

INVITATION TO SEMINAR

Research Approach and Graduate Studies in USA Universities

Amphitheater ENSA Khouribga
Tuesday June 13 at 11:30-13:00



Dr. Muthanna Al-Dahhan

University of Missouri System Curators' Distinguished Professor of Chemical and Biochemical Engineering and of Nuclear Engineering and Radiation Science
(Missouri S&T)

Biography

Dr. Muthanna Al-Dahhan is the University of Missouri System Curators' Distinguished Professor of Chemical and Biochemical Engineering and of Nuclear Engineering at the Missouri Univ. of Science and Technology (Missouri S&T) (The Highest Academic Rank in University of Missouri System), and the Wayne and Gayle Laufer Endowed Chair in Energy. He is the former chair of the Department of Chemical and Biochemical Engineering (January 2009 – June 2019), an AIChE Fellow, and ABET Program Evaluator. He was Visiting Professor on Sabbatical (June 2021 -September 2022) and currently Affiliated Professor at the Mohammed VI Polytechnic University (UM6P), TechCell, Morocco. He has been an expert/advisor to the International Atomic Energy Agency (IAEA) and was UNESCO expert on quality assurance of engineering and science education from 2010-2016.

He has developed state-of-the-art Multiphase Flows and Reactors Engineering and Education Laboratory (**mFREEL**), which is unique in the USA and the world and can be considered a global resource. He obtained over \$15 million in external funding as PI and Co-PI. He has been listed in 2019 and beyond among the 2% of scientists in the world highly cited by Stanford University Study. His research activities include more than 262 papers in peer-reviewed journals, 80 papers in reviewed proceedings, 59 plenary and keynote lectures, 168 invited talks, over 500 national and international conference presentations, and contributed to 3 key chapters, one patent, and about 10 Ips initiating applications. As of June 2023, he has an h-index of 55 and 12035 citations (google scholar), 47 and 8308 citations (Scopus), and an i10 index of 182.

He has graduated over 50 PhD and 35 MS students and supervised many post-doc fellows, research associates, visiting faculty members, and undergraduate students on a wide range of research topics. All his students and co-workers are holding leading positions in industry and academia in the United States and around the world.

Prior to Missouri S&T he was Assistant Professor, Associate Professor, and Professor at Washington University in St. Louis (1994-2008), Associate Director of the Chemical Reaction Engineering Laboratory (CREL) (1994-2008), Project Manager at Xytel Corporation, USA (1993/1994), Head of process, process engineer and project engineer in pilot plants – Baghdad - Iraq (1979-1985). He holds three degrees in chemical engineering (BSc in 1979, University of Baghdad-Iraq; Master of Science degree in 1988, Oregon State University, Oregon, USA, and Doctoral of Science degree in 1993, Washington University in St. Louis, Missouri, USA). He directed from 1999-2008 industry-academia consortium on gas conversion to alternative clean fuels/chemicals using slurry bubble columns supported by USA and international companies (Eni, Italy, Sasol, South Africa, Statoil, Norway, ConocoPhillips (Phillips 66), USA, Air Products and Chemicals (USA), Johnson Matthey Catalysts (UK)).

Professor Al-Dahhan has received many awards and recognitions nationally and internationally and his graduate and undergraduate students received many awards and recognitions for the work done under his supervision. He founded and chaired several national and international conferences and technical sessions. He has been a consultant to CRDF, IREX, US Department of State /Sandia National Laboratory, and many companies and research organizations in USA and from around the world, such as the Kuwait Institute for Scientific Research (KISR). Dr. Al-Dahhan has established extensive collaboration in the USA and around the world with academia, industry, and research centers.

Abstract

The focuses of USA universities and colleges vary from university to university and therefore, the opportunities and funding levels and availability for MS and PhD degrees studies also differ among USA universities. This makes the model of undergraduate and graduate education in USA and North America in general distinctive despite whatever limitations, if any.

In this lecture, the research approach, funding methods, topics to be funded, funding agencies, and the role of faculty members in funding and in supervising graduate students will be outlined. These affect and determine the MS and PhD programs in USA universities that vary among universities.

Research funding in USA universities gives great opportunities to students to pursue their PhD degree with fully financially support provided by the research funding. These opportunities, the requirements for admitting graduate students in USA universities, the structure of graduate study programs, the role of graduate students in the funded projects and their training and development in USA, duration of studies, opportunities for the employment/finding jobs in USA after the graduation, and others will be stated and discussed in this lecture.

Research Interests

Professor Al-Dahhan's cutting-edge research expertise is concentrated on multiscale experimentation, modeling, and computing of multiphase reactors and multiphase flow engineering and applications that integrates hydrodynamics, and heat and mass transfer (transport phenomena) and reactions in addressing and advancing numerous topics, industrial processes, and emerging subjects and technologies related to chemical and petroleum industries, clean and alternative energy and chemicals, bioenergy, thermal hydraulics of the 4th generation, small modular and current nuclear reactors and their nuclear fuels, environmental applications, nanofluids for enhanced heat and mass transfer, and wastewater, groundwater, water and solvent treatment and reuse.

This fully integrated research approach has been enhanced and enabled by developing:

- Advanced and state-of-the-art measurement techniques that are integrated in novel ways into the research and experimental framework and can be utilized in harsh industrial environment and severe conditions to significantly advance the understanding of the engineering science, knowledge, fundamentals, modeling, design, scale-up, scale-down, performance and computational fluid dynamics (CFD) validation of various multiphase reactors, flow and processes.
- Sophisticated experimental set-ups ranging from separate effect and laboratory to pilot plant scale experiments and rigs.
- Several levels of multiscale modeling, phenomenological models, neural network and mechanistic correlations, new scale-up methodologies, and CFD validation schemes of various multiphase reactors and multiphase flow systems with implementation of CFD to design the experiments, facilitate the industrial application of new scale-up methodologies, process design and optimization, and to develop hybrid reactor multiscale modeling.