

AU RESEARCH NEWSLETTER

Academic Year 2022/2023
Volume 2, Issue 4

IN THIS ISSUE

- Scientific Lecture by Professor Zabalawi at University of Petra, Jordan
- Research Funding News
- Faculty Research Outcomes
- Research Seminars
- Workshops
- Research Capacity Building Trainings
- Faculty News
- AU Events

KEYNOTE SPEECH AT UNIVERSITY OF PETRA, JORDAN

ARTIFICIAL INTELLIGENCE: A WAY FORWARD FOR EDUCATION



As a keynote speaker of the 16th International Conference for the Gifted and Talented at the University of Petra titled: "Gift, Talent, and Artificial Intelligence in Education: Visions for the Future", Professor Zabalawi – President of the Australian University, gave a talk on the Artificial Intelligence: A Way Forward for Education. Professor Zabalawi pointed out the need to employ Artificial Intelligence in educational institutions, and that while higher education

institutions in developed countries are looking to expand the employment of Artificial Intelligence within its institutions, higher education institutions in the Arab world are still thinking about the possibility of employing Artificial Intelligence. Professor Zabalawi mentioned a few examples of employing Artificial Intelligence in higher education, including the adoption of AI in teaching, learning and assessment. In addition, AI can be incorporated in academic advising, taking attendance, measuring the fulfilment of the intended learning outcomes and developing the digital era attributes of the graduates. Furthermore, he illustrated that, AI can be used to transform the campus into a smart campus, in arranging campus tours for visitors and new students, and AI can be heavily used in the laboratories by using virtual and augmented realities.

AU

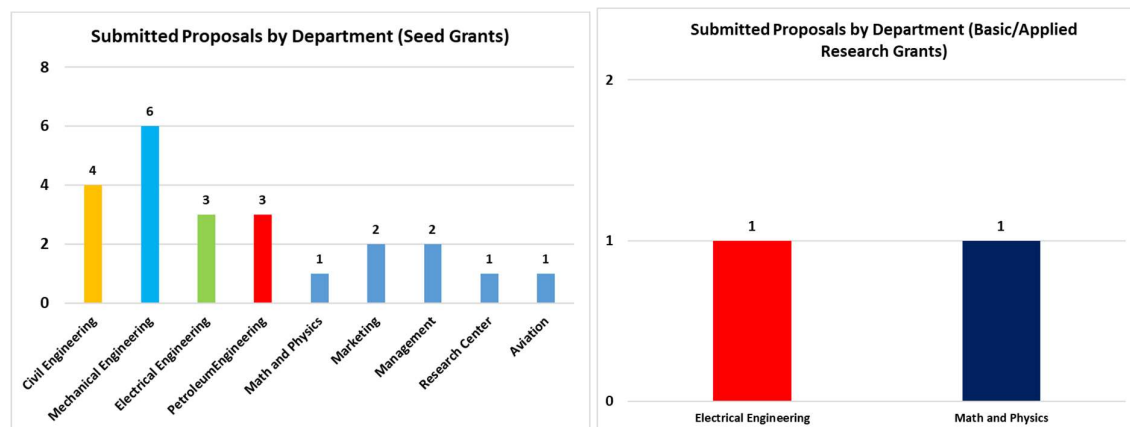
RESEARCH FUNDING NEWS

AU 5TH CALL FOR INTERNAL FUND

The Scientific Research Center at AU has announced the AU 5th Call for internal research proposals (February 1st, 2023 – February 28th, 2023). This Call was focusing on the following main domains:

- Water and Environment
- Renewable Energy
- Robotics and Artificial Intelligence
- Cybersecurity
- Advanced Materials and Manufacturing
- Electric Vehicle Cars
- Digital Transformation (e.g., Education, Health, Finance, Society, etc)
- Innovation and Entrepreneurship
- Business Management, Finance, and Marketing

This Call offered two types of grants: Seed Grant and Basic/Applied Research Grant. 23 seed grants and 2 basic/applied research grants were submitted by faculty members from different departments as represented in the Figure below.

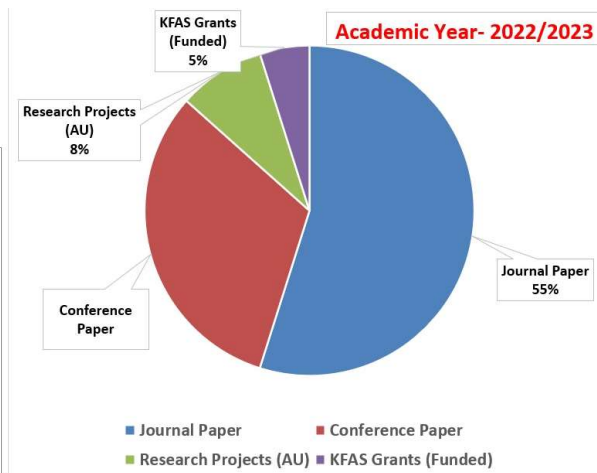
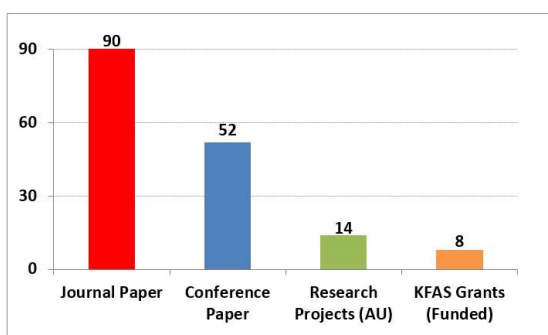


FACULTY RESEARCH OUTCOMES – 2022/2023

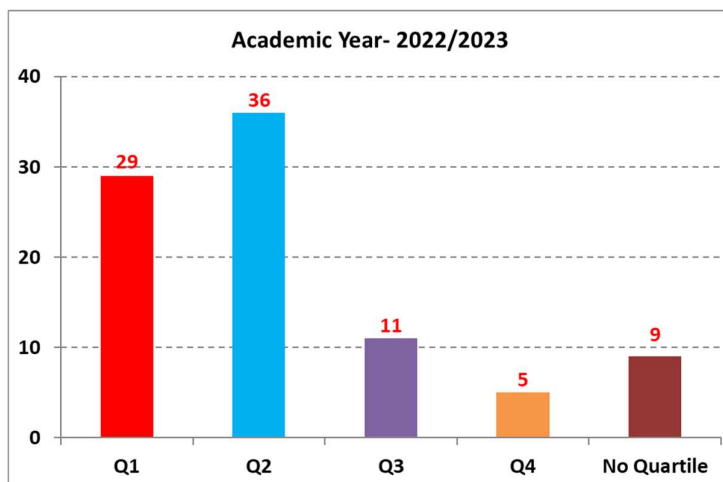
PUBLICATIONS (JOURNALS, CONFERENCES, AND BOOKS)

AU faculty members published a total of 142 research work covering the period from September 1st, 2022, through June 30th, 2023 (90 journal papers and 52 conference papers). AU faculty received 8 funded KFAS projects and 14 AU internal research grants as shown in the Figure below. Many peer-reviewed papers were published in Q journals (ranking based on Scopus).

Type	Total
Journal Paper	90
Conference Paper	52
Research Projects (AU)	14
KFAS Grants (Funded)	8
Grand Total	164



According to Scopus, 29 publications in Q1 Journals (research paper published in top 25% of the international journals), 36 publications in Q2 journals (research paper published in the middle-high position – between top 50% and top 25%), 11 publications in Q3 journals (middle-low position), and 5 publications in Q4 journals.



RESEARCH SEMINARS

SOLAR CONNECTION AND MAGNETIC BUOYANCY

In this talk **Dr. Abrar Ali** presented three dimensional numerical experiments that mimic the competing effects of the overlaying turbulent convection on magnetic concentrations, with results revealing interesting characteristics of the magnetic field which are believed to contribute to the mechanisms involved in the Sun. The complex interactions driven by Magnetic Fields are behind the structure and appearance of the Sun. Motivated by a desire to greater understand these dynamics, we explore the formation of coherent magnetic structures deep within the solar interior. In order to produce strong structured magnetic features as displayed on the solar photosphere layer, magnetic fields must pass through the distortion and shredding of the turbulent convection zone.

CREATIVE APPLICATIONS OF THIN FILMS IN MECHANICAL ENGINEERING

The objective of the talk held by **Dr. Ahmad Sedaghat** is to show students and colleagues how innovative ideas can be inspired by adopting an object (thin films). Thin film deposition techniques have evolved considerably during the 20th century. Several technological breakthroughs happened in areas such as: Magnetic recording media; Electronic semiconductor devices; Integrated passive devices; LEDs; Optical coatings (such as antireflective coatings); and Hard coatings on cutting tools. Other applications are in energy generation, energy storage, and medical applications. This talk provides innovative application of tin films in 5 research examples: Solar window films, Cool roof techniques, Heat films for simulating birds' wing colour on flight performance. Heat films for measuring thermal properties of Wood Plastic Composites (WPCs) and Circulating skin of air foils in Magnus systems.

ASSESSMENT OF A HYBRID RENEWABLE ENERGY SYSTEM: THE CASE OF KUWAIT



The energy needs in Kuwait are increasing rapidly and more power sources are required to cover this demand, especially in peak time in summer. Renewable energy has a good potential of use in Kuwait due to Kuwait's weather and environment with countless sunny days and wind. **Dr. Michel Nahas** proposed an off-grid system that includes solar panel, wind turbine, battery bank and fuel cell system to form a standalone power system. Furthermore, the load demand of a typical Kuwaiti residence along with available meteorological data are measured and considered. The overall performance of the hybrid system is analysed to form an optimum and dynamic system with high performance all year round that fits the load of the residence.

RESERVOIR FLOW ASSESSMENT IN VERTICAL AND HORIZONTAL WELLS



Reservoir flow assessment in production and injection wells is one of the key elements in reservoir management and surveillance plans. It is done using different technologies to determine the source of production and define the fluid parameters from the different fluid entries. Also, it is used in the injection wells to determine the distribution of injected fluids among the different reservoir flow units. In this session **Dr. Mahmoud Gobran** elaborated that advanced technologies have been established for reservoir flow assessment in the complex cases like flow in the highly deviated and horizontal wells specially which have smart completion technologies. The objective of this seminar is to show the different technologies for reservoir flow assessment and practical case studies from

field.

FIDIC CONTRACT SUITE



The seminar delivered by **Eng. Mansoor Ali** focused on the general introduction of FIDIC, its history and the various forms of FIDIC contracts. As well as explains the Golden principles and elaborates on the prevalent FIDIC Forms. FIDIC is an international popular Contract Form which is the basis of construction contracts around the Globe. This seminar is very useful for Civil Engineering students and practitioners, as well as those who aspire to be involved with Contract Management & Project Management.

SUSTAINABILITY AND SOCIAL DEVELOPMENT



Although sustainability requirements can be easily understood, it is observed, as presented by **Eng. Mohammed Ibrahim Hashem**, that there is a strong resistance towards implementing these requirements, which means that awareness alone is not enough implementation requires Social Development, which starts with promoting knowledge, commitment, and action.

APPLICATIONS OF ADAPTIVE ANTENNA ARRAYS IN WIRELESS COMMUNICATIONS



The application of adaptive antenna arrays has been suggested in recent years for mobile communication systems to overcome the problem of limited channel bandwidth, thereby satisfying an ever-growing demand for a large number of high bit rate mobiles on communications channels. In the workshop **Dr. Amin Al Ka'bi** presented that It has been shown by many studies when an array is appropriately used in a mobile communications system, it helps in improving the system performance by increasing channel capacity and spectrum efficiency. It also extends the range of coverage, reduces multipath fading, and co-channel interference.

DATA SCIENCE IN OIL AND GAS INDUSTRY



Data Science and Artificial Intelligence is becoming a powerful solution to engineering problems in all domains and of course in oil and gas Industry. Solving ill posed inverse problems has been always a challenge on mathematics and engineering applications too. In this talk **Dr. Anahita Abadpour** discussed data assimilation and how this AI tool could be used to address a very complex problem in characterization of underground reservoir models.

E-MOBILITY - ELECTRIC VEHICLE TECHNOLOGY AND INNOVATION



The first part of the session delivered by **Eng. Naser Abu Daqqa** provided an overview about the future of eMobility including the chances of the technology to reduce carbon footprint and to achieve NetZero. The second part of the session focused on the technology itself explaining the different powertrain options available for electric vehicles, including hybrid systems, and pure electric systems. The third part of the session covered the benefits and limitations of each option, as well as current trends and future prospects. An overview of the latest trends and developments in electric vehicle technology and Innovation will be provided on a global scale. It will discuss advances in electric vehicle batteries, powertrains, and other technologies.

ATTRACTING INVESTMENTS TO THE PETROLEUM INDUSTRY USING DISTRIBUTED LEDGER



The Investment in E&P has witnessed a severe decline in the last decade as presented in this session by **Eng. Khaled Hantoush**. This has caused a decrease in hydrocarbon discoveries in non-OPEC countries, the reserve replacement ratio is also declining for oil majors. The lack of investment is mainly due to the price volatility, which leads IOCs, hedge funds, and banks to evaluate the CAPEX invested in the industry. Democratizing Investments can surge liquidity in the Petroleum industry, should retail investors gain access to specific Petroleum licences instead of investing in IOC shares, the pace of funding and risk tolerance will help in providing the Investments needed to keep up with the global Petroleum demand. Security tokens using distributed ledger technology can provide the technical

structure for this funding in addition to creating a secondary market that can create a second revenue stream for the token issuer. The tokenization of assets still demands further legislation.

WORKSHOP

RESEARCH CONTRIBUTION TO CIVIL ENGINEERING AND SUSTAINABLE INFRASTRUCTURES: SELECTIVE



The Australian University, College of Engineering, Civil Engineering Department co-organized with University of Nevada, Reno, Western Regional Superpave Center, Civil & Environmental Engineering Department a 2-days workshop entitled: **Research Contribution to Civil Engineering and Sustainable Infrastructures: Selective Research Outcomes and Recommendations.**

The workshop had two sessions. The title of the first session was “Sustainable Pavement Engineering and Road Materials”. The session provided managers, engineers, and practitioners with the basic understanding of the Superpave asphalt mix design process and balanced mix design (BMD) process. The session also presented the overall findings from the research study funded by Kuwait Foundation for the Advancement of Sciences (KFAS) on the “Effect of a Raveling on the performance of Hot Mix Asphalt under Arid Climatic Conditions: Case Study in Kuwait”

The title of the second sessions was “Sustainable Alternatives in Construction Materials in Kuwait”. The session provided the basic understanding of newly introduced methodologies to make building materials more environmentally friendly and the impact of these methodologies on the current market practice to managers, engineers, and practitioners.

WORKSHOP: SIMBOUND GAME BASED SIMULATION

The existing scientific evidence suggests a positive relation between students' motivation and achievements when they are learning using game-based simulations. In this workshop, **Mr. Louis Havriliuc** the Simbound CEO, presented the key features of this unique game simulation. Simbound allows university students to learn digital marketing fundamentals and acquire functional knowledge in this area by playing a digital marketing game simulation. The simulation provides the students with the opportunity to create their own digital marketing campaigns using virtual funds as if they are doing it in a real world. The game simulates the real-world scenarios including consumer behaviour and gives students the option to undertake corrective measures in their actions to achieve better results. In this manner, the students learn by doing, using a technology which is proven to be fun and engaging to them - gaming. The instructors have the control over the entire process of learning with many performance measurement features and reports.



RESEARCH CAPACITY BUILDING TRAININGS

AU's College of Business in collaboration with AU's Scientific Research Center organized series of Research capacity building training sessions. The distinguished researchers from AU-College of Business and AU-Scientific Research Center delivered training on the following topics:



Writing and presenting research

In this training, **Prof. Alper Erturk** provided basic paper development and journal submission processes. Instructor covered the critical points that needs to be in a paper. He also discussed how to choose the right journal, how to reply to editor / reviewer comments, covered important things to avoid to increase the chance of getting acceptance from high-profile journals. The training had one 1.5-hour session. The video archive and supplementary materials for this training is available at: [1. Writing and Presenting Research](#)



Literature Review

This training, delivered by **Dr. Dieter Thom**, discussed the basic concepts involved in writing an effective literature review starting from formulating a problem and moving to assessing research material and finally drafting, editing, and reflecting on it. Additionally, the session particularly focused on how to cite properly using Endnote and others (other resources). The training had one 1.5-hour session. The video archive and supplementary materials for this training is available at: [2. Literature Review](#)



Grant Writing (KFAS)

In this training, **Dr. Vladimir Simovic** provided step-by-step guidance in the process of preparing the KFAS project application. The participants learned how to develop competitive project idea for KFAS calls, how to prepare project application along with supplementary materials and submit it using KFAS - Research Grants Management System. The training had three 1.5-hour sessions. The video archive and supplementary materials for this training is available at: [3. Grant Writing](#)



Understand measurement - Developing questions - Designing the questionnaire

This training, delivered by **Dr. Faidon Theofanidis**, discussed the concepts involved in measurement of the subjective properties of business and marketing phenomena. The workshop focused on questionnaire design, which can be used to collect data in large-scale surveys. The training had one 1.5-hour session. The video archive and supplementary materials for this training is available at [4. Understanding measurement - Developing questions - Designing the Questionnaire](#)



Introduction to SPSS and quantitative data analysis

The participants in this training jointly delivered by Prof. Alper Erturk and Dr. Faidon Theofanidis learned about the introduction to SPSS software and basic SPSS functions. using SPSS for descriptive statistics, Correlations, T-Tests, ANOVA, Regression Analysis, Factor Analysis, Discriminant Analysis, and Structural Equation Modelling. The training had seven 1.5-hour sessions. The video archive and supplementary materials for this training is available at: [5. Introduction](#)



[to SPSS & Quantitative Data Analysis](#)



Design of qualitative research and analysis of interview information

This training, delivered by **Dr. Oualida Abidi**, provided review of the characteristics and merits of interview-based qualitative research, and discussion of the process of qualitative data analysis and presentation. The training had one 1.5-hour session. The video archive and supplementary materials for this training is available at: [6. Design of Qualitative Research and Analysis of Interview Information](#)



Introduction to writing and presenting research - Integral training

Introduction to 'Writing and Presenting Research' training, delivered by **Dr. Omar AlHussainan**, aimed to enable trainees to write a scientific research paper. Trainees also learned how to format, edit and structure their papers/research. The training had one 1.5-hour session. The video archive and supplementary materials for this training is available at [7. Introduction to writing and presenting research - Integral training](#)

FACULTY NEWS

Approved KFAS Proposals



Dr. Oualid Abidi has received an approval on KFAS proposal for 1st Cycle 2021/2022 entitled: Information and communication overload impact on knowledge workers in digital transformation age: The role of creative self-efficacy, autonomy, and workplace civility. The present research makes important theoretical and practical contributions. Theoretically, the JD-R model is extended to incorporate creative self-efficacy as a psychological mechanism associated with excessive job demands on knowledge workers. Previous studies did not address decreased creative self-efficacy as a strain component in their conceptualization of the JD-R model. This study also extends the conceptualization of job resources in the JD-R model to encompass workplace civility.



Dr. Hassan Salti has received an approval on KFAS proposal for 2nd Cycle 2021/2022 entitled: Preparing Engineers for the Sustainable Future: Embedding the New Kuwait 2035's Vision into Engineering Curricula. This project aims to join Australian University (AU), Kuwait and CQUniversity (CQU), Australia to collaboratively review the awareness of sustainability among engineering stakeholders and to develop pedagogical strategies in engineering higher education institutions to graduate engineers who are an asset for the achievement of the worldwide sustainable development goals. The project also aims at identifying whether the environment (Australia vs Kuwait) has any impact on the effectiveness of the implemented pedagogical strategies.



Dr. Wisam Al-Saadi has received an approval on KFAS proposal for 1st Cycle 2021/2022 entitled: Assessment of exhaust emissions, engine performance and comparative toxicology of waste (biomass) derived fuels. Using waste tires and other waste (bio)mass to generate energy is an efficient way to reduce waste disposal. However, it must be ensured that environmental benefits do not outweigh human health risks. This proposal will answer the research questions, (i) can waste energy help to mitigate waste management issues and reduce greenhouse gas (GHG), carbon dioxide (CO₂) emissions? (ii) Will waste-derived biofuels be less toxic to human health? The proposed study is a continuation of the previous study that will include waste biomass preparation, including waste tires and getting biofuel from waste biomasses by pyrolysis process, pyrolysis oil upgradation, conducting comprehensive engine experiments using state-of-the-art diesel engines, and exhaust gas measuring instruments.



Dr. Seyed Mehdi Alizadeh has received an approval on KFAS proposal for 1st Cycle 2021/2022 entitled: Stochastic Methods for Underground Water Contamination by Diffusion of Nitrate with Uncertainty. Many people in the world suffer from lacking safe and clean water. Groundwater is known as a valuable source of clean water in many countries. However, underground water sources are being contaminated by chemicals from many sources and transport of pollutants such as nitrate in groundwater causes environmental problems. Numerous classifications of underground water contamination sources have been developed and discussed. The use of pesticides and fertilizers, the storage and disposal of manure, stockpiling of materials, and a large number of other activities carry the risk that underground water may be contaminated. In this study, the effect of uncertainty in nitrate diffusion coefficient and permeability in a three-dimensional underground water media under nitrate contamination is quantified.



Dr. Malek Adouni has received an approval on KFAS proposal for 2nd Cycle 2021/2022 entitled: Chondrocyte mechanical properties explained by an explicit multiscale composition of the articular cartilage: mutual continuity between cellular and tissue level. This study seeks to develop a multi-scale and -structure model of cartilage, incorporating the cell distributions with their microenvironment. This computational construct will investigate the intermediate pathogenetic alterations (specifically systematic factors) and their effect on the chondrocytes' mechanical environments and the articular cartilage's aggregate mechanical response. The outcomes of this work may broaden our understanding of functional cartilage alteration in general and provide insights into the search for novel therapeutic targets.

RESEARCH NEWS

AU CoB Scientific Conference 2023 - Announcement



The Australian University, College of Business is organizing a Scientific Conference on Digitalization, Innovations and Sustainable Development: Trends and Business Perspectives. The Conference will be held on 29th and 30th of November 2023 at the Australian University., Kuwait.

The main topics of the Conference will include, but are not limited to:

- Digital Economy
- Digital Transformation Driving Industry 4.0
- Digital Transformation in Marketing
- Digital Consumer and Transformation in Consumer Behaviour
- Digital Entrepreneurship and Innovation
- Digital Transformation in Financial Sector
- Digital Workforce and the Future of Work
- Digitalization in Education and Digital Competences
- Ethical Implications of Digitalization
- Emerging Technologies in Business
- Digital Citizenship
- Digital Needs
- Digital Divide
- Cyber Security in Digital Transformation Age
- Social Media Analytics
- Physical Customer Experience
- Environmental Innovation
- Digitalization in Health

The Conference output will be an edited book with selected conference papers and selected papers will be offered with a fast-track publication opportunity in a designated journal. The list of journals is TBA.

At this point, the following keynote speakers are confirmed:

1. **Prof. Tugrul Daim**
Professor in the Department of Engineering and Technology Management, Portland State University, USA
2. **Prof. Erman Coskun**
Professor of Management Information Systems, Head of MIS Department, Izmir Bakircay University, Turkey
3. **Prof. Luis Rueda**
Professor of Computer Science, School of Computer Science, University of Windsor, ON, Canada

Bridging the Gap Quality of Higher Education



The Teaching and Learning Center organized the Annual Forum on Bridging the Gap Quality of Higher Education on May 31st, 2023, dedicated to develop a balanced set of objectives that allows the educational system to be more economically productive and develop sustainable goals that contribute to the enhancement of the individual and societal well-being.

Please share with us any updates on your research, scholarly, or creative activities. Updates may be related to a paper that has been accepted for publication in a high-impact journal, a book chapter you've just published, or other updates you wish to share with our Scientific Research Center. Send details to research@au.edu.kw

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