





# Hammam S. R. Daraghma, Ph.D.

## Mechanical Engineer



### Personal Information:

Current Address	KFUPM, Dhahran, Saudi Arabia	 <a href="#">Google Scholar</a>
Email	<a href="mailto:dr.hamamdar@gmail.com">dr.hamamdar@gmail.com</a>	 <a href="#">ResearchGate</a>
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### Personal Profile:

Hamam is a distinguished mechanical engineer with extensive academic and research experience. He holds a Ph.D. in Mechanical Engineering, specializing in Design and Vibrations, from King Fahd University for Petroleum and Minerals (KFUPM) in Saudi Arabia. His substantial contributions to research include numerous published articles and active involvement in conferences. Beyond research, he exhibits proficiency in teaching, technical skills, and exceptional writing skills, showcasing his adaptability across engineering, research, and education domains.

### Education:

- May, 2023: **Ph.D. in Mechanical Engineering** at King Fahd University of Petroleum and Minerals (KFUPM), Dhahran, Saudi Arabia. “**3<sup>rd</sup> Honors**” with overall score of **3.000/4**.

Thesis title “ **Numerical and Experimental Investigation of Coupled Beam Array for Vibration Energy Harvesting Applications.** ”

- May, 2017: **M.Sc. in Mechanical Engineering** at King Fahd University of Petroleum and Minerals (KFUPM), Dhahran, Saudi Arabia. “**2<sup>nd</sup> Honors**” with overall score of **3.343/4**.

Thesis title “ **Investigation of fiber optic embedding processes within different types of materials.** ”

- Jan., 2012: **B.Sc. in Mechanical Engineering** at An-Najah National University (ANNU), Nablus, Palestine. **1st position** in the 32<sup>nd</sup> batch (2011/2012) with an overall score of **82.6%**.

Senior Design Project “ **Vehicle's Speed Alert System (VSAS).** ”

- 2006-2007: **High School Certificate “ Tawjihi ”** in Scientific Stream at Tubas Secondary School, Tubas, Palestine. An **Excellent** overall score of **91.5%**.

### Honors and Scholarships:

1. In the 2011/2012 academic year, I achieved the **top position** in the Mechanical Engineering department at ANNU and was honored with the **first rank** for B.Sc. degree program.
2. In 2014, I received a prestigious full scholarship to pursue a **M.Sc. degree** in Mechanical Engineering from KFUPM.
3. In 2018, I received a prestigious full scholarship to pursue a **Ph.D. degree** in Mechanical Engineering from KFUPM.



**Publications:**

**✚ Published Journal Papers:**

- i. Mekid, S., and **Daraghma, H.**, 2018, “ Experimental Ultrasonic Sub-Surface Consolidation of Fiber Bragg Grating for Sensorial Materials” [Journal of Materials Processing Technology, 252, pp. 673–679.](#)
- ii. **Daraghma, H.**, Samad, M. A., Toor, I. ul H., M. Abdallah, F., and Patel, F., 2020, “ Tribological Characterization of Ni-Free Duplex Stainless-Steel Alloys Using the Taguchi Methodology” [Metals, 10\(3\), p. 339.](#)
- iii. Mekid, S., **Daraghma, H.**, and Bashmal, S., 2020, “ Electromechanical Assessment and Induced Temperature Measurement of Carbon Fiber Tows under Tensile Condition” [Materials, 13\(19\), p. 4234.](#)
- iv. Abubakar, A. A., Mekid, S., **Daraghma, H.**, and Saheb, N., 2021, “ Smart Fiber Optics Embedding in Powder-Based Materials: Numerical and Experimental Assessment” [Arabian Journal for Science and Engineering, 46\(8\), pp. 8009–8035.](#)
- v. Sayegh, M.-A., **Daraghma, H.**, Mekid, S., and Bashmal, S., 2022, “ Review of Recent Bio-Inspired Design and Manufacturing of Whisker Tactile Sensors” [Sensors, 22\(7\), p. 2705.](#)

**✚ Published/Accepted Conference Papers:**

- i. Mekid, S., Saheb, N., **Daraghma, H.**, Butt, A., and Qureshi, K., 2015, “ Upscaling Sensing Materials with Challenges of Sensors Embedding in Powder Based Materials and Polymers” [Smart Materials, Adaptive Structures and Intelligent Systems, American Society of Mechanical Engineers, p. V001T01A003.](#)
- ii. Mekid, S., and **Daraghma, H.**, 2017, “ Experimental Ultrasonic Consolidation of FBGs in Aluminum” [Advances in Manufacturing Technology XXXI, IOS Press, pp. 84–89.](#)
- iii. Mekid, S., and **Daraghma, H.**, 2019, “ Manufacturing Processes of Sensorial Materials: Sensors Placement and Experimental Validation” [IOP Conference Series: Materials Science and Engineering, IOP Publishing, p. 012014.](#)
- iv. Mekid, S., and **Daraghma, H.**, 2020, “ Sensing Signal Assessment in Sensorial Materials: Key Embedding Conditions” [2020 17th International Multi-Conference on Systems, Signals & Devices \(SSD\), IEEE, pp. 626–630.](#)

**✚ On progress Journal Papers:**

- i. “ Exploiting Internal Resonance of 3D-Printed Weakly Coupled Structures for Piezoelectric Energy Harvesting” [Addressing journal review feedback \(Nonlinear Dynamics\).](#)
- ii. “ Materials & Design Approaches for Enhanced Performance of Mechanically Compliant Thermoelectric Generators (TEGs): A Review of Recent Advances” [has been submitted to the journal \(Smart Materials and Structures\).](#)
- iii. “ Numerical Modeling and Simulation of Coupled Structures for Optimizing Piezoelectric Energy Harvesting Efficiency” [to be submitted for \(International Journal of Dynamics and Control\).](#)
- iv. “ Exploring Thermo-Electro-Mechanical Coupling in Bending-Induced Strain Variations of Thermoelectric Generators (TEGs): A Simulation Study” [to be submitted for \(Journal of Materials Science\).](#)

**✚ Conferences and Seminars:**

- i. **Sustainable Energy Materials and Technologies for a Low Carbon Future**, which took place in KAUST, Thuwal, Saudi Arabia.
- ii. **The Third International Nonlinear Dynamics Conference (NODYCON 2023)**, which took place in Sapienza University of Rome, Roma, Italy.

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#### **Research Interest:**

- Nonlinear Dynamics
- Vibrations
- Energy harvesting
- Materials design
- MEMS Sensors and Actuators
- Robotics

#### **Research activities:**

- ✚ **Development of Functional Material with Embedded Fiber-Based Sensors for Tactile Applications.** (Project No.11-ADV2133) ([\*M.Sc. thesis\*](#))
  - Conducted extensive experiments encompassing materials design for both powder-based materials, involving processes like compaction and sintering, and 3D-printed materials.
  - Proficiently employed advanced material characterization techniques, such as Scanning Electron Microscope (SEM), X-Ray Diffraction (XRD), Hardness Testing System, and Metallurgical Optical Microscope.
  - Collaborated as a co-author on multiple research papers.
- ✚ **Dynamic Approaches to Improve the Performance of Energy harvesters for Remote Sensing Applications.** (IRC for Communication and Systems Sensing) ([\*PhD dissertation\*](#))
  - Formulated and constructed the problem statement, detailing the dynamics of a coupled structure, and developed the corresponding mathematical model.
  - Led comprehensive experiments covering aspects such as system design considerations, structural fabrication processes, and materials characterization.
  - Executed experiments, utilizing the outputs to substantiate the real-life applicability of harvesting energy from vibrations.
  - Actively collaborated as a first author on several research papers extracted from the project.
- ✚ **Development of Nickel-Free Duplex Stainless-Steel Alloys through Powder Metallurgy Techniques.** (Project No. IN161009)
  - I contributed to this project as part of a term project for the Tribology course.
  - As the first author, I played a pivotal role in producing a research paper as an outcome of the project.
  - Engaged in extensive experimental work involving materials preparation and characterization, employing techniques such as the Metallurgical Optical Microscope.
  - Conducted comprehensive wearing tests and characterized the wear using a 3D Optical Profilometer and the Metallurgical Optical Microscope.
- ✚ **Development of Thermoelectric Generators on Flexible Substrates for Wearable Systems.** (IRC for Advanced Materials)
  - Played an active role in a collaborative project integral to my PhD dissertation, focusing on energy harvesting systems.
  - Specialized in simulation aspects to enhance project outcomes using COMSOL Multiphysics software.
  - Worked closely with fellow researchers, overseeing, and contributing to the experimental aspects of the project.
  - Collaborated as a co-author on various research papers, including a literature review paper centered on materials for thermal electric generator applications.

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### **Teaching Experience:**

✚ Feb. 2024 – Present: **Assistant Professor (Part time job)**

Palestine Technical University (Kadoorie)

- Machine Element Design 2 ( 12220516 )
- Mechanical Vibrations ( 12210446 )
- Engineering Workshop (12210137 )

✚ Aug. 2014 – May. 2023: **Teaching assistant (Part time job)**

King Fahd University of Petroleum and Minerals (KFUPM)

- Physics Lab ( Phys 101 )
- Manufacturing Processing Lab ( ME 323 )
- Material Science Labs ( ME 205 & ME 217 )
- Mechanics of Robotic Manipulators (ME 443)

✚ Aug. 2014 – May. 2023: **Grader (Part time job)**

King Fahd University of Petroleum and Minerals (KFUPM)

- Machine Design I ( ME 307 )
- Machine Design II ( ME 308 )
- Mechanics of Machines ( ME 309 )
- Systems Dynamics and Control ( ME 413 )
- Advanced Dynamics ( ME 552 )
- Advanced Vibrations (ME 553)

✚ Aug. 2014 – May. 2023: **Learning Support Assistant (Part time job)**

King Fahd University of Petroleum and Minerals (KFUPM)

- Dynamics ( ME 201 )
- Thermodynamics I ( ME 203 )
- Thermodynamics II ( ME 204 )
- Materials Science and Engineering (ME 216 )
- Machine Design I ( ME 307 )
- Machine Design II ( ME 308 )
- Mechanics of Machines ( ME 309 )
- Fluid Mechanics ( ME 311 )
- Heat Transfer ( ME 315 )
- Manufacturing Processes ( ME 322 )
- System Dynamics & Control ( ME 413 )
- Mechanical Vibrations ( ME 482 )

### **Technical Experience:**

✚ **Site Engineer** at Al-Bayader for Electromechanical works (01/2014 - 06/2014) in Dubai / UAE.

- Design and calculate the quantities.
- Following the submittals.
- Follow the site's progress and prepare daily and weekly reports.
- Attend the weekly meeting on the site (Signature 1 Hotels in TECOM, Dubai/ UAE)

✚ **TAB Engineer** at Molden Technical & Consulting Projects Co. W.L.L (01/2013 - 12/2013) in Kuwait / Kuwait.

- Test, Adjusting, and Balancing the A/C systems.
- Prepare and write the reports for the TAB work.
- Attend the weekly meeting on the site (Environmental Public Authority (EPA) in Shuwaikh Industrial/ Kuwait).

✚ **Maintenance Engineer** at AL FAYED TRDG. & CONT. EST (03/2012 - 12/2012) in Hail/ Saudi Arabia.

- Maintenance Engineer for A/C, firefighting, plumbing.
- Maintenance Engineer for electrical systems.
- Attend the weekly meeting on the site (The headquarters of the Ministry of Islamic Affairs branch in Hail/ Saudi Arabia).

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### Short Courses:

- ✚ Course in **LabView** (02/2015)  
20-hour course provided a solid foundation in LabVIEW programming for science/engineering.
- ✚ Course in **Mechanical Desktop** (10/2011)  
12-hour course in utilizing Mechanical Desktop in 3D drawing.
- ✚ Course in **Electromechanical Control in RHVAC systems** (10/2011 - 11/2011)  
60-hour course in designing and operating RHVAC Systems.
- ✚ Course in **CNC** (06/2011 - 07/2011)  
Using CAD and CAM software applications, CNC lathe and mill programming, setup, and operation.
- ✚ Course in **Catia 2D+3D** (03/2011 - 04/2011)  
60-hour course in 2D and 3D drawing using CATIA.
- ✚ Course in **Pneumatic systems** (02/2011 - 03/2011)  
50-hour course in designing and operating Pneumatic Systems.
- ✚ Course in **Communication Skills** (06/2010 - 08/2010)

### Skills:

- ✚ Computer Skills: Possess advanced proficiency in a range of software, including **Microsoft Office, MATLAB, ANSYS, COMSOL, SOLIDWORKS, MATHEMATICA.**
- ✚ Language Skills:  
**English:** Professional Working Proficiency.      **Arabic:** native speaker.
- ✚ Report Writing: Skilled in preparing well-structured, comprehensive reports.
- ✚ Working Under Pressure: Proven ability to handle high-pressure situations with composure and efficiency.
- ✚ Teamwork: Possess excellent collaboration skills and able to work effectively in team-oriented settings to achieve shared objectives.

### Professional Memberships:

- ✚ Jordanian Engineers Association (JEA) 01/2012 – Present

### Interests:

- ✚ Basketball.
- ✚ Football.
- ✚ Swimming.

### References:

- ✚ Dr. Muhammad Hawwa, Full Professor, Mechanical Engineering Department. King Fahd University of Petroleum and Minerals, [drmafah@kfupm.edu.sa](mailto:drmafah@kfupm.edu.sa) (***Ph.D. Advisor***)
- ✚ Dr. Nizar Jaber, Assistant Professor, Mechanical Engineering Department. King Fahd University of Petroleum and Minerals, [nizar.jaber@kfupm.edu.sa](mailto:nizar.jaber@kfupm.edu.sa) (***Ph.D. Co-Advisor***)
- ✚ Dr. Samir Mekid, Full Professor, Mechanical Engineering Department. King Fahd University of Petroleum and Minerals, [smekid@kfupm.edu.sa](mailto:smekid@kfupm.edu.sa) (***M.Sc. Advisor***)