, Simulink, SimMechanics, Unity, OpenSim, LABVIEW, and AutoCAD.

Publications

Journal Papers

- **Ma'touq J.**, AlSaaideh I., Hatahet O., Pott P.P. Investigation and Validation of New Heart Rate Measurement Sites for Wearable Technologies. Sensors 2025, 25, 2069.
- **Ma'touq J.** and AlNuman N. (2024). Comparative Analysis of Features and Classification Techniques in Breast Cancer Detection for Biglycan Biomarker Images. Cancer Biomarkers, Pre-press, 1-11.
- **Matouq J.**, Al-Waked R., Al-Rashdan M., Bani Mustafa D., and Nasif M. (2024). Computational Fluid Dynamics Analysis of Slip Flow and Heat Transfer at the Entrance Region of a Circular Pipe. Appl. Sci., 14(15), 6528.
- AlNuman N., Abdullah M., Haddad M., and **Ma'touq J.** (2024). Hand Grasps Recognition Using Single Channel Transient-State Surface Electromyography. Biomedical Engineering: Applications, Basis and Communications, 36 (3).
- **Ma'touq J.** and AlNuman N., Abuzer I., and AbdelGader B. (2023). The Association between Mobile Phone Use and Neuromusculoskeletal Complaints. Work, 76(2), pp. 759-769.
- Al-Nabulsi J., Owida H., **Ma'touq J.**, Matar S., Al-Aazeh E., Al-Maaiouf A., and Bleibel A. (2022). Non-invasive Sensing Techniques for Glucose Detection: A review. Bull. Electr. Eng. Inform, 11(4), pp. 1926-1937.
- Owida H., Al-Nabulsi J., **Ma'touq J.**, Al-Naami B., Alnaimat F. (2022). Validation of Earlobe Site As An Alternative Blood Glucose Testing Approach. Technol and Health Care, 30(6), pp. 1535-1541.
- **Ma'touq J.** (2020). An Index Finger Musculoskeletal Dynamic Model. In: Ateshian G., Myers K., Tavares J. (eds) Computer Methods, Imaging and Visualization in Biomechanics and Biomedical Engineering. LNCVB, 36, pp. 411-436.
- **Ma'touq J.**, Hu T., and Haddadin S. (2019). A Validated Combined Musculotendon Path and Muscle-Joint Kinematics Model for the Human Hand. CMBBE, 22(7), pp. 727-739.
- **Ma'touq J.**, Hu T., and Haddadin S. (2018). Sub-millimetre Accurate Human Hand Kinematics: From Surface to Skeleton. CMBBE, 21(2), pp. 113-128.
- Al-Nabulsi J., **Ma'touq J.**, Abdullah E. E., Haloubi T., and Manasra A. (2017). Blind Users Assistive Technology Based on Android Platform. IJICA, 8(3), pp. 162-171.
- **Ma'touq J.**, Al-Nabulsi J., Al-Kazwini A., Baniyassien A., Al-Haj Issa G., and Mohammad H. (2014). Eye Blinking-Based Method for Detecting Driver Drowsiness. J Med Eng Technol, 38(8), pp. 416-419.
- **Ma'touq J.**, Messenger N., Strauss D., Tayebjee M., and Stewart T. (2014). Spinal Angle and Foot Pressure During Cardiac Electrophysiological Procedures. Int. J. Cardiol., 172(3), pp. 398-400.
- Fraiwan L., Al-Bataineh O., **Ma'touq J.**, Haddad S., and Bani-Amer M. (2009). ECG-based Wireless Home Infant Apnoea Monitor. J Med Eng Technol, 33(4), pp. 309-313.

Conferences

- Ouni C., Ghoul B., Al-Shaikhli H., **Ma'touq J.**, Fakhfakh A., and Kanoun O. (2025). A Low-Power Voltage-Controlled Current Source for Wearable Bioimpedance Applications, 2025 IEEE 22nd International Multi-Conference on Systems, Signals & Devices (SSD), Monastir, Tunisia, pp. 551-556.
- **Matouq J.**, AlSaaideh I., and Hatahet O. (2024). Validation of Heart Rate Monitoring Using PPG Sensor at Dorsalis Pedis Artery, 22nd International Conference on Research and Education in Mechatronics (REM), Amman, Jordan, 2024, pp. 1-4, doi: 10.1109/REM63063.2024.10735507.
- **Ma'touq J.**, Sweiss J., Alnuman N., Abuzer I., Sabieleish M. (2023). Virtual Reality-based Rehabilitation for Children with Cerebral Palsy, 13th TSME International Conference on Mechanical Engineering (TSME-ICoME 2023), Chiang Mai, Thailand.
- **Ma'touq J.** (2019). Index Finger Musculoskeletal Dynamic Model, The 16th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, New York City, United States.
- **Ma'touq J.** (2019). An Anatomically Correct Human Hand Neuromusculoskeletal Model for Virtual Rehabilitation, Poster presentation at The 16th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, New York City, United States.
- Hu T., Kuehn J., **Ma'touq J.**, Haddadin S. (2018). Learning and Identification of Human Upper-Limb Muscle Synergies in Daily-Life Tasks with Autoencoders, OTWorld Congress 2018, Leipzig, Germany.
- Alfataftah M., Okal M., **Ma'touq J.**, Abu-Khalaf J. (2014). Muscle Controlled Bionic Hand (3D Printed Bionic Hand), The 9th Scientific Day of Biomedical Engineering, Jordanian Engineers Association, Amman, Jordan.