

AU RESEARCH NEWSLETTER

Academic Year 2022/2023
Volume 2, Issue 3

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HIGHER EDUCATION WITHIN THE CONTEXT OF DIGITAL TRANSFORMATION



As chair of the International Scientific Conference on Digital Transformation in Business: Challenges and New Opportunities, Professor Zabalawi – President of the Australian University, delivered a presentation on Higher Education within the Context of Digital Transformation (DT).

Professor Zabalawi explained the key strategies to reshaping the higher education sector by adopting DT.

He emphasized how DT permeates all activities within the university: processes, places, formats, research and teaching and learning.

In addition, he shed the light on the challenges of DT within universities such as lack of strategic planning, infrastructure challenges, proper training and development programs and correct budgeting.

He concluded his presentation by showcasing the importance of DT in building a personalized student-centered approach to teaching and learning while promoting an environment based on flexibility, creativity, and collaboration.

AU COB SCIENTIFIC CONFERENCE



Under the patronage of His Excellency Dr. Khaled Mahdi, Secretary General of the General Secretariat of the Supreme Council for Planning and Development, Australian University (College of Business) organised jointly with CQUniversity, Australia and Institute of Economic Sciences, Serbia, and under the sponsorship of Kuwait Foundation for the Advancement of Sciences (KFAS), the International

Scientific Conference aiming to bring together researchers, scholars and policymakers to present and discuss their research on the frontiers of knowledge of selected topics in the field of digital transformation in business. The Conference hosted three keynote speakers: Prof. Stephen Colbran, Head of the College of Law, Criminology & Justice at Central Queensland University, Australia, Dr Marko Rankovic, Deputy CEO, COO, Member of the Board and Executive Director of the Regional Card Processing Center - RPC, Raiffeisen Bank International, and Prof. Yusaf Talal, executive Dean of Higher Education and Emerging Technologies at Aviation Australia, Queensland, and adjunct Professor at Central Queensland University. The Conference gathered participants from Asia, Europe and Australia. The mode of the Conference was hybrid: both in-person and online participants attended. 30 presenters from 8 countries presented the results of their research and shared their expertise with their peers from the participating countries and academic institutions. The research output of the Conference is the Book of abstracts which represents a collection of 45 extended abstracts available at the following link https://iscdt.au.edu.kw/iscdt/iscdt_conference/Book_of_Abstracts.pdf



RESEARCH FUNDING NEWS

2023 KFAS 1ST CALL FOR RESEARCH PROPOSALS (JANUARY 1ST – MARCH 31ST, 2023)

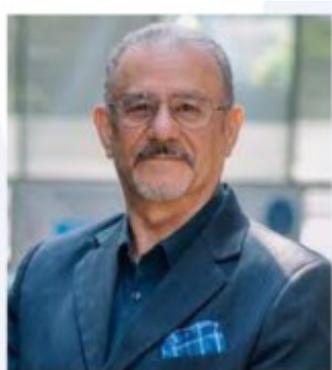


KFAS has released its first call for research proposals focused on funding research projects that address key, national priority areas through basic, applied and policy research. Proposals will be accepted in these key domains: Health, Education, Energy, Environment, Water, Food Security and Digital Transformation. The goal is to not only expand and build a growing body of knowledge in each key area but also ensure the translation and adoption of research outcomes from these research grants as a means to foster and advance social and economic growth nationally as well as contribute to scientific advancement globally. In addition to these priority areas, the call is also open to proposals on science, innovation, and technology (STI) in a broader sense. **However, priority will be given to the six domains mentioned above.** Preference will also be given to proposals that are collaborative, interdisciplinary and intersectoral in nature. The call is also open to Young Researchers Grants focused on the key priority areas as well as general STI topics.



RESEARCH SEMINARS

CHALLENGES AND MITIGATIONS FOR THE SOLAR TO BE A MAJOR IN THE ENERGY MIX



In this session, Prof. **Dr. Hussain H. Al-Kayiem** was addressing the fact that solar systems, with no exemption, have a setback of disability at night and in cloudy weather due to the non-availability of solar radiation input to the system. Also, the solar systems have low conversion efficiency, and they need large collection areas for feasible power production. This presentation tackled the problems of solar energy and discussed some mitigation possibilities to enhance the opportunities for solar to have a big share in the future energy mix.

ACCELERATED BRIDGE CONSTRUCTION & SEISMIC RESILIENT BRIDGE TECHNOLOGIES



This talk, held by Dr. Mustafa Mashal, highlighted the fact that Accelerated Bridge Construction (ABC) offers many advantages compared to traditional bridge design and construction. The use of precast concrete in ABC has been gaining popularity in the United States and other countries. This presentation introduced ABC and discussed recent seismic technologies for ABC, in particular precast concrete bridges.

VARIATIONAL BASIS FOR THE FINITE ELEMENT LINEAR ELASTOSTATIC PROBLEMS



Finite element analysis can be regarded as a tool for obtaining the approximate solution to differential equations of boundary value problems, using piecewise assumed interpolation functions within the domain of interest. In this presentation, **Dr. Jafarali Parol**, Research Scientist at Kuwait Institute for Scientific Research, showed that the finite element method computes the strains as the best-fit in the least square error sense. The best-fit paradigm reveals the complete picture of the finite element and most importantly, it offers more meaningful indicators for estimating errors in the finite element computations.

SORET-DRIVEN CONVECTION IN COLLOIDAL SUSPENSIONS



The effect of sedimentation and thermophoresis on the threshold conditions for the onset of convection is represented by an experimental parameter, β . The experimental setup showed that β is a function of the particle radius (r_p). The graph of $\beta(r_p)$ is an approximately inverted parabola with two zeros crossing in the range $5 \text{ nm} < r_p < 125 \text{ nm}$. We conducted linear and weakly nonlinear stability analyses for diluted and moderately concentrated cases. The analysis focused on the particle-dominated convection regime for which the onset is steady and on infinitely long wave-length disturbances. This talk was presented by Dr Mahmoud Darassi, Associate professor & head of the Department of Basic Sciences at the Princess Sumaya University for Technology.

DRIVING DECARBONIZATION AND DEVELOPING SUSTAINABLE ENERGY THROUGH INNOVATION



We have a unique opportunity to fast-track the energy transition. COVID-19 has dramatically impacted economies around the world, which have been further stressed due to the current conflict in East Europe. Effort and Capital are being directed towards a fast recovery and finding alternative measures to cope with the looming energy demands vs. supply shortages. Uniting and focusing our efforts will enable developing and developed countries alike to advance to a prosperous and carbon-free future extremely quickly. This is clearly the present need of the hour, where innovative solutions need to be implemented. Highly flexible and reliable power stations and distribution networks will be the intelligent backbone of a decarbonized energy system. This talk was presented by Eng. Abdel-Wahab Dirawieh, Project Manager and Primary Technology Expert at Siemens Energy - Kuwait

THE PETROLEUM INDUSTRY - THE UNTOLD STORY



The oil and gas business is very complicated and the global oil industry is continually changing and adapting new strategies in line with market requirements and geopolitical aspects. The oil sector in Kuwait is facing future challenges with a long-term strategy plan. Furthermore, the oil sector in Kuwait is well managed and governed by long-term strategies LTSP updated frequently to turn those challenges to opportunities. During this talk, **Eng. Khaled Al Mushileh** emphasised that the human capital is the core of any business and strategy and the most important key success factor. Finally, the untold story: “The oil business is more than technical aspects.”

WATER SECURITY: A NORTH START TO GLOBAL SUSTAINABILITY



This COVID-19 Pandemic triggered a global health, economic and social crisis, clouding the possibility of achieving the 2030 Agenda for Sustainable Development (SD) adopted by the UN in 2015 to improve human lives while protecting nature. Water is essential to public health and human well-being and can crucially smooth the path to ending poverty by securing the food and energy sectors. Global water security, hence, can serve as a North Start to guide the policymakers through the overwhelming task of achieving UN 2030 Agenda for SD. During this talk, **Dr. Masoud Irannezhad** discussed different water-related interventions aimed at quickly attaining global water security while taking Sustainable Development Goal No.6 (Clean Water and Sanitation) into account.

FASHION'S LEADING DESTINATION IN KUWAIT 3OUD.COM



In this talk, **Ms. Zainab AlAbdulrazzaq**, the founder of 3OUD.COM in 2015, provided a detailed overview of the history of 3OUD.COM, the importance of 3OUD.COM, the reasons why the company markets top international and local brands, and the marketing tools the company uses in the contemporary business world. During her talk, Ms. Zainab emphasized the fact that Kuwait is the country of origin for her company, which has been a leading fashion destination in the region with an impressive contribution to the fashion industry. The company was bought by Tamdeen Group as one of the biggest deals in the GCC.

FLYUP! HOW TO CREATE A SUCCESSFUL STARTUP

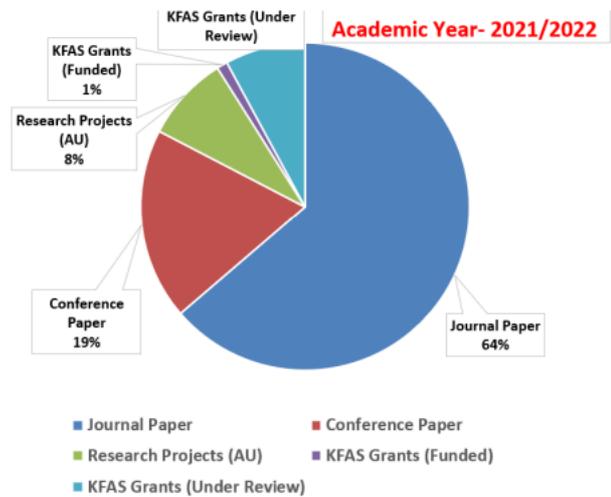
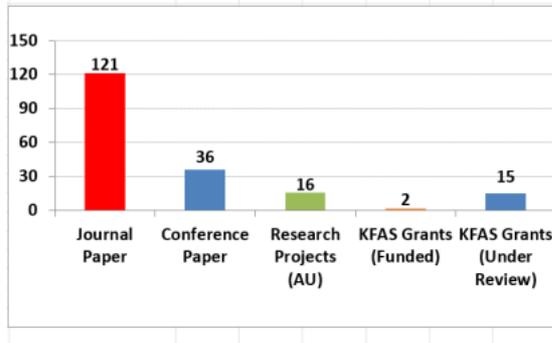


During this talk, **Mr. Mohammed Al Suraye**, Co-founder and CEO of Dawrat.com, the first marketplace for online education in the MENA region, and Co-founder and CEO of Eventat.com, the leading marketplace in Kuwait for events and selling online tickets, shared his experiences and discussed the roadmap for starting a successful startup. His work was recognized in 2015 when he won Kuwait's first award for excellence and creativity.

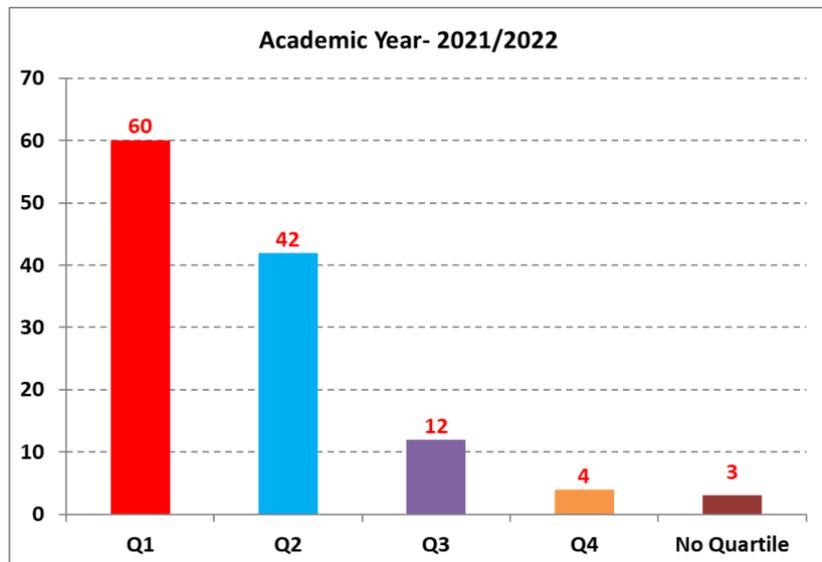
PUBLICATIONS (JOURNALS, CONFERENCES, AND BOOKS)

AU faculty members published a total of 157 research papers covering the period from September 1st, 2021, through August 31st, 2022 (121 journal papers and 36 conference papers). AU faculty received two funded KFAS projects and 16 AU internal research grants as shown in the figure below. Many peer-reviewed papers were published in Q journals (ranked based on Scopus).

Type	Total
Journal Paper	121
Conference Paper	36
Research Projects (AU)	16
KFAS Grants (Funded)	2
KFAS Grants (Under Review)	15
Grand Total	190



According to Scopus, there were 60 publications in Q1 Journals (research papers published in top 25% of the international journals), 42 publications in Q2 journals (research papers published in the middle-high position – between top 50% and top 25%), 12 publications in Q3 journals (middle-low position), and 4 publications in Q4 journals.



RESEARCH CAPACITY BUILDING TRAININGS

AU's College of Business in collaboration with AU's Scientific Research Center are organising series of the Research capacity building training sessions. The distinguished researcher will deliver training on the following topics:

1. Writing and presenting research
2. Literature Review
3. Grant Writing (KFAS)
4. Design of qualitative research and analysis of interview information
5. Understand measurement - Developing questions - Designing the questionnaire
6. Introduction to SPSS and quantitative data analysis
7. Introduction to writing and presenting research - Integral training

The training will be delivered in 22 sessions beginning on December 12, 2022 and ending on May 22, 2023.

FACULTY NEWS



Dr. Jean El Achkar was one of 25 winners of the Green Talents 2019 international competition for young researchers initiated by the Federal Ministry of Education and Research (BMBF). Every year, the German Federal Ministry of Education and Research (BMBF) hosts the prestigious Green Talents – International Forum for High Potentials in Sustainable Development to promote the international exchange of innovative green ideas within the field of sustainability. The award, under the patronage of the German Federal Minister of Education and Research, honours young researchers from numerous countries and scientific disciplines for their achievements and efforts to make their communities, countries and societies more sustainable.



Dr Taha Ahmed completed a successful KFAS grant in collaboration with the University of Nevada at Reno (UNR) to address the raveling problem in Kuwait. As part of this collaboration, Dr Taha co-supervised a master's student at UNR to address this concern. All the asphalt materials were taken from the in-service pavement (3-5 years) in Kuwait and shipped to UNR for testing and evaluation. This study concluded that the Superpave asphalt mixture performed better than the Marshall asphalt mixture. Further, the superpave asphalt mixture exhibited excellent resistance to rutting. Finally, the study recommended that the pavement design manual practiced in Kuwait be revised for the current traffic levels.



Dr Abrar Ali (Adjunct Faculty – Math and Physics Department) recently participated in organising the International Astronomical Union's NameExoWorlds 2022 campaign in Kuwait (in collaboration with Sheikh Abdullah Al-Salem Cultural Centre) where teams were formed to name one of the twenty exoplanetary systems to be observed by NASA's James Webb Space Telescope (JWST). Around 65 countries have participated in this competition and Kuwait has two submissions, where Dr Abrar is part of both teams. The results will be announced on March 20th, 2023.



Approved KFAS Proposals



Dr Jean El Achkar has received approval for the KFAS proposal for the 1st cycle 2021-2022 entitled: Green Valorization of Food Waste in Kuwait as a Renewable Energy Source using Anaerobic Digestion. This study will inspire future attempts to convert food waste into valuable resources, therefore mitigating the consequences of global climate change. Universities, corporations, malls, communities, and governments can replicate such an approach in the long term. The outcomes will put forward practical and sustainable initiatives for Kuwait's energy and environmental sectors, which are necessary to reach Kuwait Vision 2035.



Dr Mohamad Farhat has received approval for the KFAS proposal for the 1st Cycle 2021/2022 entitled: Development of an Organic Rankine Cycle (ORC) System Powered by a Solar Concentrator Optimized for Residential Application in Kuwait. The purpose of this project is to develop a cost-effective solution to generate electricity from solar energy. The system consists of an organic Rankine cycle (ORC) coupled to a solar concentrator. It produces electrical and thermal energy from solar energy and could be used for residential or industrial applications, isolated areas, or large-scale electricity production in Kuwait. The system could also be coupled with a storage system to generate electricity during the absence of solar energy (night, cloudy weather, etc.). The system will be

analysed, modelled, and designed for a residential application in Kuwait. In addition, a techno-economic optimization will be carried out to minimize the system cost while maintaining high efficiency.



Dr Vladimir Simovic has received approval for the KFAS proposal for the 1st Cycle 2021/2022 entitled: Remote Work Capacity Building - Empowering Digital Transformation for Physically Disabled People. This project focuses on building a digital learning platform for people with physical disabilities and building the capacity for remote work in the area of digital marketing. The reason why digital marketing was selected as a competence area is the expertise of the project team and the fact that remote platforms offer many opportunities for people with relevant knowledge in this area

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