ABDULLAH A. ALSHAYA

Assistant Profeesor of Mechanical Engineering at Kuwait University

Kuwait City, Kuwait

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RESEARCH AREAS

Biomechanics: Locomotion, Orthopedics.
Solid Mechanics: Hybrid Methods (Thermoelastic Stress Analysis, Digital Image Correlation), Inverse Methods (Material Characterization).
Vibration Control: Command Shaping, Multi-Mode Systems, Sloshing Suppression.

ACADEMIC EMPLOYMENT

Assistant Professor, Kuwait University 2017-present

- Teaching and developing undergraduate and graduate courses in core and mechanical engineering.
- Engaging in several committees at department and college levels.
- Advising students through their academic years.
- Performing professional service activities which benefit the university, the community, and the engineering education profession.
- Engaging in research activities through attending conferences and workshops, publishing research manuscripts in peer-reviewed journals, and applying for research grants.

EDUCATION

Ph.D. Mechanical Engineering, University of Wisconsin-Madison 2013-2016
M.A. Mathematics, University of Wisconsin-Madison 2013-2015
M.S. Engineering Mechanics, University of Wisconsin-Madison 2012-2013
M.S. Mechanical Engineering, University of Wisconsin-Madison 2011-2012
B.S. Mechanical Engineering, Kuwait University 2004-2008

ACADEMIC EXPERIENCE

College of Engineering and Petroleum, Kuwait University
Director of Research Office 2019-2021

RESEARCH EXPERIENCE

University of Wisconsin-Madison
Graduate Research Assistant, Experimental Mechanics Lab 2013-2016
Dissertation title: Experimental, Analytical and Numerical Analyses of Orthotropic Materials and Biomechanics Application

Project Research Assistant, Biomechanics Lab 2013-2014
Project: Validation of Multiple Musculoskeletal Thumb Models with Collected Experimental Data

Graduate Research Assistant, Polymer Engineering Center 2011-2012
Project: Alternative Approach for Measuring Friction Coefficient of Polymers Based on Timoshenko and Van Karman Device

TEACHING EXPERIENCE

Kuwait University
Instructor, Mechanical Engineering Department 2017-present

Undergraduate: Core Courses
ENG 203: Dynamics (4)
ENG 307: Applied Numerical Methods and Programming in Engineering (12)
ENG 308: Numerical Methods in Engineering (2)

Mechanical Engineering
ME 351: Mechanical Design I (4)
ME 448: Advanced Strength of Material (1)
ME 450: Mechanical Vibrations (2)
ME 483: Biomechanics (2)

Graduate: Mechanical Engineering
ME 512: Mechanical Vibrations (2)

University of Wisconsin-Madison
Teaching Assistant, Mathematics Department — Fall 2016
Math 112: College Algebra

Tutor, Undergraduate Learning Center and Mathematics Department — 2013-2016
Provide private and drop-in tutoring sessions for Math and Mechanical Engineering classes.

Grader, Engineering Mechanics and Mathematics Department — 2013-2016
EMA-547/8 Engineering Analysis I/II and MATH-431 Theory of Probability

PROFESSIONAL EXPERIENCE

Co-Founder, Kuwait Institute for Training and Engineering Simulations (KITES), Kuwait — 2020-present
Chief Scientific Officer (CSO) and a Lead Simulation Consultant.

Well Surveillance Engineer, Kuwait Oil Company (KOC), Kuwait — 2009-2011
Witnessing, developing, and optimizing well production.

Green Belt in Six Sigma Methodologies, Six Sigma Academy — 2011
Six Sigma Project: Reduce the failed jobs which are requested by Field Development Engineers to 70% in a six-month period by guiding the Well Surveillance Engineers to perform the requested jobs more professionally and effectively while keeping the cost and operation time as low as possible.

Power Plant Engineer, Ministry of Electricity and Water, Kuwait — 2009
Developing and designing power plants.

JOURNAL PUBLICATIONS

11 **Alshaya, A.**, Alhazza, K., **2022**. "Smooth and Robust Multi-Mode Shaped Commands," *Mechanical Systems and Signal Processing*, (https://doi.org/10.1016/j.ymssp.2021.108658).

10 Andreucci, C., **Alshaya, A.**, Fonseca, E., Jorge, R., **2022**. "Proposal for a New Bioactive Kinetic Screw in an Implant, Using a Numerical Model," *Applied Sciences*, 12 (2), p. 779.

9 **Alshaya, A.**, Considine, J., **2021**. "Inverse Identification of Elastic Constants using Airy Stress Function: Theory and Application," *Meccanica*, 56, p. 2381 - 2400.

8 **Alshaya, A.**, Alshayji, A., **2021**. "Robust Multi-Steps Input Command for Liquid Sloshing Control," *Journal of Vibration and Control*, (https://doi.org/10.1177/10775463211017721).

7 **Alshaya, A.**, Almujarrab, D., **2020**. "A Smooth Polynomial Shaped Command for Sloshing Suppression of a Suspended Liquid Container," *Transactions of the Institute of Measurement and Control*, 0142-3312.

6 **Alshaya, A.**, Alghanim, K., **2020**. "Command-Shaping for Sloshing Suppression of a Suspended Liquid Container," *Journal of Dynamic Systems, Measurement and Control*, 142, 121003.

5 **Alshaya, A.**, Lin, S. J., **2020**. "Hybrid Stress Analysis of a Near-Surface Circular Hole in Finite Structures," *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science*, 234 (7), p. 1366 - 1381.

4 Kalayciogli, B., **Alshaya, A.**, Rowlands, R., **2019**. "Experimental Stress Analysis of an Arbitrary Geometry containing Irregularly Shaped Hole," *Strain*, 55 (3), e12306.

3 **Alshaya, A.**, Rowlands, R., **2017**. "Experimental Stress Analysis of a Notched Finite Composite Tensile Plate," *Composite Science and Technology*, 144, p. 89 - 99.

2 **Alshaya, A.**, Shai, X., Rowlands, R., **2016**. "Thermoelastic Stress Analysis of a Finite Orthotropic Composite Containing an Elliptical Hole," *Experimental Mechanics*, 56 (8), p. 1373-1384.

1 **Alshaya, A.**, John, H., Rowlands, R., **2016**. "Stresses and Strains in Thick Perforated Orthotropic Plates," *ASCE Journal of Engineering Mechanics*, 142 (11), p. 4016082.

PROCEEDING & CONFERENCE PAPERS

12 Alazmi, A., **Alshaya, A.**, Alhazza, K., **2019**. "Natural Frequencies and Mode Shapes of Mechanically-Connected Beams," [abstract] In: *Proceedings of the First International Nonlinear Dynamics Conference*; Rome, Italy.

11 **Alshaya, A.**, Majeed, M., Alhazza, K., **2019**. "Time-delay Control of Cantilever Beams," [abstract] In: *Proceedings of the First International Nonlinear Dynamics Conference*; Rome, Italy.

10 **Alshaya, A.**, Considine, J., **2019**. "Determination of Constitutive Parameters in Inverse Problem Using Thermoelastic Data," In: *Residual Stress, Thermomechanics & Infrared Imaging, Hybrid Techniques and Inverse Problems, Volume 7: Proceedings of the 2018 Annual Conference on Experimental and Applied Mechanics*, pp. 25-34.

9 **Alshaya, A.**, Bourisli, R., Considine, J., **2018**. "Determination of Constitutive Properties Using DIC-Displacement Data and U-FEM," In: *Proceedings of the 2018 COMSOL Conference*; Lausanne, Switzerland.

8 **Alshaya, A.**, Considine, J., Rowlands, R., **2018**. "Determination of Constitutive Properties in Inverse Problem Using Airy Stress Function," In: *Residual Stress, Thermomechanics & Infrared Imaging, Hybrid Techniques and Inverse Problems, Volume 8: Proceedings of the 2017 Annual Conference on Experimental and Applied Mechanics*, pp. 73-81.

7 Kalayciogli, B., **Alshaya, A.**, Rowlands, R., **2018**. "Experimental Stress Analysis of Unsymmetrical, Irregularly Shaped Structure containing an Arbitrarily-Shaped Hole," In: *Residual Stress, Thermomechanics & Infrared Imaging, Hybrid Techniques and Inverse Problems, Volume 8: Proceedings of the 2017 Annual Conference on Experimental and Applied Mechanics*, pp. 9-12.

6 **Alshaya, A.**, Kalayciogli, B., Rowlands, R., **2017**. "Extending DIC to Stress Analysis Arbitrarily-Shaped Structure Containing an Irregularly-Shaped Hole," [abstract]. In: *Annual International Digital Image Correlation Conference*; Barcelona, Spain.

5 **Alshaya, A.**, Samad, W., Rowlands, R., **2017**. "Desirable Features of Processing DIC Data with a Stress Function," In: *International Digital Imaging Correlation Society: Proceedings of the 2016 First Annual Conference*, pp. 241-242.

4 **Alshaya, A.**, Shai, X., Rowlands, R., **2016**. "Stresses Analysis of a Finite Orthotropic Plate Containing an Elliptical Hole From Recorded Temperature Data," In: *Residual Stress, Thermomechanics & Infrared Imaging, Hybrid Techniques and Inverse Problems, Volume 9: Proceedings of the 2016 Annual Conference on Experimental and Applied Mechanics*, pp. 47-56.

3 **Alshaya, A.**, Rowlands, R., **2016**. "Determination of Stress Concentration in Orthotropic Composites Using Mapping Collocation Techniques," In: *Proceedings of the ANTEC, Annual Technical Conference*; Indianapolis, IN, pp. 354-361.

2 **Alshaya, A.**, Rowlands, R., **2014**. "Reducing Stress Concentration in a Side Notched Finite-Width Composite Plate," In: *Proceedings of the ANTEC, Annual Technical Conference*; Las Vegas, NE, pp. 2671-2678.

1 **Alshaya, A.**, Petzold, S., Eriten, M., Osswald, T., **2013**. "Friction Coefficient Measurements Using Timoshenko and Van Karman Device: Bulk Polymers," In: *Proceedings of the ANTEC, Annual Technical Conference*; Cincinnati, Ohio, pp. 1900-1907.

TECHNICAL PRESENTATION

2 **Alshaya, A.**, Rowlands, R., **2016** April. "Hybrid Full-Field Stress Analysis of Finite Structures Subjected to a Concentrated Load Using Mapping-Collocation Technique," In: *Midwest Experimental Mechanics Graduate Student Symposium*; Urbana, IL.

1 **Alshaya, A.**, Rowlands, R., **2015** March. "The Stress and Strain Analysis in an Infinite Orthotropic Sitka Spruce Plate with Finite Thickness," In: *Midwest Experimental Mechanics Graduate Student Symposium*; Madison, WI.

PEER REVIEW

Journal of the Brazilian Society of Mechanical Sciences and Engineering (1)
Complexity (1)
Transactions of the Institute of Measurement and Control (6)

Nonlinear Dynamics (2)

RESEARCH GRANTS

1 "Control of Three-dimensional Nonlinear Sloshing using Multi-Steps Input Commands", *Kuwait University*, **March 2022**, Primary Investigator (PI), 6,850 K.D (≈ $ 22,550).

STUDENT SUPERVISION

Undergraduate

1 Dima Almujarrab, "Smooth-Polynomial Command-Shaping for Sloshing Suppression of a Suspended Liquid Container," December **2019**.

Graduate

4 Fatema Mohammed, "Three-dimensional Modeling of Sloshing Dynamics," [Thesis], August **2023**.

3 Asmaa Alshemmari, "Dynamics Model of Bipedal Gait Analysis: Direct and Inverse Approach," [Thesis], August **2023**.

2 Munira Alburaidi, "Multi-Mode Robust Shaped Commands for Sloshing Control," [Thesis], August **2023**.

1 Abdulaziz Aldhubaibi, "Inverse-Problem of Diametrically Loaded Disk using Digital Image Correlation," [Thesis], August **2023**.

COMMITTEES

Consultation and Short Courses, member	2021-2022
Research Committee, member	2020-2022
Timetable Committee, member	2020-2022
Scholarship Committee, member	2019-2020
Student Advising Committee, coordinator	2018-2022
Dynamics and Control TAG, coordinator	2018-2020
Design and Material Labs, member	2017-2018

AWARDS AND HONORS

Student Research Travel Grant - Conference Presentation Funds	November 2016
Academic Achievement Award from University of Wisconsin-Madison	May 2013-2016
Honor Society of Phi Kappa Phi, Member Board	April 2013
Kuwait University Scholarship	2010
Amir (Prince of Kuwait) Honor Reward (The best two students in each Colleges)	2009
Kuwait University Excellence Student (The best two students in each Colleges)	2007-2008
Dean's Honor List	2006-2009

MEMBERSHIP

American Mathematical Society (AMS)	November 2014
Society of Plastics Engineers (SPE)	November 2012
Society of Petroleum Engineers (SPE)	May 2011

SOCIAL ACTIVITIES

Coordinator of ASME chapter in Kuwait University, Mechanical Engineering Department 2017-2018
Provide MATLAB short courses (Introductory, Intermediate, and Advanced Level)

SKILLS

Global Languages:	Fluent in English and Arabic languages
Programming and Numeric Computing Platform:	MATLAB, EES
Engineering Simulation Software:	ANSYS, COMSOL
Office Software & Tools:	Word, Excel, PowerPoint, LaTeX

TEACHING COURSES

Summary of the Teaching Courses and Average Student Evaluations at Kuwait University per Semester:

No.	Course Number	Course Title	Semester	No. of Students	Evaluation Score
1	0600308	Numerical Methods in Engineering	Spring 16/17	30	98%
2	0630448	Advanced Strength of Material		30	-
3	0600308	Numerical Methods in Engineering	Summer 16/17	32	88%
4	0630203	Dynamics	Fall 17/18	36	86%
5	0630203	Dynamics		39	78%
6	0600307	Applied Numerical Method & Program. in Eng.	Spring 17/18	25	82%
7	0630483	Biomechanics		19	-
8	0600307	Applied Numerical Method & Program. in Eng.	Summer 17/18	22	94%
9	0600307	Applied Numerical Method & Program. in Eng.	Fall 18/19	29	88%
10	0630351	Mechanical Design I		31	86%
11	0600307	Applied Numerical Method & Program. in Eng.	Spring 18/19	25	90%
12	0630351	Mechanical Design I		30	96%
13	0600307	Applied Numerical Method & Program. in Eng.	Summer 18/19	24	98%
14	0630203	Dynamics	Fall 19/20	39	90%
15	0600307	Applied Numerical Method & Program. in Eng.		30	94%
16	0630415	Mechanical Vibrations		26	96%
17	0600307	Applied Numerical Method & Program. in Eng.	Spring 19/20	26	92%
18	0630415	Mechanical Vibrations		13	98%
19	0630483	Biomechanics		33	95%
20	0600307	Applied Numerical Method & Program. in Eng.	Summer 19/20	23	84%
21	0600307	Applied Numerical Method & Program. in Eng.	Fall 20/21	32	97%
22	0630512	Mechanical Vibrations (graduate)		13	82%
23	0600307	Applied Numerical Method & Program. in Eng.	Spring 20/21	23	89%
24	0630351	Mechanical Design I		38	88%
25	0630351	Mechanical Design I		37	87%
26	0630203	Dynamics	Fall 21/22	12	90%
27	0600307	Applied Numerical Method & Program. in Eng.		23	89%
28	0600307	Applied Numerical Method & Program. in Eng.	Spring 21/22	24	-
29	0630351	Mechanical Vibrations (graduate)		5	-