

Ala Hijazi

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Education

Ph.D. in Aerospace Engineering, December 2001

Wichita State University (Wichita, Kansas)

Major: Structures & Solid Mechanics - Damage Tolerance

Dissertation: Residual Strength of Thin Sheet Aluminum Panels with Multiple Site Damage

M.S. in Mechanical Engineering, August 1998

Wichita State University (Wichita, Kansas)

Major: Computer Aided Mechanical Design

Thesis: Knee Joint Kinematics and its Applications in Artificial Limb Design

B.S. in Mechanical Engineering, June 1995

Faculty of Engineering Technology – Al Balqa University (Amman, Jordan)

Major: Thermal and Hydraulic Machines - Power Plants

Experience

Associate Professor, September 2018 to present

Dept. of Mechanical & Maintenance Engineering, German Jordanian University, Jordan

- Instructor for several mechanical engineering undergraduate courses:
 - *TME 213* – Mechanics of Materials.
 - *TME 320* – Machine Design.
 - *TME 538* – Applied Machine Design.
 - *TME 539* – Computer Aided Design (using SolidWorks).
 - *IE 121* – Engineering Workshops.

Visiting Scholar, June 2019 to September 2019

Institute of Fluid-Mechanics and Aerodynamics, Munich Bundeswehr University, Germany
German Research Foundation (DFG) – Initiation of international collaboration grant for the project:
Experimental Study of the Fluid-Structure Interaction for 2D Wing Model at Transonic Conditions.

Associate Professor, July 2012 to August 2018

Department of Mechanical Engineering, The Hashemite University, Jordan
(Sabbatical Leave: Sep. 2013 – Aug. 2015)

- Instructor for several mechanical engineering undergraduate courses:
 - *ME 446* – Machine Design I.
 - *ME 447* – Machine Design II.
 - *ME 538* – Introduction to Non-Destructive Testing Techniques.
 - *ME 445* – Mechanical Drawing (using Creo).
 - Designed and developed video tutorials for Creo-Parametric ([link](#)).
 - *ME 330* – Strength of Materials Lab.
- ME students' practical training coordinator.

Associate Professor, September 2013 to August 2015

Department of Mechanical Engineering, King Abdul-Aziz University, Saudi Arabia

- Instructor for several mechanical engineering graduate and undergraduate courses:
 - *MENG 262* – Dynamics.
 - *MENG 102* – Engineering Graphics (using SolidWorks).
 - *MENG 204* – Mechanical Engineering Drawing (using SolidWorks).
 - *MENG 690* – Non-Destructive Testing Techniques (Special Topics).
- Restructured and redeveloped the content for the Mechanical Engineering Drawing course (*MENG 204*) to be taught using the SolidWorks software package ([course page](#)).
- Participated in the department's curriculum development efforts and its preparations for the ABET re-accreditation visit.
- Initiated an SAE Mini-BAJA design club and supervised the first team ([link](#)).

Director, September 2011 to August 2013

Non-destructive Testing Center, The Hashemite University, Jordan

- Obtained NDT Level II (PT, MT, UT, RT & ET) certification - *in accordance with ANSI / ASNT CP-189*.
- Designed, developed and taught the elective mechanical engineering course “*ME 538 – Introduction to Non-Destructive Testing Techniques*” ([course page](#)).

Assistant Professor, September 2005 to July 2012

Department of Mechanical Engineering, The Hashemite University, Jordan

- Instructor for several mechanical engineering undergraduate courses:
 - *ME 231* – Dynamics.
 - *ME 446* – Machine Design I.
 - *ME 447* – Machine Design II.
 - *ME 346* – Machine Elements Design.
 - *ME 538* – Introduction to Non-Destructive Testing Techniques.
 - *ME 445* – Mechanical Drawing (using Pro/Engineer).
 - *ME 330* – Strength of Materials Lab.
- Member of several department and college committees.
- Advisor for several graduation projects and one M.Sc. thesis.
- Obtained internal and external funds for several research projects:
 - *Reducing the Manufacturing Cost of PVC Products Using Appropriate Fillers, Plasticizers, and Recycled PVC Pellets*, with S. Tarazi and A. Hijazi; Jordan Scientific Research Support Fund (\$70,800); October 2010 – September 2012.
 - *Nonlinear Modeling and Control of Quay-Side Container Cranes: A Scaled Experimental Model, Theory and Experiments*, Z. Masoud, A. Hijazi and M. Ashhab; The Hashemite University (\$27,350); May 2007 – April 2010.
 - *Heat Transfer Enhancement Using Nanofluids; Experimental and Computational Investigation*, E. Abu-Nada, A. Hijazi and Z. Masoud; The Hashemite University (\$17,650); June 2007 – November 2008.
 - *Design of an Optical Image-Splitter for Use in Dual-Wavelength Thermal Imaging*; A. Hijazi; The Hashemite University (\$1,400); April 2006 – March 2007.
- Industrial consulting through the National Faculty for Factory (FFF) Program:
 - *DEERA Metal Industries Company (Summer 2012)*: Design of a Light-Weight Aluminum Fuel Semi-trailer Tanker.

- *Arabian Body Builders Company (Summer 2007):* Design of the Structure and Tailgate Mechanism for a Rear-loader Garbage Compactor Truck. (Received the annual Ministry of Higher Education prize for FFF projects, 2nd prize - \$2,850).
- *MIZE Company for Automotive Industries & Casting (Summer 2006):* Material Properties Control and Defects Minimization for Casting Products.

Visiting Scientist, June 2010 to September 2010

Institute of Fluid-Mechanics and Aerodynamics, Munich Bundeswehr University, Germany
 German Research Foundation (DFG) research visit grant for the project: Development of a High Speed PIV Camera using Multi-color Illumination.

Visiting Scientist, June 2008 to September 2008

Material Science & Methods Institute, Saarland University, Germany
 German Research Foundation (DFG) research visit grant for the project: Quantitative Evaluation of Plastic Strain in Metals using Scanning Electron Microscopy.

Research Scientist, August 2003 to February 2005

Department of Industrial & Manufacturing Engineering, Wichita State University, Kansas

- Development of an Ultra-High-Speed Camera Capable of Simultaneous Full-Field Deformation and Temperature Measurements, (NSF), Co-PI.
 - Added temperature field measurement capability (using the dual-emission Laser Induced Fluorescence technique) to the ultra-high-speed camera developed previously.
- Acquisition of an Ultra-High-Speed Camera for use in Metal Cutting Studies, (NSF).
 - Developed a novel multi-channel non-intensified ultra-high-speed camera.
- Machining as a High-Strain-Rate Test, (Army Research Office).
 - Established a carefully instrumented machining test as a new high-strain-rate test for material properties.
 - Mapped the strain and strain rate in the primary deformation zone during high speed machining using ultra-high-speed microphotography and digital image correlation.
 - Mapped the temperature distribution in the primary deformation zone using infrared thermal imaging.

Research Fellow, August 2002 to July 2003

Department of Aerospace Engineering & the National Institute for Aviation Research (NIAR), Wichita State University, Kansas

- Instructor for two aerospace engineering undergraduate courses.
 - AE 223 – Statics.
 - AE 333 – Mechanics of Materials.
- Generation of Forming Limit Curves and Friction Coefficient Data for Use in Sheet Metal Forming Simulations, (Cessna Aircraft Co.).
 - Designed limiting dome height (LDH) test rig that permits in-situ strain measurement using digital image correlation (DIC).
 - Generated forming limit curves (FLC) for 2524-T3, 2024-O, 60061-O and 6061-W aluminum alloys.
 - Obtained the coefficient of friction data for use in FEM simulations of sheet-metal forming.

Post-Doctoral Research Associate, January 2002 to July 2002

Department of Aerospace Engineering & NIAR, Wichita State University, Kansas

- Evaluation and Retrofit of Fail-Safety on KC-135 Fuselage Structure, (US Air Force).
 - Tested 2024-T3 and 7075-T6 coupons to measure the crack tip opening angle (CTOA).

- Performed FRANC3D/STAGS simulations and parametric studies to determine the critical CTOA values to be used for analyzing the fuselage models.
- Performed FRANC3D/STAGS fracture analysis to evaluate the effect of multiple site damage (MSD) and corrosion on the structural integrity of the KC-135 fuselage.

Graduate Research Assistant, August 1998 to December 2001
Department of Aerospace Engineering & NIAR, Wichita State University, Kansas

- Multiple Site Damage in Aging Aircraft, (Advanced Design and Manufacturing Research Center).
 - Prepared and tested many configurations of 2024-T3, 2524-T3 and 7075-T6 aluminum panels with MSD. The configurations tested included: un-stiffened panels, single-bay stiffened panels, two-bay stiffened panels with a broken middle stiffener, and bolted lap-joint panels.
 - Conducted mechanical tests for determining material properties and performed fatigue and fracture toughness tests.
 - Modeled and analyzed various panel configurations using FRANC2D/L to determine the geometric corrections for stress intensity factor.
 - Modeled and analyzed bolted lap-joint panels for determining residual strength using FRANC3D/STAGS based on the CTOA fracture criterion.
 - Developed semi-empirical models for predicting residual strength of panels with MSD.
- Damage Tolerance of Composite Sandwich Airframe Structures, (FAA).
 - Fabricated sandwich composite panels and prepared test coupons.
 - Developed calibration standards for measuring the planer damage area in low-energy impact-damaged sandwich panels using ultrasound through-transmission testing.
 - Conducted impact tests and performed subsequent non-destructive evaluation using ultrasound, indentation profile measurement, and visual inspection.
 - Conducted in-plane compression-after-impact tests to determine residual strength.
- Technical Advisor for undergraduate students selected for a National Science Foundation Undergraduate Research Experience Program.
 - Trained students on using the equipment in the Composites Lab and Structures Lab.
 - Supervised and helped students with their team project "Residual Strength of Damaged and Repaired Composite Sandwich Beams".
- Technical assistant for the course AE653 (Mechanics of Composite Materials) responsible for supervising and training the students in the Composites Lab.

Graduate Assistant, August 1997 to July 1998
Department of Mechanical Engineering, Wichita State University, Kansas
Assistant for the instructor of Machine Design I & II courses.

Research Interests

- Solid & Fracture Mechanics.
- Experimental Mechanics, Advanced Experimental Techniques.
- Material and Structural Testing.
- Composite Materials.
- Non-destructive Testing and Evaluation.
- Optical Measurements, Applied Optics.

Professional Services

- Reviewer for several international journals:
 - Measurement.
 - Experiments in Fluids.
 - Experimental Heat Transfer.
 - Journal of Composite Materials.
 - Geotechnical Testing Journal.
 - Journal of Testing and Evaluation.
 - Measurement Science and Technology.
 - Journal of Microfluidics and Nanofluidics.
 - International Journal of Heat and Mass Transfer.
 - Journal of Materials Engineering and Performance.
 - International Journal of Modeling, Identification and Control.
- Member of the organization committee of the “3rd International Conference on Thermal Engineering: Theory and Applications”; Amman, Jordan, May 21 – 23, 2007.

Professional Affiliations

- International Society for Optics and Photonics (SPIE).
- American Society of Mechanical Engineers (ASME).
- American Institute of Aeronautics and Astronauts (AIAA).
- Jordanian Engineers Association.

Computer Skills

- Solid Modeling: Creo (*Pro/Engineer*), SolidWorks.
- FEA & Fracture Mechanics: ANSYS, NASTRAN, FRANC2D, FRANC3D/STAGS, AFGROW.
- Other: C language, MATLAB, MathCAD, DAVIS, ARAMIS, VIC-2D, LabView.

Publications

Journals:

- *A Novel Approach for the Determination of Surface Tilt Angles in Two-dimensional Digital Image Correlation Experiments*; Ala Hijazi; Experimental Mechanics; November 2019. (DOI [10.1007/s11340-019-00554-8](https://doi.org/10.1007/s11340-019-00554-8)) [**Q1 Mechanical Engineering, 2018**]
- *Artificial Neural Network Modeling to Evaluate the Polyvinylchloride Composites' Properties*; Safwan Altarazi, Maysa Ammouri, Ala Hijazi; Computational Materials Science; Vol.153, October 2018. (DOI [10.1016/j.commatsci.2018.06.003](https://doi.org/10.1016/j.commatsci.2018.06.003)) [**Q2 Materials Science, 2018**]
- *High-Speed Imaging using 3CCD Camera and Multi-Color LED Flashes*; Ala Hijazi, Alexander Friedl, Christian Cierpka, Christian Kähler, Vis Madhavan; Measurement Science and Technology; Vol.28, No.11, November 2017. (DOI [10.1088/1361-6501/aa892a](https://doi.org/10.1088/1361-6501/aa892a)) [**Q1 Engineering, 2017**]
- *Contribution of the Imaging System Components in the Overall Error of the Two-Dimensional Digital Image Correlation Technique*; Ala Hijazi and Christian Kähler; ASTM - Journal of Testing Evaluation, Vol.45, No.2, March 2017. (DOI [10.1520/JTE20150437](https://doi.org/10.1520/JTE20150437)) [**Q2 Mechanical Engineering, 2016**]

- *Nondestructive Evaluation of Welded Joints Using Digital Image Correlation*; Mohanna Eshtayeh, Ala Hijazi and Miftah Hrairi; Journal of Nondestructive Evaluation, Vol.34, No.4, November 2015. (DOI [10.1007/s10921-015-0310-z](https://doi.org/10.1007/s10921-015-0310-z)) [**Q1 Mechanical Engineering, 2015**]
- *Influence of Camera's Optical Axis Non-perpendicularity on Measurement Accuracy of Two-Dimensional Digital Image Correlation*; Ala Hijazi, Alex Friedl and Christian Kähler; Jordan Journal of Mechanical and Industrial Engineering, Vol.5, No.4, August 2011. ([link](#)) [**Q2 Mechanical Engineering, 2011**]
- *A Calibrated Dual-Wavelength Infrared Thermometry Approach with Non-greybody Compensation for Machining Temperature Measurements*; Ala Hijazi, Sandeep Sachidanandan, Rajesh Singh, Vis Madhavan; Measurement Science and Technology, Vol.22, No.2, February 2011. (DOI [10.1088/0957-0233/22/2/025106](https://doi.org/10.1088/0957-0233/22/2/025106)) [**Q1 Engineering, 2011**]
- *A Novel Ultra-High Speed Camera for Digital Image Processing Applications*; Ala Hijazi, Vis Madhavan; Measurement Science and Technology, Vol.19, No.8, August 2008. (DOI [10.1088/0957-0233/19/8/085503](https://doi.org/10.1088/0957-0233/19/8/085503)) [**Q1 Engineering, 2008**]
- *Natural Convection Heat Transfer Enhancement in Horizontal Concentric Annuli using Nanofluids*; Eyad Abu-Nada, Ziyad Masoud, Ala Hijazi; International Communications in Heat and Mass Transfer, Vol.35, No.5, May 2008. (DOI [10.1016/j.icheatmasstransfer.2007.11.004](https://doi.org/10.1016/j.icheatmasstransfer.2007.11.004)) [**Q1 Chemical Engineering, 2008**]
- *Link-up Strength of 2524-T3 and 2024-T3 Aluminum Panels with Multiple Site Damage*; Bert Smith, Tanya Flores, Ala Hijazi; AIAA - Journal of Aircraft, Vol.42, No.2, March 2005. (DOI [10.2514/1.4211](https://doi.org/10.2514/1.4211)) [**Q1 Aerospace Engineering, 2005**]
- *Comparison of Residual Strength Estimates for Bolted Lap Joint Panels*; Ala Hijazi, Bert Smith, Thomas Lacy; AIAA - Journal of Aircraft, Vol.41, No.3, May 2004. (DOI [10.2514/1.446](https://doi.org/10.2514/1.446)) [**Q1 Aerospace Engineering, 2004**]
- *Linkup Strength of 2024-T3 Bolted Lap Joint Panels with Multiple Site Damage*; Ala Hijazi, Bert Smith, Thomas Lacy; AIAA - Journal of Aircraft, Vol.41, No.2, March 2004. (DOI [10.2514/1.9331](https://doi.org/10.2514/1.9331)) [**Q1 Aerospace Engineering, 2004**]
- *Strength of 7075-T6 and 2024-T3 Aluminum Panels with Multiple Site Damage*; Bert Smith, Ala Hijazi, Roy Myose; AIAA - Journal of Aircraft, Vol.39, No.2, March 2002. (DOI [10.2514/2.2933](https://doi.org/10.2514/2.2933)) [**Q1 Aerospace Engineering, 2002**]
- *Strength of Stiffened 2024-T3 Aluminum Panels With Multiple Site Damage*; Bert Smith, Ala Hijazi, AKM Haque, Roy Myose; AIAA - Journal of Aircraft, Vol.38, No.4, July 2001. (DOI [10.2514/2.2829](https://doi.org/10.2514/2.2829)) [**Q1 Aerospace Engineering, 2001**]

Conferences:

- *Effect of Camera's Focal Plane Array Fill Factor on Digital Image Correlation Measurement Accuracy*; Ala Hijazi, Nathir Rawashdeh, Christian Kähler; Proceedings the 5th International Conference on Advances in Mechanical Engineering; Turkey; December, 2019.
- *High-Speed Image Capture using 3CCD Camera and Multi-Color High-Power Light Emitting Diodes*; Ala Hijazi, Alexander Friedl, Christian Cierpka, Christian Kähler, Vis Madhavan; Proceedings the 10th International Conference on Optics-Photonics Design and Fabrication; Germany; March, 2016.
- *An Image-Splitting-Optic for Dual-Wavelength Imaging*; Ala Hijazi, Vis Madhavan; Proceedings of the SPIE 6th International Symposium on Multi-Spectral Image Processing and Pattern Recognition; China; November, 2009. (DOI [10.1117/12.833202](https://doi.org/10.1117/12.833202))
- *A Novel Multi-Channel Non-Intensified Ultra High Speed Camera Using Multi-Wavelength Illumination*; Ala Hijazi, Vis Madhavan; Proceedings of the SPIE Optics & Photonics 2006 Conference; USA; August, 2006.

- *A Novel Multi-Channel Non-Intensified Ultra High Speed Camera for Use in Digital Image Correlation*; Vis Madhavan, Ala Hijazi; Proceedings of the 2005 NSF DMII Grantees Conference; USA; January, 2005.
- *Determination of Forming Limit Curves using 3D Digital Image Correlation and In-Situ Observation*; Ala Hijazi, Nikhil Yardi, Vis Madhavan; Proceedings of the 49th International SAMPE Symposium and Exhibition; USA; May, 2004. ([link](#))
- *Use of Ultra High Speed Imaging to Study Material Deformation during High Speed Machining*; Vis Madhavan, Ala Hijazi; Proceedings of the 2004 NSF Design, Service and Manufacturing Grantees and Research Conference; USA; January, 2004.
- *High speed digital image correlation and finite element simulations*; Vis Madhavan, Ala Hijazi, Amir Adibi-Sedeh and Vanesh Pednekar; Invited presentation at the Manufacturing Engineering Division's Laboratory-Fresh Session on Machining Process Research at the ASME IMECE '03; USA; November, 2003.
- *Summary of the Effect of Multiple site Damage on the Linkup Strength of 2024-T3 Aluminum Panels*; Bert Smith, Ala Hijazi, Roy Myose; Proceedings of the SAE General Aviation Technology Conference and Exhibition (GATC); USA; April, 2002; SAE Transactions 2002-01-1534.
- *Critical Crack Tip Opening Angle Determination for Thin Sheet Aluminum Alloys*; Tarek Boudraa, Thomas Lacy, Ala Hijazi; Proceedings of the SAE General Aviation Technology Conference and Exhibition (GATC); USA; April, 2002.
- *Residual Strength of Thin Sheet Aluminum Panels with Multiple Site Damage*; Ala Hijazi; ASTM Committee E-08 on Fatigue and Fracture - Annual Student Forum; USA; November 2001.
- *Modified Linkup Models for Determining the Strength of Stiffened Panels with Multiple Site Damage*; Bert Smith, Ala Hijazi, AKM Haque, Roy Myose; Proceedings of The 3rd Joint FAA/DoD/NASA Conference on Aging Aircraft; USA; September, 1999.
- *Strength of Stiffened Panels with Multiple site Damage*; Bert Smith, Adil Mouak, Perry Saville, Ala Hijazi, Roy Myose; Proceedings of the SAE General Corporate and Regional Aviation Meeting and Exhibition; USA; April, 1999; SAE Transactions 1999-01-1575.

Final Reports

- *Design of a Light-Weight Aluminum Fuel Semi-trailer Tanker in accordance with ADR-2011 Specifications*; Ala Hijazi; Final technical report for FFF industrial consulting project, 2012. (DOI [10.13140/RG.2.2.19551.30886](#))
- *Design of the Structure and Tailgate Mechanism for a Rear-loader Garbage Compactor Truck*; Ala Hijazi; Final technical report for FFF industrial consulting project, 2007. (DOI [10.13140/RG.2.2.12840.42249](#))
- *Material Properties Control and Defects Minimization for Casting Products*; Ala Hijazi; Final technical report for FFF industrial consulting project, 2006.
- *Generation of Forming Limit Curves and Friction Coefficient Data for Use in FEA of Sheet Metal Forming*; Vis Madhavan, Ala Hijazi, Nikhil Yardi; Final technical report for ADMRC Project C3, 2003.
- *Evaluation and Retrofit of Fail-Safety on KC-135 Fuselage Structure*; Thomas Lacy, Dale Cope, Ala Hijazi, Yoshiki Yamada; Final technical report for Boeing contract JF0044 (WSU 4493), 2002.

Patents

- *System and Method for Capturing Image Sequences at Ultra-High Framing Rates*; Vis Madhavan and Ala Hijazi; United States Patent No. [7777199](#), August, 2010.