Moosa Salim Moosa Al Kharusi

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Objective

To improve my professional skills in educational institution and to use what I have achieved in my academic live to the benefit of the society, country, and worldwide. Also, my objective is to have the opportunity of working in different conditions.

Personal Information

- Nationality : OMANI
- Date and Place of Birth : 10 / 1 /1986 (Muscat – Oman)

Education

- **Doctor of Philosophy in Mechanical Engineering (Applied Nano-mechanics of polymer composite material)**
  2012 – Nov. 2017, Sultan Qaboos University Oman;
- **Master of Science in Mechanical Engineering (Applied mechanics)** 2010 - Jan 2012, Sultan Qaboos University Oman; **CGPA: 3.55 (Scale 4.0).**
- **Bachelor of Science in Mechanical Engineering**
  2004 - June 2009 Sultan Qaboos University Oman; **CGPA: 3.25 (Scale 4.0).**
- **Secondary School Certificate**
  2001-2004: Sutal Secondary School Oman, Alawabi; **90.7%** (Science Discipline).

Ph.D Thesis

- **Effective Mechanical Properties of Carbon Nanotubes Based Nano-composites using Computational Mechanics Approach;** supervisors: Prof. Tasneem Pervez and Dr. Khalid Al-Zebdeh.

Carbon nanotubes (CNT) possess novel properties that make them potentially useful in many applications, which take full advantage of its unique properties of aspect ratio, mechanical strength, electrical and thermal conductivity. However, the properties and characteristics of CNTs and CNT based nano-composites are still being researched heavily to explore the potential of these emerging composites. This research work is aimed to **characterize and simulate** the mechanical behavior of a single graphene sheet, a single wall carbon nanotube (SWCNT), a single wall carbon nanotube embedded in a polymer at nano-level, and scaling it up to micro-level to obtain a realistic estimation of mechanical properties of SWCNT based nanocomposites.

MSc. Thesis

- **Modeling, Simulation, and Testing of Water-Swelling and Oil-Swelling Elastomers;** supervisors: Dr. Sayyad Zahid Qamar and Prof. Tasneem Pervez. The main aim of the project is performance evaluation of swelling elastomer seals used in oil well applications under different field conditions. The failure of these swell packers can lead to significant losses in terms of time and money. Performance evaluation of swelling-elastomer packers and other sealing elements prior to being put to use is therefore critically important. A series of experiments have been done on this type of elastomer in order to determine the actual mechanical properties and swelling behavior of the swelling elastomer. Theoretical investigation with numerical simulation of the elastomer seal is carried out in this project using the actual material properties for different swelling rate.

BSc. Final Year Project

- **Optimum Design of Cone and Launcher System for Solid Expandable Tubular in Well Drilling Applications;** (2009)**;** supervisor Prof. Tasneem Pervez.
  The main idea of this project is to expand the diameter of a tubular by pushing or pulling a mandrel through it. This industry breakthrough meets urgent challenges posed by drilling in high-pressure zones, deepwater environments and troublesome subsalt plays. Its innovative characteristics allow operators to successfully drill reservoirs that until now could not be reached economically with other technology. So, the objective of this project is to come up with a simpler design and do the analysis to check whether our proposed design is workable or not.

Journal Papers

1. Akhtar M, Qamar SZ, Mehdi M, Pervez T, **Al-Kharusi M** (2022) *"Novel Method for Determination of Polymer-Solvent Interaction Parameter using Mechanical Properties,"* accepted (08-Feb-2022); Arabian Journal for Science and Engineering
2. Masud, M.; **Kharusi, M.S.M.A.;** Ali, M.U.; Mubashar, A.; Hussain, S.J.; Tariq, A.; Rehman, G.U.; Akhtar, M.H.; Javeed, S. (2021) *"Prediction of the Ultimate Strength of Notched and Unnotched IM7/977-3 Laminated Composites Using a Micromechanics Approach."* Polymers, 13, 3491. https://doi.org/10.3390/polym13203491
3. Pervez T, Qamar SZ, Akhtar M, **Al Kharusi, M. S. M.** (2021) "*Design and Construction of Test Facility for Evaluation of Swell Packers in Cased and Open Holes*," published online 07-Sept-2021, Journal of Petroleum Exploration and Production Technology; IF 2.077
4. Qamar, S. Z., Pervez, T., Akhtar, M., **Al Kharusi, M. S. M.** (2021). "*Long-Term Performance Assessment of Swell Packers Under Different Oilfield Conditions*." ASME. J. Energy Resour. Technol. June 2021; 143(6): 063006. https://doi.org/10.1115/1.4050485
5. **M. S. M. Al-Kharusi**, K. Alzebdeh, and T. Pervez (2016), "*An Atomistic-Based Continuum Modeling for Evaluation of Effective Elastic Properties of Single-Walled Carbon Nanotubes*," Journal of Nanomaterials, vol. 2016, Article ID 8641954, 13 pages, 2016. doi:10.1155/2016/8641954
6. S.Z. Qamar, M. Akhtar, T. Pervez, **M.S.M. Al-Kharusi** (2013), *"Mechanical and structural behavior of a swelling elastomer under compressive loading"*, Materials and Design, 45, pp. 487496.
7. M. Akhtar, S. Z. Qamar, T. Pervez, R. Khan, **M.S.M. Al-Kharusi** (2012), "*Elastomer Seals in Cold Expansion of Petroleum Tubulars: Comparison of Material Models*," Materials and Manufacturing Processes, Vol. 27, Iss. 7.
8. S. Z. Qamar, T. Pervez, M. Akhtar, **M.S.M. Al-Kharusi** (2012), "*Design and Manufacture of Swell Packers: Influence of Material Behavior*," Materials and Manufacturing Processes, Vol. 27, Iss. 7.

Conference papers

1. **M.S.M. Al-Kharusi**, T. Pervez, K. Alzebdeh (2018) *"Evaluation of Young's Modulus of Single Walled Carbon Nanotube using Finite Element Analysis Technique"*, TCMC International Conference on Materials Science and Graphene Technology 2018, Dubai UAE, April 9-11, 2018.
2. **M.S.M. Al-Kharusi**, T. Pervez, K. Alzebdeh (2017) *"Effective Mechanical Properties of Nanoscale Representative Volume Element of CNT-based Nanocomposites"*, EDAS 2017, 11th International Conference on Composite Science and Technology, American University of Sharjah, April 2017.
3. **M.S.M. Al-Kharusi**, T. Pervez, K. Alzebdeh (2014) *"Effect of Chirality and Geometry on the Young's Modulus of Graphene Structure Using Spring Based Finite Element Approach"*, ASME

2014 International Mechanical Engineering Congress and Exposition, The Palais Des Congres, Montreal, Canada, November 14–20, Paper No.: IMECE2014-37972.

4. **M.S.M. Al-Kharusi**, S.Z. Qamar, T. Pervez, M. Akhtar (2013) *"Elastomer Seal With Frictional Contact: Analytical Solution"*, ASME 2013 International Mechanical Engineering Congress and Exposition, San Diego, California, USA, November 15–21, Vol: 9.
5. S.Z. Qamar, M. Akhtar, **M.S.M. Al-Kharusi** (2013) *"Effect of Swelling Behavior on Elastomeric Materials: Experimental and Numerical Investigation"*, ASME 2013 International Mechanical Engineering Congress and Exposition, San Diego, California, USA, November 15–21, Vol: 9.
6. S.Z. Qamar, T. Pervez, **M.S.M. Al-Kharusi**, M. Akhtar (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.
7. **M.S.M Al-Kharusi**, S.Z. Qamar, T. Pervez, M. Akhtar (2011) "*Non-Linear Stress Evaluation of Swelling Elastomer Seals Sheared by Pressure at both Ends,*" Annual Technical Symposium and Exhibition of the SPE (ATS&E), May 15-18, 2011 AlKhobar, Saudi Arabia, paper no.: 149032-MS.
8. S.Z. Qamar, T. Pervez, M. Akhtar, **M.S.M. Al-Kharusi** (2010) "*Material Behavior of Water-Swelling and Oil-Swelling Elastomers,*" International Conference on Applied Mechanics, Materials and Manufacturing (ICAMMM 2010), 13-15 December 2010, Mascut, Oman.
9. M. Akhtar, S.Z. Qamar, T. Pervez, R. Khan, **M.S.M. Al-Kharusi** (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, Mascut, Oman.

Work Experience

1. **September-2020 – Now:** Assistance Professor in Mechanical and Industrial Engineering Department, College of Engineering, Sultan Qaboos University, Muscat, Oman.
2. **December-2016 – 2020:** Mechanical Engineering and Vehicle Technology Department in the Global College of Engineering and Technology (GCET), in partnership with University of the West of England (UWE), Bristol, UK**.** The partnership is on franchised base.
   - **May-2018 – 2020: Head of Department and Senior lecturer**
     - **Participating in developing of New undergraduate and postgraduate programs (i.e. Energy Engineering and Master's in Engineering Programme).**
   - **December-2016 to April, 2018: Senior lecturer**
     - **Teaching different courses:**

1. Mechanics of Materials
2. Computational Methods (**Application of Finite Element Analysis and Computational Fluid Dynamics (CFD)**) using ANSYS software.
3. Engineering Mathematics 4. Energy and Thermodynamics.
5. Fluid Mechanics.
6. Basic Mechanics (Statics and Dynamics).
7. Solid Mechanics.
8. Engineering Experimentations.
9. Professional and Academic Skills.
10. **September 2015, External co-supervisor of MSc student,** Hafiza Sumiya Mohsin, Thesis title "*Mathematical Modeling of Swelling Elastomer Seal used in Petroleum Applications*", NED University of Engineering and Technology, Pakistan
11. **February 2012 – 2016, Teaching Assistance in different courses during PhD study:**
12. Application of Finite Element Analysis with ANSYS software
13. Applied Computational Methods
14. Computational Mechanics of Advance Material
15. **September 2009 – 2016, Research Assistance in Advance Mechanics and Advanced Materials Research Group (SQU):**
16. Continuous testing of different types swelling elastomers used for oil wells applications in different conditions (temp., salinities, etc.).
17. Develop analytical model that can be used by field engineer to predict the performance of elastomer seals under certain well conditions.
18. Effective mechanical properties of CNTs based composites using computational mechanics approach.
19. **June – August 2008, Training in Aerospace Department. at University of Glasgow (UK):**

- ✦ Design Project of New Test Section and New Diffuser in the Wind Tunnel of the department workshop.

20. **January 2007, First Industrial Training at Sultan Qaboos University (SQU):**

- ✦ Training in Safety (2 Weeks)
- ✦ Attended fire safety in the home lecture in the Fire Safety Engineering College (Oman)

Continuing Education

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21. **November 2018 to March, 2019,** Post Graduate Certificate in Academic Practice (PCAP), University of the West of England (UWE), Bristol, UK.

PCAP is a professional development programme which aims to promote the development of high-quality professional practice in higher education.

22. **December-2017 to March-2018;** Industrial Innovation Specialists Training Program, Industrial Innovation Centre (IIC), Oman.

    The training is an intensive program of study and practical implementation of the methods of Systematic Innovation, a proven, structured method by which companies can achieve incremental and/or breakthroughs innovations in: products, processes, services, new markets, business models and so on. The center is under the umbrella of the Ministry of Commerce and Industry as well as Public Establishment for Industrial Estates (PEIE).

23. **July-2014;** Structure and Multiscale Mechanics of Carbon Nanomaterials, International Center for Mechanical Science, Udine, Italy.

    The course gives a broad overview on the relationship between structure and mechanical properties of carbon nanomaterials from world-leading scientists in the field. The main goal was to get an in-depth understanding of the exceptional broad range of mechanical properties of carbon materials based on their unique nanostructure of several types of carbon nanomaterials and at different length scales.

24. **June-2014;** EBSD Applications training, **Oxford Instrument**, High Wycombe, United Kingdom.

    The main objective of this course was to understand the capabilities and limitations of the EBSD technique, use the hardware and software components of the system, set up samples in the **Scanning Electronic Microscope** (SEM) and suitable acquisition and processing and explore some of the more advanced capabilities of the system.

25. **June 2014;** AZtech Energy Applications, **Oxford Instrument**, High Wycombe, United Kingdom.

    The main objective of this course was to perform EDS analysis using the AZtecEnergy system, set up appropriate analysis SEM and ED operating conditions, acquire spectra and correctly identify the elements, process spectra into quantitative analysis, acquire and process electron image, maps and linescans, store, recall, export and report data, write standard operating procedures, create tailored profiles for specific tasks and monitor and maintain system performance.

26. **June 2014;** INCA Wave Applications, **Oxford Instrument**, High Wycombe, United Kingdom.

    The main objective of this course was to get some basic experience of using the INCA software, set up appropriate imaging conditions for effective image detection, acquire X-ray data for features, set up single and multiple fields for analysis, set up and edit classification schemes and store, reprocess and report INCAEnergy or INCAFeature data.

Research Projects

- **Supervisory of more than 22 Final Year Projects in different areas, for example;**
- Modelling and Simulation of Cathodic Protection for CRA and CS Material
- Design and Study the Failures for Expansion Bellow in Mechanical Vapor Compressor (water plant)
- Turbocharger Performance Diagnostics and Failure Analysis
- Analysis and Fabrication of 3D printed CNC Machine
- Study, Design and analysis of Double Pipe Heat Exchanger
- Design and simulation of water treatment
- Work as Research Assistant for the following research project
- **Mono-diameter Expandable Solution**; PDO sponsored (2010); PI: Prof. Tasneem Pervez.
- **Characterization and Longevity Testing of Swellable Elastomers**; PDO sponsored (2009); PI: Dr. Sayyad Zahid Qamar.
- **Characterization and Analysis of Elastomer Seals used in Oilwell Applications**; Internal Grant sponsored (2009); PI: Dr. Sayyad Zahid Qamar.
- **Material Characterization of expandable and elastomer**; PDO sponsored (2008); PI: Prof. Tasneem Pervez.
- **Analytical investigation of seal performance used for oil well application;** (2009); (develop a model that describes the seal performance in term of pressure distribution along the seal length for different boundary conditions); supervisor Dr. Sayyad Zahid Qamar.
- **Polymeric Self-healing material (the future industrial material);** (2010); (overview about recent development in this area); supervisor Dr. Tasneem Pervez.
- **Family House Project;** (2007); supervisor Mr. Issam Al Bahdour.
- **Head loss of the water in pipe;** (2007)**;** supervisor Dr. Nabil Al Rawahi.

Innovations

- **Development of New Nano-Representative Volume Element for CNT-based nanocomposite using Finite Element Methods;** (2015).
- **Development of Non-linear Model of Elastomer Seals used for Oil well Applications;** (2011).
- **Design of Cone and Launcher System for Solid Expandable Tubular in Well Drilling;** (2009).

- **Design Flapping Wings Aircraft;** (2008).
- **Development of a Selection Design Program for Bearings**; (2007).

Awards and recognition

- April 2012, **PhD Scholarship in Mechanical Engineering, Sultan Qaboos University, Sultanate of Oman**
- September 2009, **Master of Science Scholarship in Mechanical Engineering, Sultan Qaboos University, Sultanate of Oman**
- September 2010, **2nd prize, SPE international Student Competition, Italy.**
- June 2010, **1st prize, SPE Middle East Student Competition, Oman.**
- June 2009, **2nd prize; Design Competition in MIE Department, College of Engineering, SQU.**

Language Skills

- **Arabic** – mother tongue
- **English** – fluent (writing, reading, speaking)

Computer Skills

- Microsoft office package: **Word, Excel and Power point.**
- Drawing Programs : **AutoCAD, Solidworks , ADMS, MathCAD**
- Finite Element programs: **ANSYS, ABAQUS, ALGOR**
- Engineering Programs: **MATLAB, TKSolver, C++, MINITAB, MAPLE**

Memberships

- Sep. 2009 - Now, **Member, Applied Mechanics and Advanced Materials Research Group (AM²RG), SQU, Oman.**
- Dec. 2014 – Dec. 2015, **Member, American Society of Mechanical Engineering (ASME), USA.**
- May 2009-May 2010, **Member, Society of Automotive Engineering (SAE), USA**.
- Sep. 2006, **Member, Mechanical Engineering Society (SME), SQU.**

Other Activities

- February 2008, **Organizer, designing a Mechanical Floating Device Competition, organized by Society of Mechanical Engineering, SQU**. (More than 40 groups participated in this competition).
- February 2007, **Participated in Innovative Engineer workshop, SQU.**
- Sep/2007-Feb/2008, **Participated in Self-development workshop at SQU.**
- 2007, **Participated in Designing Car that can moved using potential energy**.

References

1. **Prof. Tasneem Pervez;** Professor in Mechanical and Industrial Department, College of Engineering, Sultan Qaboos University

   E-mail: tasneem@squ.edu.om; **Mobile number:** +968 99701042
2. **Dr. Rohitha Weerasinghe**, former deputy dean in Global College of Engineering and Technology,

   E-mail: Rohitha.Weerasinghe@uwe.ac.uk **Tel:** + 44 (0)117 32 87137
3. **Dr. Farooq Khalfan Saif Al Jahwari;** Assistance Professor in Mechanical and Industrial Department, College of Engineering, Sultan Qaboos University

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4. **Dr. Omar Said Awadh Al Abri;** The Research Council, Sultanate of Oman

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