Abdullah Al-Dwairi, PhD
Curriculum Vitae

Department of Industrial Engineering
Jordan University of Science and Technology (JUST),
Irbid 22110, Jordan
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Personal

Full Name: Abdullah Fawaz Al-Dwairi
Nationality: Jordanian

Education

Ph.D. in Mechanical Engineering/Applied Mechanics
Saint Petersburg State University of Technology and Design, Saint Petersburg, Russia, 1994
(*Now Saint Petersburg State University of Industrial Technologies and Design*)

- Dissertation: *Computer-Aided Synthesis of Multi-Loop Linkage Mechanisms for High-Speed Cyclic Combing Machines*

Higher Diploma in Mechanical Engineering (with Honors)
Leningrad Institute of Textile and Light Industry, Leningrad, Russia, 1990
(*Now Saint Petersburg State University of Industrial Technologies and Design*)

- Thesis: *Design of a Mobile Tool Holder and Support Structure for Corrective Turning of Large-Diameter Drums*

Academic Positions

- **Associate Professor**
  Industrial Engineering Department
  Jordan University of Science and Technology (JUST), Irbid, Jordan
  September 2011 – Present
- **Visiting Professor**
  The Petroleum Institute (now part of Khalifa University), Abu Dhabi, United Arab Emirates
  February 2014 – June 2015 (Sabbatical Leave)
- **Assistant Professor**
  Industrial Engineering Department, Jordan University of Science and Technology, Jordan
  September 2004 – August 2011
- **Full-Time Lecturer**
  Mechanical Engineering Department, Jordan University of Science and Technology, Irbid, Jordan
  September 2000 – August 2004
- **Assistant Professor**
  Mechanical Engineering Department, Philadelphia University, Amman, Jordan
  February 1995 – August 2000

Administrative Experience

- **Head of Industrial Engineering Department**
  Jordan University of Science and Technology (JUST)
  Sep. 2008 – Aug. 2010
- **Vice Dean, Deanship of Student Affairs**
  Jordan University of Science and Technology (JUST)
  September 2013 – February 2014 (left for sabbatical)

Experience with Accreditation

- **Head of the Industrial Engineering committee for ABET Accreditation**
  June 2008 – Aug. 2010
- **Head of the Industrial Engineering committee for Specialty Accreditation by Jordanian Accreditation Board**
  Sep. 2009 – Aug. 2010
- **Active member of the accreditation committees at JUST**
  June 2008 - present

Research Interest Areas

Machine Dynamics
Mechanism Design
Additive Manufacturing
Welding Technologies
Product Design and Development
Decision Making Techniques
Quality Management

Publications

Journal Articles

1. **A. Al-Dwairi** and S. Al-Lubani, "Modeling and dynamic analysis of a planetary mechanism with an elastic belt," *Mechanism and Machine Theory*, vol. 39, no. 4, pp. 343-355, 2004. https://doi.org/10.1016/j.mechmachtheory.2003.08.002

2. **A. Al-Dwairi**, "Design of centric drag-link mechanisms for delay generation with focus on space occupation," *ASME Journal of Mechanical Design*, vol. 131, no. 1, 011015, 2009. https://doi.org/10.1115/1.3042157

3. **A. Al-Dwairi**, F. T. Dweri, and O. M. Ashour, "A novice-centered decision-support system for type synthesis of function-generation mechanisms," *Mechanism and Machine Theory*, vol. 45, pp. 1252-1268, 2010. https://doi.org/10.1016/j.mechmachtheory.2010.04.006

4. **A. Al-Dwairi**, M. Al-Nawafleh, S. Al-Lubani, and F. Al-Ghathian, "Lagrangian modeling and analysis of the dynamics of frictional winding mechanisms," *Multibody System Dynamics*, vol. 26, pp. 175-190, 2011. https://doi.org/10.1007/s11044-011-9254-y

5. T. Al-Hawari, S. Khrais, O. Al-Araidah, and **A. Al-Dwairi**, "2D laser scanner selection using fuzzy logic," *Expert Systems with Applications*, vol. 38, no. 5, pp. 5614-5619, 2011. https://doi.org/10.1016/j.eswa.2010.10.074

6. S. Al-Lubani, **A. Al-Dwairi**, and O. Al-Araidah, "A 2-DOF model and dynamic analysis of textile winding machines with sprung feeler rollers," *Journal of Materials Science and Engineering A*, vol. 2, no. 5, pp. 430-435, 2012. DOI:10.17265/2161-6213/2012.05.006

7. M. Al-Tahat, A. Al-Refaie, and **A. Al-Dwairi**, "Performance evaluation and analysis of a JIT-Kanban production system with sampling inspection," *International Journal of Industrial and Systems Engineering*, vol. 11, no. 3, pp. 225-249, 2012. https://doi.org/10.1504/IJISE.2012.047097

8. O. Bataineh and **A. Al-Dwairi**, "Integrated SPC-based scheme utilizing variable control charts and Cpm ratio to improve manufacturing quality of empty hard gelatin capsules," *International Journal of Productivity and Quality Management*, vol. 9, no. 3, pp. 332-351, 2012. https://doi.org/10.1504/IJPQM.2012.046366

9. M. T. Hayajneh, **A. Al-Dwairi**, and S. F. Obeidat, "Optimization and control of bending distortion of submerged arc welded I-beams," *Journal of Constructional Steel Research*, vol. 142, pp. 78-85, 2018. https://doi.org/10.1016/j.jcsr.2017.12.012

10. **A. Al-Dwairi**, E. Abdelall, and I. Rivero, "Effect of pre-welding heat treatment on the mechanical properties of friction stir welded Al-4 wt.% Cu alloys," *Metallography, Microstructure, and Analysis*, vol. 9, no. 2, pp. 169-179, 2020. https://doi.org/10.1007/s13632-020-00628-3

11. E. Abdelall, **A. Al-Dwairi**, S. Al-Raba'a, et al., "Printing functional metallic 3D parts using a hybrid friction-surfacing additive manufacturing process," *Progress in Additive Manufacturing*, vol. 6, pp. 731-741, 2021. https://doi.org/10.1007/s40964-021-00193-3

12. E. Abdelall, **A. Al-Dwairi**, E. Ashour, et al., "Experimental study of a novel layer deposition technique and its effect on anisotropic behavior of wire arc additively manufactured steel parts," *Progress in Additive Manufacturing*, vol. 6, pp. 871-879, 2021. https://doi.org/10.1007/s40964-021-00201-6

13. O. Bataineh, **A. Al-Dwairi**, Z. Ayoub, and M. Al-Omosh, "DOE-based experimental investigation and optimization of hardness and corrosion rate for Cu-x% Al2O3 as processed by powder metallurgy," *AIMS Materials Science*, vol. 8, no. 3, pp. 416-433, 2021. doi: 10.3934/matersci.2021026

14. E. Abdelall, **A. Al-Dwairi**, S. Al Darabsehb, and S. Al-Raba'a, "Investigating the feasibility of depositing AA6061-T6 alloy over mild steel by friction surfacing," *Journal of Applied Research and Technology*, vol. 20, pp. 126-135, 2022. https://doi.org/10.22201/icat.24486736e.2022.20.2.1735.

15. Y. Dweiri, **A. Al-Dwairi**, M. Al-Zanina, and R. Al Diabat, "Elliptical trainer redesign to diversify muscles recruitment," *ASME Journal of Medical Devices*, vol. 16, no. 3, p. 031012, 2022. https://doi.org/10.1115/1.4054548

16. **A. Al-Dwairi**, O. Al-Araidah, and S. Hamasha, "An integrated QFD and TRIZ methodology for innovative product design," *Designs*, vol. 7, no. 6, p. 132, 2023. https://doi.org/10.3390/designs7060132

17. M. Mistarihi, A. Al-Omari, and **A. Al-Dwairi**, "Designing and simulation assessment of a chair attachment air blowing method to enhance the safety of prolonged sitting," *Biomimetics*, vol. 8, no. 2, p. 194, 2023. https://doi.org/10.3390/biomimetics8020194

18. **A. Al-Dwairi**, "Bi-objective Pareto optimization of centric crank-rocker mechanisms," *Cogent Engineering* (*Mechanical Engineering Section*), vol. 11, no. 1, 2340679, 2024. https://doi.org/10.1080/23311916.2024.2340679

19. **A. Al-Dwairi** and D. Al-Qur'an, "On the quick-return motion capability of drag-link driven crank-slider mechanisms," *Mechanics Based Design of Structures and Machines*, January 2025. https://doi.org/10.1080/15397734.2025.2455994

20. E. Adelall, S. Hammouri, **A. Al-Dwairi**, and O. Al-Araidah, "Beyond GOALS: Evaluating minimal invasive surgical skills in 3D printed models with motion analysis in a Jordanian school, *Journal of Educational Evaluation for Health Professions*, Accepted for publication, March 2025.

Articles in Russian

1. **A. Al-Dwairi**, "Analytical and optimization synthesis of a six-link vise drive mechanism for cyclic combing machines," in *Computer-Aided Design of Technological Process Control Systems in Textile and Light Industry*, Publications of Saint Petersburg State University of Technology and Design, pp. 77-80, 1992.

2. **A. Al-Dwairi** and E. E. Peisach, "Structural updates for the principal mechanisms of the cyclic comber 'Textima-1532'," *Publications of Saint Petersburg Engineering Center*, vol. 12, no. 5, 1992.

3. **A. Al-Dwairi** and E. E. Peisach, "Lower nipper and separating cylinder mechanisms of cyclic combing machines: Review and classification," *Referativny Zhurnal/Light Industry*, VINITI, Russian Academy of Science, vol. 1, no. 1A74, 45 pages, 1993.

4. **A. Al-Dwairi** and E. E. Peisach, "Enhancement of the differential carrier drive in the separating cylinders mechanism of cyclic combing machines," *Publications of Saint Petersburg Center for Scientific and Technical Information*, no. 11-94, 1993.

Conference Articles

1. **A. Al-Dwairi**, "Kinematic synthesis of linkage mechanisms as a problem of nonlinear programming," in *Proceedings of CATAEE Engineering Conference*, Philadelphia University, Amman, Jordan, 1996.

2. A. B. Kikin and **A. Al-Dwairi**, "A computer program for interactive synthesis of dwell lever mechanisms," in *Proceedings of TRANSFER Conference*, Trenčín, Slovakia, 2001.

3. **A. Al-Dwairi** and A. B. Kikin, "Multipurpose techniques for the least-squares synthesis of linkages," in *Proceedings of the 11th IFToMM World Congress in Mechanism and Machine Science*, Tianjin, China, 2004.

4. **A. Al-Dwairi**, "Analytical synthesis of drag-link mechanisms for delay generation," in *Proceedings of the 12th IFToMM World Congress on Mechanism and Machine Science*, Besançon, France, 2007.

5. F. T. Dweiri, **A. Al-Dwairi**, and O. M. Ashour, "An AHP-based approach to the type synthesis of function generation mechanisms," in *Proceedings of the 12th IFToMM World Congress on Mechanism and Machine Science*, Besançon, France, 2007.

6. S. Al-Lubani, **A. Al-Dwairi**, and O. Al-Araidah, "Vibration analysis of filament winder machines with sprung roller followers," in *Proceedings of the 37th Summer School-Conference "Advanced Problems in Mechanics,"* Russian Academy of Science, Saint Petersburg, Russia, 2009.

7. **A. Al-Dwairi**, S. Al-Lubani, and M. Al-Nawafleh, "Analytical synthesis of crank-rocker and double-crank mechanisms with minimax link-length ratios," in *Proceedings of the 37th Conference "Advanced Problems in Mechanics,"* Russian Academy of Science, Saint Petersburg, Russia, 2009.

8. O. Bataineh and **A. Al-Dwairi**, "Integrated SPC-based scheme for using control charts and Cpm ratio to improve manufacturing quality of empty hard gelatin capsules," in *Proceedings of the 11th International Conference on QIR*, Indonesia, 2009.

9. S. Hamasha, **A. Al-Dwairi**, and O. Al-Araidah, "A modified quality function deployment methodology for innovative product design," in *Proceedings of the Industrial and Systems Engineering Research Conference (ISERC)*, Anaheim, CA, USA, 2016.

10. O. Bataineh and **A. Al-Dwairi**, "A DOE experimental investigation of the dispersion strengthening of copper alumina formed through powder mixing and sintering," in *Proceedings of the 10th International Conference on Materials Science*, Varna, Bulgaria, 2017.

11. **A. Al-Dwairi**, D. Qudah, D. Qur'an, and T. Khasawneh, "Design and control of a powered swing for children with special needs," in *Proceedings of the Second International Conference of Industrial Systems and Manufacturing Engineering*, Amman, Jordan, 2019. (Best poster award).

Article on Engineering Education

12. **A. Al-Dwairi**, "An inquiry-discovery separation based instruction technique for promoting experiential design learning," in *Proceedings of the 5th International Forum on Engineering Education*, University of Sharjah, UAE, 2010. Republished in *Engineering Education in the 21st Century: Quality, Globalization, and Local Relevance*, 2012.

Patent

- **Patent No. 2037575 of the Russian Federation,** *A Vise Drive Mechanism for Cyclic Combing Machines*. Registered by the Russian Committee for Patents and Trademarks (ROSPATENT), 1995, in Russian.

Co-supervised MSc Theses (at the IE Department, JUST)

1. An AHP-Based Decision Support System for Type Synthesis of Function-Generation Mechanisms
2. An Integrated TRIZ and QFD Methodology for Innovative Product Design
3. Investigation of Bending Distortion Due to Submerged Arc Welding of Steel Sections
4. An Integrated QFD and Value-Engineering Strategy and its Application to the Design of Apartment Buildings in Jordan.

5. Investigation of the Impact of ISO Certification on the Performance of Mid-Size Industrial Firms in Jordan
6. Optimization of Friction-Stir Welding Process Parameters and Tool Design for Joining of Dissimilar Aluminum Alloys
7. Evaluation and Redesign of Elliptical Cross-Trainer Using TRIZ Ideality Concept
8. Design of a Portable Upper-Extremity Rehabilitation Device for Patients with Post-Stroke Muscle Spasticity
9. Experimental Study on a Novel Friction-Surfacing Based Additive Manufacturing Process
10. An Experimental Investigation to Improve the Mechanical Properties of Hybrid Wire-Arc Additively Manufactured Metallic Parts
11. Experimental Investigation of the Capability of a Hybrid Friction-Surfacing Additive Manufacturing Process in Producing Functional Metallic 3D Objects
12. The Influence of Direct Metal Laser Sintering Technology Process Parameters on the Anisotropic Behavior of Printed Parts
13. Design of a Novel Shaper Machine Drive Mechanism with Improved Dynamics at Working Stroke
14. Integrating Fuzzy MCDM and QFD Approaches for Ergonomic Seat Design to Enhance Prolonged Sitting Safety
15. A Constraint-Relaxation Mechanism Design Technique and its Application to a Biped Robot Leg Mechanism

Courses Taught

Mechanical Engineering Courses	Industrial Engineering Courses
Mechanics of Materials	Product Realization (Graduate Course)
Dynamics and Vibrations	Product Design and Development
Design of Machinery	Design of Production Systems (Project-based)
Machine Design (I and II)	Engineering Metrology
Automatic Control	Engineering Economy and Project Management
Computer-Aided Design	Engineering Design (Multidisciplinary course)
Automotive Engineering (Elective course)	Engineering Measurements Lab
Analytical Mechanics (Elective course)	Manufacturing Processes Lab
Instrumentation and Dynamical Systems Lab.	Graduate Seminar

Professional Service

- **Member**, Jordan Engineers Association, 1990 - present
- **Reviewer** for multiple national and international journals and conferences
- **Co-founder and Committee Head,** Industrial Incubator at JUST (2008-2010), which later evolved into the JUST Center of Excellence for Innovative Projects
- **Chair**, Linkages and Cams Session, 12th IFToMM World Congress, France, 2007
- **Chair**, Engineering Instruction Methods Session, International Forum on Engineering Education & European SD PROMO Conference, Sharjah, UAE, 2010

- **Invited Lecturer**, 14th Jordan Science Week, Royal Scientific Society, Amman, Jordan, 2009 (Lecture: *TRIZ Theory: An Innovation Acceleration Tool*)
- **Coach,** "Made in Jordan" Design Competition, Royal Scientific Society, Amman, Jordan
- **Invited Participant**, Workshop "Accreditation Criteria Development for Engineering Programs," Jordan Ministry of Higher Education, Amman, 2009
- **Invited Lecturer**, Phi Research and Innovation Summit (PRIS 2017), Phi Research Institute, Amman, Jordan, 2017 (Lecture: *Systematic Innovation with TRIZ Theory*)
- **Jury Member**, PAIR Program Research Proposal Presentation, Phi Research Institute, Jordan, 2019
- **Invited Lecturer**, Al-Balqa Applied University Science Week, ME Department, Irbid, Jordan, 2022 (Lecture: *How to Avoid Tight Tolerances in Mechanical Assemblies*
- **Examiner**, Jordan Civil Service Bureau for Public Sector Engineering Positions
- **Co-organizer**, Industry Communication Days, Faculty of Engineering at JUST
- **Elected Steering Committee Member**, Society of JUST Faculty Members
- **Deputy Head**, JUST Campus Health and Safety Committee, 2024
- **Head/Member** of departmental and faculty committees such as Accreditation, Graduate Studies, Curriculum Development, Faculty Recruitment, Scientific Research, and Bids Committees

Awards and Scholarships

- **Favorite Faculty Award**
  JUST Students Union / Industrial Engineering Department
  Honored by students for excellence in teaching and mentorship.
- **Letter of Appreciation for Voluntary Contributions**
  Royal Scientific Society, Jordan
  Acknowledged for volunteer work in advancing scientific community outreach.
- **Shield of Honor for Voluntary Contributions**
  Phi Science Institute, Jordan
  Awarded for contributions to community outreach and education initiatives.
- **Best Poster Award**
  The 2nd International Conference of Industrial Systems and Manufacturing Engineering, Jordan
- **Red Diploma (Honors Degree)**
  Saint Petersburg State University of Technology and Design, Russia
  Awarded for graduating with a high academic performance.
- **PhD Scholarship**
  Saint Petersburg State University of Technology and Design, Russia
  Full scholarship awarded for academic excellence and research potential.
- **Higher Diploma Scholarship in Mechanical Engineering**
  Jordan Ministry of Higher Education
  Awarded for outstanding academic achievement as a secondary school graduate.

Computer Skills

- **Technical Software:** Mathematica, Working Model, Solid Works, and others

- **Instruction Technology:** MS Teams, Zoom, E-learning, Blackboard, Whiteboard

Languages

Arabic, English, and Russian