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Education

- Ph.D. in Engineering Mechanics, University of Toledo, 1997.
- M.Sc. in Mechanical Engineering, University of Toledo, 1991.
- B.Sc. in Mechanical Engineering, Kuwait University, 1988.

Appointments

- Associate Professor, July 2011–present, Department of Systems Design Engineering, University of Waterloo.
- Assistant Professor, December 2005–June 2011, Department of Systems Design Engineering, University of Waterloo.
- Research Associate, June 1997–December 2005, Department of Engineering Science and Mechanics, Virginia Polytechnic Institute and State University.
- Adjunct Faculty, August 1996–May 1997, Department of Mathematics and Life Sciences, Owens Community College.
- Teaching and Research Assistant, 1990–1997, Department of Mechanical, Industrial and Manufacturing Engineering, University of Toledo.

Research

Fields

- MEMS and NEMS sensors and actuators
- Energy harvesting and micro-power generation
- Health monitoring of structures and machines

- Dynamics of the musculoskeletal system
- Dynamics and control of cranes

Grants, PI

- Low Voltage Actuation and Control of an Electrostatic Micromirror, NSERC – Engage, 2013–2014.
- Micro-Electro-Mechanical Gas Sensors, NSERC – Research Tools and Instruments, 2012–2014.
- Driver Alcohol Detection – Collaborative Development of Passive, Unobtrusive Technology to Prevent Drunk Driving, Network of Centres of Excellence – Auto21, 2012–2015.
- Nonlinear Micro-Electro-Mechanical Sensors and Actuators, NSERC – Discovery Accelerator Supplement, 2011–2014.
- Nonlinear Micro-Electro-Mechanical Sensors and Actuators, NSERC – Discovery Grant, 2011–2016.
- Development of an Ethanol Vapor Detection Prototype, FedDev Ontario – Applied Research and Commercialization Initiative, 2011–2012.
- Development of Demonstration Micro-Power Units for Moderate Vibration Environments, OCE – Technical Problem Solving, 2011.
- Developing Second Generation Micro Power Generators and Demonstration Systems for Lighting Applications as Immediate Market Entry Points, OCE – Technical Problem Solving, 2010–2011.
- Wideband Micro-Power Units, NSERC – Collaborative Research and Development, 2010–2012.
- Development of a Sensor System, Sober Steering Sensors – Canada, 2010–2012.
- Wideband Micro Power Generation, Arjae Spectral Enterprises, Ltd., 2009–2011.
- Dynamics of Micro-Electro-Mechanical System Resonators, NSERC – Discovery Grant, 2008–2011.
- MEMS Test and Characterization Laboratory, CFI – IOF, 2008–2013.
- MEMS Test and Characterization Laboratory, CFI – LOF & ORF – RI, 2007–2008.

Grants, Co-PI

- Advancing Nanotechnology: Development of Novel Scanning Probe Tools for Applications in Atomically Precise Fabrication, Characterization and Meteorology, ORF – Research Excellence, 2011–2016.
- High Capacity Alongside Sea Base Sustainment (HiCASS), (with Lockheed Martin, Maritime Systems and Sensors), Office of Naval Research, 2004–2005.

Patents

1. S. Park, M. S. Al-Ghamdi, M. E. Khater, and E. M. Abdel-Rahman, "Combined Electromagnetic-Electrostatic Actuation Method and a Novel Tunable Magnetic Sensor," provisional US Patent, 62/038,276, August 2014.

2. K. M. Elrayes, E. M. Abdel-Rahman, R. R. Mansour, and E. F. Elsaadani, "Transduction by Magnetic Field Disruption," provisional US Patent, August 2012.
3. M. S. Soliman, E. M. Abdel-Rahman, R. R. Mansour, and E. El-Saadany, "Vibration-Based Power Generator," US Patent 8,222,754, July 2012.
4. A. A. Alwasel, K. M. Elrayes, E. M. Abdel-Rahman, and Carl T. Haas, "Mobile Direct Biological Joint Angle Sensors," provisional US Patent, 61/664,145, June 2012.
5. A. H. Nayfeh, E. M. Abdel-Rahman, and M. Ghommem, "Differential Frequency Gyroscope," provisional US Patent, December 2011.
6. M. E. Khater, E. M. Abdel-Rahman, and A. H. Nayfeh, "Methods and Systems for Detection Using Threshold-Type Electrostatic Sensors," US Patent App. 12/791,293. International Patent PCT/CA2010/00821, December 2010.
7. M. A. E. Mahmoud, E. M. Abdel-Rahman, R. R. Mansour, and E. F. Elsaadani, "Springless Vibration Energy Harvesters," provisional US Patent, December 2010.

Publications

Theses

- E. M. Abdel-Rahman, "A Three-Dimensional Dynamic Anatomically Based Model of the Human Tibio-Femoral Joint," Ph.D. Dissertation, Department of Mechanical Engineering, University of Toledo, Toledo, OH, December 1997..
- E. M. Abdel-Rahman, "A Two-Dimensional Dynamic Model of the Human Knee Joint," M.Sc. Thesis, Department of Mechanical Engineering, University of Toledo, Toledo, OH, August 1991.

Journal Papers

1. A. Alwasel, M. Yung, E. M. Abdel-Rahman, R. P. Wells, and C. T. Haas, "Fatigue Detection Using Phase-Space Warping," submitted, Journal of Biomechanics.
2. T. Dagdelen, M. Khater, S. Park,R. Saritas, E. Abdel-Rahman, and M. Yavuz, "Static Analysis of Bonding Wires Under DC Current," submitted, Materials Transactions.
3. S. Lajimi, G. Heppler, and E. M. Abdel-Rahman, "A mechanical-thermal noise analysis of a beam-rigid body microgyroscope," submitted, Journal of Physics D: Applied Physics.
4. S. Lajimi, G. Heppler, and E. M. Abdel-Rahman, "A parametric study of a beam-rigid body highly sensitive frequency-modulation (FM) microgyroscope," submitted, Journal of Vibration and Acoustics.

5. S. Lajimi, G. Heppler, and E. M. Abdel-Rahman, "On modeling beam-rigid-body microgyroscopes," submitted, Applied Mathematical Modelling.

6. S. Lajimi, G. Heppler, and E. M. Abdel-Rahman, "Primary resonance of an amplitude-/frequency-modulation beam-rigid body microgyroscope," submitted, International Journal of Non-Linear Mechanics.

7. A. F. Payam and E. M. Abdel-Rahman, "Estimation of Sample-Tip Height for Non-Contact Mode Atomic Force Microscopy," submitted, Precision Engineering.

8. S. Ozdemir, M. Khater, S. Akhtar, O. Gunal, E. M. Abdel-Rahman, and M. Yavuz, "Measuring the Quality Factor in MEMS devices," accepted, Austin Journal of Nanomedicine & Nanotechnology.

9. M. E. Khater, S. Akhtar, S. Park, S. Ozdemir, E. M. Abdel-Rahman, C. P. Vyasarayani, and M. Yavuz, "Contact Damping in MEMS Actuators," Applied Physics Letters, 2014, 105: 253501.

10. M. Yilmaz, B. A. Tunkar, E. M. Abdel-Rahman, M. Yavuz, M. A. E. Mahmoud, S. Park, and K. Elrayes, "High-Efficiency Passive Full-Wave Rectification for Electromagnetic Energy Harvesters," Journal of Applied Physics, 2014, 116: 134902.

11. M. Khater, M. Eltaher, E. M. Abdel-Rahman, and M. Yavuz, "Surface and Thermal Load Effects on the Buckling of Curved Nanowires," Engineering Science and Technology, an International Journal, 2014, 17: 279–283.

12. M. E. Khater, M. Al-Ghamdi, S. Park, K. M. E. Stewart, E. M. Abdel-Rahman, A. Penlidis, A. H. Nayfeh, A. K. S. Abdel-Aziz, and M. Basha, "Binary MEMS Gas Sensors," Journal of Micromechanics and Microengineering, 2014, 24: 065007.

13. A. H. Nayfeh, E. M. Abdel-Rahman, and M. Ghommem, "A Novel Differential Frequency Microgyroscope," Journal of Vibration and Control, doi:10.1177/1077546313491775.

14. S.-R. Chung, S. Park, E. M. Abdel-Rahman, J. T. W. Yeow, and M. Khater, "Architecture for MEMS-Based Analog Demodulation," Journal of Micromechanics and Microengineering, 2013, 23: 045013.

15. C. P. Vyasarayani, E. M. Abdel-Rahman, and J. McPhee, "Modeling of Contact and Stiction in Electrostatic Micro-Cantilever Actuators," ASME Journal of Nanotechnology in Engineering and Medicine, 2012, 3: 011003.

16. A. Alwasel, K. Elrayes, E. M. Abdel-Rahman, and C. Haas, "Reducing Shoulder Injuries Among Construction Workers," Gerontechnology, 2012, 11: 242.

17. S. Forouzanfar, R. Mansour, and E. M. Abdel-Rahman, "Lorentz-force Transduction for RF Micromechanical Filters," Journal of Micromechanics and Microengineering, 2012, 22: 035018.

18. A. Seleim, S. Towfighian, E. Delande, E. M. Abdel Rahman, and G. R. Heppler, "Dynamic Analysis of a Close-Loop Controlled Chaotic MEMS Resonator," Nonlinear Dynamics, 2012, 69: 615-633.

19. S. Towfighian, G. R. Heppler, and E. M. Abdel Rahman, "Low-Voltage Closed Loop MEMS Actuators," Nonlinear Dynamics, 2012, 69: 565-575.

20. K. M. E. Stewart, N. T. McManus, E. M. Abdel-Rahman, and A. Penlidis, "Doped Polyaniline for the Detection of Formaldehyde," Journal of Macromolecular Science, Part A: Pure and Applied Chemistry, 2012, 49: 1-6.

21. S. Towfighian, A. Seleim, E. M. Abdel Rahman, and G. R. Heppler, "A Large-Stroke Electrostatic Micro-Actuator," Journal of Micromechanics and Microengineering, 2011, 21: 075023.

22. B. K. Hammad, E. M. Abdel-Rahman, and A. H. Nayfeh, "On the Use of the Subharmonic Resonance as a Method for Filtration," Journal of Computational and Nonlinear Dynamics, 2011, 6: 041007.

23. M. Khater, K. Vummidi, E. M. Abdel-Rahman, A. H. Nayfeh, S. Raman, "Dynamic Switching of MEMS Shunt Switches," Journal of Micromechanics and Microengineering, 2011, 21:035009.

24. C. P. Vyasarayani, E. M. Abdel-Rahman, J. McPhee, and S. Birkett, "Modelling of MEMS Resonators Past Pull-in," Journal of Computational and Nonlinear Dynamics, 2011, 6: 031008.

25. S. Towfighian, G. R. Heppler, and E. M. Abdel Rahman, "Analysis of a Chaotic Electrostatic Micro-oscillator," Journal of Computational and Nonlinear Dynamics, 2011, 6: 011001.

26. M. Ghommem, A. H. Nayfeh, S. Choura, F. Najar, and E. M. Abdel-Rahman, "Modeling and Performance Study of a Beam Microgyroscope," Journal of Sound and Vibration, 2010, 329: 4970-4979.

27. F. Najar, A. H. Nayfeh, E. M. Abdel-Rahman, S. Choura, and S. El-Borgi, "Nonlinear Analysis of MEMS Electrostatic Microactuators: Primary and Secondary Resonances of the First Mode," Journal of Vibration and Control, 2010, 16: 1321-1349.

28. F. Najar, A. H. Nayfeh, E. M. Abdel-Rahman, S. Choura, and S. El-Borgi, "Dynamics and Global Stability of Beam-Based Electrostatic Microactuators," Journal of Vibration and Control, 2010, 16: 721-748.

29. B. K. Hammad, A. H. Nayfeh, and E. M. Abdel-Rahman, "Modeling and Analysis of Electrostatic MEMS Filters," Nonlinear Dynamics, 2010, 60: 385-401.

30. M. Mahmoud, E. M. Abdel-Rahman, E. F. El-Saadany, and R. R. Mansour, "Electro-Mechanical Coupling in Electrostatic Micro-Power Generators," Smart Materials and Structures, 2010, 19: 025007.

31. S. H. Ghafari, E. M. Abdel-Rahman, F. Golnaraghi, and F. Ismail, "Effect of Internal Clearance on the Vibration of Ball Bearings," Journal of Sound and Vibrations, 2010, 329: 1332-1347.

32. A. H. Nayfeh, H. M. Ouakad, F. Najar, S. Choura, and E. M. Abdel-Rahman, "Nonlinear Dynamics of a Resonant Gas Sensor," Nonlinear Dynamics, 2010, 59: 607-618.

33. M. S. M. Soliman, E. M. Abdel-Rahman, R. Mansour, and E. F. El-Saadany, "A Design Procedure for Wideband Micro-Power Generators," Journal of Microelectromechanical Systems, 2009, 18: 1288-1299.

34. S. Emam and E. M. Abdel-Rahman, "Response of Microbeam-Based Devices Accounting for the Electrostatic Force and Geometric Nonlinearities," Journal of Advanced Research in Dynamical and Control Systems, 2009, 1: 18-30.

35. M. F. Daqaq, E. M. Abdel-Rahman, and A. H. Nayfeh, "Two-to-One Internal Resonance in Microscanners," Nonlinear Dynamics, 2009, 57: 231–251.

36. M. S. M. Soliman, E. M. Abdel-Rahman, E. F. El-Saadany, and R. R. Mansour, "A Wideband Vibration-Based Energy Harvester," Journal of Micromechanics and Microengineering, 2008, 18: 115021.

37. H. N. Arafat, A. H. Nayfeh, and E. M. Abdel-Rahman, "Multi-Modal Responses of Contact-Mode Atomic Force Microscopes," Nonlinear Dynamics, 2008, 54: 151-166.

38. M. F. Daqaq, E. M. Abdel-Rahman, and A. H. Nayfeh, "Towards a Stable Low-Voltage Torsional Microscanner," Microsystem Technologies, 2008, 14: 725–737.

39. A. H. Nayfeh, M. I. Younis, and E. M. Abdel-Rahman, "Dynamic Pull-in Phenomenon in MEMS Resonators," Nonlinear Dynamics, 2007, 48: 153-163.

40. F. Najar, S. Choura, E. M. Abdel-Rahman, S. El-Borgi, and A. Nayfeh, "Dynamic Analysis of Variable-Geometry Electrostatic Microactuators," Journal of Micromechanics and Microengineering, 2006, 16: 2449-2457.

41. E. M. Abdel-Rahmanand A. H. Nayfeh, "Contact Force Identification using the Subharmonic Resonance of Contact-Mode AFM," Nanotechnology, 2005, 16: 199-207.

42. A. H. Nayfeh, M. I. Younis, and E. M. Abdel-Rahman, "Reduced-Order Models for MEMS Applications," Nonlinear Dynamics, 2005, 41: 211-236.

43. F. Najar, S. Choura, S. El-Borgi, E. M. Abdel-Rahman, and A. H. Nayfeh, "Modeling and Design of Variable-Geometry Electrostatic Microactuators," Journal of Micromechanics and Microengineering, 2005, 15: 419-429.

44. E. M. Abdel-Rahman, M. I. Younis, and A. H. Nayfeh, "Finite-Amplitude Motions of Resonators and Their Stability," Journal of Computational and Theoretical Nanoscience, 2004, 1: 385-391.

45. X. Zhao, E. M. Abdel-Rahman, and A. H. Nayfeh, "A Reduced-Order Model for Electrically Actuated Microplates," Journal of Micromechanics and Microengineering, 2004, 14: 900-906.

46. E. M. Abdel-Rahmanand A. H. Nayfeh, "Secondary Resonances of Electrically Actuated Resonant Microsensors," Journal of Micromechanics and Microengineering, 2003, 13: 491-501.

47. M. I. Younis, E. M. Abdel-Rahman, and A. H. Nayfeh, "A Reduced-Order Model for Electrically Actuated Microbeam-Based MEMS," IEEE Journal of Microelectromechanical Systems, 2003, 12: 672-680.

48. E. M. Abdel-Rahmanand A. H. Nayfeh, "Two-Dimensional Control for Ship-Mounted Cranes: A Feasibility Study," Journal of Vibration and Control, 2003, 9: 1327-1342.

49. E. M. Abdel-Rahman, A. H. Nayfeh, and Z. N. Masoud, "Dynamics and Control of Cranes: A Review," Journal of Vibration and Control, 2003, 9: 863-908.

50. E. M. Abdel-Rahman, W. F. Faris, and A. H. Nayfeh, "Axisymmetric Natural Frequencies of Statically Loaded Annular Plates," Shock and Vibration, 2003, 10: 301-312.

51. E. M. Abdel-Rahman, M. I. Younis, and A. H. Nayfeh, "Characterization of the Mechanical Behavior of an Electrically Actuated Microbeam," Journal of Micromechanics and Microengineering, 2002, 12: 759-766.

52. E. M. Abdel-Rahmanand A. H. Nayfeh, "Pendulation Reduction in Boom Cranes Using Cable Length Manipulation," Nonlinear Dynamics, 2002, 27: 255-269.

53. C-M. Chin, A. H. Nayfeh, and E. M. Abdel-Rahman, "Nonlinear Dynamics of a Boom Crane," Journal of Vibration and Control, 2001, 7: 199-220.

54. E. M. Abdel-Rahmanand M. S. Hefzy, "Three-Dimensional Dynamic Behavior of the Human Knee Joint under Impact Loading," Medical Engineering and Physics, 1998, 20: 276-290.
55. M. S. Hefzy and E. M. Abdel-Rahman, "Dynamic Modeling of the Human Knee Joint: Formulation and Solution Techniques. A Review Paper," Biomedical Engineering-Application, Basis & Communication, 1995, 7: 5-21.
56. E. M. Abdel-Rahmanand M. S. Hefzy, "A Two-Dimensional Dynamic Anatomical Model of the Human Knee Joint," Journal of Biomechanical Engineering, 1993, 115: 357-365.

Conference Papers

1. T. Dagdelen, M. Khater, S. Park,R. Saritas,E. Abdel-Rahman, and M. Yavuz, "Displacement Analysis of Bonding Wires Under DC Current," International Conference on Nanojoining and Microjoining, Emmetten, Switzerland, December 2014.
2. M. Yavuz, M. Irannejad, A. Brzezinski, B. Cui, and E. M. Abdel-Rahman, "Nano-bonding and Packaging Graphene-based NEMS Devices," Saudi International Nanotechnology Conference, Riyadh, Saudi Arabia, December 2014
3. S. Lajimi, G. Heppler, and E. M. Abdel-Rahman, "A parametric study of the response of a beam-rigid body microgyroscope,", ASME IMECE, Montréal, Canada, November 2014, IMECE2014-40012.
4. R. Saritas, M. Khater, H. Nafissi, S. Park, T. Dagdelen, E. Abdel Rahman, and M. Yavuz, "Modal Response of Bonding Wires under Thermal Loading," IEEE International Conference on Nanotechnology, Toronto, Canada, August 2014, pp. 113-116.
5. M. Eltaher, M. Khater, S. Park, E. M. Abdel-Rahman, and M. Yavuz, "A Model for Nano Bonding Wires under Thermal Loading," IEEE International Conference on Nanotechnology, Toronto, Canada, August 2014, pp. 382–384.
6. M. Xie, S. Park, E. M. Abdel-Rahman, and M. Yavuz, "Actuation of a Frequency Modulated MEMS Gyroscope," ASME IDETC, Buffalo, NY, DETC2014-34817, August 2014.
7. S. Park, M. Al-Ghamdi, M. Khater, E. M. Abdel-Rahman, and M. Yavuz, "Adjustable Sensitivity MEMS Magnetic Sensor," ASME IDETC, Buffalo, NY, August 2014, DETC2014-35004.
8. M. Bendame, E. M. Abdel-Rahman, and M. Soliman, "Test and Validation of a Nonlinear Electromagnetic Energy Harvester," ASME IDETC, Buffalo, NY, August 2014, DETC2014-35093.
9. T. Dagdelen, K. El-Rayes, S. Park, M. Khater, R. Seritas, E. M. Abdel-Rahman, and M. Yavuz, "Fatigue Test for Thick Wire Bonds," ASME IDETC, Buffalo, NY, August 2014, DETC2014-35190.
10. A. Alwasel, E. M. Abdel-Rahman, and C. Haas, "A Technique to Detect Fatigue in the Lower Limbs," ASME IDETC, Buffalo, NY, August 2014, DETC2014-35484.
11. S. Lajimi, G. Heppler, and E. M. Abdel-Rahman, "Nonlinear Dynamics of a Beam-Rigid Body Microgyroscope," ASME IDETC, Buffalo, NY, August 2014, DETC2014-35671.
12. M. Bendame, M. Soliman, and E. M. Abdel-Rahman, "Perturbation of a Horizontally-Aligned Energy Harvester," International Conference on Structural Nonlinear Dynamics and Diagnosis, Agadir, Morocco, May 2014.

13. S. Lajimi, G. Heppler, and E. M. Abdel-Rahman, "The Application of a New Beam-Rigid Body MEMS Gyroscope in the Frequency-Modulation Mode," IEEE International Conference on Nano/Micro Engineered and Molecular Systems (NEMS), Waikiki Beach, HI, April 2014, pp. 586–591.

14. S. Lajimi, E. M. Abdel-Rahman, and G. Heppler, "Modeling and Sensitivity Analysis of a MEMS Vibratory Rotation Rate Sensor," Proceedings of SPIE 9061, Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems, vol. 9061, San Diego, CA, March 2014, paper # 90612 (1-11).

15. M. E. Khater, E. M. Abdel-Rahman, and A. H. Nayfeh, "A Microsensor for Measuring Minute Chemical and Biological Masses," Gulf International Conference on Applied Mathematics, Kuwait, November 2013. (Invited paper).

16. B. K. Hammad, E. M. Abdel-Rahman, and M. A.E. Mahmoud, "Micro Cantilever Electrostatic Energy Harvester," ASME IDETC, Portland, OR, August 2013, DETC2013-13340.

17. S. Park, E. M. Abdel-Rahman, and M. Khater, "Low Voltage Electrostatic Actuation for MEMS Actuator Using Frequency Modulation," ASME IDETC, Portland, OR, August 2013, DETC2013-13376.

18. A. Alwasel, K. El-Rayes, E. M. Abdel-Rahman, and C. Haas, "A Human Body Posture Sensor for Monitoring and Diagnosing MSD Risk Factors," ISARC: International Symposium on Automation and Robotic in Construction, Montréal, Canada, August 2013.

19. S. Lajimi, G. Heppler, and E. M. Abdel-Rahman, "Eigenvalue Analysis of a Cantilever Beam-Rigid-Body MEMS Gyroscope," ICMEM: International Conference on Mechanical Engineering and Mechatronics, August 2013, Toronto, Canada, pp. 178-1–178-5.

20. S. Lajimi, G. Heppler, and E. M. Abdel-Rahman, "A New Cantilever Beam-Rigid-Body MEMS Gyroscope: Mathematical Model and Linear Dynamics," ICMEM: International Conference on Mechanical Engineering and Mechatronics, August 2013, Toronto, Canada, pp. 177-1–177-6.

21. M. Khater, T. Dagdelen, A. Abdel-Aziz, S. Park, K. El-Rayes, E. M. Abdel-Rahman, and M. Yavuz, "Analysis of Thick Wire Bonds Under Thermal Loads," CanCNSM: Canadian Conference on Nonlinear Solid Mechanics, Montréal, Canada, July 2013, paper # 830.

22. D. M. Effa, E. M. Abdel-Rahman, and M. Yavuz, "Cantilever Beam Microgyroscope Based on Frequency Modulation," IEEE/ASME International Conference on Advanced Intelligent Mechatronics: AIM 2013, Wollongong, Australia, July 2013, pp. 844-849.

23. W. T. Chen, K. Stewart, J. Carroll, R. Mansour, E. M. Abdel-Rahman, and A. Penlidis, "Novel Gaseous Phase Ethanol Sensor Implemented with Underloaded RF Resonator for SHF Sensor-Embedded Passive Chipless RFIDS," Transducers 2013, Barcelona, Spain, June 2013, pp. 2059-2062.

24. M. Alusail, E. M. Abdel-Rahman, M. Yavuz, and M. Khater, "Residual Stresses in Circular Thin Plates Using Two Dimensional X-Ray Diffraction and Finite Element Analysis," CANCAM: Canadian Congress of Applied Mechanics, Saskatoon, Canada, June 2013.

25. M. Yilmaz, E. M. Abdel-Rahman, S. Park, K. Elrayes, M. Yavuz, M. A. E. Mahmoud, M. S. M. Soliman, and R. A. El-Shatshat, "Testing of a Passive Full-Wave MOSFET Rectifier," CANCAM: Canadian Congress of Applied Mechanics, Saskatoon, Canada, June 2013.

26. T. Dagdelen, K. El-Rayes, M. Khater, E. M. Abdel-Rahman, I. Sel, and M. Yavuz, "Fatigue Analysis of Thick Wire Bonds," International Conference on Nanojoining and Microjoining, Beijing, China, December 2012.

27. M. A. E. Mahmoud, B. K. Hammad, E. M. Abdel-Rahman, E. F. El-Saadany, and R. R. Mansour "Analysis of Out-of-plane Micro-Power Generators," IEEE IECON, Montréal, Canada, October 2012, pp. 930-936.

28. S.-R. Chung, E. M. Abdel-Rahman, and J. Yeow, "A MEMS Analog Demodulator," IEEE IECON, Montréal, Canada, October 2012, pp. 3946-3951.

29. S. Park, M. Pallapa, J. Yeow, and E. M. Abdel-Rahman, "Low Voltage Electrostatic Actuation and Angular Displacement Measurement of Micromirror Coupled with Resonant Drive Circuit," IEEE IECON, Montréal, Canada, October 2012, pp. 3976-3981.

30. S. Park and E. M. Abdel-Rahman, "Low Voltage Electrostatic Actuation and Displacement Measurement through Resonant Drive Circuit," ASME IDETC, Chicago, IL, August 2012, DETC2012-71268.

31. S. Park and E. M. Abdel-Rahman, "Stabilization of Electrostatic Actuators through a Variable Gain Amplifier," ASME IDETC, Chicago, IL, August 2012, DETC2012-71274.

32. K. Elrayes, E. M. Abdel-Rahman, R. R. Mansour, and E. F. El-Saadany, "Field Disruption Energy Harvester," ASME IDETC, Chicago, IL, August 2012, DETC2012-71440.

33. A. Alwasel, K. Elrayes, E. M. Abdel-Rahman, and C. Haas, "Reducing Shoulder Injuries among Construction Workers," ISG-ISARC: International Symposium on Automation and Robotic in Construction, Eindhoven, Netherlands, June 2012.

34. S. Akhtar, A. R. Ahmad, and E. M. Abdel-Rahman, "A Metaheuristic Bat-Inspired Algorithm for Full Body Human Pose Estimation," Canadian Conference on Computer and Robot Vision, Toronto, Canada, May 2012, pp. 369-375.

35. M. Bendame and E. M. Abdel-Rahman, "Nonlinear Modeling and Analysis of a Vertical Springless Energy Harvester," International Conference on Structural Nonlinear Dynamics and Diagnosis, Marrakech, April-May 2012, MATEC Web of Conferences, Vol. 1, paper # 01004.

36. M. Bendame, K. Elrayes, M. E. Mahmoud, E. M. Abdel-Rahman, R. Mansour, and E. El-Saadany, "Vertically-Aligned Springless Energy Harvester," ASME IDETC, Washington, DC, September 2011, DECT2011-48371.

37. I. Khodadad, L. Ball, R. Baghat, I. Shafieloo, E. M. Abdel-Rahman, E. El-Saadany, R. Mansour, and A. Hajian, "Optimization of a Micro Power Unit," ASME IDETC, Washington, DC, September 2011, DECT2011-48687.

38. M. E. Khater, E. M. Abdel-Rahman, and A. H. Nayfeh, "Nonlinear Phenomena in MEMS and NEMS: A Micro Sensor for Measuring Minute Gas and Biological Masses," European Nonlinear Dynamics Conference, Rome, Italy, July 2011.

39. M. Bendame, K. Elrayes, E. M. Abdel-Rahman, M. A. E. Mahmoud, R. R. Mansour, and E. F. El-Saadany, "Horizontally-Aligned Springless Energy Harvester," International Conference on Applied Mathematics, Modeling Computational Science, Waterloo, Canada, July 2011.

40. S. Forouzanfar, R. R. Mansour, and E. M. Abdel-Rahman, "Lorentz force transduction for RF micromechanical filters," Transducers: International Solid-State Sensors, Actuators and Microsystems Conference, Beijing, China, June 2011, pp. 2458-2461.

41. M. A. S. Aly, N. Lopez, D. Weyers, S. Rasheed, E. M. Abdel-Rahman, and A. Hajian, "Investigating the Use of Carbon Nanotubes in MRI Receiver Coils," ISMRM Annual Meeting & Exhibtion, Montréal, Canada, May 2011, Vol. 19, pp. 3884.

42. S. Akhtar, A. R. Ahmad, E. M. Abdel-Rahman, and T Naqvi, "A PSO Accelerated Immune Particle Filter for Dynamic State Estimation," Canadian Conference on Computer and Robot Vision, St. John's, Canada, May 2011, pp. 72-79.

43. A. F. Payam and E. M. Abdel-RahmanâĂIJEstimation of Sample-Tip Height in Non-Contact Mode Atomic Force Microscopy Using an Adaptive Nonlinear Observer," Multifrequency AFM Conference, Madrid, March 2011.

44. A. Alwasel, K. Elrayes, E. M. Abdel-Rahman, and C. Haas, "Sensing Construction Work-Related Musculoskeletal Disorders (WMSDs)," International Symposium on Automation and Robotic in Construction, Seoul, Korea, June-July 2011, pp. 164-169.

45. M. Pallapa, M. A. S. Aly, A. I. H. Chen, L. Wong, K. W. Wong, E. M. Abdel-Rahman, and J. T.-W. Yeow, "Modeling and Simulation of a Piezoelectric Micro-Power Generator," The COMSOL Conference, Boston, MA, October 2010.

46. M. Khater, K. Vummidi, E. M. Abdel-Rahman, A. Nayfeh, S. Raman, "Dynamic Switching of MEMS Shunt Switches," ASME IDETC, Montréal, Canada, August 2010, DECT2010-28487.

47. M. A. E. Mahmoud, E. M. Abdel-Rahman, R. R. Mansour, and E. F. El-Saadany, "Springless Vibration Energy Harvesters," ASME IDETC, Montréal, Canada, August 2010, DETC2010-29046.

48. M. S. M. Soliman, E. M. Abdel-Rahman, E. F. El-Saadany, and R. R. Mansour, "Output Power Optimization for Electromagnetic Vibration Energy Harvesters," ASME IDETC, Montréal, Canada, August 2010, DETC2010-28893.

49. S. Towfighian, A. Seleim, E. M. Abdel-Rahman, and G. R. Heppler, "Experimental Validation for an Extended-Stability Electrostatic Actuator," ASME IDETC, Montr 'eal, Canada, August 2010, DETC2010-28983.

50. S. Towfighian, G. R. Heppler, and E. M. Abdel-Rahman, "A Low Voltage Controller for a Chaotic Micro Resonator," ASME IDETC 2010, Montréal, Canada, August, DETC2010-28990.

51. M. A. E. Mahmoud, E. M. Abdel-Rahman, E. F. El-Saadany, and R. R. Mansour, "Battery-less Electrostatic Micro-Power Generator," Microsystems and Nanoelectronics Research Conference, Ottawa, Canada, October 2009.

52. S. Towfighian, G. R. Heppler, and E. M. Abdel Rahman, "Quadratic Controller for a Chaotic Micro-Resonator," Microsystems and Nanoelectronics Research Conference, Ottawa, Canada, October 2009.

53. A. Seleim, E. M. Abdel-Rahman, and G. R. Heppler, "Dynamics of a Closed Loop Controlled MEMS Actuator," Microsystems and Nanoelectronics Research Conference, Ottawa, Canada, October 2009.

54. K. Vummidi, M. Khater, E. M. Abdel-Rahman, A. Nayfeh, S. Raman, "Dynamic Pull-in of Shunt Capacitive MEMS Switches," Eurosensors, Lausanne, Switzerland, September 2009, Procedia Chemistry, Vol. 1, pp. 622-625.

55. M. Khater, E. M. Abdel-Rahman, and A. H. Nayfeh, "A Novel Mass Sensing Technique for Electrostatically-Actuated MEMS," ASME IDETC, San Diego, CA, August–September 2009, DECT2009-87551.

56. A. F. Payam, M. Fathipour, E. M. Abdel-Rahman, and J. Yazdanpanah, "Estimation of Sample-Tip Height in Non-Contact Mode Atomic Force Microscopy Using an Adaptive Nonlinear Observer," ICEE, Tehran, Iran, May 2009.

57. S. Lajimi, E. M. Abdel-Rahman, and G. Heppler, "On Natural Frequencies and Mode Shapes of Micro-Beams," Proceedings of the International Multi-Conference of Engineers and Computer Scientists, Hong Kong, March 2009, Vol. 2, pp. 2184–2188.

58. F. Najar, E. M. Abdel-Rahman, S. Choura, S. El-Borgi, and A. H. Nayfeh, "Modeling and Design of a Multilayered Electrostatic Microactuator Using Timoshenko Beam Theory," International Conference on Advances in Mechanical Engineering and Mechanics ICAMEM, Sousse, Tunisia, December 2008.

59. A. F. Payam and E. M. Abdel-Rahman, "A Hybrid PD-Fuzzy Controller for Atomic Force Microscopes," ASME IMECE, Boston, MA, November 2008, IMECE2008-68061.

60. F. Najar, E. M. Abdel-Rahman, A. H. Nayfeh, and S. Choura, "Analysis of the Orbits of Electrostatic MEMS Resonators," ASME IMECE, Boston, MA, November 2008, IMECE2008-68042.

61. K. Vummidi, E. M. Abdel-Rahman, B. K. Hammad, S. Raman, and A. H. Nayfeh, "Micromechanical Resonators with Near-Linear Response," ASME IMECE, Boston, MA, November 2008, IMECE2008-66517.

62. M. S. M. Soliman, E. M. Abdel-Rahman, R. R. Mansour, and E. F. El-Saadany, "Design of a Wide-Band Energy Harvester," ASME IMECE, Boston, MA, November 2008, IMECE2008-67379.

63. H. Ouakad, A. Nayfeh, S. Choura, E. M. Abdel-Rahman, F. Najar, and B. Hammad, "Nonlinear Feedback Control and Dynamics of an Electrostatically Actuated Microbeam Filter," ASME IMECE, Boston, MA, November 2008, IMECE2008-68965.

64. B. K. Hammad, A. H. Nayfeh, and E. M. Abdel-Rahman, "A Study of Subharmonic Excitation of Mechanically Coupled Microbeams for Filtration," ASME IMECE, Boston, MA, November 2008, IMECE2008-66728.

65. S. Towfighian, E. M. Abdel-Rahman, and G. R. Heppler, "Static and Dynamic Analysis of a Bistable Micro-actuator," ASME IMECE, Boston, MA, November 2008, IMECE2008-67553.

66. C. P. Vyasarayani, E. M. Abdel-Rahman, J. McPhee, and S. Birkett, "Modelling MEMS Resonators Past Pull-in," ASME IMECE, Boston, MA, November 2008, IMECE2008-67763.

67. M. S. M. Soliman, E. F. El-Saadany, R. R. Mansour, and E. M. Abdel-Rahman, "Wideband MEMS-Based Energy Harvesters," Microsystems and Nanoelectronics Research Conference, Ottawa, Canada, October 2008.

68. M. A. E. Mahmoud, E. M. Abdel-Rahman, E. F. El-Saadany, and R. R. Mansour, "Approximate Solutions for the Response of an Electrostatic MEMS Micro Power Generators," Conference on Nonlinear Vibrations, Stability, and Dynamics of Structures, Blacksburg, VA, June 2008.

69. C. P. Vyasarayani, E. M. Abdel-Rahman, J. McPhee, and S. Birkett, "Modelling MEMS Resonators Past Pull-in," The Mechanics Conference, Blacksburg, VA, May 2008.

70. M. S. M. Soliman, E. M. Abdel-Rahman, R. R. Mansour, and E. F. El-Saadany, "A Prototype for a Wide-Band Energy Harvester," The Mechanics Conference, Blacksburg, VA, May 2008.

71. S. Towfighian, E. M. Abdel-Rahman, and G. R. Heppler, "Simulation of the Static Response of a Chaotic Microactuator," The Mechanics Conference, Blacksburg, VA, May 2008.

72. F. Najar, S. Choura, E. M. Abdel-Rahman, A. H. Nayfeh, and S. El-Borgi, "Modeling and Design of an FGM-Multilayer Microbeam with Electrostatic Actuation," COTUME: Tunisian Congress of Mechanics, Hammamet, Tunisia, March 2008, pp. 241-242.

73. S. H. Ghafari, E. M. Abdel-Rahman, F. Golnaraghi, and F. Ismail, "Chaos in Healthy Ball Bearings," ASME IMECE, Seattle, WA, November 2007, IMECE2007-43076.

74. B. K. Hammad, A. H. Nayfeh, and E. M. Abdel-Rahman, "A Discretization Approach to Modeling Capacitive MEMS Filters," ASME IMECE, Seattle, WA, November 2007, IMECE2007-42186.

75. B. K. Hammad, A. H. Nayfeh, and E. M. Abdel-Rahman, "A Subharmonic Resonance - Based MEMS Filter," ASME IMECE, Seattle, WA, November 2007, IMECE2007-42201.

76. H. Jammoussi, S. Choura, E. M. Abdel-Rahman, H. Arafat, A. Nayfeh, G. Chaabane, "Control of a Digital Micromirror Device Using Input Shaping," ASME IMECE, Seattle, WA, November 2007, IMECE2007-43430.

77. B. K. Hammad, E. M. Abdel-Rahman, and A. H. Nayfeh, "A Novel MEMS RF Filter," IMAC-XXV Conference and Exposition on Structural Dynamics, Orlando, FL, February 2007.

78. G. Chaabane, E. M. Abdel-Rahman, A. H. Nayfeh, S. Choura, and S. El-Borgi, "Dynamic Analysis of a Digital Micromirror Device," ASME IMECE, Chicago, IL, November 2006, IMECE2006-14010.

79. F. Najar, S. Choura, E. M. Abdel-Rahman, S. El-Borgi, and A. Nayfeh, "Dynamics of Electrostatic Microactuators with Variable-Geometry," ASME IMECE, Chicago, IL, November 2006, IMECE2006-14017.

80. H. N. Arafat, A. H. Nayfeh, and E. M. Abdel-Rahman, "Modal Interactions in Contact-Mode Atomic Force Microscopes," ASME IMECE, Chicago, IL, November 2006, IMECE2006-14938.

81. M. F. Daqaq, E. M. Abdel-Rahman, and A. H. Nayfeh, "Modal Interactions in Resonant Microscanners," ASME IMECE, Chicago, IL, November 2006, IMECE2006-13844.

82. B. K. Hammad, E. M. Abdel-Rahman, and A. H. Nayfeh, "Characterization of a Tunable MEMS RF Filter," ASME IMECE, Chicago, IL, November 2006, IMECE2006-14136.

83. G. Chaabane, E. M. Abdel-Rahman, A. H. Nayfeh, S. Choura, S. El-Borgi, and H. Jammoussi, "Modeling and Dynamic Analysis of a Digital Micromirror Device," Conference on Nonlinear Vibrations, Stability, and Dynamics of Structures, Blacksburg, VA, August 2006.

84. F. Najar, E. M. Abdel-Rahman, S. Choura, S. El-Borgi, and A. H. Nayfeh, "Resolving the Dynamics of Electrostatic Microactuators Using a Novel Discretization Technique," Conference on Nonlinear Vibrations, Stability, and Dynamics of Structures, Blacksburg, VA, August 2006.

85. B. K. Hammad, E. M. Abdel-Rahman, and A. H. Nayfeh, "Tuning of a MEMS RF Filter," Nanotech, Boston, MA, May 2006, Vol. 3, pp. 345-348.

86. E. M. Abdel-Rahman, B. K. Hammad, and A. H. Nayfeh, "Simulation of a MEMS RF Filter," ASME IDETC, Long Beach, CA, September 2005, DETC2005-85329.

87. A. H. Nayfeh, M. I. Younis, and E. M. Abdel-Rahman, "Dynamic Analysis of MEMS Resonators under Primary-Resonance Excitation," ASME IDETC, Long Beach, CA, September 2005, DETC2005-84146.

88. A. H. Nayfeh, M. I. Younis, and E. M. Abdel-Rahman, "Dynamic Analysis of MEMS Resonators," International Symposium on the Vibration of Continuous Systems, Berchtesgaden, Germany, July 2005.

89. A. H. Nayfeh, M. I. Younis, and E. M. Abdel-Rahman, "Reduced-Order Modeling of MEMS," the M.I.T. Conference on Computational Fluid and Solid Mechanics, Cambridge, MA, June 2005, pp. 394-400.

90. D. L. Day, R. Grandrino, A. H. Nayfeh, Z. Masoud, E. M. Abdel-Rahman, and R. A. McKinney, "Overview of HiCASS Cargo Transfer Method," ASNE Day: Naval Engineering for Joint and Coalition Rapid Maritime Response, Virginia Beach, VA, April 2005.

91. A. H. Nayfeh, M. I Younis, and E. M. Abdel-Rahman, "Reduced-Order Modeling of MEMS," Special Symposium on Vibration and Control, Cairo International Conference on Energy and Environment, Sharm El-Sheikh, Egypt, March 2005.

92. E. M. Abdel-Rahmanand A. H. Nayfeh, "Parametric Identification of Contact Forces Using AFM," The International Conference on MEMS, NANO, and Smart Systems, Banff, Canada, August 2004, pp. 541-547.

93. M. I. Younis, E. M. Abdel-Rahman, and A. H. Nayfeh, "Global Dynamics of MEMS Resonators under Superharmonic Excitation," The International Conference on MEMS, NANO, and Smart Systems, Banff, Canada, August 2004, pp. 694-699.

94. M. I. Younis, E. M. Abdel-Rahman, and A. H. Nayfeh, "Dynamic Simulation of a Novel RF MEMS Switch," Nanotech: The International Conference on Modeling and Simulation of Microsystems, Boston, MA, March 2004, Vol. 2, pp. 287-290.

95. E. M. Abdel-Rahman, M. I. Younis, and A. H. Nayfeh, "A Nonlinear Reduced-Order Model for Electrostatic MEMS," ASME IDETC, Chicago, IL, September 2003, DETC2003-48517.

96. E. M. Abdel-Rahman, S. A. Emam, and A. H. Nayfeh, "A Generalized Model of Electrically Actuated, Microbeam-Based MEMS Devices," ASME IDETC, Chicago, IL, September 2003, DETC2003-48526.

97. X. Zhao, E. M. Abdel-Rahman, and A. H. Nayfeh, "Mechanical Behavior of an Electrically Actuated Microplate," ASME IDETC, Chicago, IL, September 2003, DETC2003-48531.

98. E. M. Abdel-Rahman, A. H. Nayfeh, and M. I. Younis, "Dynamics of an Electrically Actuated Resonant Microsensor," The International Conference on MEMS, NANO, and Smart Systems, Banff, Canada, July 2003, pp. 188-196.

99. E. M. Abdel-Rahmanand A. H. Nayfeh, "Subharmonic Resonance of a MEMS Resonator under Electric Actuation," AIAA Structures, Structural Dynamics, and Materials Conference, Norfolk, VA, April 2003, AIAA-2003-1688, Vol. 4, pp. 2596-2603.

100. E. M. Abdel-Rahmanand A. H. Nayfeh, "Superharmonic Resonance of an Electrically Actuated Resonant Microsensor," Nanotech: The International Conference on Modeling and Simulation of Microsystems, San Francisco, CA, February 2003, Vol. 1, pp. 312-315.

101. M. I. Younis, E. M. Abdel-Rahman, and A. H. Nayfeh, "A Reduced-Order Model for Electrically Actuated Resonators and Micro-Switches," Conference on Nonlinear Vibrations, Stability, and Dynamics of Structures, Blacksburg, VA, July 2002. Abstract.

102. W. F. Faris, E. M. Abdel-Rahman, and A. H. Nayfeh, "Mechanical Behavior of an Electrostatically Actuated Micropump," AIAA Structures, Structural Dynamics, and Materials Conference, Denver, CO, April 2002, AIAA-2002-1303, Vol. 2, pp. 803-809.

103. M. I. Younis, E. M. Abdel-Rahman, and A. H. Nayfeh, "Static and Dynamic Behavior of an Electrically Excited Resonant Microbeam," AIAA Structures, Structural Dynamics, and Materials Conference, Denver, CO, April 2002, AIAA-2002-1305, Vol. 2, pp. 822-830.

104. E. M. Abdel-Rahmanand A. H. Nayfeh, "Feasibility of Two-Dimensional Control for Ship-Mounted Cranes," ASME IDETC, Pittsburgh, PA, September 2001, DETC2001/VIB-21454.

105. E. M. Abdel-Rahmanand A. H. Nayfeh, "Cargo-Pendulation Reduction in Boom Cranes via Cable-Length Manipulation," AIAA Structures, Structural Dynamics, and Materials Conference, Atlanta, GA, April 2000, AIAA-2000-1541.

106. M. S. Hefzy, H. Yang, E. M. Abdel-Rahman, and M. Alkhazim, "Effects of Knee Flexion Angle and Quadriceps Contraction on Hamstring Co-Contraction," ASME IMECE, Dallas, TX, November 1997, Vol. 36, pp. 145-146.

107. M. S. Hefzy and E. M. Abdel-Rahman, "Three-Dimensional Dynamic Modeling of the Human Knee Joint: Formulation and Solution Technique," ASME IMECE, Atlanta, GA, November 1996, Vol. 58, pp. 909-916.

108. E. M. Abdel-Rahman, M. S. Hefzy, and T. D. V. Cooke, "Determination of the Ligamentous and Contact Forces in the Human Tibio-Femoral Joint Using a Three-Dimensional Dynamic Anatomical Model," The Southern Biomedical Engineering Conference, Dayton, OH, March 1996, pp. 373-376.

109. E. M. Abdel-Rahman, M. S. Hefzy, and A. Afjeh, "Determination of the Three-Dimensional Dynamic Response the Tibio-Femoral Joint Using a DAE Solver," ASME IMECE, Chicago, IL, November 1994, Vol. 28, pp. 421-422.

110. E. M. Abdel-Rahman, A. Afjeh, and M. S. Hefzy, "An Improved Solution Algorithm for the Determination of the 3-D Dynamic Response the Tibio-Femoral Joint," The Southern Biomedical Engineering Conference, Washington, DC, April 1994, pp. 368-371.

111. E. M. Abdel-Rahman and M. S. Hefzy, "Three-Dimensional Dynamic Modeling of the Tibio-Femoral Joint," ASME Winter Annual Meeting, New Orleans, LA, November 1993, Vol. 26, pp. 315-318.

112. E. M. Abdel-Rahman and M. S. Hefzy, "Two-Dimensional Dynamic Model of the Tibio-Femoral Joint," ASME Winter Annual Meeting, Atlanta, GA, December 1991, Vol. 20, pp. 413-416.

Book Chapters

1. A. F. Payam, E. M. Abdel Rahman, and M. Fathipour, "Control of Atomic Force Microscope Based on the Fuzzy Theory," in Fuzzy Controllers, Theory and Applications, Ed. Lucian Grigorie, In-Tech, Vienna, Austria, 2011, pp. 207-224.
2. A. H. Nayfeh, Z. N. Masoud, N. A. Nayfeh, and E. M. Abdel-Rahman, "Control of Ship-Mounted Cranes," in Proceedings of IUTAM Symposium on Vibration Control of Nonlinear Mechanisms and Structures, Eds. H. Ulbrich and W. Gunthner, Springer, 2005, pp. 21-35.
3. M. S. Hefzy and E. M. Abdel-Rahman, "Three-Dimensional Dynamic Anatomical Modeling of the Human Knee Joint," in Musculoskeletal Models and Techniques, Ed. Cornelius T. Leondes, Volume III of Biomechanical Systems: Techniques and Applications, CRC Press, Boca Raton, FL, 2001.

Technical Reports

1. S. Chen, M. Khater, U. Ali, O. Mullick, E. M. Abdel-Rahman, and R. Mansour, "Sensor Technology Report," (35 pages), Sober Steering Sensors, LLC., Canada, May 2010.
2. M. S. M. Soliman, M. L. Ball, and E. M. Abdel-Rahman, "Wideband MPG Quality Model," (7 pages), Arjae Spectral Enterprises, Ltd., Canada, October 2009.
3. E. M. Abdel-Rahman, "Redesign of a Variable Optical Attenuator," (4 pages and software), Fiberoptics Inc., USA, August 2006.
4. A. Nayfeh and E. M. Abdel-Rahman, "High Capacity Alongside Sea Base Sustainment (HiCASS) - Stabilization Task," (7 pages), Office of Naval Research, Office of Naval Research, USA, June 2005.

Abstracts & Presentations

1. C. P. Vyasarayani, A. Kheyraddinimousavi, D. Goettler, E. M. Abdel-Rahman, and Z. Leseman, "Stiction Repair of Cantilevers by Parametric Resonances," ASME IMECE, San Diego, CA, November 2013, IMECE2013-66177.
2. A. H. Nayfeh, E. M. Abdel-Rahman, and B. K. Hammad, "Recent Advances in MEMS Filters," US-Tunisia Workshop: Research and Educational Advances in Design and Fabrication of Micro-Electro-Mechanical Systems, Tunisia, December 2006.
3. A. H. Nayfeh, Z. N. Masoud, N. A. Nayfeh, and E. M. Abdel-Rahman, "Control of Ship-Mounted Cranes," IUTAM Symposium on Vibration Control of Nonlinear Mechanisms and Structures, Munich, Germany, July 2005.
4. E. M. Abdel-Rahmanand A. H. Nayfeh, "Routes to Pull-in," SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, May 2005.

5. E. M. Abdel-Rahmanand A. H. Nayfeh, "Cargo-Pendulation Reduction in Boom Cranes via Cable-Length Manipulation," 7th semi-annual meeting, MURI on Nonlinear Active Control of Dynamical Systems, Blacksburg, VA, March 2000.
6. E. M. Abdel-Rahmanand A. H. Nayfeh, "An Investigation of Cable-Length Manipulation as a Control Strategy for Ship-Mounted Cranes," 6th semi-annual meeting, MURI on Nonlinear Active Control of Dynamical Systems, Blacksburg, VA, October 1999.
7. E. M. Abdel-Rahmanand A. H. Nayfeh, "Evaluation of Three-Dimensional Effects in the Maryland Rigging," 5th semi-annual meeting, MURI on Nonlinear Active Control of Dynamical Systems, Blacksburg, VA, March 1999.

Invited Seminars & Talks

1. "MEMS: Opportunities and Challenges," Egyptian Engineering Day, Cairo, Egypt, September 3, 2012.
2. "Novel Techniques in Energy Harvesting," Ain Shams University, Egypt, December 24, 2011.
3. "Nonlinear Aspects of MEMS Analysis and Design," Virginia Tech, Blacksburg, VA, September 18, 2002.

Editorials

1. M. Yavuz, M. Irannejad1, K. Alici, E. M. Abdel-Rahman, A. Brzezinski, and B. Cui, "Graphene Based Nano Electromechanical Interconnects to Enable Ultrafast Electronics," Austin Journal of Nanomedicine & Nanotechnology, 2014, 2: 1-2.
2. M. Yavuz, A. Brzezinski, B. Cui, and E. M. Abdel-Rahman, "Trends in Nano and Micro-Electro-Mechanical Systems and Training Recommendations for Highly Qualified Personnel (HQP) in This Field," Austin Journal of Nanomedicine & Nanotechnology, 2014, 1: 1-2.

Teaching

Undergraduate Courses

- Dynamics: 2008–2014
- Kinematics and Dynamics of Machines: 2014
- Numerical Methods: 2011
- Modeling and Simulation of Mechanical Systems: 2007–2009

Graduate Courses

- Design of MEMS and NEMS, 2006–2014.
- Nonlinear Systems, 2013–2014
- Applied Nonlinear Dynamics, 2009–2012.
- Dynamic Modeling of Biomechanical Systems, 2010.
- Solution Techniques of DAE Systems, independent study, 2008.

Graduate Supervision

1. M. R. Atelge, M.A.Sc., *Sliver Paste Bonding of IGBT Power Modules*, University of Waterloo, in progress.
2. A. Alneamy, M.A.Sc., *Electrostatic-Electromagnetic Actuation*, University of Waterloo, in progress.
3. R. Almikhlafi, M.A.Sc., *Fabrication and Test of Frequency-Modulated Gyroscopes*, University of Waterloo, in progress.
4. B. Tunkar, M.A.Sc., *Power Management of Electromagnetic Energy Harvesters*, University of Waterloo, in progress.
5. M. Alghamdi, Ph.D., *Bifurcation-Based MEMS Sensors*, University of Waterloo, in progress.
6. H. Nafissi, Ph.D., *MEMS AFM*, University of Waterloo, in Progress.
7. T. Dagdelen, Ph.D., *Fatigue of Bonding Wire*, University of Waterloo, in progress.
8. K. Elrayes, Ph.D., *Field Disruption Energy Harvesting*, University of Waterloo, in progress.
9. D. Effa, Ph.D., *A Frequency-Modulated MEMS Gyroscope*, University of Waterloo, in progress.
10. A. Alwasel, Ph.D., *Analysis of Fatigue and Injury in Human Motion*, University of Waterloo, in progress.
11. M. Bendame, Ph.D., *Modeling and Analysis of Springless Electromagnetic Energy Harvesters*, University of Waterloo, in progress.
12. R. Saritas, M.A.Sc., *Techniques for Analysis of Thick Bonding Wires*, University of Waterloo, 2014.
13. M. Xie, M.A.Sc., *Actuation Techniques For Frequency Modulated MEMS Gyroscopes*, University of Waterloo, 2014.
14. M. Alghamdi, M.A.Sc., *Binary MEMS Inertial Sensors*, University of Waterloo, 2014.
15. S. Ozdemir, M.A.Sc., *Measurement of the Quality Factor for MEMS Using Non-Destructive Test Techniques*, University of Waterloo, 2014.
16. S. Akhtar, Ph.D., *Metaheuristic Optimization Techniques for Articulated Human Tracking*, University of Waterloo, 2014.

17. R. Alharbi, M.A.Sc., *Reflectivity and Elastic Modulus of Nano-Aluminum Films on Silicon Crystal Substrates*, University of Waterloo, 2014.
18. M. Al Lawati, M.A.Sc., *Gait Shape Control for 2-D.O.F Bipedal Robots Using Hybrid Virtual Holonomic Constraints*, University of Waterloo, 2014.
19. S. A. M. Lajimi, Ph.D., *Design, Modeling, Dynamics and Nonlinear Dynamics of Beam-Rigid Body Gyroscope*, University of Waterloo, 2013.
20. T. Dagdelen, M.A.Sc., *Failure Analysis of Thick Wire Bonds*, University of Waterloo, 2013.
21. M. Alusail, M.A.Sc., *Residual Stresses In Circular Thin Plates Using Two Dimensional X-Ray Diffraction and Finite Element Analysis*, University of Waterloo, 2013.
22. M. Yilmaz, M.A.Sc., *Passive Full-Wave MOSFET Rectifiers for Electromagnetic Harvesting*, University of Waterloo, 2013.
23. K. Elrayes, M.A.Sc., *Low-Frequency Electromagnetic Energy Harvesting*, University of Waterloo, 2011.
24. A. Alwasel, M.A.Sc., *A Monitoring System to Reduce Shoulder Injury Among Construction Workers*, University of Waterloo, 2011.
25. M. Khater, Ph.D., *Use of Instabilities in Electrostatic Micro-Electro-Mechanical Systems for Actuation and Sensing*, University of Waterloo, 2011.
26. S. Forouzanfar, Ph.D., *Magnetic Transduction for RF Micro-Mechanical Filters*, University of Waterloo, 2011.
27. S. Towfighian, Ph.D., *A Large-Stroke Electrostatic Micro-Actuator*, University of Waterloo, 2010.
28. A. Seleim, M.A.Sc., *Design and Implementation of a Controller for an Electrostatic MEMS Actuator and Sensor*, University of Waterloo, 2010.
29. B. K. Hammad, Ph.D., *Modeling, Simulation, and Analysis of Micromechanical*, Virginia Tech, 2008,
30. F. Najar, Ph.D., *Static and Dynamic Behaviors of MEMS Microactuators*, Tunisia Polytechnic School, 2008.
31. H. Ouakad, M.Sc., *Nonlinear Dynamics and Control of Microbeam Based Systems*, Tunisia Polytechnic School, 2007.
32. M. Ghommem, M.Sc., *Modeling & Nonlinear Dynamics of Vibrating Beam Microgyroscope*, Tunisia Polytechnic School, 2007.
33. G. Chaabane, M.Sc., *Modeling and Dynamic Analysis of the Digital Micromirror Device*, Tunisia Polytechnic School, 2006.
34. M. F. Daqaq, Ph.D., *Adaptation of Nontraditional Control Techniques to Micro and Macro Systems*, Virginia Tech, 2005.
35. X. Zhao, Ph.D., *Modeling and Simulation of MEMS Devices*, Virginia Tech, 2004.
36. M. I. Younis, Ph.D., *Modeling and Simulation of Microelectromechanical Systems*, Virginia Tech, 2004.

Professional Activities

- Editor
  - Associate editor, Nonlinear Engineering: Modeling and Application, De Gruyter, 2012–present.
  - Associate editor, International Journal of Modern Nonlinear Theory and Application, Scientific Research Publishing, 2012–present.
  - Associate editor, Mathematical Problems in Engineering, Hindawi Publishing Corporation, 2011–2014.
  - Guest Editor, Nonlinear Dynamics, Special issue on MEMS and NEMS, 2008.
- Member
  - Technical Committee on Dynamics and Control of Structures and Systems, ASME: Applied Mechanics Division, 2006 - present.
  - Technical Committee on Micro/Nano Systems (MNS), ASME: Design Engineering Division, 2011 - present.
- Organizer
  - *MEMS Sensors and Actuators*, ASME IDETC 2014, 8th International Conference on Micro- and Nanosystems (MNS), Buffalo, NY, August 2014.
  - *Microscale Energy Harvesting*, ASME IDETC, International Conference on Micro- and Nanosystems (MNS),
    - Buffalo, NY, August 2014.
    - Montréal, Quebec, Canada, August 2010.
  - *International Conference on Structural Nonlinear Dynamics and Diagnosis*,
    - Agadir, May 2014.
    - Marrakech, April-May 2012.
  - *Energy Harvesting*, ASME IDETC 2012, 24th Conference on Mechanical Vibration and Noise (VIB), Chicago, IL, August 2012.
  - *Design, Fabrication, Dynamics, and Control of Micro and Nano Systems*, ASME IMECE,
    - Vancouver, BC, Canada, November 2010.
    - Lake Buena Vista, FL, USA, November 2009.
    - Boston, USA, November 2008.
  - *IASTED International Conference on Modern Nonlinear Theory - Bifurcation and Chaos: MNT 2007*, Montréal, May–June 2007.
  - *Nonlinear Dynamics in Microelectromechanical Systems*, SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, May 2005.
  - *Modeling the Dynamics of MEMS and NEMS: Methods and Applications*, ICEMNS: The International Conference on MEMS, NANO, and Smart Systems, Banff, Canada, August 2004.

- Reviewer
  - *Journal of Computational and Nonlinear Dynamics*
  - *Journal of Dynamic Systems, Measurement and Control*
  - *Journal of Experimental Nanoscience*
  - *Journal of Intelligent Material Systems and Structures*
  - *Journal of Microelectromechanical Systems*
  - *Journal of Micromechanics and Microengineering*
  - *Journal of Vibration and Acoustics*
  - *Journal of Vibration and Control*
  - *Measurement Science and Technology*
  - *Nanotechnology*
  - *New Journal of Physics*
  - *Nonlinear Dynamics*
  - *Smart Materials and Structures*
  - *Sensors*
  - *Transactions on Mechatronics*
  - National Science and Engineering Research Council
  - Estonian Science Foundation
- Consultant

  DiCon Fiberoptics Inc., "VOA: Variable Optical Attenuators," 2005-2006.

Awards & Fellowships

- *Engineering Research Excellence Award*, Faculty of Engineering, University of Waterloo, 2014.
- *Discovery Accelerator Supplement*, Natural Sciences and Engineering Research Council of Canada, April 2011.
- *Outstanding Research Assistantship*, Department of Mechanical, Industrial and Manufacturing Engineering, University of Toledo, July 1995.

Updated: January 28, 2015