Abdusalam Imhmed K Al Khwaji

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Link to Web of Science	:	https://www.webofscience.com/wos/author/record/ABE-6624-2020
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State Citizenship	:	Libyan



Summary

Research activities include developing computer programming for modeling and simulating engineering problems (Finite Differences, Finite Elements, Finite Volumes Methods, and Molecular Dynamics), building basic industrial robotic arms using Arduino-microcontrollers, measurement & instrumentation of thermofluid systems, building basic drones for thermal environment monitoring, simulation and modeling of Nanofluids using Lammps & Ansys, building visual interactive systems using Visual Basic.
Teaching activities for undergraduate and graduate levels: examples of the achieved courses: Heat & Mass transfer, Convection Heat Transfer, Radiation Heat Transfer, Fluid Mechanics, Thermodynamics, Computational Heat Transfer & Fluid Dynamics, Finite Element, Finite Volume, Finite Differences, Thermal Measurements, Bioheat & Biofluid, Mathematical Modeling, Parameter estimation, Vibration, Introduction to industrial robotics, Physics, calculus, control systems
Numerical Methods.

Skill Areas

- MATLAB, Mathematica, C, C++, and Python and other programming languages.
- Control systems using Arduino Microcontroller.
- Data acquisition & instrumentation
- Languages – Arabic, English, and German
- Parameter estimations (Levenberg-Marquardt, Genetic Algorithm, etc.)
- Molecular Dynamics Simulation softwares: Lammps, Moltemplate, Packmol, Avogadro, etc.
- Computational Fluid Dynamics and Heat Transfer Simulation Software: Ansys
- Mathematical modeling and simulation (Finite difference, finite element and finite volume methods)
- Nano-scale fluid & heat transfer simulation using Molecular Dynamics techniques (Lammps)

Experience

Mechanical Engineering Department, Omar Almukthar University, El-Beide, Liby

- (**Assistant**) - From September 1998 until November 2001**. Activities include teaching** Matlab-programming, and calculus courses. (After that, I got a Libyan-s**cholarship** to study Master on Mechanical Engineering from 2002 until 2006, Germany)
- (**Assistant Instructor**) – From March 2007 until March 2008**. Activities,** teaching undergraduate C programming and power plant courses. (after that, I received a Government scholarship for a PhD on Mechanical Engineering from May-2008 until May-2013, USA)
- (Instructor) – From Feb 2014 until June 2014. Working as an instructor.

Graduate student experiences, Virginia Tech, - Blacksburg, VA, USA

- (**Graduate Student**) – During Spring 2011 Semester, I taught undergraduate heat & mass transfer course.
- (**Graduate Student**) – During Fall 2012 Semester, I co-supervised senior radiation heat transfer design project.
- (**Graduate Student**) – I was a Delegate to GSA for Mechanical Engineering Department.
- (**Graduate Student**) – During Spring 2013 Semester, I co-supervised senior project about estimating perfusion using infrared sensors.
- (**Graduate Student**) – During Spring 2013 Semester, I got graduate teaching assistant position to teach heat and mass transfer course.

Computational and experimental heat transfer, Virginia Tech, Blacksburg, VA, USA

- Mathematical modeling using analytical and numerical techniques (CFD).
- Instrumentation experience - Fabrication of thermocouples and heat flux sensors.
- Statistical analysis of measurements in thermo-fluid area.
- Modeling thermofluid systems (Example: characterizing burn severity using thermal measurements).

Postdoc experiences, Virginia Tech, - Blacksburg, VA, USA

- (**Instructor**) – During Summer 2013 Semester, I taught dynamic systems – vibrations course
- (**Researcher & Instructor**) – During Fall 2013 Semester, I worked in a project to design supplemental Heat transfer experiments for use in the heat & mass transfer classroom.

Research and teaching experiences, ALasmarya Islamic University, College of Engineering, Zliten, Libya

- **(Instructor)** – from February 2014 to February 18, 2017. I taught a variety of undergraduate courses including Calculus, Numerical Methods, Programming, Thermodynamics, Fluid Mechanics, Control Systems, Finite Elements, and Measurement & Instrumentation, and also, I co-supervised several undergraduate research projects during this period.
- (**Assistant Professor**) – From February 2017 to February 20, 2021, I taught graduate and undergraduate courses; such as, Advanced Heat & Mass Transfer, Control System, Mechanical Measurements and Instrumentation, C & MATLAB Programming languages, and finite element method. I have also co-supervised undergraduate and graduate researchers.
- Head of Mechanical Engineering Department of Alasmarya Islamic University– From Jan 2015 to Oct. 2018.
- **(Sabbatical leave)** – From Oct. 2018 to June 2019 – I conducted Research work in the field of Nano-heat transfer using Lammps and Moltemplate, USM, Penang, Malaysia.
- (**Associate Professor**) – From 20 Feb. 2021 to Feb. 2025, teaching and research activities, teaching undergraduate courses: Numerical Methods, Introduction to industrial robotics, Fluid Mechanics, during this period, I supervised undergraduate research (Developing Wearable robot).
- Owning Alasmarya Islamic University Excellence Award for publishing Scientific Research on recognized journal, 2021.
- Head of Research and Consulting Department of Engineering College, Dec. 2021 - Oct. 2022
- Owning Alasmarya Islamic University Excellence Award for publishing Scientific Research on recognized journal, 2022.
- **(Sabbatical leave)** – From Oct. 2022 – June 2023 – Research work in Molecular Dynamics Simulation and Tool life estimation (Parameter Estimation)
- Excellence Award in Scientific Research 2023 for the best H-index in ME department from Alasmarya Islamic University
- Head of Research and Consulting Department of Engineering College– From June 2023 - till date
- (**Professor**) – From 20 Feb. 2025 to date – teaching activities include industrial robotics and Industrial measurements, and supervising both undergraduate and graduate researchers.

Education

- **PhD** - Virginia Tech, Blacksburg, VA, USA, Mechanical Engineering Department, September 2009 – May 2013 - Majoring in heat transfer, with an option from the Biomedical Engineering Department. Dissertation title "*Computational and Experimental Modeling of the Bioheat Transfer Process of Perfusion in Tissue Applied to Burn Wounds*", The overall **GPA** is **3.63**, Graduation date**: May 17th, 2013**
- **M.Sc.** – Technical University of Braunschweig, Niedersachsen, Germany, Mechanical Engineering Department, 2002 – 2006 - CSE "**Computational Sciences in Engineering**". Dissertation title "*System simulation of a solar thermal and photovoltaic system for heat and power supply for a single-family house in*

Majorca (Including hot water and air conditioning"

- **B.Sc.** – Omar Almukthar University, El-Beide, Libya, Mechanical Engineering Department, 1991 – 1996 – B.Sc. "B"

Publication

Journal publications

- Abdusalam Alkhwaji, Brian Vick, Tom Diller, "New mathematical model to estimate tissue blood perfusion, thermal contact resistance and core temperature," ***Journal of Biomechanical Engineering***, Vol.134, 2012, 081004, pp. 1-8.

- Alkhwaji A, Vick B, Diller T. Estimating burn depth from thermal measurements. Biomedical Sciences Instrumentation 2012; 48:12-9. PMID: 22846259.

- Abdusalam Alkhwaji, Brian Vick, Tom Diller, "Modeling and Estimating Simulated Burn Depth Using the Perfusion and Thermal Resistance Probe,"***Journal of Medical Device,*** Vol.7, September 2013, 031003, pp. 1-9.

- Abdusalam Alkhwaji, Tom Diller, "Monitoring and Quantifying Burn Wounds on Pig Skin using Thermal Measurements, **"The International Journal of Engineering and Information Technology (IJEIT),** Vol.3, NO. 1, December 2016, ISSN 2410-4256, pp. 5-12.

- Abdusalam Alkhwaji, "Switch Search Direction Algorithm versus GN and LM Parameter Estimation Algorithms in Modeling Inverse Heat Transfer Problem, **"AL Asmarya Islamic University Journal of Basic and Applied Sciences,** Vol.1, July 2016, pp. 53-68.

- Abdusalam Alkhwaji, "Design of an Automated Parking Lot Management System and Effect of Ambient Temperature Changes, **"International Science & Technology Journal,** Vol.9, January 2017, pp. 1-13.

- Abdusalam Alkhwaji, "Modeling Convective Cooling Applied to Perfused and Non-perfused Layers using Thermal Measurements (With and Without Thermal Capacitance Effects), **"Journal of Humanities and Applied Science (JHAS),** Vol.28-2, March 2017, pp. 135-157.

- Abdusalam I. Al-khwaji1, Abdusalam M. Sharf, Abdallah O. Hawal, Saleh N. Ben Najim "Controlling Mechanical Processes in a Modern House (Smart House), "**AL Asmarya Islamic University Journal of Basic and Applied Sciences**, Vol.2, December 2016, pp. 118-129.

- Abdusalam Alkhwaji, Salem Elbahloul, Khairil Fadzli Bin Abu Bakar, Mohd Zulkifly Abdullah, "The Comparison Between Water Models In Predicting Water Thermal And Dynamic Properties From Molecular Dynamics ", **International Journal of Scientific & Technology Research**, Volume 9, Issue 08, August 2020.

- Abdusalam Alkhwaji, Salem Elbahloul, Khairil Fadzli Bin Abu Bakar, Mohd Zulkifly Abdullah, "Selected water thermal properties from molecular dynamics for engineering purposes", Journal of Molecular Liquids, Nov. 2020, DOI: 10.1016/j.molliq.2020.114703

- Abdusalam Alkhwaji, Muamar M Ben Isa, Hitem A Aswihli, "Experimental investigation of cutting parameters effect on surface roughness during wet and dry turning of low carbon steel material", Journal of Academic Research (Applied Sciences), 2021.

- Influence of Nanoparticles on Thermophysical Properties of Hybrid Nanofluids of Different Volume Fractions, Mohd Zulkifly A., K. H. Yu, H. Yuan Loh, R. K., P. G., Abdusalam Alkhwaji, Nanomaterials 12 (15), 1-13, August 2022

- Alkhwaji, A. I. K. (2023). Estimation of the Thermal Conductivity of H2O-Cu Nanofluid from Molecular Dynamics Simulation. Journal of engineering research and applied sciences (JERAS), 11th Edition –2023, (Hoon – Libya), ISSN 2414-6515, https://ceh.edu.ly/JERAS/index.php/j/article/view/25

- Alkhwaji, A. I., Muamar M. BenIsa, & Hitem A. Aswihli. (2024). Estimating tool life from measurements during longitudinal turning process using linear least squares. Journal of Pure & Applied Sciences, 23(1), 1–7. https://doi.org/10.51984/jopas.v23i1.2888

- Muamar M. BenIsa, Abdusalam Imhmed K. Al Khwaji, & Mustafa O. Hakoumah. (2024). Proposed Machine Learning Model Using Levenberg-Marquardt Algorithm to Predict the Remaining Useful Life of cutting tools by monitoring sound or temperature measurements. African Journal of Advanced Pure and Applied Sciences (AJAPAS), 3(1), 99–110. Retrieved from https://www.aaasjournals.com/index.php/ajapas/article/view/702

- Abdusalam Alkhwaji, "Mechanical Measurements and Instrumentations,", ***Book, in press***, October 2025.

Conferences proceedings

- Paper conference, "Detecting burn severity and the associated inflammation responses using thermal measurements in living tissue – Modeling and experimental approaches", The 12th Annual Graduate student research symposium, May 16th, 2013

- Abstract and poster, "Thermal measurements for quantifying burn severity in living tissue", the Annual Meeting of the Biomedical Engineering Society, October 24-27, 2012, Atlanta, USA

- Paper conference, "Estimating Burn Depth from Thermal Measurements", Rocky Mountain Bioengineering Symposium 2012 - Conference paper.

- Paper conference, "Implementing New Mathematical Model to Estimate the Blood Perfusion in Tissue and Contact Resistance at the Surface of Tissue", The 10th Annual Graduate Student Research Symposium, May 12th, 2011 – Conference paper.

- Poster conference, "Smart House Using Arduino", Arduino International Day Conference in Misurata/Libya, March 2nd, 2016 – Conference poster.

- Abdusalam Alkhwaji, Salem Elbahloul, Mohumed S. Farhat, "Lammps as Nano-scale Lab to Estimate Fluid Thermal Properties from Molecular Dynamics ", The 3rd Conference of Engineering Sciences & Technology 3rd CEST 2020, Elmergib University in December 1-3, 2020

- Abdusalam Alkhwaji, Ali Shrif, Abdusalam Sharf, Mohd Zulkifly A., Computational Analysis of Water/Cu nanofluid Dynamic Viscosity using Molecular Dynamic Simulations, the 4th conference for engineering sciences and technology (CEST-2021), Alasmarya Islamic University, 14-16 December 2021 /Zliten – Libya.