

# Curriculum Vitae

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Dr. Mohammed Abu mallouh is an Associate professor in the department of Mechatronics Engineering at Hashemite University. He received the Ph.D. degree in Mechanical Engineering from **Queen's university**, Canada, in 2008, and a B.Sc. degree in Mechanical Engineering from the University of Jordan, Jordan, in 1999. The title of my PhD. Thesis is: force/velocity control with neural network compensation for contour tracking with pneumatic actuation. In the thesis, modeling, simulation, validation and controlling (PID with Neural Networks compensator) of a pneumatic gantry robot were conducted. He teaches Robotics and Artificial Intelligence courses since 2009 and 2014; respectively.

He was a visiting professor and post-doctoral fellow at Queen's university in 2009 and 2010, respectively. In 2011, he received a research grant (135,000 USD) from Jordan Ministry of Higher Education and Scientific Research. Currently, he is working on a project titled: "Design and build a small hybrid fuel cell/battery vehicle for in campus applications" "The project received a grant of about 70,000.00 USD. His research interests include many subjects like: Robotics, hybrid and electric vehicles, artificial intelligence applications, modeling, simulation, automatic control and pneumatic systems.

## Education

- Ph.D. in Mechanical Engineering from *Queen's University*, Kingston, Ontario, Canada, October 2008.
- January 2003 admitted as a full time student in the M.Sc program, *Queen's University*. May 2004 promoted to the PhD program directly based on my request and academic performance.
- B.Sc in Mechanical Engineering from *University of Jordan*, Amman, Jordan, 1999.

## Professional Academic Experience

- July 2016-, present Associate professor, Department of Mechatronics Engineering, Hashemite University, Zarqa, Jordan.

- July 2017-, Sep 2019, Head of Department of Mechatronics Engineering, Hashemite University, Zarqa, Jordan.
- January 2009- July 2016, Assistant professor, Department of Mechatronics Engineering, Hashemite University, Zarqa, Jordan.
- February-August, 2010, Post-doctoral fellow, Department of Mechanical & Materials Engineering, Queen's University, Canada. Main research objective is to examine the effect of different management control strategies on the performance of hybrid FC/battery rickshaw.
- June-Sep. 2009, visiting professor, Fuel Cell research Centre, Queen's University, Canada. Main research objective is to study feasibility of converting a diesel powered auto rickshaw to fuel cell/battery hybrid electric version using realistic driving cycles.
- Oct. 2008-Jan. 2009, Research Assistant (After Ph.D.), Department of Mechanical & Materials Engineering, Queen's University, Canada. The Ph.D. research work was extended in two aspects: 1) Compare the force tracking performance of a gantry pneumatic system when using proportional flow valves and PID controller instead of proportional pressure valves with intelligent controller. 2) design and evaluate the performance of an intelligent controller for pneumatic actuated positioning system.
- 2004- 2008, Research Assistant (Ph.D.), Department of Mechanical & Materials Engineering, Queen's University, Canada. PhD. Thesis title: force velocity control with neural network compensation for contour tracking with pneumatic actuation. In this research, modeling, simulation and validation of a pneumatic gantry system were conducted. PID and intelligent controllers were designed and tested experimentally in order to successfully regulate the normal contact force and tangential velocity of the end effector of a pneumatic gantry robot while tracking the contour of a planar workpiece.
- 2003-2008, Teaching Assistant, Department of Mechanical & Materials Engineering, Queen's University, Kingston, Ontario.

### Specialty and Research Interests

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| <ul style="list-style-type: none"> <li>- Robotics</li> <li>- Artificial Intelligence</li> <li>- Automatic Control</li> </ul> | <ul style="list-style-type: none"> <li>- Hybrid and Electric Vehicles</li> <li>- Modeling and simulation</li> <li>- Pneumatic systems</li> </ul> |
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### Research Grants

- Design and build a small hybrid fuel cell/battery vehicle for in campus applications (2019-2021.)  
**Funded by:** Hashemite University  
**Awarded Amount:** 70,000.0 USD.  
**Role:** main investigator

**Objectives:** This project aims to design and build a 5 kw hybrid FC/battery vehicle. The system is intended to be used by the security personnel in the Hashemite University.

- Development of ground and aerial vehicles network for security applications (2018-2020.)

**Funded by:** Hashemite University

**Awarded Amount:** 200,000.0 USD.

**Role:** Co-investigator

**Objectives:** This project aims to design and build an integrated security system consisting of a number of solar ground electric vehicles that are integrated with unmanned aerial vehicles (UAVs). The ground solar vehicles will have zero emission and will provide efficient land transportation. The UAVs will be equipped with cameras and thus will monitor the campus from above and provide fast and easier access to difficult access location in the campus. This system is to be used by the security personnel in the Hashemite University.

- Powertrain and Control Design for Hybrid Fuel-Cell/Battery Vehicle (2011-2014.)

**Funded by:** Jordan Ministry of Higher Education and Scientific Research

**Awarded Amount:** 135,000.0 USD.

**Role:** primary investigator

Objectives:

- 1- Building, designing and investigating four hybrid vehicle configuration models.
- 2- Evaluating the performance of the four vehicles models in terms of fuel economy, emission and drivability using standard international and a developed local driving cycles
- 3- Studying Effects of different power management control strategies on the performance of hybrid vehicle.
- 4- Building and testing (experimentally) a hybrid Fuel Cell (FC)/battery test bench at the Hashemite University – Jordan, which is considered to be the first of its kind built in a Jordanian academic institute.
- 5- Conducting a feasibility study on the conversion of a gasoline mid-size vehicle into a hybrid FC/battery vehicle.

- Intelligent multivariable control system for hybrid vehicles (2010).

**Funded by:** Hashemite University

**Awarded Amount:** 1,200.0 USD.

**Role:** main investigator

**Objective:** to examine the effect of different management control strategies (including fuzzy logic) on the performance of hybrid FC/battery rickshaw.

## Teaching Experience

- Robotics
- Dynamics
- Eng. Ethics
- Technical writing
- Artificial Intelligence
- Automatic control
- Process control Lab.
- Fundamentals of electric/ hybrid vehicles
- Automation and PLC
- Automatic control Laboratory
- Transducers lab.

## **Awards and scholarships**

- Award for 2<sup>nd</sup> place in the practical graduate projects (implemented in industry) competition organized by Jordan Engineers Association and Amman Chamber of Industry (2018)
- Award for 2<sup>nd</sup> place in the graduate projects competition organized by Jordan Engineers Association and Amman Chamber of Industry (2017)
- Scholarship (2003-2007) from Hashemite University, Zarqa, Jordan.
- Queen's Graduate Conference Award (2004, 2006 and 2007) from Queen' University, Ontario, Canada.
- Queen's Graduate Award (2006, 2007) from Queen' University, Ontario, Canada.

## **Professional membership**

- Member of the Institute of Electrical and Electronics Engineers (IEEE).
- Member of the American Society of Mechanical Engineers (ASME).
- Member of the Jordan Engineering Association.
- Member of the IEEE Robotics and Automation Society Jordan Chapter.
- Current Secretary of the The IEEE Jordan Chapter of Robotics and Automation Society

## **Institutional services (current and previous)**

- Head of Department of Mechatronics Engineering, Hashemite University,
- Head of Engineering Collage curriculum Committee.
- Member of Engineering Collage Council.
- Member of Engineering Collage Graduate projects Committee.
- Member of Engineering Collage ABET Committee.
- Member of Engineering Collage Industrial outreach Committee.
- Member of Engineering Collage community services Committee.
- Member of Department Computer and Electronic Learning Committee.
- Head of Department Curriculum Committee.
- Head of Department Library Committee
- Member of Department graduation projects and training Committee
- Member of Department scientific research Committee
- Member of many tender studying committees
- Member of the Engineering Collage student council election Committee.
- Member of the Engineering Collage Laboratory Equipment's Committee
- Member of Engineering Collage Scientific Day Committee.
- Coordinator of Department ABET Committee.
- Supervisor for many Department Graduation Projects
- Supervisor for Department Practical Training.

## Professional activities

- Member of the organizing committee and chair of Robotics track of the IEEE International Symposium on Mechatronics and its Applications (ISMA), 4/2013.
- Member of the organizing committee of the Zaytoonah University International Engineering Conference on Design and Innovation in Infrastructure (ZEC Infrastructure 2012), 6/2012.
- Member of the judges committee in the Formula 1 competition for schools held at Jubilee Center for Excellence in Education, 5/2013.
- Member of the organizing committee of the 5th National Technology Parade held at Hashemite University, 5/2012.
- Co-organizing the first robotics competition at Hashemite Universities, 2/2014.
- Reviewer for many international journals.

## Research Visits

- Post-doctoral fellow, February-Aug, 2010, Fuel cell research Centre and Department of Mechanical & Materials Engineering, Queen's University, Canada. Main research objective is to examine the effect of different management control strategies on the performance of hybrid FC/battery rickshaw.
- Visiting professor, June-Sep. 2009, Department of Mechanical & Materials Engineering, Queen's University, Canada. Main research objective is to study feasibility of converting a diesel powered auto rickshaw to fuel cell/battery hybrid electric version using realistic driving cycles.

## Industrial Engineering Experience (non-academic)

- 2002-2003; Production Engineer in Plastika for Plastics IND. Co. Ltd, Amman Jordan.
- 2000-2002; Thermoforming (Vacuum & pressure) Process Engineer in Arabian Gulf Manufacturer for Plastic Industry, Jeddah, Kingdom of Saudi Arabia.
- 1999-2000; Sales Engineer in Engineering Investment Co. Ltd, Amman, Jordan.
- 14-16 November, 2000; Training course at *Illig* (Germany, <http://www.illig.de/>) about Thermoforming process: troubleshooting, materials, machines and tools.
- 11-30 October, 1999; Training course at *SCHENCK* (Germany, <http://www.schenckprocess.com/en/>) about Load cells types and mechanical mounting and software training on Disomat B, F, S and Disoware S.
- 4-8 October, 1999; Training course at *URACA* (Germany, <http://www.uraca.de/>) about high-pressure plunger pumps: design, function, operations and applications.
- Sep. 20-Oct. 1 1999; Training course at *Leistritz* (Germany, <http://www.leistritz.com/>) about Leistritz screw pump: Construction features, applications, designs and operating limits.
- July 7-Sep. 1<sup>st</sup>, 1998; Training practice at *Public Power Corporation of Greece-Amynteo lignite centre/Amynteo mine mechanical maintenance department* (Greece, <http://www.dei.gr/ecHome.aspx?lang=2>) about maintenance of conveyor belts and excavators for mines.

## Publications

### Journal Papers:

- Salah, M., El-Hageen, H., Badarneh, O., Ababneh, M., **Abu Mallouh, M.**, (2020) “Robust Output Feedback Control for Uncertain Chaotic Systems”, *International Journal of Systems, Control and Communications*.
- **Abu Mallouh, M.**, Salah, M., Abdelhafez, E., Hamdan, M., and Surgenor, B. (2016) “Modeling, Simulation, and Performance Comparison of Conventional Vehicle Against Three Configurations of Hybrid Vehicles”, *International Review on Modelling and Simulations*. Vol. 9, No. 4: 238-245.
- Salah, M., **Abu Mallouh, M.**, Youssef, M. Abdelhafez, E., Hamdan, M., and Surgenor, B. (2016) “Hybrid Vehicular Fuel Cell/Battery Powertrain Test Bench: Design, Construction, and Performance Testing”, *Transactions of the Institute of Measurement and Control*, vol. 39, 9: pp. 1431-1440
- Al-naami, Bassam, **Abu Mallouh, M.** and Abdel hafez, E. (2014) “Performance Comparison of Adaptive Neural Networks and Adaptive Neuro-Fuzzy Inference System in Brain Cancer Classification”, *Jordan Journal of Mechanical and Industrial Engineering*, 8(5):305-312.
- **Abu Mallouh, M.**, Abdelhafez, E., Salah, M., Hamdan, M., Surgenor, B. and Youssef, M. (2014) “Model Development and Analysis of a Mid-Sized Hybrid Fuel Cell/Battery Vehicle with a Representative Driving Cycle”, *Journal of Power Sources*, 260: 62-71.
- Abdelhafez, E., Hamdan, M., **Abu Mallouh, M.**, Mohammed, L. and Aboushi, A. (2014) “Effect of an Insulation Layer to Prevent Water Vapor Condensation along the Inside Surface of a Building Wall Using an Artificial Neural Network”, *Journal of Infrastructure Systems*.
- Al-naami, Bassam, **Abu Mallouh, M.** and Kheshman, Abed Alrazzaq (2013) “Automated Intelligent Diagnostic of Alzheimer Disease Based on Neuro-Fuzzy System and Discrete Wavelet Transform”, *Biomedical Engineering: Applications, Basis and Communications*, 26(3): 1450035 (10 pages).
- Dehghan, B, Taghizadeh, S, Surgenor, B. and **Abu Mallouh, M.**, (2012) “A Novel Adaptive Neural Network Compensator as Applied to Position Control of a Pneumatic System”, *Intelligent Control and Automation*, 2: 388-395.
- Farraj, A, **Abu Mallouh, M.**, Kalendar, A, Al-Shqirated, A and Hammad, M (2012) “Experimental Study of Solar Powered Air Conditioning Unit Using Drop In Hydro Carbon Mixture to Replace R-22”, *Jordan Journal of Mechanical and Industrial Engineering*, 2(1): 63-70.



- **Abu Mallouh, M.,** McInnes, L., Surgenor, B. and Peplly, B (2012) “Intelligent Control for Optimal Performance of a Fuel Cell Hybrid Auto Rickshaw”, *Energy Procedia*, 29: 367–376
- **Abu Mallouh, M.,** Denman, B., Surgenor, B.W. and Peppley, B., (2011) “Analysis and validation of a PSAT model of a fuel cell hybrid rickshaw”, *International Journal of Energy Research* 35 (15):1389–1398.

#### **Conference Papers (refereed):**

- **Abu Mallouh, M.,** Surgenor, B., Abdelhafez, E., Salah, M. and Hamdan, M. (2014) “Development of Driving Cycle for Amman City with Performance Evaluation for ICE Vehicle”, *ASME 2014 12th Biennial Conference on Engineering Systems Design and Analysis*, Copenhagen, Denmark, June 25-27.
- **Abu Mallouh, M.,** Surgenor, B., Salah, M., Abdelhafez, E. Hamdan, A. and Hamdan, M. (2014) “Performance Comparison for hybrid Fuel Cell/Battery Vehicle Utilizing Different Power Management Control Strategies”, *ASME 2014 12th Biennial Conference on Engineering Systems Design and Analysis*, Copenhagen, Denmark, June 25-27.
- Salah, M., Abdelhafez, E, **Abu Mallouh, M.** and Hamdan, M (2013) “Artificial Neural Networks-Based Modeling for Electrical Actuated Automotive Cooling Systems”, *the 9th International Symposium on Mechatronics and its Applications*, Amman, Jordan, April 9-11.
- **Abu Mallouh, M.,** Al-Marouf, M, Surgenor, B.W. and Peppley, B., (2011) “Effect of control strategy on the performance of a fuel cell hybrid auto rickshaw”, *SAE 2011 World Congress*, Detroit, Michigan, April 12-14. SAE Technical Paper No. 2011-01-1174, doi:10.4271/2011-01-1174
- Taghizadeh, S., Surgenor, B and **Abu Mallouh, M.,** (2010) “Control of a Pneumatic Gantry Robot with Adaptive Neural Network Compensation” Proceedings of the *ASME 2010 International Design Engineering Technical Conferences*, Montreal, Quebec, Canada, August 15-18.
- **Abu mallouh M,** Denman B, Surgenor B and Peppley B., (2009) "A study of fuel cell hybrid auto rickshaw using realistic urban drive cycles", *International Conference on Green Energy & Sustainability*, Amman, Jordan, Nov 10–12,.
- **Abu Mallouh, M.,** Surgenor, B and Taghizadeh, S., (2009) “Hybrid Control of a Pneumatic Gantry Robot for Contour Tracking: Proportional Pressure Versus Proportional Flow Control” Proceedings of the *ASME 2009 Dynamic Systems and Control Conference*, Hollywood, California, October 12-14.
- **Abu Mallouh, M.** and Surgenor, B. (2008) “Force/Velocity Control of a Pneumatic Gantry Robot for Contour Tracking with Neural Network Compensation” Proceedings

of the *ASME 2008 International Conference on Manufacturing Science and Engineering*, Evanston, Illinois, USA, October 7-10

- **Abu Mallouh, M.** and Surgenor, B., (2007) “Hybrid Force/Velocity Control of a Pneumatic Gantry Robot for Contour Tracking: Tuning and Model Validation” Proceedings of the *ASME 2007 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, Las Vegas, USA, September. 4-7.



## References

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