

## **Maaz Akhtar**

### **Associate Professor**

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## **Professional Objective**

Pursue a challenging career in research and academia, with the intention of serving the society and humanity.

## **Research Interest**

- Mechanics and Mechanics of Materials
- Project Management, Process Optimization, Risk Management
- Finite Element Analysis of Structural problems, Metal Forming, Swelling behavior etc
- Analytical, Numerical and Experimental investigation of Materials such as Polymers, Metals, Bio-Materials, Nano-Materials, Green Nano-Materials etc

## **Educational Background**

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|------------------|--|
| <b>Oct 2014</b>  | Ph.D. in Mechanical Engineering from Mechanical and Industrial Engineering Department, Sultan Qaboos University, Sultanate of Oman<br><b>Thesis:</b> Performance Analysis of Swelling Elastomer Seals used in Petroleum Applications |
| <b>June 2006</b> | Master's in Mechanical Engineering from Mechanical Engineering Department, NED University of Engineering & Technology, Karachi, Pakistan   |
| <b>Feb 2003</b>  | Bachelor's in Mechanical Engineering from Mechanical Engineering Department, NED University of Engineering & Technology, Karachi, Pakistan   |

## **Computational Skills**

- Computer Sciences diploma : One year duration (Programming languages, Databases, IT etc)
- Word editors: Microsoft office (Ms-word, Excel, Ms-project etc)
- Referencing Software: Endnote
- Finite Element Packages : Abaqus, AnSys, Comsol
- Programming Languages : C++, Matlab
- CAD softwares : Autocad, Unigraphics (NX)
- Special Purpose softwares : Adobe Illustrator, Total Quality Management, TORA etc

## Work Experience

- July 2017 to date**      **Associate Professor**, Mechanical Engineering Department, NED University of Engineering & Technology, Karachi, Pakistan
- May 2014 – July 2017**      **Assistant Professor**, Mechanical Engineering Department, NED University of Engineering & Technology, Karachi, Pakistan
- Jan 2010 – Apr 2014**      **Research Assistant**, Applied Mechanics and Applied Materials Research Group, Mechanical and Industrial Engineering Department, Sultan Qaboos University, Sultanate of Oman
- Jun 2006 to Dec 2009**      **Assistant Professor**, Mechanical Engineering Department, NED University of Engineering & Technology, Karachi, Pakistan
- Jan 2003 to May 2006**      **Manager Engineering**, Allied Engineering Corporation, Karachi, Pakistan

## Honours and Scholarships

- NEDAASC Best Publication award for the years 2016 and 2017
- Cumulative GPA of four throughout the Masters of Engineering at Mechanical Engineering Department, NED University of Engineering and Technology.
- Scholarship for Ph.D., Sultan Qaboos University, Sultanate of Oman.

## Funded Research Projects

- Grant from ASHRAE Global (USA) is approved for a project "Small-Sized Parabolic Trough Collector System for Solar De-humidification Application: Design, Development, and Potential Assessment".
- SRGP HEC Funding for Project Title "Fabrication and Electromechanical Characterizations of Stretchable & Bendable Copper Nanoparticle Thin Films using Electrolysis".
- NEDAASC Funding for FYPs Project Title "Synthesis and Optimization of Nano Particles and Green Nano Composites".
- Project Title "Material Characterization of Swelling Elastomer", Duration one year, Project Sponsored by Petroleum Development of Oman
- Project Title "Evaluation of Water-Swelling and Oil-Swelling Elastomers", Duration one year, Project Sponsored by Petroleum Development of Oman
- Project Title "Characterization and Longevity Testing of Swellable Elastomers", Duration two years, Project Sponsored by Petroleum Development of Oman
- Project Title "Mechanical Profile Control", Duration one year, Project Sponsored by Petroleum Development of Oman
- Project Title "Performance of Elastomer Seals in Cased and Open Holes", Duration Six months, Project Sponsored by Petroleum Development of Oman

### **Organizing Conferences**

- Member of organizing team and technical reviewer committee in Eighth International Mechanical Engineering Congress, jointly arranged by Mechanical Engineering Department, NED University of Engineering & Technology and The Institution of Engineers Pakistan held in Karachi, Pakistan in 2018.
- Member of organizing team and technical reviewer committee in Seventh International Mechanical Engineering Congress, jointly arranged by Mechanical Engineering Department, NED University of Engineering & Technology and The Institution of Engineers Pakistan held in Karachi, Pakistan in 2017.
- Conference secretary of Sixth International Mechanical Engineering Congress (SIMEC-2016), jointly arranged by Mechanical Engineering Department, NED University of Engineering & Technology and The Institution of Engineers Pakistan held in Karachi, Pakistan.
- Conference secretary and Member of technical reviewer committee of Fifth International Mechanical Engineering Congress (FIMEC-2015), jointly arranged by Mechanical Engineering Department, NED University of Engineering & Technology and The Institution of Engineers Pakistan held in Karachi, Pakistan.
- Member organising committee of International Conference on Applied Mechanics, Materials and Manufacturing (ICAMMM-2010), arranged by Sultan Qaboos University, Sultanate of Oman held in Muscat, Oman

### **Academic Activities and Achievements**

- Group head of Applied Mechanics and Materials Research Group, in Mechanical Engineering Department, NED University of Engineering and Technology. Motivating other faculty members to conduct research and help them in publishing papers in international conferences and reputed Journals.
- Expert Member Board of Study in Mechanical Engineering Department at Nazeer Hussain University
- Lab In-charge of Material Testing Laboratory in Mechanical Engineering Department.
- Taught several subjects at undergraduate and postgraduate levels including Solid Mechanics, Finite Element Analysis, Advanced Stress analysis etc. with consistent excellent feedback.
- Supervised several final year design projects and Independent research projects for undergraduate and postgraduate student respectively.
- Designed many experiments and prepared workbooks for different courses.
- Revised syllabus and prepared course outline for several undergraduate and postgraduate subjects.
- Member of committees for organising Open Day and Orientation Day in Mechanical Engineering Department.
- Member of Board of Studies, Mechanical Engineering Department.
- Member Curriculum Revision Committee

## Research Collaboration

- Applied Mechanics and Advanced Materials Research Group, Sultan Qaboos University, Sultanate of Oman
- Faculty of Industrial Management, Universiti Malaysia Pahang, Malaysia

## Graduate level Research

| Student Name       | Year        | Research Topic  |
|--------------------|-------------|---|
| Hafiz Zohaib Raza  | In-progress | To improve the mechanical property of rebar steel by heat treatment cycle and chemical composition variation              |
| Barkat Ali         | In-progress | The mediating role of earn value management (EVM) for achieving performance based payment mechanism for projects          |
| Rabiya Jamil       | 2019        | Synthesis of new epoxy based nanocomposite material using unique recipe   |
| Tayyaba Khalid     | 2019        | Design and fabrication of portable automatic micro-bending tester for thin films  |
| Khurram Shahzad    | 2019        | Design and optimization of wear resistance of aluminum alloys   |
| Saeed Jamal        | 2019        | Influence of heat treatment on compressive strength of special aluminum alloys using standard and non-standard geometries |
| Amir Shahzad       | 2019        | Influences of nanofluids on performance of solar parabolic trough collector   |
| Ali Abbas          | 2019        | Developing step-by-step process of implementing project risk management in a developing country                           |
| Imran Lashari      | 2018        | Investigation of different corrosion resistance techniques for steel  |
| Imran Shabbir      | 2018        | Enhancement of mechanical properties of high strength steel using heat treatment processes                                |
| Ali Khawaja        | 2018        | Effect of surface melting on mechanical properties on different metal alloys  |
| Atif Saeed         | 2017        | Mechanical and structural analysis of different magnesium alloys  |
| Sumiya Mohsin      | 2017        | Mathematical modeling of swelling elastomer seals used in petroleum application   |
| Asim Shahzad       | 2016        | To develop a technique for continuous welding using SMAW (Shielded Metal Arc Welding) process                             |
| Fahad Rehman       | 2015        | Experimental analysis of welding non-similar material used in shipbuilding grating plates                                 |
| Ammad Chaudry      | 2015        | Numerical simulation of extrusion process for different aluminium alloys  |
| Muhammad Umer Awan | 2015        | Influence of machining parameters on surface roughness in five axes ball end-milling                                      |

# List of Publications

## INTERNATIONAL JOURNAL PUBLICATIONS

1. Mehdi, M., **Akhtar, M.**, Abro, S., Qamar, Z., Nauman, M. M., Aziz, S., Khan Z., Sufiyan M., Waseem M.B., & Azraf, A. (2019). Electrochemical synthesis of AgNP and mechanical performance of AgNP-EG coatings on soft elastomer. *Journal of Elastomers & Plastics*, 0095244319879973.
2. Muzamil, M., Wu, J., **Akhtar, M.**, Patel, V., Majeed, A., & Yang, J. (2019). Multicomponent enabled MWCNTs-TiO<sub>2</sub> nano-activating flux for controlling the geometrical behavior of modified TIG welding joint process. *Diamond and Related Materials*, 97 (2019) 107442.
3. Muzamil, M., Wu, J., **Akhtar, M.**, Zhang, Z., Majeed, A., & Yang, J. (2019). "Modified TIG Welding Joint Process: An Approach to Improve Microstructure and Fracto-Mechanical Behavior by MWCNTs Inducement in Al-Mg-Si Alloy." *Materials* 12(9), 1441.
4. Mehdi, M., Chandio, A., **Akhtar, M.**, Khan, Z., Zaman, A., & Muhammad, A. (2019). "Silver nano platelet films on soft micro grating surface." *Microelectronics International* 36.1 (2019): 1-7.
5. **Akhtar, M.**, Qamar, S. Z., Mehdi, S. M., & Hussain, A. (2019). "Diffusion-based swelling in elastomers under low-and high-salinity brine." *Journal of Elastomers & Plastics* 51.1 (2019): 75-84.
6. **Akhtar, M.**, Qamar, S. Z., Pervez, T., & Al-Jahwari, F. K. (2018). "Performance evaluation of swelling elastomer seals." *Journal of Petroleum Science and Engineering* 165 (2018): 127-135.
7. **Akhtar, M.**, Qamar, S. Z., Muhammad, M., & Nadeem, A. (2018). "Optimum heat treatment of aluminum alloy used in manufacturing of automotive piston components." *Materials and Manufacturing Processes* 33.16 (2018): 1874-1880.
8. Mehdi, M., **Akhtar, M.**, Hussain, A., Nauman, M., Alothmany, D. S., Ahmed, I., & Choi, K. H. (2018). "Dip coated stretchable and bendable PEDOTPSS films on low modulus micro-bumpy PDMS substrate." *Journal of Polymer Engineering* 38.5 (2018): 469-474.
9. Hussain, A., Mehdi, S. M., **Akhtar, M.**, Ani, F. N., & Ahmed, I. (2018). "Combustion Performance of Diesel Palm Olein Fuel: A Combined CFD and Experimental Approach." *Arabian Journal for Science and Engineering* 43.3 (2018): 1291-1300.
10. Mehdi SM, **Akhtar M**, Qamar SZ, (2017) "Electromechanical response of delaminating polymer thin films on rough elastomeric substrate," *Journal of Elastomers and Plastics*, 49(8), 696-705.
11. Muzamil M, **Akhtar M**, Samiuddin, M, Mehdi SM, (2016) "Effect of Heat Treatment on Impact Resistance of AU5GT and AS7G06 Aluminum Alloys," *Journal of Mechanical Sciences and Technology*, 30(10), 4543~4548
12. Mehdi SM, **Akhtar M**, Hussain A, Alotmany DS, Aziz S, (2016) "CFD study of liquid sodium inside a wavy tube for laminar convectors: Effect of Reynolds number, wave pitch

and wave amplitude,” *Mathematical Problems in Engineering*, DOI: <http://dx.doi.org/10.1155/2016/6146195>

13. Mehdi SM, **Akhtar M**, Hussain A, Alotmany DS, Choi KH. (2016). “Electromechanical response of dip-coated silver films on micro-bumpy polymer surface,” *Arabian Journal for Science and Engineering* 42 (5): 1903-1908 DOI: <http://dx.doi.org/10.1007/s13369-016-2358-1>
14. Qamar SZ, Pervez T, **Akhtar M**, (2016) “Performance evaluation of water-swelling and oil-swelling elastomers,” *Journal of Elastomers & Plastics*, 48(6), 535-545.
15. Qamar SZ, **Akhtar M**, Pervez T, Al-Kharusi MSM (2012) “Mechanical and Structural Behavior of a Swelling Elastomer under Compressive Loading,” *Materials and Design*, 45 (2013), 487–496
16. Qamar SZ, Pervez T, **Akhtar M**, Al-Kharusi MSM (2011) “Design and Manufacture of Swell Packers: Influence of Material Behavior,” *Materials and Manufacturing Processes*, 27 (7), 2012, 727-732
17. **Akhtar M**, Qamar SZ, Pervez T, Khan R, Al-Kharusi MSM (2011) “Elastomer Seals used in Cold Expansion of Petroleum Tubulars: Comparison of Material Models,” *Materials and Manufacturing Processes*, , 27 (7), 715-720
18. Qamar SZ, **Akhtar M**, Pervez T (2015) “Swelling Behavior of Soft and Biological Materials,” *Key Engineering Materials*, Vol 656-657, p 580-585
19. **Akhtar M**, van de Velden M, Al-Houqani SA (2013) “Investigation of Pre- and Post-Swelling Behavior of Elastomeric Material,” *the Journal of Engineering Research (TJER)*, 10(1), p 65-79
20. Soomro MW, **Akhtar M**, Khan R, Altaf S (2013) “Experimental Investigation of Mechanical Properties and Forming Capabilities in Thin Magnesium Sheet at Elevated Temperature,” *Applied Mechanics and Materials*, 315, 527-530
21. Soomro MW, Khan R, **Akhtar M** (2012) “Anisotropy and Forming Characteristics of Magnesium Alloy ZE10,” *Advanced Materials Research*, Vol 488, pp. 295-299

### **INTERNATIONAL CONFERENCE PUBLICATIONS**

1. **Akhtar M**, Saeed A, Mehdi S M (2018) “Mechanical and Structural Comparison of AZ31 and AZ61 Magnesium Alloys Along with Deep Drawing Capabilities”, *Proceeding of International Conference on Sustainable Energy and Green Technology (SEGT-2018)*, 11-14 Dec, Kuala Lumpur, Malaysia. 2018
2. Mehdi SM, **Akhtar M**, Ahmad S, Adeel M, Malik M N (2018) “Finite Element Study of Micro Rough Topologies for Stretchable Thin Films” *Proceedings of Eighth international Mechanical Engineering Congress (IMEC-2018)*, 26-17 Jan, Karachi, Pakistan
3. **Akhtar M**, Qamar SZ, Mehdi SM, Nadeem A (2016) “Mechanics of Swelling in Elastomer with Diffusion in Low and High salinity Brine,” *International Conference on Applied Mechanics and Industrial Systems (ICAMIS-Oman-2016)*, 8-10 Dec 2016, Muscat, Oman

4. **Akhtar M**, Qamar SZ, Muzamil M, Nadeem A, Saifuddin T (2016) “Effect of Heat Treatment on Mechanical and Impact Behavior of AC8H Aluminum Alloy,” International Conference on Applied Mechanics and Industrial Systems (ICAMIS Oman-2016), 8-10 Dec 2016, Muscat, Oman
5. Mehdi SM, **Akhtar M**, Kim SW, Muzamil M (2015) “Numerical investigation of tensile testing for skin like thin Polydimethylsiloxane (PDMS),” Proceedings of Fifth international Mechanical Engineering Congress (FIMEC-2015), 9-10 May, Karachi, Pakistan
6. Qamar SZ, **Akhtar M**, Pervez T (2014) “Effect of Swelling on Mechanical and Structural Properties of Rubberlike and Biological Materials,” International Conference on Machining, Materials, and Mechanical Technologies (IC3MT-2014), 31 Aug – 05 Sept 2014, Taipei, Taiwan
7. **Akhtar M**, Qamar SZ, Pervez T, Al-Jahwari FK (2013) “FEM Simulation of Swelling Elastomer Seals in Downhole Applications,” Paper # IMECE2013-64312, ASME 2013 International Mechanical Engineering Congress and Exposition (IMECE-2013), November 15-21, San Diego, California
8. Al-Kharusi MSM, Qamar SZ, Pervez T, **Akhtar M** (2013) “Elastomer Seal with frictional contact-Analytical Solution,” Paper # IMECE2013-64348, ASME 2013 International Mechanical Engineering Congress and Exposition (IMECE-2013), November 15-21, San Diego, California
9. Qamar SZ, **Akhtar M**, Al-Kharusi MSM (2013) “Effect of Swelling Behavior on Elastomeric Materials: Experimental and Numerical Investigation,” Paper # IMECE2013-64344, ASME 2013 International Mechanical Engineering Congress and Exposition (IMECE-2013), November 15-21, San Diego, California
10. **Akhtar M**, Qamar SZ, Pervez T (2012) “Swelling Elastomer Applications in Oil and Gas Industry,” Paper # TMT12-153, 16th International Research/Expert Conference “Trends in the Development of Machinery and Associated Technology” (TMT-2012), 10-12 September 2012, Dubai, UAE
11. Qamar SZ, Pervez T, Al-Kharusi MSM, **Akhtar M** (2011) “Material Characterization of Water-Swelling and Oil-Swelling Elastomers,” 15th International Research/Expert Conference “Trends in the Development of Machinery and Associated Technology” (TMT 2011), 12-18 September, 2011, Prague, Czech Republic
12. Al-Kharusi MSM, Qamar SZ, Pervez T, **Akhtar M** (2011) “Non-Linear model for evaluation of elastomer seals subjected to differential pressure” Paper # SPE-149032, SPE/DGS Saudia Arabia section technical symposium and exhibition, 15-18 May, Al-Khobar, Saudia Arabia
13. Qamar SZ, Pervez T, **Akhtar M**, Al-Kharusi MSM (2010) “Material Behavior of Water-Swelling and Oil-Swelling Elastomers,” International Conference on Applied Mechanics, Materials and Manufacturing (ICAMMM-2010), 13-15 December 2010, Muscat, Oman
14. **Akhtar M**, Qamar SZ, Pervez T, Khan R, Al-Kharusi MSM (2010) “Hyperelastic Material Models for Swelling Elastomers: Experimental and Numerical Investigation,” International Conference on Applied Mechanics, Materials and Manufacturing (ICAMMM-2010), 13-15 December 2010, Muscat, Oman

## References

- 1) **Dr Sayyad Zahid Qamar** **Ph.D. Supervisor,  
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