

Bashar K. Hammad

Associate Professor
Department of Mechanical and Maintenance Eng.
German Jordanian University
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Education

- **Ph.D. in Engineering Mechanics** May 2008
Virginia Polytechnic Institute and State University (Virginia Tech)
Dissertation: “Modeling, Simulation, and Analysis of Micromechanical Filters
Coupled with Capacitive Transducers”
Advisor: Prof. Ali H. Nayfeh
- **M.S. in Mechanical Engineering** December 2003
University of Texas at Arlington
Thesis: “Characterization of smart MEMS pump by applying quasi-static model
based on simulations of membrane and solid-fluid interface of microvalves”
Advisor: Prof. T.C. Yih
- **B.S. in Mechanical Engineering** May 1997
University of Jordan
Graduation Project: “Theoretical Investigation of Solar Air Heaters”
Advisor: Prof. M. Al-Saad

Experience

- **Associate Professor** Fall 2018 to present
Department of Mechanical and Maintenance Engineering, German Jordanian University
- **Associate Professor** Summer 2018
Mechatronics Engineering Department, The Hashemite University
- **Assistant Professor** Fall 08 to Summer 2018
Mechatronics Engineering Department, The Hashemite University
- **Director** Spring 11 to Spring 16
Center of Academic Quality Assurance, The Hashemite University
- **Assistant Dean of Engineering for Student Affairs and Training** Fall 09 to Spring 10
The Hashemite University
- **Graduate Research Assistant** Fall 04 to Spring 08
Nonlinear Dynamics Lab, Virginia Tech

- **Graduate Teaching Assistant** Spring 07
Engineering Science and Mechanics Department, Virginia Tech
- **Teaching Instructor** Summer I & II 06
Physics Department, Virginia Tech
- **Graduate Teaching Assistant** Fall 03
Mechanical Engineering Department, University of Texas at Arlington
- **Graduate Research Assistant** Summer 03
Automation & Robotics Research Institute, University of Texas at Arlington
- **Application Engineer** 1997 - 2002
Technical Support Department, Petra Engineering Industrial Co., Jordan
- **Internship** Summer 1996
Electrical and Refrigeration Departments, Petra Engineering Industrial Co., Jordan

Publications

Journal Papers

- 1) Wael Al-Kouz, Sameer Al-Dahidi, Bashar Hammad, Mohammad Al-Abed. "Modeling and analysis framework for investigating the impact of dust and temperature on PV systems' performance and optimum cleaning frequency", *Applied Sciences*, Vol 9, Issue 7, 2019, (Article number 1397).
- 2) Bashar Hammad, Abdallah Al-Zoubi & Manuel Castro. "Harnessing technology in collaborative renewable energy education", *International Journal of Ambient Energy*, DOI: 10.1080/01430750.2018.1501751, 2018
- 3) Bashar Hammad, Mohammad Al-Abed, Ahmed Al-Ghandoor, Ali Al-Sardeah, Adnan Al-Bashir, "Modeling and Analysis of Dust and Temperature Effects on Photovoltaic Systems' Performance and Optimal Cleaning Frequency: Jordan Case Study," *Renewable and Sustainable Energy Reviews*, Vol 82, pp. 2218 – 2234, 2018.
- 4) Bashar Hammad, Ali Al-Sardeah, Mohammad Al-Abed, Salem Nijmeh, Ahmed Al-Ghandoor, "Performance and economic comparison of fixed and tracking photovoltaic systems in Jordan," *Renewable and Sustainable Energy Reviews*, Vol 80, pp. 827 – 839, 2017.
- 5) Adnan Atoum, Abdallah Al-Zoubi, Majed Abu Jaber, Mamoun Al-Dmour, and Bashar Hammad, "A New Approach for Delivering eLearning Courses in Jordanian Universities," *Advances in Social Sciences Research Journal*, Vol 4, No. 8, pp. 1 – 13, 2017.
- 6) Ahmad Al-Khasawneh and Bashar K. Hammad, "Implementation of service learning and civic engagement for students of computer information systems through a course project at the Hashemite University," *Education for Information*, Vol 31, No. 4, pp. 181 – 193, 2015.
- 7) Bashar K. Hammad, Rami H. Fouad, Salem D. Nijmeh, Mousa Mohsen, and Asma Tamimi, "Adaptive control of solar tracking system," *IET Science, Measurement & Technology*, Vol 8, No. 6, pp. 426 – 431, 2014.
- 8) Bashar K. Hammad, Shaher M. Rababeh, Mohammad A. Al-Abed, and Ahmed M. Al-Ghandoor "Performance Study of On-Grid Thin-Film Photovoltaic Solar Station as a Pilot Project for Architectural Use," *JJMIE*, Vol 7, No. 1, pp. 1 – 9, 2013.
- 9) Bashar K. Hammad, "Natural Frequencies and Mode Shapes of Mechanically Coupled Microbeam Resonators with an Application to Micromechanical Filters," *Shock and Vibration*, DOI 10.3233/SAV-130809, Available online July 17, 2013.

- 10) Bashar K. Hammad, Ali H. Nayfeh, and Eihab M. Abdel-Rahman, "A Study of Subharmonic Excitation of Mechanically Coupled Microbeams for Filtration," *Journal of Computational Nonlinear Dynamics*, Vol. 6, 2011, 041007-11.
- 11) Ali H. Nayfeh, Bashar K. Hammad, and Muhammad Hajj, "Discretization Effects on Flutter Aspects of Wing/Store Configurations," *Journal of Vibration and Control*, Vol 18, No. 7, pp. 1043 – 1055, 2012.
- 12) Bashar K. Hammad, Eihab M. Abdel-Rahman, and Ali H. Nayfeh, "Modeling and analysis of electrostatic MEMS filters," *Nonlinear Dynamics*, Vol 60, No. 3, pp. 385 – 401, 2010.
- 13) Yih TC, CM Wei and B Hammad, "Modeling and characterization of a nanoliter drug-delivery MEMS micropump with circular bossed membrane," *J. Nanomedicine: Nanotechnology, Biology, and Medicine*, Vol. 1(2), p. 164-175, 2005.

Referred Conference Papers

- 1) Waleed H. Al-Natsheh, Bashar K. Hammad and Mustafa A. Abu Zaid, "Design and Implementation of a Cylindrical Persistence of Vision Display," 6th International Conference on Electrical and Electronics Engineering (ICEEE 2019), Istanbul, Turkey, April 16-17, 2019.
- 2) Llanos Tobarra, Rafael Pastor, Antonio Robles-Gomez, Jesus Cano, Bashar Hammad, Abdullah Al-Zoubi, Roberto Hernandez, Manuel Castro, "Impact of online education in Jordan: results from the MUREE project", IEEE EDUCON2019, Dubai, UAE, April 9-11, 2019.
- 3) Jacob Cenicerros, Hichem Abdelmoula, Bashar Hammad, Abdessattar Abdelkefi, Patricia A. Sullivan, "Nonlinear modeling and performance analysis of electret-based energy harvesters," Proceedings of the 2017 ASEE Gulf-Southwest Section Annual Conference, Dallas, TX, USA.
- 4) Llanos Tobarra, Salvador Ros, Roberto Hernandez, Rafael Pastor, Manuel Castro, Abdallah AlZoubi, Bashar K. Hammad, Mamoun Dmour, A. Robles-Gomez, and A. C. Caminero , "Analysis of Integration of Remote Laboratories for Renewable Energy courses at Jordan Universities," 2015 IEEE Frontiers in Education Conference, October 21 - 24, 2015, EL Paso, TX, USA.
- 5) Abdallah Al-Zoubi, Bashar K. Hammad, Salvador Ros, Llanos Tobarra, Roberto Hernandez, Rafael Pastor, and Manuel Castro, "Remote Laboratories for Renewable Energy Courses at Jordan Universities," 2014 IEEE Frontiers in Education Conference, October 22 - 25, Madrid, Spain.
- 6) Bashar K. Hammad, Eihab M. Abdel-Rahman, and Mohamed A.E. Mahmoud, "Micro Cantilever Electrostatic Energy Harvester," Proceedings of IDETC/CIE 2013, ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, August 4 - 7, 2013, Portland, OR, USA, Paper no. DETC2013-13340.
- 7) Bashar K. Hammad, Randa A. Mahasneh, and Ahmad M. Khasawneh, "A Case Study of Service Learning and Civic Engagement for Mechatronics Engineering Students through a course Project," ISMA 2013 - 9th International Symposium on Mechatronics and its Applications, Amman, Jordan, April 9 - 11, 2013
- 8) Mahmoud, M.A.E.; Hammad, B.K.; Abdel-Rahman, E.M.; El-Saadany, E.F.; Mansour, R.R., "Analysis of out-of-plane Micro-Power Generators," IECON 2012 - 38th Annual Conference on IEEE Industrial Electronics Society, 25 - 28 October 2012, Montral, Canada, pp. 930 – 936
- 9) Bashar K. Hammad, Ali H. Nayfeh, and Eihab M. Abdel-Rahman, "A Study of Subharmonic Excitation of Mechanically Coupled Microbeams for Filtration," Proceedings of ASME International Mechanical Engineering Congress 2008, October 31 - November 6, IMECE2008, Boston, Massachusetts, USA, Paper no. IMECE2008-66728.

- 10) Bashar K. Hammad, Eihab M. Abdel-Rahman, and Ali H. Nayfeh, "A Subharmonic Resonance Based MEMS Filter," Proceedings of ASME International Mechanical Engineering Congress 2007, November 5-10, Seattle, Washington, USA. Paper no. IMECE2007-.
- 11) Krishna Vummidi, Eihab M. Abdel-Rahman, Bashar K. Hammad, Ali H. Nayfeh, and Sanjay Raman, "Micromechanical Resonators with Near-Linear Response," Proceedings of ASME International Mechanical Engineering Congress 2008, October 31 - November 6, Boston, Massachusetts, USA, Paper no. IMECE2008-66517.
- 12) Hassen M. Ouakad, Ali H. Nayfeh, Slim Choura, Eihab M. Abdel-Rahman, Fehmi Najar, and Bashar K. Hammad, "Nonlinear Feedback Control and Dynamics of an Electrostatically Actuated Microbeam Filter," Proceedings of ASME International Mechanical Engineering Congress 2008, October 31 - November 6, Boston, Massachusetts, USA. Paper no. IMECE2008-68965.
- 13) Giancarlo G. Bordonaro, Muhammad R. Hajj, Ali H. Nayfeh, Bashar K. Hammad and John C. Duke, "Parameters Sensitivities to Damage Initiation in a Beam-Mass System," Proceeding of 49th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, April 7 - 10 2008, Schaumburg, IL (AIAA 2008-2165).
- 14) Bashar K. Hammad, Ali H. Nayfeh, and Eihab M. Abdel-Rahman, "A Study of Subharmonic Excitation of Mechanically Coupled Microbeams for Filtration," Proceedings of ASME International Mechanical Engineering Congress 2008, October 31 - November 6, IMECE2008, Boston, Massachusetts, USA. Paper no. IMECE2008-66728.
- 15) Bashar K. Hammad, Eihab M. Abdel-Rahman, and Ali H. Nayfeh, "A Discretization Approach to Modeling Capacitive MEMS Filters," Proceedings of ASME International Mechanical Engineering Congress 2007, November 5-10, Seattle, Washington, USA. Paper no. IMECE2007-.
- 16) Haider N. Arafat, Ali H. Nayfeh, and Bashar K. Hammad, "Experimental Observations of Nonlinear Non-planar Oscillations of a Cantilever Beam," Proceedings of the ASME 2007 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference IDETC/CIE 2007, September 4-7, 2007, Las Vegas, USA.
- 17) Bashar K. Hammad, Eihab M. Abdel-Rahman, and Ali H. Nayfeh, "Characterization of a Tunable MEMS RF Filter," Proceedings of ASME International Mechanical Engineering Congress 2006, November 5-10, IMECE2006, Chicago, Illinois, USA.
- 18) Eihab M. Abdel-Rahman, Bashar K. Hammad, and Ali H. Nayfeh, "SIMULATION OF A MEMS RF FILTER," Proceedings of IDETC/CIE 2005, ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference September 24-28, 2005, Long Beach, California, USA.

Non-Referred Conference Papers

- 1) Nicolas Patrici, Mohammad Mismar, Bashar K. Hammad, Khaled M Gharaibeh, Rafael Llavori de Micheo, Nick Harris, "Euro-Mediterranean perspectives on the complex shifts between external and internal QA of teaching and learning, at strategic and practical levels: Enhancing Quality Assurance Management (EQuAM) in Jordanian universities," 9th European Quality Assurance Forum, November 13 - 15, 2014, Barcelona, Spain.
- 2) Bashar K. Hammad and Ali H. Nayfeh, "Linear Vibrations of MEMS Filters," Proceedings EMD2007, the 18th Engineering Mechanics Division Conference of ASCE, June 3-6, 2007, Blacksburg, Virginia, USA.

- 3) Bashar K. Hammad, Eihab M. Abdel-Rahman, and Ali H. Nayfeh, "A Novel MEMS RF Filter," Proceedings of IMAC-XXV Conference and Exposition on Structural Dynamics, February 19-22, 2007, Orlando, Florida, USA.
- 4) Bashar K. Hammad, Eihab M. Abdel-Rahman, and Ali H. Nayfeh, "TUNING OF A MEMS RF FILTER," Technical Proceedings of the 2006 NSTI Nanotechnology Conference and Trade Show, Vol. 3, p. 345-348, May 7-11, 2006, Boston, Massachusetts, USA.
- 5) Bashar K. Hammad and T.C. Yih, "Characterization of an Intelligent Micro-Sensor/Pump by Stroke Volume," published in TexMEMS V held on May 6th, 2003.

Master Students

- External Examiner, Faisal Matal, "Waste Heat Recovery from Industrial Sector: Case Study – Cement Factory", University of Jordan, December 2018.
- Thesis Co-Advisor, Ali Al-Sardeyah, "Performance and Economical Analyses of Grid-Connected Photovoltaic (PV) Tracking Systems in Jordan", The Hashemite University, April 2015.
- External Examiner, Fedaa Abd Elhamid, "Impact of Passive Techniques on Thermal Behavior of Emergency Shelter", University of Jordan, December 2015.
- External Examiner, Mageda El-Moubarak, "Islanding Detection Methods for Grid-tied Inverters", Princess Sumaya University for Technology, May 2015.

Graduation Projects

- Advisor, "Novel Cylindrical POV-Screen", The Hashemite University, 2015.
(Graduation Project: Novel Cylindrical POV-Screen – www.youtube.com/watch?v=yqFfEF2JcQo)

Presentations

- Bashar K. Hammad, "Design of Students Learning Outcomes," Higher Education Workshop, The Hashemite University, Jordan, May 30, 2012.
- Bashar K. Hammad, "Jordanian Accreditation and Quality Assurance Criteria," Higher Education Workshop, The Hashemite University, Jordan, (October 6, 2011 & May 24, 2012).
- Bashar K. Hammad, Adnan M. A. Mukattash, and Ahmed M. Al-Ghandoor, "Standalone openloop controlled two-axis off-grid photovoltaic solar tracker: design, analysis, and feasibility study," accepted for publication in Proceedings of Global Conference on Renewables and Energy Efficiency for Desert Regions (GCREEDER 2011), April 26-28 2011, Amman, Jordan.
- Bashar K. Hammad and "Moh'd Sami" Ashhab, "Modeling, Simulation, and Control of a Solar Tracking System," accepted for publication in Proceedings of Global Conference on Renewables and Energy Efficiency for Desert Regions (GCREEDER 2011), April 26-28 2011, Amman, Jordan.
- Ali H. Nayfeh, Bashar K. Hammad, and Mohammad Hajj, "Flutter Analysis of the Golland+ Wing with Store," Dynamics and Control Workshop, Amman, Jordan, March 24-29, 2008.
- Ali H. Nayfeh, Bashar K. Hammad, and Mohammad Hajj, "Flutter Analysis of the Golland+ Wing with Store," ESM 100th Anniversary Mechanics Conference, Virginia Tech, Blacksburg, VA, May 29-30, 2008.
- Bashar K. Hammad, Eihab M. Abdel-Rahman, and Ali H. Nayfeh, "Exploiting Nonlinear Phenomena in Microelectromechanical Filters for Wireless Communications," poster presentation, the 23rd Annual Research Symposium, Virginia Tech, March 28th, 2007.
- Bashar K. Hammad and T. C. Yih, "Modeling and characterization of a nanoliter drug-delivery MEMS micropump with circular bossed membrane," oral presentation, Annual Celebration of Excellence by Students ACES, University of Texas at Arlington, Spring 2004.

Workshops

- *Attendant*, “Experts’ Network for Strategic Planning in Higher Education,” Islamic Educational, Scientific and Cultural Organization (ISESCO) & Federation of the Universities of the Islamic World (FUIW), Irbid, Amman, Jordan, October 30 – November 1, 2012.
- *Attendant*, “How to Qualify for ABET Accreditation,” Arab Organization for Quality Assurance in Education & Association of Arab Universities, Amman, Jordan, November 4 – 5, 2012.
- *Organizer*, “Higher Education Workshop,” The Hashemite University, Jordan, The Hashemite University, Jordan, (March 27 – 31, 2011, October 2 – 6, 2011, & May 27 – 31, 2012).
- *Co-organizer*, “Student Learning Outcomes: Design and Measures (for Faculties of Humanities and Social Sciences),” EU Tempus activity, The Hashemite University, Jordan, January 29 – 31, 2012.
- *Co-organizer*, “Student Learning Outcomes: Design and Measures (for Faculties of Engineering and Medical Sciences),” EU Tempus activity, The Hashemite University, Jordan, January 31 – February 2, 2012.
- *Attendant*, “ISESCO Strategy for developing Higher Education,” Amman, Jordan, October 24 –27, 2011.
- *Attendant*, “Developing Service-learning and Civic Engagement Partnerships across the Curriculum,” EU funded Tempus project, Lebanon, January 26 – 31, 2011.

Funded Projects

- Standalone Off-Grid Closed-Loop Two-Axis Photovoltaic Solar Tracker: Design, Fabrication, Control, and Comparison.
 - Funded by: King Abdullah II fund for Development (KAFD) & King Abdullah II Design & Development Bureau (KADDB).
 - Amount: JD 3616 (US\$ ≈ 5107). – Duration: 6 months.
- Standalone Off-Grid Open-Loop Two-Axis Photovoltaic Solar Tracker: Design, Fabrication, Control, and Comparison.
 - Funded by: Faculty of Engineering – The Hashemite University.
 - Amount: JD 1800 (US\$ ≈ 2542). – Duration: 12 months.
- Optimization of the Off-Grid and On-Grid Photovoltaic Solar Systems Using a Solar Tracker: Design, Fabrication, Control, and Feasibility Study.
 - Funded by: Deanship of Scientific Research – The Hashemite University.
 - Amount: JD 131,000 (US\$ ≈ 185,000). – Duration: 24 months.

Teaching Experience

- Statics (ESM 2104 - VT)
- Statics (401211 - HU)
- Transducers and Interfacing (405341 and 110405431 - HU)
- Transducers and Interfacing Lab (405341 - HU)
- Control and Transducers Lab (110405432 -HU)
- Control Systems 1 (4405451 - HU)
- Control Systems 2 (405454 - HU)
- Automatic Control (110405331 – HU)

- Automatic Control Lab (110405332 – HU)
- Dynamics and Vibrations (405211 – HU, TME 214 – GJU)
- Heating, Ventilation and Air Conditioning (TME 522 – GJU)
- Principles of Renewable Energy Systems (110405549 - HU - Traditional)
- Principles of Renewable Energy Systems (110405549 - HU - Online Course)
- Renewable Energy Systems (24571 - PSUT - Blended Learning)
- Special Topics (Building Automation) (4405495 - HU)

(VT: Virginia Tech, HU: The Hashemite University, PSUT: Princess Sumaya University for Technology, GJU: German Jordanian University)

Awards

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| • The Hashemite University Scholarship, Jordan | 2002-2006 |
| • SRTD Award to attend Nanotech Europe 2009, Berlin, Germany
(SRTD: Support to Research and Technological Development and Innovation Initiatives and Strategies in Jordan Project funded by the European Union) | 2009 |
| • Pratt Fellowship, Virginia Tech | Fall 2006 |
| • Pratt Fellowship, Virginia Tech | Spring 2007 |
| • Graduate Teaching Fellowship, Virginia Tech | Summer 2007 |

Reviewed Papers for

- Nonlinear Dynamics
- Renewable and Sustainable Energy Reviews
- Applied Physics Letters
- Journal of Vibration and Acoustics
- International Journal of Non-Linear Mechanics
- Sustainable Energy Technologies and Assessments
- Environmental Engineering and Management Journal
- Shock and Vibration
- Sustainable Cities and Society
- International Journal of Thermal and Environmental Engineering
- Jordan Journal of Mechanical and Industrial Engineering
- Jordan Journal of Electrical Engineering
- Heliyon
- ASME International Mechanical Engineering Congress, IMECE 2007, 2012, 2013, 2014, 2017
- Frontiers in Education (FIE) 2015, El Paso, Texas, October 21-24
- 6th International Conference on Electrical and Electronics Engineering (ICEEE 2019), April 16-17, 2019, Istanbul, Turkey
- ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference IDETC/CIE 2009 & IDETC/CIE 2013

Professional Service

- Coordinator, Quality Assurance and Accreditation Committee in Mechanical and Maintenance Engineering Department, German Jordanian University, 2019.
- Member, Quality Assurance and Accreditation Committee in School of applied Technical Science (College level), German Jordanian University, 2019.
- Member, E-learning Committee (University level), German Jordanian University, 2019.
- Member, Technical Committee of 6th International Conference on Electrical and Electronics Engineering (ICEEE 2019)
- Representative of Mechatronics Engineering Department in College Council for academic year 2017/2018
- Member, Committee of Preparing documents for Tender for Design, Supply, Delivery, Installation, Testing, and Commissioning of Grid-Connected Photovoltaic Systems at University of Jordan, Jordan, 2016.
- Contact Person, Towards a National Qualifications Framework for Jordan - NQF-J A project funded by Erasmus+ (European Union's programme) 2016–2018.
- Member, Committee of Supervision for Design, Supply, Delivery, Installation, Testing, and Commissioning of Grid-Connected Photovoltaic Systems at the Hashemite University, Jordan, 2015.
- Member, Committee of Preparing documents for Tender for Design, Supply, Delivery, Installation, Testing, and Commissioning of Grid-Connected Photovoltaic Systems at the Hashemite University, Jordan, 2013.
- Contact Person, Enhancing Quality Assurance Management in Jordanian Universities - EQuAM A project funded by Tempus (European Union's programme) 2013–2015. • Contact Person, Tuning Middle East and North Africa - T-MEDA A project funded by Tempus (European Union's programme) 2014–2016.
- Member, Scientific Committee, Enhancing Quality of Technology-Enhanced Learning at Jordanian Universities eQTel
A project funded by Tempus (European Union's programme) 2014–2017.
- Member, Scientific Committee, Modernising Undergraduate Renewable Energy Education: EU Experience for Jordan - MUREE
A project funded by Tempus (European Union's programme) 2013–2015.
- Member, QS (World University Rankings) Committee at The Hashemite University, 2013.
- Member, Curricula Committee at The Hashemite University, Academic Years 2011–2012. 2012–2013, 2013 – 2014, 2014 – 2015, 2015 – 2016.
- Member, DataBase Committee for Service Learning Project at The Hashemite University, 2013. • Member, International Scientific Committee of International Conference on Energy, Water, & Environment (ICEWE 2012), Jordan, November 27 – 30 2012.
- Member, Committee of Program Accreditation for Renewable Energy Engineering and Sustainability at Al Al-Bayat University, Jordan, October 2015.
- Member, Follow-up Committee of General Accreditation for Hittien College, Jordan, July 2013.
- Member, Follow-up Committee of General Accreditation for Philadelphia University, Jordan, June 2012.
- Member, Hashemite University Committee to establish a Microsystem Center.