

Samir A. Emam



Associate Professor
Department of Mechanical Engineering
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Education

- PhD, Engineering Mechanics, Department of Engineering Science and Mechanics, Virginia Tech, USA, December 2002, GPA: 3.93/4.0
- MS, Mechanical Engineering, Zagazig University, Egypt, April 1996, GPA: 3.8/4.0
- BS, Mechanical Engineering, Zagazig University, Egypt, May 1991, GPA: 3.38/4.0

Professional

- Associate Professor: Department of Mechanical Engineering, United Arab Emirates University, Al Ain, UAE, 2012 – Present.
- Assistant Professor: Department of Mechanical Engineering, United Arab Emirates University, Al Ain, UAE, 2006 – 2012.
- Visiting Scholar: Department of Engineering Science & Mechanics, Virginia Tech, USA, 2005.
- Consultant, Structural and thermal subsystem of Egypt-Sat I, Egyptian Authority for Remote Sensing and Space Sciences, 2004.
- Assistant Professor: Department of Mechanical Design & Production, Faculty of Engineering, Zagazig University, Egypt, 2003 – 2006.
- Post-Doctoral Associate: Department of Engineering Science & mechanics, Virginia Tech, USA, 2002/2003.
- Graduate Research Assistant: Department of Engineering Science & Mechanics, Virginia Tech, USA, 1999 – 2002.
- Graduate Teaching Assistant: Department of Mechanical Engineering, American University in Cairo, Egypt, 1998.
- Graduate Teaching Assistant: Department of Mechanical Engineering, Zagazig University, Egypt, 1992 – 1998.

Communication Skills

- Excellent oral and written communication skills in English.

Research Activities

Chapter in Book:

Chapter Title: "Exact solution for the postbuckling of composite beams"
Book Title: "*Composite Materials in Engineering Structures*",
Publisher: Nova Science Publishers, New York, <http://www.novapublishers.com>
Editors: Jennifer M. Davis,
Year: 2010.
https://www.novapublishers.com/catalog/product_info.php?products_id=12664

Articles Published in Peer-Reviewed International Journals:

1. **Samir A. Emam** and Mostafa Abdalla, Subharmonic parametric resonance of simply supported buckled beams, *Nonlinear Dynamics*, 79, 1443–1456, 2015.
2. **Samir A. Emam**, A general nonlocal nonlinear model for buckling of nanobeams, *Applied Mathematical Modelling*, 37, 6929-6939, 2013.
3. **Samir A. Emam** and Ali H. Nayfeh, Nonlinear response of buckled beams to 1:1 and 3:1 internal resonances, *International Journal of Non-Linear Mechanics*, 52, 12-25, 2013.
4. **Samir A. Emam**, Approximate analytical solutions for the nonlinear free vibrations of composite beams in buckling, *Composite Structures*, 100, 186–194, 2013.
5. M.A. Eltaher, **Samir A. Emam**, F.F. Mahmoud, Static and stability analysis of nonlocal functionally graded nanobeams, *Composite Structures*, 96, 82-88, 2013.
6. M.A. Eltaher, **Samir A. Emam**, F.F. Mahmoud, Free vibration analysis of functionally graded size-dependent nanobeams, *Applied Mathematics and Computation*, 218, 7406–7420, 2012.
7. **Samir A. Emam**, Analysis of shear-deformable composite beams in postbuckling, *composite structures*, 94, 24-30, 2011.
8. Kamal A. Mustafa, **Samir A. Emam** et al., On leak detection of pipelines using computational pipeline monitoring, *Journal of Advanced Research in Dynamical and Control Systems*, 3(1), 34-44, 2011.
9. Farag K. Omar, Kamal A. Mustafa, and **Samir A. Emam**, Mathematical modeling of gearbox including defects with experimental verification, *Journal of Vibration and Control*, 18(9) 1310–1321, 2011, 2011.
10. **Samir A. Emam**, Dynamics of a flexible-hub geometrically nonlinear beam with a tip mass, *Journal of Vibration and Control*, 16(13), 1989-2000, 2010.
11. **Samir A. Emam**, Mahmoud E. Khater and Emil H. Gad, On the static and dynamic response of resonant microbeams, *Journal of Advanced Research in Dynamical and Control Systems*, 1(2), 31-45, 2009.
12. **Samir A. Emam** and Eihab 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*, 1(2), 18-30, 2009.
13. **Samir A. Emam**, A static and dynamic analysis of the postbuckling of geometrically imperfect composite beams, *Composite Structures*, 90, 246-253, 2009.

14. **Samir A. Emam** and Ali H. Nayfeh, Postbuckling and free vibrations of composite beams, *Composite Structures*, 88, 636-642, 2009.
15. Ali H. Nayfeh and **Samir A. Emam**, Exact solutions and stability of the postbuckling configurations of beams, *Nonlinear Dynamics*, 54, 395-408, 2008.
16. **Samir A. Emam** and Ali H. Nayfeh, nonlinear responses of buckled beams to subharmonic-resonance excitations, *Nonlinear Dynamics*, 35, 105-122, 2004.
17. **Samir A. Emam** and Ali H. Nayfeh, On the nonlinear dynamics of a buckled beam subjected to a primary-resonance excitation, *Nonlinear Dynamics*, 35, 1-17, 2004.
18. Ali H. Nayfeh, **Samir. A. Emam**, Sergio Preidikman, and Dean T. Mook, An exact solution for the natural frequencies of flexible beams undergoing overall motions, *Journal of Vibration and Control*, 9, 1221-1229, 2003.
19. F.F. Mahmoud, M.M. Hasan, S.S. Ali Eldin, and **S. A. Emam**, An incremental mathematical programming model for solving multiphase frictional contact problems, *Computers & Structures*, 68, 567-581, 1998.
20. S.S. Ali Eldin and **S. A. Emam**, An incremental convex programming model for solving multiphase contact problems with non-classical friction, *Journal of Engineering and Applied Science*, 44, 6, 1997.

Papers under review:

- Samir A. Emam and Daniel J Inman, A review on bistable composite laminates for morphing and energy harvesting, *Applied Mechanics Reviews*.
- M.A. Eltaher, M.E. Khater, and Samir A. Emam, A review on nonlocal elastic models for bending, buckling, vibrations, and wave propagation of nano-scale beams, *Applied Mathematical Modeling*.
- Samir A. Emam, M.A. Eltaher, M.E. Khater, Buckling and free vibrations of nonlocal curved composite nanobeams, *Composite Structures*.

Research Outreach:

Collaborative research with

- Prof. Ali H. Nayfeh, Virginia Tech, USA.
- Prof. Daniel J. Inman, University of Michigan, USA.
- Prof. Peter Hagedorn, Technische Universität Darmstadt, Germany.
- Dr. Mostafa M. Abdalla, TU Delft, Netherlands.
- Dr. Eihab Abdel-Rahman, University of Waterloo, Canada.
- Dr. Mohammad Daqqaq, Clemson University, USA.
- Dr. Mahmoud Khater, University of Waterloo, Canada.
- Dr. Mohamed Eltaher, Zagazig University, Egypt.

Sample Presentations at International Conferences:

- 8th International Conference on Structural Dynamics, EURODDYN 2011, July 4-7, 2011, Leuven, Belgium.
- IV European Conference in Computational Mechanics, Paris, France, May 16-21, 2010.
- Scientific Engineering Society, 2002, State College, PA, USA.
- AIAA Conference, Structural Dynamics and Materials SDM, April 2003, Norfolk, Virginia, USA
- ASME Design Engineering Technical Conferences, Sept. 2001, Pittsburgh, PA, USA

Invited Talks:

- Technical University of Vienna, Vienna, Austria, 28-31 March, 2004.
- Department of Engineering Science and Mechanics, Virginia Tech, 19 Feb. 2003.

Contracts and Grants:

- Dynamically assisted bistable laminates, two-year National Research Foundation fund, 2013-2015, USD 76,000.
- Theoretical and Experimental Study of Composite Beams in Post-buckling, Research Affairs at the UAE University, AY 2010/2011.
- Dynamics and Control of a Flexible-hub Beam Systems, Research Affairs at the UAE University, Grant # 1615-07-01-10, AY 2009/2010.
- A Realistic Mathematical Model for the Vibration of a Robot Arm with Experimental Validation, Research Affairs at the UAE University, Grant # 07_38_07_11/07, AY 2007/2008.

Fellowships, Prizes, and Awards:

- Award of excellence in scientific publication in top 10% journals, UAE University, May 2015.
- Fulbright Research and Teaching Scholarship, Bi-national Fulbright Commission, Cairo, Egypt, March 2006. The scholarship supports the stay for five months at the department of Nuclear and Mechanical Engineering, Pennsylvania State University, State College, PA, USA.
- PhD degree scholarship at Virginia Tech, The scholarship was totally supported by the Egyptian Government, 1999-2002.

Advising: Research Direction:

- Main advisor for a master's degree student at the Department of Mechanical Design and Production, Faculty of Engineering, Zagazig University, Egypt, 2004-2006. The student's thesis was: "Nonlinear vibrations of micro-electro-mechanical systems".
- Main advisor of MS student working on the vibration-based techniques for crack identification of rotating systems, UAE University.

Reviewing Activities for Journals:

Active reviewer for the following top tier journals:

- Composite structures
- Composites-B
- Journal of vibration and control
- Nonlinear dynamics
- International journal of nonlinear mechanics
- Journal of sound and vibration
- Journal of mechanical engineering science
- International journal of structural stability and dynamics
- Advances in acoustic and vibrations, Transaction of the ASME
- Applied mathematical modeling
- ASME-journal vibration and acoustics
- Computers and mathematics applications
- Proc. Of the institution of mechanical engineers, part c, journal of mechanical engineering science
- Transactions of the institute of measurement and control
- Zamm - zeitschrift fuer angewandte mathematik und mechanik

Teaching, Mentoring, and Advising

Courses taught:

ME, UAE University: 2006-present

- Statics
- Dynamics
- Mechanics of materials
- Mechanical vibrations

- Mechanical engineering analysis
- Machine design I
- Kinematic design of machinery
- Differential equations and engineering applications
- Engineering design and ethics
- Introduction to programming
- Engineering practice and entrepreneurship
- Finite element method (Graduate)
- Advanced mathematics (Graduate)
- Flight dynamics, stability and control (within Aerospace Minor)

ESM, Virginia Tech: 2005

- Dynamics
- Mechanics of deformable bodies

ME: Zagazig University, Egypt: 2003-2006

- Stress analysis
- Design of machine elements
- Mechanical vibrations
- Theory of elasticity and plasticity (Graduate)

Ready to teach these courses

- Nonlinear dynamics
- Advanced vibrations
- Advanced dynamics
- Elastic stability of structures
- Theory of plates and shells
- Advanced mechanics of materials
- Mechanics of composite structures
- Perturbation methods

ABET accreditation:

In 2006, I joined the department of mechanical engineering, United Arab Emirates University, as an assistant professor. At that time, the department was working in getting the ABET accreditation for the first time. It was a very good chance to get engaged in the process from the early beginning till the happy end of getting the accreditation in 2010. I am fully familiar with the process from the course level to the program level. In AY 2014-2015, I assumed the chair of the Continuous Quality Improvement Committee that serves as a focal point among the assessment committee, focus groups, and the department council. I directly participated in the following activities:

- Defining the Student Outcomes SOs, according to ABET criterion of ME program
- Defining the Program Educational Objectives PEOs
- Mapping Course Outcomes to appropriate Student Outcomes
- Designing assessment tools; both direct and indirect
- Designing the cycle of Continuous Improvement at different levels
- Executing and analyzing results of a variety of assessment tools
- Being a member of curriculum committee
- Being a member of continuous quality improvement committee CQI
- Being a member of ABET committee
- Writing the self-study report SSR
- Initiating a process to oversee the quality assurance of senior graduation projects

Original Designs, Plans, and Inventions:

I originated a design for a vibration-based wind-energy harvesting system. I promoted the idea to a team of senior undergraduate students at the UAE University who developed a prototype for the system, which proves the validity of the concept. We participated in the 1st Engineering Students Renewable Energy Competition, held in the United Arab Emirates University, Al Ain, 1 May, 2010. Our project won the first prize among thirty five competitors from the Gulf Commonwealth Countries GCC.

Diversity of Students:

I have dealt with a wide diversity of students in my teaching and advising. In addition to the students I taught at my home country, Egypt, I taught students at the ESM department, Virginia Tech and my current job at the UAE University enables me to deal with a diversity of students from many different countries and cultures. It is good to know that about 90% of the UAE residences are expats.

Students Advising:

Academic advisor:

Served as an academic advisor of more than 100 ME students.

Supervision of industrial hands-on training

Supervised many ME students in their industrial training. Two site visits and weekly reports were performed to ensure effectiveness of training.

Supervision of graduation projects

- Design and testing of a distance-measurement device for athletes: AY 07/08
- Modeling and design of a vibration-based energy-recovery system (AY 09/10): This project won the first prize among thirty one (31) competitors from the Gulf Commonwealth Counties GCC in the 1st Engineering Students Renewable Energy Competition ESREC held in the UAE University on 1 May 2010.
- Design of a tuned-mass damper, AY 11/12
- Analysis and design of a full-scale roller coaster, AY 12/13
- Design of a shock absorber dynamometer, AY 14/15

Supervision of laboratory activities

- Developed the vibration lab at the UAE University.
- Created and developed the lab equipment including the hardware and software for a physiological kit that is used to perform bio-measurements for bioengineering courses.

Service**Professional**

- Member, Egyptian Engineering Syndicate, since 1992
- Member, American Society for Mechanical Engineers ASME, 2003-present
- Member, American Institute of Aeronautics and Astronautics AIAA, 2000-2001

On-Campus Service

- Chair, ME Department dynamics and control focus group
- Chair, ME Department Continuous Quality Improvement Committee CQIC
- Chair, ME Department senior design project committee
- Member, ME Department ABET committee
- Member, ME Department Outcomes Assessment Committee
- Member, ME Department design and manufacturing group
- Member, ME Department Aerospace MS Program

- Member, ME Department Research committee
- Member, ME Department Strategic Plan committee

Organizing workshop: 21-22 Feb, 2010

- I initiated, planned, and organized a two-day workshop delivered by Leuven Measurement Systems LMS, a leading company in vibration and acoustic measurement, Leuven, Belgium.

References

1. Prof. Ali H. Nayfeh, University Distinguished Professor, Department of Engineering Science and Mechanics, Virginia Tech, Blacksburg, VA 24061
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2. Prof. Daniel Inman, Chair, Department of Aerospace Engineering, University of Michigan, Ann Arbor, MI, 48109
Email: daninman@umich.edu
3. Dr. Eihab Abdel-Rahman, University of Waterloo, Canada
Email: eihab@uwaterloo.ca
4. Dr. Mostafa M. Abdalla, Aerospace Engineering, TU Delft, Delft, Netherlands.
Email: M.M.Abdalla@tudelft.nl
5. Dr. Mohammad Daqqaq, Department of Mechanical Engineering, Clemson University, Clemson, SC, USA.
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6. Prof. Amr El Dieb, Professor and Former Dean, College of Engineering, United Arab Emirates University, Al Ain, 15551, UAE
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