Mohammad A. Masadeh

Ph.D. in Electrical Engineering, IEEE Senior Member

Firas Al-Ajloni Str., Irbid, Jordan

E-mail: m.masadeh@ju.edu.jo

Research Group: https://sites.google.com/view/epser/home

LinkedIn: https://www.linkedin.com/in/mohammad-a-masadeh/

IEEE *Xplore*: https://ieeexplore.ieee.org/author/37086047577

Profile

- Having expertise in teaching undergraduate and graduate levels and including in developing and delivering courses and laboratories, curriculum development, and supervision of design projects.
- Teaching various electrical power engineering courses. This includes electric transmission and distribution, electrical control and protection systems, electric machines, power electronics, electric drives, and renewable energy systems.
- *Being an active member of the IEEE Standards Association (IEEE-SA) and an officer for the IEEE Std. P114: Standard Test Procedure for Single-Phase Induction Motors, IAS/IPCSD - Industrial Power Conversion Systems Department.*
- Being nominated for the Annual ENCS Teaching Excellence Award for Teaching Assistants 2018, Concordia University.
- Having adequate experience in designing, developing, and testing various power electronic converters (rectifiers, inverters, and choppers) and their control schemes.
- Being the author of 8 recent papers published in IEEE Transactions and conferences in power electronics modeling and control, finite element methods (FEM)-based induction machine modeling and emulation, and renewable energy harvesting.

Education

Ph.D. in Electrical Engineering, Concordia University, Montreal, QC, Canada **Sept. 2014 - May 2019**

Thesis title: *Modeling and Emulation of Induction Machines for Renewable Energy Systems* ***GPA 4.3/4.3***
Date of defence: Jan. 9, 2019
Date conferred: May 7, 2019
Ranking - Oral Presentation: Outstanding *(as stated in the official transcript)*
Ranking - Thesis: Excellent *(as stated in the official transcript)*
Supervisor: Pragasen Pillay, *Professor*
Research group website: https://users.encs.concordia.ca/~peer/index.html

The Ph.D. degree was equalized from the Ministry of Higher Education in Jordan on Dec. 5, 2019, in Electrical Engineering / Electrical Power and Renewable Energy.

M.Sc. in Electrical Engineering, Power and Control **Feb. 2000 - Jun. 2003**

Jordan University of Science and Technology, Irbid, Jordan
Thesis title: *A Closed-Loop Control System for Blood Glucose Level in Diabetics*
Supervisor: Mohammed S. Ibbini, *Professor*

B.Sc. in Electrical Engineering, Electro-mechanical Systems **Sept. 1994 - Jun 1999**

Al-Balqa Applied University, Amman, Jordan

Research Field and Domain of Interest

- Modeling and emulation of electric machines and their control
- Control of power electronics and energy conversion systems
- Power-hardware-in-the-loop (PHIL) simulation
- Modeling and control of various renewable energy systems e.g., wind, solar, and fuel cell
- Control and protection of power systems
- Energy harvesting via micro-photosynthetic power cells (μ-PSCs)
- Fuzzy logic control systems

Work Experience

- **Full-Time Lecturer, Assistant Professor** **Oct. 2024 – Now**

  Department of Mechatronics Engineering
  School of Engineering
  The University of Jordan
  Amman, Jordan

  Job Responsibilities:

  - Teaching - 0908483 Digital Signals and Systems Analysis,
    - 0908325 Power Systems and Electrical Machines,
    - 0908321 Electrical Machines,
    - 0908232 Computer Skills for Mechatronics.
  - Supervising final project.
    - *Smart Parking Management System.*
  - Member, the University Proficiency Exam for Graduating Students Committee, Department of Mechatronics Engineering, the University of Jordan.
  - Member, the Educational Contents Digitalization Committee, Department of Mechatronics Engineering, the University of Jordan.

- **Assistant Professor** **Oct. 2023 – Sep. 2024**

  Electrical Engineering Department
  Al-Balqa Applied University, Al-Husn University College
  Irbid, Jordan

  Job Responsibilities:

  - Teaching - ELE 1471 Power System Protection,
    - ELE 1570 Power System Reliability,
    - ELE 1478 Special Topics in Electrical Power,
    - ELE 2363 Power Electronics (Th and Lab),
    - ELE 2461 Electric Drive Systems (Th and Lab).
  - Supervising final projects:
    - *Active Power Filter for Power Quality Improvement*
    - *A Comprehensive Analysis of Grid-tied Solar and Wind Power for Clean Energy Mix in Jordan*
  - Chair, Final Projects Examination Committee, EE Department
  - Member, Curricula Development Committee - Electrical Power Systems, Al-Balqa Applied University
  - Member, Quality Assurance Committee, EE Department
  - Member, Hiring Committee, Electrical Power Engineering, EE Department.

- **Power Supply Engineer** **Jun. 2021 – Jun. 2023**

  Satellite Systems
  MDA Space
  Sainte-Anne-de-Bellevue, QC H9X 3R2, Canada

  Job Description:

  Collaborate with a multi-disciplinary engineering team to develop state-of-the-art spacecraft equipment DC power supplies and associated regulator circuitry using PCB technology. Oversee detailed designs and documentation such as analysis, parts lists, schematics, assembly drawings and test procedures.

  Job Responsibilities:

  - Designing and testing DC-DC converters: flyback, push-pull, Half- and full-bridge types, using Mentor Xpedition Enterprise VX.2.7 (Designer and Layout Browser).
  - Designing the schematic diagram for the UC1825 PWM controller and ISL71040 gate driver for the power FBG04N30B and FBG20N18B eGaNs.
  - Preparing the parts list and Parts Application Review (PAR) for detailed Electronic Power Conditioning (EPC) motherboards and daughterboards.
  - Applying the Worst-Case Analysis (WCA) using the Root Sum Square (RSS) and Extreme Value Analysis (EVA) in PTC Mathcad Prime 6.0.0.0.

- PCB sizing and preliminary placement for different projects related to power dissipation design data.
- Contributing to R&D programs.

- **Adjunct Professor** **Jul. 2021 – Dec. 2021**

  Department of Electrical and Computer Engineering
  Concordia University
  Montreal, QC H3G 2W1, Canada

  Job Responsibilities:

  - Teaching ELEC 6411 Power Electronics I (Graduate level).
  - Developing/updating the course material and supervising student design projects.
  - Preparing literature reviews and surveys for use in scholarly publications in the field of power electronic converter modeling and control.

- **Postdoctoral Fellow**, Research Associate **Mar. 2019 - Mar. 2020**

  Power Electronics and Energy Research (PEER) Group
  Department of Electrical and Computer Engineering
  Concordia University
  Montreal, QC H3G 2W1, Canada

  Job Responsibilities:

  - Developing and testing a three-phase, two-level bidirectional power electronic converter with its control to run as an induction generator emulator under normal and faulty conditions.
  - Participating and supporting technical problem-solving for junior M.Sc. and Ph.D. students.
  - Participating in designing, sizing, and commissioning electrical equipment for the 200-hp induction machine test bench. This project is in collaboration with Hydro-Québec.
  - Preparing literature reviews and surveys for use in scholarly publications in the field of power electronic converter modeling and control, FEM-based electrical machines modeling, and machine emulation using PHIL simulation.
  - Developing course material and supervising student design projects for ELEC 437/ELEC 6421 renewable energy systems.

- **Ph.D. Candidate and Research Assistant**,

  Power Electronics and Energy Research (PEER) Group
  Department of Electrical and Computer Engineering
  Concordia University
  Montreal, QC H3G 2W1, Canada

  Responsibilities

  - Designing, developing, and testing 440-V, 30-A three-phase, back-to-back (IGBT-based) two-level VSCs. This included switches and frequency selection, safe-operating area (thermal constraints) determination, and gate-drive circuitry design. The configuration allowed detailed testing of up to 15-hp electric machines, inverters, and novel controllers in a safe laboratory environment. The system had been named an emulation system.
  - Designing and running two different controllers; the conventional PID controller in the DQ-reference frame and the proportional-resonant (PR) controller in the ABC-reference frame. The controllers were run inside the real-time simulator (RTS) using the principle of rapid control prototyping (RCP).
  - Developing IGBT gate drives, dead-time, and protection circuits.
  - Designing electronic PCBs using EAGLE software.
  - Designing and developing the voltage and current sensing circuitry to be utilized in the PHIL used in the emulation system.
  - Characterizing the flux saturation in the main and both stator and rotor leakage paths for a 5-hp induction machine (IM) using FEM software; MagNet and MotorSolve by Mentor Infolytica, a Siemens Business.

- Developing and running the IM model including the characterized saturation effect (modified magnetizing and leakage reactance) as a motor and as a self-excited induction generator in RTS using dSPACE DS1103 and OP4510 from OPAL-RT. **Sep. 2014 - Jan. 2019**
- Preparing literature reviews for use in scholarly publications in the field of control of power electronics and energy conversion systems, electrical machines modeling using FEM, renewable energy systems, and PHIL simulations for emulating induction machine operation.
- Teaching assistantship, Tutorial Leader and Lab Demonstrator for power electronics, controlled electric drives, fundamentals of electrical power, and electronics.

▪ **Lecturer**, **Jul. 2004 - Jul. 2014**

Electrical and Electronic Engineering Department,
Jubail Industrial College (JIC), Royal Commission for Jubail,
Kingdom of Saudi Arabia.

Job Responsibilities:

- Teaching power electronics, electrical machines and drive systems, electrical transmission and distribution, and electrical control and protection systems.
- Supervising students' graduation projects:
  - Semester 323, "*Level control through variable speed pump*"
  - Semester 322, "*Chopper-fed DC drive system*"
  - Semester 321, "*Exploring solar cell module Siemens SM110 and Its application*"
  - Semester 302, "*Wound-rotor induction motor drive with slip-power recovery system*"
  - Semester 301, "*Vector control of AC drive*"
  - Semester 292, "*An experimental study of a converter-fed separately excited DC motor drive*"
  - Semester 291, "*Analysis and simulation of a converter-fed DC drive using Matlab*"
- Coordinating the ABET accreditation Assessment Committee.
- Developing the course materials and conducting long/short industrial training courses in large electrical machines, electric drive systems, and electrical maintenance and troubleshooting.
- Conducting industrial site visits to monitor and supervise student cooperative training.
- Founder and Counselor, JIC-IEEE Student Branch.

▪ **Part-Time Lecturer**, **Oct. 2003 - Jun. 2004**

Department of Electrical Engineering, School of Engineering,
The University of Jordan, Amman, Jordan.

- Teaching power electronics and electronic circuits.

Computer Skills

- Matlab/Simulink, PSIM
- Finite element modeling (FEM) software: MagNet and MotorSolve by Mentor Infolytica, a Siemens Business
- HOMER Pro and Grid, RETScreen
- EAGLE and AutoCAD
- Microsoft Office: Word, Excel, PowerPoint, Outlook, and Visio
- Xpedition Enterprise VX.2.7 (Designer, Layout Browser), LTspice XVII (17.0.19.0), PTC Mathcad Prime 6.0.0.0

Affiliations

- Senior Member, Institute of Electrical and Electronic Engineering (IEEE) **Jul. 2020 - Now**
- Member, Power Electronics and Energy Research (PEER) Group, ECE, Concordia University **Sep. 2014 - Now**
- Member, International Council on Large Electric Systems (Conseil International des Grands Reseaux Electriques CIGRE) **Sep. 2017 - Now**

- Member, Institute of Electrical and Electronic Engineering (IEEE) **Jan. 2011 - Jun. 2020**
- Member, Electrical Machines Technical Committee (EMTC), IES, IEEE **Jan. 2011 - Now**
- Member, The Institution of Engineering and Technology (IET) **Sep. 2014 - Now**
- Member, Jordan Engineers Association (JEA) **Sep. 1999 - Now**

Professional Activities

- Secretary, IEEE Standards Association (IEEE-SA), IAS/IPCSD - Industrial Power Conversion Systems Department, IEEE Std. 114 - IEEE Standard Test Procedure for Single-Phase Induction Motors
- Track-Chair, IEEE International Conference on Power Electronics, Drives and Energy Systems (PEDES2020)
- Technical Session Chair, IEEE International Conference on Power Electronics, Drives and Energy Systems (PEDES2020)
- Reviewer, IEEE Transactions on Industrial Electronics
- Reviewer, IEEE Transactions on Transportation and Electrification
- Reviewer, Elsevier, Journal of Renewable and Sustainable Energy Reviews
- Reviewer, Elsevier, Journal of Electric Power Systems Research
- Reviewer, Elsevier, International Journal of Electrical Power and Energy Systems
- Reviewer, IEEE Energy Conversion Congress and Exposition (ECCE)
- Reviewer, IEEE International Transportation Electrification Conference (ITEC)
- Meta-Reviewer, IEEE International Conference on Power Electronics, Drives and Energy Systems (PEDES)
- Reviewer, IEEE International Conference on Power Electronics, Smart Grid, and Renewable Energy (PESGRE)

Awards and Achievements

- Being nominated for the Annual ENCS Teaching Excellence Award for Teaching Assistants 2017-2018, Concordia University **Jun. 2018**
- Concordia Accelerator Award, School of Graduate Studies, Concordia University **Jan. 2018**
- The Engineering and Computer Science Graduate Association (ECSGA) Conference Subsidy, Concordia University. **May 2017**
- Conference Travel Support, Faculty of Engineering and Computer Science (ENCS), Concordia University. **Apr. 2017**
- Conference Publication and Travel Award, IEEE Industry Applications Society, IAS Chapters and Membership Department (CMD), Piscataway, NJ, USA **Apr. 2017**
- Concordia University Conference and Exposition Award, Concordia University. **Mar. 2017**
- Concordia Faculty Graduate Student Support Program (GSSP), Concordia University. **Sep. 2014**

Technical Events and Conferences

- Judge, The 7th Annual Graduate Students Research Conference (GSRC) 2022, School of Engineering and Computer Science, Concordia University, Montreal, QC, Canada. **Mar. 31, 2023**
- Volunteer, Proctor, *IEEEXtreme 16.0 programming competition*. **Oct. 22, 2022**
- Judge, The 6th Annual Graduate Students Research Conference (GSRC) 2022, School of Engineering and Computer Science, Concordia University, Montreal, QC, Canada. **Mar. 23, 2022**
- Volunteer, Proctor, *IEEEXtreme 14.0 programming competition (online-based event)*. **Oct. 24, 2020**
- Author, *IEEE International Electric Machines & Drives Conference (IEMDC)*, Miami, FL. **May 21-24, 2017**
- Author, *2016 IEEE International Conference on Power Electronics, Drives and Energy Systems (PEDES)*, Trivandrum, Kerala, India. **Dec. 15-17, 2016**
- Volunteer, organizing committee, *2015 IEEE Energy Conversion Congress and Exposition (ECCE)*, Montreal, QC, Canada. **Sep. 20-24, 2015**
- Author, *The 4th Saudi Technical Conference and Exhibition (STCEX)*, Riyadh, Saudi Arabia **Dec. 2-6, 2006**
- Author, *The 5th Jordanian International Electrical and Electronic Engineering Conference (JIEEEC)*, Amman, Jordan. **Oct. 13-16, 2003**
- Trainee, *Real-Time and Robotics Workshop*, University of Balamand, Tripoli, Lebanon. **Jul. 18-26, 2003**
- Author, *The International Association of Science and Technology for Development (IASTED)- Biomechanics 2003*, Rhodes, Greece. **Jun. 30-Jul. 2, 2003**

Selected Publications

*(For more information, please visit my profile on **IEEE Xplore**, **Google Scholar**, or **ResearchGate**)*

Journals

- Yupeng Liu, **M. A. Masadeh** and P. Pillay, "Power Hardware-in-the-Loop Based Emulation of a Self-Excited Induction Generator Under Unbalanced Conditions", in **IEEE *Transactions on Industry Applications,*** vol. 58, no. 1, pp. 588-598, Jan./Feb. 2022.
- **M. A. Masadeh** and P. Pillay, "Induction Generator Emulator: A Testbed for Isolated Renewable Energy Power System Experiments," in ***IEEE Transactions on Industrial Electronics***, ID 18-TIE-3576.R2, under 2nd revision.
- **M. A. Masadeh** and P. Pillay, "Induction Machine Parameters Determination and the Impact of Stator/Rotor Leakage Split Ratio on Its Performance," in ***IEEE Transactions on Industrial Electronics***, vol. 67, no. 7, pp. 5291-5301, Jul. 2020.
- **M. A. Masadeh**, K. S. Amitkumar, and P. Pillay, "Power Electronic Converter-Based Induction Motor Emulator Including Main and Leakage Flux Saturation," in ***IEEE Transactions on Transportation Electrification***, vol. 4, no. 2, pp. 483-493, Jun. 2018.
- **M. A. Masadeh**, K. Kuruvinashetti, M. Shahparnia, P. Pillay, and M. Packirisamy, "Electrochemical Modeling and Equivalent Circuit Representation of a Microphotosynthetic Power Cell," in ***IEEE Transactions on Industrial Electronics***, vol. 64, no. 2, pp. 1561-1571, Feb. 2017.
- Mohammed S. Ibbini, **Mohammad A. Masadeh**, and Shadi Mansi, "Analysis and Control of a Single-Phase Double-Stage Grid-Connected Photovoltaic System", in ***International Journal of Modelling and Simulations,*** vol. 21, no. 2, Dec. 2011.

Conferences

- Yupeng Liu, **M. A. Masadeh** and P. Pillay, "Emulation of an Isolated Induction Generator Under Unbalanced Conditions", in 2020 ***IEEE Energy Conversion Congress and Exposition (ECCE)***, Detroit, MI, Oct. 2020.
- **M. A. Masadeh** and P. Pillay, "Induction Motor Emulation Including Main and Leakage Flux Saturation Effects," in *2017* ***IEEE International Electric Machines and Drives Conference (IEMDC)***, Miami, FL, May 2017.
- **M. A. Masadeh** and P. Pillay, "Power Electronic Converter-Based Three-Phase Induction Motor Emulator," in *2016* ***IEEE International Conference on Power Electronics, Drives and Energy Systems (PEDES)***, Trivandrum, Dec. 2016.
- Mohammed S. Ibbini, Shadi Mansi, **Mohammad Masadeh,** and Eid Al Hajri, "Simscpe Solar Cells Model Analysis and Design", in *the 8th* ***WSEAS International Conference on Renewable Energy Sources (RES14)****, Computer Applications in Environmental Sciences and Renewable Energy,* Kuala Lumpur, Malaysia, Apr. 2014, pp. 97-103.

Detailed information and references are available upon request

This CV has been updated on December 30, 2024.
M. A. Masadeh