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Book of Abstracts

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UNITED ARAB EMIRATES
MINISTRY OF EDUCATION

مجلس علماء الإمارات
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Program Overview

8:30	**Registration (Main Building)**														
9:30-10:30	**Opening Ceremony (Main Building)** Keynote Address: The Art and Science of Doing a PhD Professor Ghassan Aouad, President of the Applied Science University, Kingdom of Bahrain														
10:30-11:00	**Coffee Break**														
11:00-12:30	A1-Humanities & Social Sciences I (SBA0001)	A2-Humanities & Social Sciences II (SBA0002)	A3-Business & Management I (SBA0004)	A4-Business & Management II (SBA0005)	A5-Clinical and Health I (SBA0006)	A6-Life Sciences I (SBA0007)	A7-Industrial Engineering (SBA0008)	A8-Petroleum (SBA0009)	A9-Electrical & Computer Engineering I (SBA0010)	A10-Civil & Environmental Engineering I (SBA0011)	A11-Biomedical Engineering I (SBA0012)	A12-Chemistry & Chemical Engineering I (SBA0013)	A13-Chemistry & Chemical Engineering II (SBA0014)	A14-Mechanical Engineering I (SBA0015)	Poster Session A
12:30-13:45	Lunch														
13:45-15:15	B1-Humanities & Social Sciences III (SBA0001)	B2-Humanities & Social Sciences IV (SBA0002)	B3-Business & Management III (SBA0004)	B4-Business & Management IV (SBA0005)	B5-Clinical and Health II (SBA0006)	B6-Life Sciences II (SBA0007)	B7-Electrical & Computer Engineering II (SBA0008)	B8-Electrical & Computer Engineering III (SBA0009)	B9-Civil & Environmental Engineering II (SBA0010)	B10-Civil & Environmental Engineering III (SBA0011)	B11-Biomedical Engineering II (SBA0012)	B12-Chemistry & Chemical Engineering III (SBA0013)	B13-Mechanical Engineering II (SBA0014)	B14-Mechanical Engineering III (SBA0015)	Poster Session B
15:15-15:30	**Coffee Break**														
15:30-17:00	C1-Humanities & Social Sciences V (SBA0001)	C2-Business & Management V (SBA0002)	C3-Clinical & Health III (SBA0004)	C4-L Life Sciences III (SBA0005)	C5-Electrical & Computer Engineering IV (SBA0006)	C6-Information Security (SBA0007)	C7-Energy & Fuels (SBA0008)	C8-Materials Science (SBA0009)	C9-Civil & Environmental Engineering IV (SBA0010)	C10-Civil & Environmental Engineering V (SBA0011)	C11-Biomedical Engineering III (SBA0012)	C12-Chemistry & Chemical Engineering IV (SBA0013)	C13-Mechanical Engineering IV (SBA0014)	C14-Mechanical Engineering V (SBA0015)	Poster Session C

Sessions: A1–A14

A1: Humanities & Social Sciences I

Chairs: Adnan Ajsic (American University of Sharjah, United Arab Emirates), Sahera Bleibleh (UAEU, United Arab Emirates)

Assessment of Scientific Graphical Literacy Of 10th Grade Students In Al-Ain Educational Office, United Arab Emirates

Sara Hamad, Mohammed Madi Yousif and Hassan Tairab (United Arab Emirates University, United Arab Emirates)

The purpose of this study was to investigate the scientific graphical literacy level of the 10th grade science students, and explore the extent to which students at 10th grade have the essential skills to process and interpret visual scientific graphs in the private and public schools in Al Ain educational Zone. This study was exploratory survey design in which an attempt was made to explore student understanding of scientific graphs. A Graphical Literacy Test was developed for this study to evaluate the student ability to interpret, and construct graphical information. 125 grade10th science students participated in the present study. Sixty-two of them were female and the rest (63) were male students. Out of the sample, 95 of the students were from public schools. Based on the findings reported in the present study, different educational implications for curriculum planners and developers, science teachers, and students in relation to graphical literacy development.

Students' Attitudes towards Student Centered Learning Through The Blended Learning Model in ESL Classes

Doaa Hamam (BRITISH University in DUBAI & DUBAI MEN'S COLLEGE, United Arab Emirates)

The study is conducted to explore students' attitudes towards SCL through the blended model in ESL classes. The study was conducted in a training center in UAE and the sample comprised of 34 students. The students were given a survey after attending a general English course (level 8) that lasted for 6 weeks. The survey included general questions about the model used in the classroom and their preference as attendees for this class. The students' age group was 29-35 with mean=31.1. Three students from the sample were also interviewed to get in-depth data about what they liked or disliked. After the data analysis, the survey and the interview showed a general trend of satisfaction among students. However, some of them reported that they felt socially isolated when they interacted with the LMS only. In general the students liked SCL through the blended model and reported that active learning took place in their classes.

Using STEM Project-based Learning Approach in Teaching Mathematics to Develop Students' Creative Thinking Skills and their Beliefs about the Unity of Knowledge

Hisham Ayob (Higher Colleges of Technology - UAE, United Arab Emirates)

UAE vision 2021 emphasize the importance of integrating STEM in higher education as well as developing the required material for developing creativity. Moreover, HCT is an applied higher education institute and its strategic goals focused on developing creativity. So, there is a need to develop a model example for integrating STEM in higher education to convert mathematics from an abstract subject to applied subject as well as developing creative thinking skills.Thus, the main purpose of the study is to analyze the effectiveness of using STEM project-based learning approach in teaching Mathematics to develop creative thinking skills for engineering students at higher education in UAE. The existing procedures for the STEM project-based learning were identified through a literature review. A quasi-experimental design was employed in the study for the quantitative aspect. This study used three groups; two experimental groups and one control group. The experimental group 1 will taught using STEM project-based learning approach where students used the engineering design to create a prototype. The experimental group 2 will taught using STeM project-based learning where students will use a simulation software to create the

project. to conclude the approaches impact on the development of creative thinking skills. Whereas, the control group was taught by using traditional methods. Thus, two dependent variables were measured simultaneously for all three groups by the pre-test and posttests at two different times before and after the intervention. This study involved an intervention of the utilization of the STEM project-based learning approach for 16 weeks as follows: 1. Pre-tests of (creative thinking test, and students' beliefs about the unity of knowledge survey) were administered to the three groups during the first week before the intervention; 2. Intervention utilizing the STEM and STeM project-based learning approach for the experimental groups was for 16 weeks. On the other hand, the control group was taught following the traditional method; and 3. Post-tests of (creative thinking test, and students' beliefs about the unity of knowledge survey) were administered to the three groups during the week after the intervention. The independent variable was the method of instruction, either the STEM project-based learning, STeM project-based learning, or traditional method. The dependent variables were performance in creative thinking skills. A test for creative thinking skills was developed to measure the respective dependent variable. After the four months intervention, the researcher will use the multivariate analysis of variance (MANOVA) to analyze the creative thinking skills test results.

Science Teachers' and Students' Perceptions Regarding the Implementation of Inquiry Instruction in a Middle School in Dubai

Marwa Eltanahy (British University in Dubai, United Arab Emirates)

Inquiry-based learning in education represents the student-centred approach that focuses on encouraging learners to construct new knowledge. The main purpose of this study is to explain grade eight-science teachers' and students' perceptions about applying inquiry-based learning in a private school in Dubai. Furthermore, to explore the extent to which the science textbook of grade eight promotes inquiry instruction. Data is collected through a mixed method approach where two science teachers and fifty students in grade eight are recruited to respond to the given questionnaires. Moreover, an evaluation rubric is used to analyse the science textbook of grade eight to explore the extent to which it supports the inquiry practices. The study found that science teachers have positive perceptions toward applying inquiry instruction, although they are not able to differentiate the types of inquiry used in their classes. Besides, students have expressed a positive feeling towards learning science through inquiry-based strategy. In addition, the new science textbook enhances all the inquiry areas and illustrates its components effectively.

Evaluating Textbook Questions and Classroom Instructional Questions Based on the Revised Bloom's Taxonomy: Grade 6 Science Textbook Used in a Private School in Dubai

Rima Abou khreibi (The British University in Dubai, United Arab Emirates)

The textbook and instructional questions were analyzed using the Revised Bloom's Taxonomy to ascertain the type of cognitive process and knowledge that is being taught in a Grade 6 Science curriculum in a private international school in Dubai, U.A.E. Questions play an important role in critical and creative thinking and it is important to investigate the levels of questions used in the textbook and during instruction. The research used a qualitative approach analysis of the questions, using the Revised Bloom's Taxonomy cognitive and knowledge dimensions. The results showed that lower rather than higher order thinking questions are more common in textbooks and instructions. Textbook questions emphasized "Remember", while instructional questions emphasized "Understand" cognitive process. The most common knowledge dimension is the "Conceptual" knowledge. Therefore, it is recommended that textbook writers and educators include higher order questions within curriculum and pedagogy to help improve critical thinking among learners.

The Impact of Intensive Teachers' Training on Improving the UAE Students' Achievement in the PISA International Exam

Khaleel Al Arabi and Lutfieh Rabbani (United Arab Emirates University, United Arab Emirates)

The purpose of this study was to determine the relationship between intensive teachers' training and students' achievement in the Programmed for International Student Assessment (PISA) in the emirate of Abu Dhabi. This study made use of a quasi-experimental design to investigate the effect of teachers´ training on students' achievement. All relevant teachers (Science, Mathematics, Arabic and English) have received appropriate training on PISA test skills by qualified instructors. The training was providing intensive workshops for five continuous hours and three times in two months. During these periods, teachers trained the students on the PISA test skills. The sample of the study were students in the secondary schools of the Emirate of Abu Dhabi born in 2002, as well as all teachers who received PISA training.

A 2: Humanities & Social Sciences II

Chair: Filareti Kotsi (Zayed University, United Arab Emirates)

Identity Activism

Fatima Almehdhar (Paris Surbonne - Abu Dhabi, United Arab Emirates)

National Identity is a fluid concept that is subject to reformation. The national Identity in the Arab world can be used as a political tool to Counter-terrorism. However, there is a confusion of national identity especially between the notion of national identity based on citizenship, and the notion of national identity in terms of religion. Therefore, governments should develop strong mechanisms to empower the sense of belonging to the nation in terms of state, rather than religion. In this paper I will highlight some historical examples that would reflect the role played by developing the sense of national identity to counter the religion dominance and a recent example adopted by UAE to empower and create of national identity through education of the youth, as well as the role of awareness through multiple channels such as media to further educate citizens.

The Effectiveness of Leaderships' Styles on Teamwork Productivity in Al-Ain Private Schools

Eman Azzam (United Arab Emirates University, United Arab Emirates)

This study shows different leadership styles and its characteristics. Moreover, it attempts to explore whether a relationship exists between the leadership styles of schools' principals and the leadership styles of Heads of Departments (HoD). In addition, it will explore whether a correlation exists between leadership styles of HoD and teamwork performance among teachers at Al-Ain Private Schools. Finally, the study will identify the challenges, if any, faced by teachers when they work in teams.

Mapping the Capability of Talents' Development Initiatives in the UAE to Enhance Talents' Creativity

Basema Mohammed Younes (British University in Dubai & Ministry of Culture & Knowledge Development, United Arab Emirates)

The main objective is to "explore the reality about how talents' development initiatives are serving talents in the UAE . To what extent those initiatives satisfy the needs of the talents and are they capable of developing their creativity in order to generate new industries to support the national income . The objectives of this research: -To Map the talents' development initiatives in the UAE - Analyze their role to identify talents' and develop them. -Explore the challenges faced by them. - Recommend a strategy to overcome obstacles and build a sustainable development that is able to invest talents' creativity. This research aims to contribute to the UAE vision 2021-2030 that looks at creative industries as the country's new economy in the future.

Do Muslims Feel Threatened by Other Muslims or Non-Muslims? Investigating Muslims' Implicit Attitudes towards Muslims and Non-Muslims Using Implicit Association Test

Eida Juma (Zayed University, United Arab Emirates)

Since 9/11, many studies investigating prejudice against Muslims by non-Muslims using different techniques (e.g. interviews, surveys etc.) and have shown that non-Muslims find Muslims threatening. However, few studies examined Muslims' perspectives and it remains to be seen whether Muslims have prejudice against their own religious group. Accordingly, the current study investigated implicit attitudes of Muslims towards Muslims and non-Muslims using IAT. This is a computer-conducted standardized test used for measuring the strength of associations between concepts (e.g., Muslims, non-Muslims) and evaluations (e.g., safe, threatening). 20 Muslim females aged between 17 and 27 years old took part in the experiment and were required to categorize Muslim and non-Muslim faces accompanied by words conveying either a safe or threatening evaluation. When categorizing Muslim faces, participants were faster and made fewer errors when these faces were accompanied by "safe" words. In contrast, when categorizing non-Muslim faces, participants were faster and made fewer errors when these faces were accompanied by "threatening" words. These findings indicate that the participants had strong preference to Muslims over non-Muslims.

Measuring Happiness of Domestic Workers: A study conducted in the UAE

Amani Alhosani (Zayed University, United Arab Emirates)

This research paper aims to measure happiness of female domestic workers. One of the leading causes beyond this study is the recent mission of the UAE government to build a happy nation. Another goal highlights the importance of improving the wellbeing of domestic workers as being a venerable group. As the UAE is participating in the international society, the human rights reports should be addressed to avoid prejudice. In order to distinguish between the fact of being amongst the 20th happiest countries in the world and the violation of human rights of domestic workers, an investigation regarding this controversial topic should be objectively studied. In terms of methodology, the Quality of Life Inventory that involves the sweet 16 elements of happiness is used as a base to build the questionnaire. The findings show deficiency in most of the happiness elements that need to be improved under governmental institutions.

A New Cold War

Khaled Alfalasi (Zayed University, United Arab Emirates)

In this paper, I argue that the United States of America and the Russian Federation have reengaged in a cold war. Following a review of key concerns regarding the confrontation between the USA and Russia it is evident that political hostilities match those of the previous cold war. Military maneuvers by both states threaten each other's security. Similarly, both states continue to develop their respective nuclear weapons capabilities and threaten a nuclear arms race. They are also engaged in political warfare efforts such as propaganda. Finally, proxy wars offer a clear indication of both super powers foreign policy objectives as they support opposing factions or governments in such confrontations. These points all contribute to an escalating rhetoric of mistrust and fear leading to increasingly confrontational policies.

A3: Business & Management I

Chairs: Ashly Pinnington (British University in Dubai, United Arab Emirates), Valerie Lindsay (AUS, United Arab Emirates)

Diffusion and Adoption of Innovation within the Manufacturing Sector of Oman

Seema Nasser (British University in Dubai, United Arab Emirates)

In the recent past years many governments have been focusing on innovation through linking it to their policies and budgets for accelerating economic growth and to achieve a balanced economy. Due to several reasons including increased costs, reduced profit margins, increased competition, technological changes etc., even modern business organizations have been adopting innovation

as a competitive strategy. Oman has been an oil-based economy for the past several decades. However, due to explainable reasons including reduced oil prices the government realized the need to transform economy into a non-oil based diversified economy. The government identified some sectors to focus on, including manufacturing sector. The current research identifies the role of innovation, government's initiatives in terms of various policies/activities. The paper discusses the diffusion of innovation by manufacturing sector, and adoption of innovation by consumers. Various issues such as overall readiness of the stakeholders, factors influencing, barriers to overcome with reference to diffusion and adoption of innovation are addressed in this research paper. The paper recognizes the need for further research.

The Role of Organizational Culture on Food Handlers' Behaviors in Food Businesses

Sadi Taha (BUiD, United Arab Emirates)

Traditional interventions like inspections and training as solutions to stop food borne illnesses and food product recalls have been found deficient. With the purpose of improving food safety practices, it is important that organizational culture is recognized and measured in firms. In order to evaluate food handlers' perceptions of food safety culture and food handling behavior intentions, a sample of food handlers (n = 45) was selected from food businesses located in Dubai. A questionnaire comprising previously validated scales was used to find out the factors of organizational culture that have an effect on food handlers' intended food hygiene behaviors to implement the safe practices. Linear regression was used to test the proposed model that comprised of six independent variables. The model explained 86.6% of the variance in food handlers' intentions. The results highlight to the managers of food businesses the elements of organizational culture that may be particularly important in shaping the behaviors of food handlers, which may be used to reduce food borne illnesses and product recalls.

The Effect of Balanced Scorecard Implementation on Organizational Performance, The Case of Healthcare Sector in UAE

Alaa Mushtaha, Khaled Aljifri and Taoufik Zoubeidi (UAE Uinversity, United Arab Emirates)

The balanced scorecard (BSC) has been applied in various industries, including manufacturing (Hoque, 2005; Hoque & James, 2000), the public sector (Bianchi & Montemaggiore, 2008; Hoque & Adams, 2011), banking and insurance (Kaplan & Norton, 1996), hospitality (Elbanna, Eid, & Kamel, 2015), and healthcare (Inamdar, Kaplan, & Reynolds, 2002; Stewart & Bestor, 2000).The study examines the relationship between CSFs for BSC implementation and the organizational performance variables Profitability, Innovation, Total Quality Management, Competitiveness, and Economic perspective, Environmental perspective, and Social perspective. The proposed model is tested using mixed qualitative and quantitative approaches, and a survey questionnaire and interviews are conducted with hospital executive officers, human resources directors, and hospital directors involved in BSC implementation. The findings are important to a theoretical BSC framework, and are therefore relevant to the healthcare sector in the UAE and globally, and to those interested in BSC implementation in any healthcare organization. The results will help executive management to succeed in BSC implementation in the healthcare sector and to enhance the level of healthcare in the UAE.

Impact of Taxpayers' Awareness and Tax Complexity on Tax Compliance in UAE

Huda AlBesher (The British University in Dubai & BUID, United Arab Emirates)

the purpose of this study is to analyze the effect of taxpayers' awareness and tax complexity on the tax compliance level. Understanding the relationship from taxpayers' view will help Federal Tax Authority (FTA) in United Arab Emirates (UAE) to improve tax revenue collection and reduce compliance costs. A significant gap in the literature identified as there is a scarcity of studies which are investigating tax awareness and tax complexity impact on compliance levels in Middle East countries. The research will be carried out using quantitative method; where the data will be

collected via questionnaire from registered taxpayers chosen through simple random sampling. The analysis of the result will be done using multiple linear regressions. Anticipated results will be that taxpayers' awareness has a positive and significant effect on compliance level and tax complexity has negative impact on tax compliance level. The result will be shared with FTA to enhance taxation compliance in UAE.

Financial Strategy and Firm Performance under Different Economic Conditions- Evidence from the UAE
Abdulla AlAwadhi (UAE University, United Arab Emirates)

This study aimed at probing a possible connection between adopted financial strategy and firm's performance. A literature review used to generate a representative pool of eleven variables to measure firm performance under various economic conditions. The variables are categorized as: i) six variables as a proxy for capital structure, and ii) five variables as a proxy for cash flow management; four variables were tested empirically for the first time. An empirical analysis using quarter-based ten years (2006-2015) financial panel dataset of 92 listed public joint stock companies from ten business sectors by applying Hansen model. The GMM and EViews used in performing the panel financial dataset analysis and interpretation. The analysis yielded a robust variance impact on the relationship between adopted financial strategy and different firm's performance measures. This finding supported our assumption: Different adopted financial strategies under different economic conditions are leading to different firm's performance/results.

A4: Business & Management II
Chair: Husam-Aldin Al-Malkawi (The British University in Dubai, United Arab Emirates)

Investing in Research as A Smart Strategy to Drive UAE to A Competitive Knowledge Economy
Amal AlHassani (The British University in Dubai, United Arab Emirates)

Knowledge economy system is the new engine of economic growth by transforming the knowledge into a wealth to be used for developing the countries. This transforming will add more value than the natural resources value in the economic growth. UAE began to understand the rules of this new business game and how it's important for increasing the economic growth. For that, UAE started rapidly transferring into a knowledge economy. This paper addresses two different purposes. First, examine the relationship between knowledge economy and research and development (R&D). Second, analyze how the research as a developer tool in knowledge economy can impact in UAE growth. To know that, mixed qualitative and quantitative approach will be employed to answer the research questions of this paper. The anticipated results after data collection and analysis concentrate will lead to finding that the relationship between knowledge economy and research positively correlates with the economic growth.

Conceptualization of Differences between Entrepreneurs and Non-Entrepreneurs of Undergraduate Emirati Students
Rasha Abou Samra (British University in Dubai & Higher Colleges of Technology, United Arab Emirates); Shaikha Al Naqbi (Higher Colleges of Technology, United Arab Emirates)

Innovation is the transformation of the creative idea into real life project. This research is comparing between the perception of entrepreneurship between the creators of ideas who are still in the process of thinking and those who were able to transfer their ideas to real life projects. Before becoming an entrepreneur and during the first year of entrepreneurship are two critical stages that need further studies. This research is a focus group research which focuses on two groups; the first group is a group of undergraduate students who had creative ideas and worked on transferring those ideas into prototypes and tested those prototypes and the second group is a group of students who took further step to the real life market where they were able to open their business and start gaining returns on their investments. The conclusion of the study shows qualitative differences and the rationalization behind each one.

Social Media Use among Women Entrepreneurs

Sumaiya Ihsan Ul Haq and Norita Ahmad (American University of Sharjah, United Arab Emirates)

This paper will discuss how the gender element plays a key role in the use of social media among the entrepreneurs. Further in the paper, the topic will be narrowed down to the women entrepreneurs in the Middle East region. An in-depth analysis will be conducted through interviews, discussing how social media has equipped the women in the United Arab Emirates (UAE) to become successful entrepreneurs; considering the many challenges they face in the Arab world. In addition, theories such as institutional theory, and Social Interaction Theory (SIT) will be used to understand the (in)effective use of social media by these entrepreneurs.

Occupational Commitment of Women in STEM Fields: The Impact of Coping Self-Efficacy and Role Models

Lama Blaique (British University in Dubai, United Arab Emirates)

With technical innovations being a dynamic force behind economic growth for many countries worldwide, apprehensions are emerging related to the decreasing numbers of individuals who are joining the technical career domains. The under-representation of women in science, technology, engineering and mathematics (STEM) fields drastically reduces the available talent pool that would aid in enhancing technical innovation. The literature still falls short on explaining and uncovering the factors that might contribute to females' persistence and commitment in STEM fields. The aim of this study is to try to understand the factors that might affect female persistence and occupational commitment in these fields through qualitative analysis. Only a small number of researches have attempted to investigate women's persistence in STEM fields from a cognitive perspective, thus a qualitative research is deemed pertinent to try to comprehend the aspects behind the career decisions of persisting women. Our aim is to heighten the attention on the process elements of persistence and occupational commitment of females working in STEM fields. We attempt to shed light on the dynamic approaches adopted by females in STEM fields to overcome occupational challenges. The theoretical framework for this reach is the career self-management model, an updated model of the social cognitive career theory which draws from Bandura's initial cognitive work and attempts to enhance and draw links between previous theoretical domains and career development.

The impacts of different labor legislations on various HR practices within the Holding companies in UAE

Houria Almakki (British University In Dubai, United Arab Emirates)

The present workforce need assurance in future that HR planning must analyze the competence of the current workforce. Comparing future requirements with current workforce abilities will identify weaknesses or surplus. Checking workforce surpluses and deficits human resource must prepare action plans for the workforce {5}This include identifying the type and number of employees needed, employee competency,recruiting,retaining measures,training of employees etc.In theory, both government dictated labour legislations and organization implemented human resource practices should focus on employee well being. The actual practice of these theories is not clear. This study will try to analyse the actual human resource practices of holding companies in UAE and their compliance with the labour laws of the country, Mixed research approach will be used for this study The study will reveal the human resources practices of holding companies in UAE, the reasons why UAE locals avoiding work in Holding companies

A5: Clinical and Health I

Chair: Ghaleb Husseini (AUS, United Arab Emirates)

Targeting Breast Cancer Stem Cells Multi-Drug Resistance by Energy Restriction Mimetic Agents

Dana Zaher (University of Sharjah & Sharjah Institute for Medical Research, United Arab Emirates); Hany A Omar (University of Sharjah, United Arab Emirates)

Breast cancer (BC) is the most commonly diagnosed cancer in women worldwide. Targeting cancer stem cells, the multi drug resistant population, is extremely challenging. The aim of this work was to exploit the mechanistic synergy between Energy restriction mimetic agents (ERMAs) as OSU-CG5 and a conventional chemotherapeutic agent as doxorubicin to counteract cancer multidrug resistance. The generated doxorubicin-resistant breast cancer cells (MCF-7 and MDA-231 cell lines) showed less sensitivity to doxorubicin and an increase in breast cancer CD44+/CD24low cells, in addition to an increase in the expression of ABC proteins. The treatment of these cells with doxorubicin in combination with OSU-CG-5 overcame their resistance and showed a significant synergistic effect. The results suggested that targeting breast cancer by ERMAs could be a rational strategy to minimize their multi-drug resistance, and the combination with classical chemotherapeutic agents may represent a clinically relevant strategy for cancer treatment improving the survival of patients.

A Novel Disease-Causing AMPD2 Variant In A Patient With Pontocerebellar Hypoplasia 9 And Evidence On The Presence Of Potential Pathogenic Variants In Non-Middle Eastern Populations

Hanadi Abdelrahman (College of Medicine and Health Sciences, UAEU, United Arab Emirates)

Pontocerebellar hypoplasia type 9 (PCH-9) is an autosomal recessive neurodegenerative disorder caused by loss of function variants in AMPD2 gene. We clinically evaluated an Emirati patient presented with severe developmental and growth delays. We performed exome sequencing, Sanger sequencing and segregation analysis followed by in silico and in vitro analysis to elucidate the pathogenicity of the variant, we also ran a population ancestry analysis of likely pathogenic variants on ExAC database. We identified the novel mutation (c.1633G>A) in AMPD2 gene. This variant is predicted to be pathogenic using several in silico tools, and resulted in a decrease in the enzyme function in the patient's polymorphonuclear cells (PMNCs) by 82% (95% CI: 73.3-91.7%, p=0.029) compared to control. This data establishes that the affected child is affected by PCH-9. In addition, population analysis of AMPD2 variants confirmed the presence of potentially disease causing mutations in non-Middle-Eastern populations.

Identification of Novel Synthetic Compounds "Chromenes" with Anti-Cancer Activity

Nehla Benhalilou and Hussain El Hasasna (UAE University, United Arab Emirates); Khawlah Athamneh (United Arab Emirates University, United Arab Emirates); Rabah Iratni, Asma Alrashedi and Halima Al Samri (UAE University, United Arab Emirates)

Cancer is the second leading cause of death worldwide. Conventional therapies cause serious side effects. There is an increasing demand to utilize alternative approaches to the prevention of cancer. The objective of this research is to screen and identify new synthetic compounds for breast cancer therapy. We have synthesized newly designed chromenes and tested them for their potential anticancer activities against the triple negative breast cancer (TNBC). They significantly inhibited, in time- and concentration-dependent manner, the viability of the breast cancer cell lines and induced apoptosis as well. Furthermore, cell cycle distribution analysis on chromenes-treated cells revealed that the cell underwent a mitotic arrest confirmed by an increased expression of the M phase specific marker, p(ser10) histone H3. Further investigations are underway to elucidate the molecular mechanism(s) through which chromenes exerts their anti-cancer effects. Our current study provide evidences that chromenes could be a potential therapeutic compounds against the TNBC.

The Role of Iron Regulatory Proteins in Colorectal Cancer Development and Progression

Nesreen Alkhofash, Wael Hasan and Mawieh Hamad (University of Sharjah, United Arab Emirates)

Project Abstract: Cancer cells have truncated iron metabolism which is thought to increase the reactive oxygen species stress that might contribute in colorectal cancers development and

progression. In this paper we investigated the role of 5 iron regulator proteins; Transferrin Receptor 1 and 2, Ferroportin, Ferritin and Catalase, on the development and progression of colorectal cancer (CRC) by Western blot, immunohistochemistry. In addition, we analyzed 2 more proteins that interacted with these iron regulators, affecting the overall iron metabolism process, Heme oxygenase-1 and Hepcidin.

HCT-116 Colorectal Cancer Cells Release Chemokines That Induce The Chemotaxis and Intracellular Calcium Mobilization in NK92 Cell Lines

Noha M. Elemam (University of Sharjah & College of Medicine, Sharjah Institute for Medical Research, United Arab Emirates); Zaidoon Al-Jaderi and Azzam Maghazachi (University of Sharjah, United Arab Emirates)

Natural Killer (NK) cells, innate immune cells with a potential anti-tumor activity, can be used to target solid tumors such as colorectal cancer. In an attempt to increase their migration to tumor sites, drugs such as dimethyl fumarate (DMF) or monomethyl fumarate (MMF) are used to increase chemokine receptors expression and thus chemotaxis. NK92 cells were used where they were found to migrate towards CCL27, CCL28 and CXCL16, proposed chemokine ligands released by colorectal cancer cells. This has been supported by NK92 migration towards the supernatant collected from HCT-116, a colorectal cancer cell line. This migration pattern was enhanced by treatment with 100 µM of DMF or MMF. Additionally, the respective receptors CCR10 and CXCR6 expression were upregulated on NK92 cells upon pretreatment. Therefore, this study highlights the potential of NK cells to be used for cancer immunotherapy by directing them to tumor sites.

A6: Life Sciences I

Chair: Zarook Shareefdeen (American University of Sharjah, United Arab Emirates)

Environmental Problems and Policy Solutions in the Neoliberal Era-A Case Study Of Forests Sustainability

Yusra Abdulrahman (Masdar Institute, United Arab Emirates)

This paper will look into the supremacy of neoliberalism and its impact in both inappropriate and ineffectiveness of managing forests in the private and commercial sector. That has caused the failure of forestry protection thus resulting to high deforestation. In the effort to protect the forests, this paper discusses the need for international convention in the support and facilitation of community forestry which is a successful forest conservation tool in dissimilar countries especially in Africa e.g. Tanzania. The global community has to apply global principles and enforce them locally in order to ensure maximum conservation and protection of the most common features such as forests. This research uses a case study methodology to help address the research objectives and research problems. In order to examine how neoliberalism dominance has constrained collective environmental action, the paper discusses neoliberalism policies particularly in Brazil in the discussion section. This paper reached a conclusion stating that ,the International Forest Policy's main work is to bring up international collective action, which is currently fragmented with no coherent forest conventions existing, keeping in mind that forest are a common pool of resources.

Measurements of Gamma-Emitting Radionuclides in Beach Sand near Barakah Nuclear Power Plant (NPP) Site for Baseline Data Purposes, UAE

Mouza Alrashidi (UAEU, United Arab Emirates); Walid ElMowafi (FANR, United Arab Emirates); Sulaiman AlAbed and Mohamed Eltokhi (UAEU, United Arab Emirates)

The natural radioactivity concentrations of 238U (226Ra),232Th and 40K were estimated in beach sand near Barakah NPP, using gamma spectrometry using HPGe detector. The average activity concentrations of 238U (226Ra), 232Th and 40K are 4.43±3.88,1.68±1.71, and 106.3±7.27 Bq/kg, respectively. In addition, the hazard parameters such as Radium equivalent and absorption dose

were estimated. The current estimated activity concentrations were lower than levels reported in nearby countries and the world average.

Biological Treatment of Sewage Water for Multiple Welfare Purposes

Rana Habib (United Arab Emirate University, United Arab Emirates)

The current research work is carried out for the biological treatment of sewage water for different valuable purposes. Four interconnected ponds were designed for the biological treatment of sewage water to check its suitability for different experimental species. Anaerobic bacteria were introduced into pond 1 to biodegrade the sewage contaminants and to generate methane gas. Aerobic bacteria and phytoremediation plants were introduced into pond 2 for bioremediation purposes. Sand and gravel filter was also applied on pond 2 water to provide biofilm for bacteria and to eliminate left over heavy metals. In Pond 3, Tilapia fish was introduced for bio-filtration and fresh water fish farming. Water from pond 3 directly drained into pond 4 for irrigation purposes. Physicochemical parameters were demonstrated a significant decrease in water turbidity, conductivity, pH and heavy metal concentrations from pond 1 towards pond 4. Similarly, Microbial analysis were identified no major pathogen in the biologically treated sewage water.

C-C Cross Coupling Reactions and Wittig Olefination in One Pot

Areej Elamin (UAEU & uAE, United Arab Emirates)

With semi-stabilized and stabilized phosphoranes , Wittig reactions can be run in combination with C-C cross-coupling reactions such as with the Suzuki reaction. When 2-formylphenylboronic acid is used as substrate, these reactions can be combined with a Heck-reaction and a hydrolysis in one pot.

CO2 Enrichment Affects Ecophysiological Parameters of Maize Plants under Different Water Stress Regimes in UAE

Taoufik Ksiksi (UAE University, United Arab Emirates); Shaijal Thru Ppoyil (United Arab Emirates University, United Arab Emirates); Abdul Rasheed Palakkott (UAEU, United Arab Emirates)

Drought stress mitigating effects of CO2 enrichment were assessed on the growth of maize (Zea mays L.) plants inside a greenhouse in Al Foah, UAE. For the study, maize seeds were planted inside three custom-built plastic cage structures. Each cage was set for one of the three CO2 concentrations: 1000 ppm CO2, 700 ppm CO2, and ambient CO2 (i.e. 435 ppm). Additionally, three water stress treatments, HWS (200 ml per week), MWS (400 ml per week), and CWS (600 ml per week) were applied on two-weeks old seedlings until flowering. The results showed that the total chlorophyll content and stomatal length increased, and stomatal density decreased, under enriched (700 ppm and 1000 ppm CO2), when compared to ambient CO2 concentrations. Overall, maize plants were taller and bigger in drought-stressed enriched (700 ppm and 1000 ppm) CO2 environments. We posit as much as 33% irrigation savings under enriched CO2 concentrations.

Life Cycle Analysis of Conventional, Organic Green-House and Hydroponic Tomato Cultivation Systems in Abu Dhabi

Mona Al marzooqi (Masdar Institute A Part of Khalifa University of Science and Technology, United Arab Emirates); Lina Yousef (A Part of Khalifa University of Science and Technology)

This study compares the environmental impact of the life cycles of three cultivation systems (conventional open field, organic green-house, and hydroponic) for tomato production in the UAE using Abu Dhabi fields as a case study. The burdens associated with all phases of cultivation were considered using 1 kg of loose commercial tomato as a reference point. The study also aims to evaluate the energy and water demands in these phases in order to identify the most sustainable option for the UAE. The life cycle assessment (LCA) inventories were created based on primary data acquired from farm owners and a commercial company planning to set-up operations in Abu Dhabi. The results of the study are aimed to get a better understanding of the costs and benefits

of each cultivation system and the development of best management practices for farming in the UAE.

A7: Industrial Engineering

Chairs: Raid Al-Aomar (Abu Dhabi University & College of Engineering, United Arab Emirates), Noha M. Hassan (American University of Sharjah, United Arab Emirates)

CO2 Corrosion Inhibitor Behavior under Different Hydrodynamic Condition

Ning Wang and Yansong Bai (Khalifa University of Science and Technology, United Arab Emirates)

Influence of hydrodynamic conditions on the film resistance behavior of two corrosion inhibitors was studied using jet impingement apparatus. Linear polarization resistance (LPR) was carried out to obtain a live corrosion data, which depicts the inhibitor efficiency change along with the flow speed and time. Inhibitor efficiency increase firstly and then decreased with the pump speed. On the other hand, electrochemical impedance spectroscopy (EIS) interpreted the details of corrosion behavior. Inductive loops emerged as a negative factor to reduce the film resistance. At last, it's proved that proper change in the inhibitor formation can improve corrosion resistance a lot.

Organizational Culture and Innovation: A Conceptual Relationship and Change Framework

Amir Shikhli (University of Sharjah, United Arab Emirates); Refaat Hassan Abdel-Razek (University of Sharjah, Sharjah, UAE, United Arab Emirates); Salaheddine Bendak (University of Sharjah, United Arab Emirates)

The interrelationship between organizational culture and innovation is rarely investigated. The objectives of this paper are to develop a framework that would determine existing culture and innovation types in any given organization, model the interrelationships between them and help the management to adjust organizational culture to achieve desired innovation type. First step of the framework consists of using the Organizational Culture Assessment Instrument (OCAI), a questionnaire based on the Competing Value Framework (CVF), to determine culture types within the organization, and the Community Innovation Survey (CIS) to determine existing innovation types. Then multiple linear regression analysis is used to find out the interrelationship between them. This framework is validated by implementing it in one of the largest information technology organizations in UAE. The model gave adjusted R2 values ranging between 0.53 and 0.83, which indicate that the model is workable and gives reliable results. The results reveal that for each innovation type there is a recommended combination of the four culture types.

Routing of Autonomous Vehicle

Batool Madani and Malick Ndiaye (American University of Sharjah, United Arab Emirates)

This enormous growth in the market of e-commerce increased the need for solving the Last Mile delivery problem that refers to the process of conveying goods from transportation hubs to a destination in the supply chain management. Autonomous vehicles can be used to make the delivery of the purchased products to the customer. The aim of the paper is to find the optimal routes for small autonomous delivery machine filled with parcels by an autonomous vehicle to minimize the delivery time and increase the delivery efficiency. A classification of system-to-system handover is introduced as well as a review of AVs technologies in Last Mile delivery is presented.

Fault Detection via Nonlinear Profile Monitoring Utilizing Artificial Neural Networks

Ahmed F Mohamed, Mahmoud Awad and Mohammad AlHamaydeh (American University of Sharjah, United Arab Emirates)

Fault detection is the characterization of a normal behavior of a system using a response function or profile of interest, and identification of any deviation from such normal behavior. As system complexity grows, predicting the underlying structure or form of response function becomes

challenging if not impossible. This article presents a data-driven approach for fault detection of complex systems using multivariate statistical process control based on Artificial Neural Networks (ANNs) characterization. In this approach, the quality of a system is characterized where one explanatory variable is adequately explained as a function of the other variables using an ANN model. The vector of weights and biases of the ANN model is monitored using Hotelling T^2 through control charts. The proposed method is tested and compared to existing methods such as polynomial and sum of sine function regression for three cases from the literature. Moreover, it is applied to a 4-story reinforced concrete building that utilizes continuous monitoring to avoid potentially catastrophic failures. The proposed ANN approach outperforms the existing methods for small shifts (deviations) from healthy states. For large and medium shifts, it provides comparable results that are on the conservative side

Optimization of P-Chart For Processes With Multiple Assignable Causes

Emad Aldin M. Abdelkreem and Mahmoud Awad (American University of Sharjah, United Arab Emirates)

Attribute control charts are used extensively in many industries to detect assignable causes for processes. They are particularly useful in service industries and in transactional business processes, because many of the characteristic in those fields are not easily measured on a numerical scale. In addition, several critical-to-quality characteristics can be combined to determine whether to accept or reject the product. The optimization design of fraction non-conforming p-chart has been mainly addressed from either statistical or economic prospective or considering only single assignable cause. In this research, we propose a constrained economic-statistical model for processes with multiple assignable causes to determine the optimum sample size and sampling interval. The model will be validated by comparing it to existing model. A realistic dataset from water filling company is used as a case study as well.

A8: Petroleum

Chair: Nai-Shong Yeh (AUS, United Arab Emirates)

Characterizing the Impact of ZnO and ZnSO4 Smart Brines in Improving Oil Recovery from Carbonate Reservoirs

Mariam Malas (Khalifa University of Science and Technology, United Arab Emirates); Obaid Alhmoudi (Khalifa University of Science, Technology and Research, United Arab Emirates); Islam Elseaday (The Petroleum Institute, United Arab Emirates); Hadi Belhaj (Hadi Belhaj, United Arab Emirates)

The main parameters that can aid in recovering oil are wettability alteration and interfacial tension reduction. Since the majority of carbonate rock reservoirs tend to be oil-wet, altering the wettability can increase the oil recovery. In addition, introducing nanoparticles to the oil and gas industry have shown promising results in the applications of Enhanced Oil Recovery. In order to alter the wettability of the rock surface, it was reported that increasing the sulfate ions is a dominant factor for enhancing the displacement efficiency that increases the oil recovery from the reservoir. Smart brines were prepared using varying sulfate ions from seawater, moreover ZnSO4 were compared with ZnO smart brines. Impact of ZnO and ZnSO4 on wettability alteration, IFT and zeta potential has been analyzed using low concentrations of EDTA. Core-flooding experiments were performed with pre-conditioning of low Mg and Ca brine to compensate for the effect of EDTA with heavy metals. SARA, LC-ICPMS, CT Scanning and XRD analyses were also integrated on a material balance format. The tests employed assessed the potential mechanisms present upon contact of the smart brines with carbonate reservoir rocks in enhancing zeta potential change, wettability alteration and IFT reduction compared to core-flooding performance as a function of PV injected.

Enhanced Dynamic Simulation Assessment of Fracture Propagation in Shale Gas Reservoirs

Abhijith Suboyin (Khalifa University of Science and Technology, United Arab Emirates); Mohammed Motiur Rahman and Mohammed Haroun (The Petroleum Institute, United Arab Emirates)

Augmented by the recent activities in the oil and gas industry, it can be easily said that hydraulic fracturing has become a pivotal component for the successful development of unconventional reservoirs. This tremendous growth has fuelled significant advancements in numerical modeling. This paper describes enhanced dynamic simulation assessment of fracture propagation behavior. Enhanced discrete fracture network methodologies are applied to a shale gas reservoir and investigated with the help of industrial simulators. Fracture parameters along with propagation and interaction behavior between natural fractures and hydraulic fractures are analyzed and quantified. This is followed by verification of the models which further illustrates the accuracy and relevance of the prediction models currently used in the industry. The interaction behavior and quantification of fracture properties are further investigated from the simulation results along with diagnosis of the primary contributors. In addition, a sensitivity analysis is also conducted to examine the hierarchy of the main contributing parameters and their response.

A Multiscale Analysis of Carbon Capture Coupled with CO2-EOR & Storage - A Case Study for the United Arab Emirates

Raphael Santos (Masdar Institute, United Arab Emirates); Ahmed Al Hajaj (Khalifah University, Masdar Institute, United Arab Emirates); Sgouris Sgouridis (Masdar Institute of Science and Tec, United Arab Emirates)

One of the major problems faced by the world lies on how to fight back climate change without disrupting the economy. In a scenario where fossil fuels are still dominant over renewable sources of energy, if development growth is to be maintained, doing a solid and economically viable transaction between sources of energy is primordial. Carbon captured coupled with CO2-EOR & Storage rises as a bridge, in which it would still be feasible to utilize existing fossil fuel infrastructure while addressing the climate change mitigation goals. The focus of this study is evaluate, at a multiscale level, the tradeoffs related to CCS coupled with CO2-EOR & Storage within the United Arab Emirates. The interplay between the reservoir level parameters (CO2 breakthrough time, injection rate, etc.) and the country level aspects (CO2 capture potential, desired oil production, etc.) merits further investigation which has not been previously studied.

Experimental Investigation of the EOR Potential of Chemically Modified Water Flooding in Limestones

Islam Elseaday (The Petroleum Institute, United Arab Emirates); Hadi Belhaj (Hadi Belhaj, United Arab Emirates); Obaid Alhmoudi (Khalifa University of Science, Technology and Research, United Arab Emirates); Mariam Malas (Khalifa University of Science and Technology, United Arab Emirates)

Limestone reservoirs contain almost half of the world hydrocarbon proven reserves with 90% of them detected to be mixed-wet to oil-wet. By linking some reservoir features represented in reservoir management, fluid types, rock types, reservoir vertical and areal heterogeneities and drive mechanisms, it was assumed that more than 50% of oil trapped and bypassed, even after secondary recovery, in carbonate rocks are yet to be recovered. Therefore, different techniques of enhanced oil recovery (EOR) have been introduced to carbonate reservoirs to reduce residual oil saturation (Sor) as much as possible and increase recovery. The suitable EOR technique to be used is selected mainly based on fluid/rock types and initial reservoir conditions. Chemically modified water flooding is one of the most recent and propitious EOR techniques. Recently, many studies suggested that modifying the injected brine chemistry could decrease the residual oil saturation. Various mechanisms behind chemically modified water flooding were suggested but not yet proved. Literature has pointed out that wettability alteration could be the predominant mechanism behind chemically modified water flooding. Other suggested mechanisms include emulsification and entrainment, emulsification and entrapment, IFT reduction between oil/brine interfaces, rock dissolution and electrical double layer expansion. These mechanisms were shown

effective by studying them experimentally. However, the success of the aforementioned mechanisms has not yet been proved in field scale. Understanding these mechanisms is a must. The objective of this research is to thoroughly investigate the negative/positive impact of the synergy between two different types of chemically modified water flooding combined with EDTA on oil recovery in limestones, considering what have been achieved in the literature. The chemicals being used are Sodium Hydroxide and Trisodium Phosphate. Several parameters are varied under controlled laboratory environment to reveal their possible effects. These parameters include oil composition, composition of injected brines, pH and temperature. A detailed oil analysis, including SARA analysis, gas chromatography, acid and base numbers of a crude oil, is performed. XRD and CT-scanning are also conducted to entirely characterize the core plugs used; in order to get a full picture of the rock/brine interactions. Core flooding tests, Amott spontaneous imbibition, zeta potential of crude/brine and rock/brine coupled with effluent analysis are performed to reveal more deep conclusions regarding the optimum conditions at which chemically modified water flooding could yield as best EOR potential as possible.

Characterization of Micro-Scale Fluid Saturation Method in Carbonate by Coupling of MRI & Micro-CT

Omar Al-Farisi (Khalifa University, United Arab Emirates); TieJun Zhang and Aikifa Raza (Masdar Institute of Science and Technology, United Arab Emirates); Hongtao Zhang (Khalifa University, United Arab Emirates)

Knowledge of fluid saturation at any one cross-section is very often required when studying fluid behavior in porous media. It becomes more challenging in case of microscale geometry with heterogeneous morphology, as in complex geological samples. Therefore, to solve deficiency, we used the latest advancement in uCT and MRI imaging in enabling higher resolution of pore network saturation measurement. Our research effort in addressing the challenge has led to a novel solution.

Role of Interfacial Forces in Oil Drop Deformation in Immiscible Ternary Fluids

Hongxia Li (Masdar Institute, United Arab Emirates); TieJun Zhang (Masdar Institute of Science and Technology, United Arab Emirates)

For oil recovery applications, the interfacial interactions for two-phase flow, specifically water/oil interaction with rock, have been extensively investigated with the advances in the mesco-/microscale experimental and numerical research approaches. However, as the key to understanding the water-alternating-gas (WAG) injection, foam injection and other immiscible fluids injections for enhancing oil recovery, the more complicated the interactions among ternary fluids and solid surface is rarely reported. In this work, we target on the ternary fluid system, water, gas and oil, to show the role of interfacial forces in the phase flow behavior and residual oil mobilization under immiscible WAG injection. The lattice Boltzmann model is developed for three-phase flow simulation based on the classical Shan-Chen type multicomponent model. The effect of the gas wettability on the oil mobilization and extraction efficiency is also discussed. This work also offers a methodology in the studying other ternary fluids relevant application, such as oil-infused surface in energy-water nexus and droplet generation in microfluidics.

A9: Electrical & Computer Engineering I

Chair: Mostafa Shaaban (American University of Sharjah, United Arab Emirates)

Video Popularity Prediction Using LSTM for Content Centric Networks

Huda Goian (Khalifa University, United Arab Emirates)

Due to the growing number of Internet users and smart handheld devices, the demand for data-based services increases rapidly over the past several years. Caching-centric networks and caching techniques, such edge caching, have gained numerous attention as they provide efficient and effective methods to maintain a high quality of service. In fact, only a few contents are popular

and win the majority of viewers, thus caching them reduces the latency and download time. In this view, integrating popularity prediction into caching, effectively increases network utilization as well as user satisfaction rate. In this paper, we propose the method based on long short-term memory (LSTM) for anticipating video contents demand. Unlike neural networks, LSTM is capable of finding correlations among training instance and memorizing long and short dependencies. The model hyperparameters are selected using Tree of Parzen Estimators to improve the overall performance.

Blind Channel Estimation for OFDM Systems

Lina Bariah (KUSTAR, United Arab Emirates); Arafat Al-Dweik and Sami Muhaidat (Khalifa University, United Arab Emirates)

This paper presents an efficient blind channel estimation technique for time-varying orthogonal frequency division multiplexing (OFDM) systems. New frame structure is proposed, where different modulation schemes are employed to estimate the time-varying channel coefficients. Amplitude shift keying (ASK) and phase shift keying (PSK) modulation schemes are utilized to modulate particular pair of subcarriers over consecutive OFDM symbols. Exact closed-form expression for the symbol error rate (SER) of the ASK symbols is derived and corroborated with Monte Carlo simulations to evaluate the performance of the proposed technique and compare it with the pilot based OFDM system. Analytical and simulation results show that the proposed estimator can provide estimation with accuracy and computational complexity that are comparable to pilot based estimators.

Streaming Feature Grouping and Selection (SFGS) for Big Data

Noura Al Nuaimi (UAEU, United Arab Emirates); Mohammad Mehedy Masud (United Arab Emirates University & College of Information Technology, United Arab Emirates)

Quintillion bytes of data is created every day from various organizations in real time. The ability to analyze real-time data would benefit these organization to make better decisions and improve their efficiency. However, this objective is less efficient with the traditional machine-learning practices. In this paper, we propose an efficient algorithm for selection of features from a feature stream by online feature grouping. This technique will be useful in big data analytics due to its efficiency and scalability. The main contribution of this research is to solve the issue of the extremely high dimensionality of big data by delivering the streaming feature grouping and selection algorithm. We have implemented this algorithm and evaluated using benchmark dataset against state-of-the-art streaming feature selection algorithms and feature grouping technique. The results showed superior performance in terms of prediction accuracy.

Dynamic Autoselection and Autotuning of Machine Learning Models for Cloud Network Analytics

Rupesh Karn (Masdar Institute of Science and Technology & Mubadala Company, United Arab Emirates); Ibrahim M Elfadel (Masdar Institute of Science and Technology, United Arab Emirates)

Cloud network monitoring data is dynamic and distributed. Signals to monitor the cloud can appear, disappear or change their importance and clarity over time. Machine learning (ML) models tuned to a given data set can therefore quickly become inadequate. A model might be highly accurate at one point in time but may lose its accuracy at a later time due to changes in input data and their features. Distributed learning with dynamic model selection is therefore often required. Under such selection, poorly performing models are retired or put on standby while new or standby models are brought in. In this paper, we propose such methodology for automatic ML model selection and tuning that automates the model build and selection and is competitive with existing methods. In particular, we create a Cloud DevOps architecture for autotuning and selection based on container orchestration and messaging between containers, and take advantage of a new autoscaling method to dynamically create and evaluate instantiations of ML

algorithms. The proposed methodology and tool are demonstrated on cloud network security datasets.

Video Streaming over LTE-Unlicensed

Fatema Aseeri, Mohamed Hassan and Mahmoud H. Ismail Ibrahim (American University of Sharjah, United Arab Emirates)

As the industry prepares for the 1000x mobile data challenge and the resulting spectrum crunch that LTE networks are anticipating in the licensed spectrum, the extension of LTE to the unlicensed spectrum (LTE-U) has been proposed as a promising solution. However, this extension is challenged by the problem of coexistence with incumbent unlicensed systems, especially WiFi. Several LTE channel access mechanisms for enabling fair and friendly coexistence with WiFi have been proposed and evaluated. This paper further explores the design of LTE-U - WiFi coexistence mechanisms from the perspective of video streaming. Specifically, two channel access mechanisms are proposed that take into account the difference in the availability of the LTE licensed and unlicensed channels along with the structure of the encoded video file. The performance of the proposed access mechanisms are evaluated via simulations and shown to outperform the classical Listen Before Talk (LBT) channel access mechanism.

Anomalously Diffusive Random Walk on a Maze - Bio Inspired and Other Methods

Zainab Husain (Khalifa University, United Arab Emirates); Dymitr Ruta (Etisalat British Telecom Innovation Centre, United Arab Emirates); Fabrice Saffre (BT Research and Innovation, United Kingdom (Great Britain)); Yousof Al-Hammadi (Khalifa University of Science Technology and Research, United Arab Emirates); Abdel F. Isakovic (Khalifa University, United Arab Emirates)

Biological movements provide inspiration to solve several real-world problems, resulting in the rise of several bio-inspired optimization techniques. However, to develop an efficient bio-inspired technique, it is necessary to first understand the underlying physical statistics and models. While most biological movements could be generalized as "random" at first glance, deeper empirical studies suggest that the movements in organisms follow a much more complex randomness than a simple Brownian particle movement. This paper first introduces the variations of randomness observed in biological walks and statistical models used to imitate them, and then proposes on a possible tangent of an ant colony inspired biased random walk that could help implement efficient searches in unknown environments.

A10: Civil & Environmental Engineering I

Chair: Mohammad AlHamaydeh (American University of Sharjah, United Arab Emirates)

Parametric Study on ultimate deformation and capacity of Exdended bolted T-stub connections

Ghazanfar Anwar (United Arab Emirates University, United Arab Emirates); Florea Dinu (Politehnica University Timisoara, Romania)

The disproportionate collapse of world trade center in September 11, 2001 is a turning point to study and enhance robustness to prevent progressive collapse of structures. This research aims to study T-stub components of beam-to-column extended bolted end plate connections under quasi-static large displacements for improving robustness. For this purpose, experimental testing and advanced numerical finite element investigations are carried out. Calibration of material model and T-Stub macro components are based on tensile data. Parametric study is carried out for T-stub macro-components with End plate thickness ranging from 10mm to 18mm and distance between the bolts ranging from 90mm to 140mm. It is concluded that numerical models replicate exact behavior of experiment. Parametric study reveals decrease in yield strength and ultimate capacity with increasing distance between the bolts and/or reducing the end plate thickness.

Experimental Investigation on the Flexural Behavior of Square CFSTs

Yosri Abdelmageed and Farid Abed (American University of Sharjah, United Arab Emirates)

The objective of this paper is to investigate the flexural behavior of square CFST beams experimentally using 4 point bending test. The experimental program conducted in this study consists of four CFST beams and two hollow steel beams. The parameters that are considered in the experimental program are the h/t ratio and the compressive strength of concrete. The results of the experimental program were carefully evaluated and showed that the moment capacity of square CFST beams significantly increase with the decrease of the h/t ratio. The results also showed that the compressive strength of concrete has no significance influence on the moment capacity of square CFST beams. Moreover, the moment capacity and the ductility of CFST beams has significantly improved compared with the hollow steel tubes

Using Groove-Epoxy Anchorage Method to Solve Debonding of CFRP Plates Strengthened Concrete Beams

Khalid Mohamed, Jamal Abdalla and Rami Hawileh (American University of Sharjah, United Arab Emirates)

Retrofitting and repairing of deteriorating structures have been done using several techniques. Strengthening of Reinforced Concrete (RC) members in shear with externally bonded fiber reinforced polymer (FRP) plates and sheets has been commonly accepted. It has been observed that de-bonding of the CFRP laminate and other strengthening materials is the most common type of failure. To address this issue many anchorage systems and methods have been developed. In this paper the use of bore-epoxy anchorage (Boring) system has been investigated. A total of five shear deficient RC beams were strengthened with carbon (CFRP) plates using groove-epoxy anchorage with grooves of different widths. The concrete beams were tested under four points bending. The results showed that the groove-epoxy anchorage delayed the CFRP de-bonding and increased the shear capacity of the concrete beams up to 106 % compared to the control beam.

Investigating Bond Behavior of Galvanized Steel Mesh to Concrete Surfaces

Kais Douier, Rami Hawileh, Jamal Abdalla and Waleed Nawaz (American University of Sharjah, United Arab Emirates)

Epoxy and cement mortar adhesives are used to externally bond the GSM sheets to concrete prisms. This research presents experimental results that were conducted to monitor the bond strength between Galvanized Steel Mesh (GSM) sheets and concrete surfaces via mortar and epoxy adhesives. The GSM sheets bonded length was chosen to be 200 mm in length which represents 40% of the prism's length. Three-point bending tests are conducted on the tested specimens and load- deflection response is recorded along the with associated capacity and failure modes. Epoxy and cement mortar bonded specimens failed in cohesive and adhesive modes, respectively. The strengthened specimen bonded with cement mortar was 40% less effective as compared to that bonded with epoxy adhesives. The ductility and strength of the epoxy bonded specimen was significantly higher than the specimens bonded with cement mortar.

Flexure Behavior of RC T-Beams Externally Strengthened with Hybrid Systems

Abubakr Mohammed, Jamal Abdalla and Rami Hawileh (American University of Sharjah, United Arab Emirates)

This paper aims to present an experimental program of three T-section RC beams externally strengthened in flexure with hybrid combinations of Aluminum Alloy (AA), Carbon Fiber reinforced Polymer (CFRP) and Galvanized Steel Mesh (GSM) laminates. Three T-beams with 2Φ12 longitudinal reinforcement were prepared, two of them were strengthened with hybrid laminates and the third one was used as control specimen. Flexure test was conducted on each of the three beams using four-point loading test setup until the failure of the specimens. All specimens failed in flexure and delamination was the controlling failure mode for all the strengthened specimens.

Load carrying capacity of the strengthened specimens increased from 46% to 51% over the control specimen.

A11: Biomedical Engineering I

Chairs: Salam Dhou (American University of Sharjah, United Arab Emirates), Rana Sabouni (American University of Sharjah, United Arab Emirates)

Ultrasound Enhanced Release of Transferrin Coupled Liposomes as Drug Delivery Carriers in Cancer Treatment

Nour AlSawaftah and Paul Kawak (American University of Sharjah, United Arab Emirates); Ghaleb Husseini (AUS, United Arab Emirates); Nahid Awad (American University of Sharjah, United Arab Emirates)

Liposomes are nano-sized particles capable of providing efficient and site-specific delivery of therapeutic anticancer drugs. Further improvement to these nanocarriers can be achieved by attaching receptor-specific ligands to the surface of the liposomes to enhance selective delivery to tumor cells and limit adverse off-target effects. Our research focuses on the synthesis of transferrin (TF)-poly-ethylene glycol (PEG)-liposomes encapsulated with the model drug calcein and studying the effects of low- frequency ultrasound, applied at different power densities, on calcein release.

Investigation of the Effectiveness of Plasminogen on Liposomes to Target Breast and Colo-Rectal Cancer Cells for Drug Delivery

Afifa Farooq and Sana E Zehra Murtaza (American University of Sharjah, United Arab Emirates); Ghaleb Husseini (AUS, United Arab Emirates); Nahid Awad (American University of Sharjah, United Arab Emirates)

Conventional treatment of cancer involves chemotherapy which leads to many adverse side effects in patients. To minimize these effects, drug delivery systems involving the use of liposomes as nanocarriers have been developed along with ligand-targeting and ultrasound as an external stimulus to ensure site-specific, and fast release of drugs. The proposed research aims to target breast and colorectal cancer cells by employing plasminogen-receptor mediated endocytosis. To achieve this, liposomes attached with plasminogen shall be synthesized and characterized using dynamic light scattering, as well as Stewart and Bicinchoninic assays. The drug release at high and low ultrasound frequencies shall be studied and then modeled.

Anti-cancer Drug Delivery Using a Novel Fe-NDC-MOF Nanocarrier

Mihad Ibrahim (American University of Sharjah, United Arab Emirates); Ghaleb Husseini (AUS, United Arab Emirates); Rana Sabouni (American University of Sharjah, United Arab Emirates)

This paper reports the use of a new nano-metal organic framework (nanoMOF), named Fe-NDC-MOF, as an anticancer drug carrier. Fe-NDC-MOF particles were prepared from iron nitrate and 2,6-naphthalenedicarboxylic acid using the microwave irradiation method. They have dimensions of 50-80 nm × 300-450 nm with pore diameters of 14.855 nm. Calcein disodium salt (a fluorescent model drug mimicking antineoplastic agents) was loaded successfully in this MOF with high loading efficiency (99.15%) and capacity (43.27 wt.%). Moreover, Fe-NDC-MOF managed to entrap Doxorubicin hydrochloride (DOX.HCl, a widely used chemotherapeutic drug) in an attempt to alleviate its serious side effects on healthy cells (especially cardiotoxicity). The encapsulation efficiency and capacity were found to be 67.5%, and 11.8 wt.%, respectively. It was concluded that, Fe-NDC-MOF can be utilized to design smart targeted anticancer drug delivery systems.

Solution Stability of Biological Coatings for Nanoparticles

Nahla Rizk and Matthew Martin (Khalifa University, United Arab Emirates)

Nowadays, gold nanoparticles (AuNPs) are integrated into many biological systems like in vitro and in vivo imaging, cancer therapy, and drug delivery. The stability of AuNPs as drug carriers in a drug delivery system is poorly investigated which could result in less efficient treatments. Coating

AuNPs with different biological coatings can have different optical, thermal, and chemical properties which results in variant stability limits in different environments. Investigating the adsorption process of biological coatings on the surface of AuNPs is essential to control the biological interactions of functionalized AuNPs. The goal of this project is to study the stability of coated AuNPs in different environmental. The biocompatible coatings of AuNPs used are polyethylene glycol (PEG), and polyvinylpyrrolidone (PVP). In this project, the coated AuNPs are destabilized with different concentrations of different acids, salts, and bases, and the changes can be measured using UV-Vis light, and dynamic light scattering (DLS).

The Effect of Ultrasound on the Drug Delivery of Arginine-Glycine-Aspartic Acid Peptide-Targeted Liposomes to Cancer Cells

Mohamad Mahmoud (American University of Sharjah, United Arab Emirates); Ghaleb Husseini (AUS, United Arab Emirates)

Approaches used to treat cancer, with the most prominently used being chemotherapy, have detrimental effects on patients' health. Doxorubicin, a chemotherapeutic agent, alters normal cellular functions and can cause many fatal side effects, such as cell loss and congestive heart failure. Smart Drug Delivery Systems (DDS), such as liposomes, is a novel approach which can deliver a cytotoxic agent into the tumor without affecting healthy cells. Liposomes are nanocarriers capable of delivering an encapsulated cytotoxic agent, such as Doxorubicin, to specific tumor tissue or organ. A moiety, such as an RGD motif, can be attached to the liposome's surface. This modification increases the efficacy of such liposomes by actively targeting specific receptors which are overexpressed in certain types of cancer cells. Ultrasound waves can be used to trigger the liposomes into releasing their encapsulated content, such as the chemotherapeutic agent, at the tumor site. The triggered release of these liposomes is to be studied using low frequency (20kHz) ultrasound, at several power densities, by monitoring the fluorescence of a model drug (calcein). The presentation will outline the preparation of the smart DDS (liposomes), evaluate its success as a nanocarrier, as well as its stability and storage, and analyze its drug release and sensitivity to ultrasound.

A12: Chemistry & Chemical Engineering I

Chair: Basim Abu-jdayil (UAEU, United Arab Emirates)

Brine Treatment with Layered Double Hydroxide

Abdallah Dindi, Dang Viet Quang, Enas Muen Nashef and Mohammad Abu-Zahra (Masdar Institute of Science and Technology, United Arab Emirates)

CO2 utilization has the potential to support the deployment of CO2 capture technologies through the sale of CO2 based products. This work will evaluate a novel process which combines CO2 utilization with the treatment of reject brines. This is accomplished with the use of a calcined layered double hydroxide (Mg-Al-OH) to remove Cl- from the brine giving an alkaline solution which is then bubbled with CO2 to produce sodium bicarbonate. The sorbent is re-generated via ion exchange. This process holds promise as it is able to address two environmental problems while generating valuable chemical products.

Metal Organic Frameworks as a Promising Adsorbent for the Removal of Micropollutants (Methyl Orange)

Abdollah Karami, Rana Sabouni and Ahmed Aidan (American University of Sharjah, United Arab Emirates)

The removal of the anionic dye methyl orange (MO) from aqueous solutions is investigated in batch setup using new class of porous material called metal organic frameworks (MOFs) as promising potential adsorbents. The experimental work examines the adsorption kinetics and thermodynamics of MO on three MOFs including: Cu-BTC, ZIF-8, and Fe-BTC. The preliminary results show that at the same MO initial concentration (15 mg/L) and same amount of adsorbent

(100 mg), Fe-BTC has the highest removal efficiency of 97%, followed by ZIF-8 (60%), and finally Cu-BTC (50%). In addition, the kinetic study shows that adsorption of MO on all three adsorbents followed a pseudo-second-order kinetics model with regression constant (R2) in the range of 0.996 - 1.000. All experiments were performed at room temperature (25 °C) and pH of 5.3.

Carbon Nanofibers from Renewable and Waste Resources for Wastewater Treatment

Efstratios Svinterikos (United Arab Emirates University, United Arab Emirates); Mohamed Al-Marzouqi (UAEU, United Arab Emirates); Ahmed Soliman (Supervisor, Egypt); Ioannis Zuburtikudis (Abu Dhabi University, United Arab Emirates)

The utilization of inexpensive renewable and waste resources for producing high added-value products can have positive implications in the sustainable economy of the future. This concept has been the main motivation behind our research, which focuses on the development of versatile adsorbents from inexpensive bioresources and waste feedstock. In this project, lignin, an abundant natural polymer, was blended with recycled poly(ethylene terephthalate), a widely used commodity plastic, and spun into nanofibers of controlled diameter via the electrospinning technique. The nanofibers were carbonized and activated under N2 and CO2 respectively at 600 oC, and transformed into activated carbon nanofibers (ACNFs). These ACNFs have a mesoporous structure with BET surface area around 314 m2/g and average pore width 6.7 nm. The ACNFs were treated with HNO3 in order to increase their active sites for adsorption. Their adsorption capacity was assessed through batch adsorption experiments, for the removal of Pb2+ from aqueous solutions. The ACNFs exhibited an adsorption capacity of 23.75 mg/g.

Nanoporous Functionalized Mixed Matrix Membranes for Water Treatment

Adewale Giwa (Khalifa University, United Arab Emirates)

Rather than use a 3-stage membrane separation system (i.e. MF, UF, and RO process in succession), this project seeks to develop a 1-stage nanofiltration (NF) system to reduce energy consumption and cost. The NF membranes are mixed matrix membranes (MMM) consisting of functionalized fillers from emerging nanomaterials in wastewater treatment - graphene oxide, cyclodextrin and polydopamine - that can simultaneously remove heavy metals, organics, microbes, and suspended solids. These functionalized nanofillers are incorporated into a polyethersulfone (PES) polymer matrix. So far, the highest water flux of 157 LMH has been obtained from the MMM consisting of cyclodextrin nanofiller functionalized with positively charged polyetherimide. Unexpectedly, this membrane also gave the highest rejection of trace contaminants from the treated wastewater, i.e. 90% of trace COD, 88% of trace Fe2+, 92% of trace Cr6+, and 91% of trace Zn2+. Meanwhile, the membranes functionalized with maleic acid and chitosan have shown higher structural integrity due to crosslinking action of these molecules.

Impact of Water Quality on Cooling Systems in the UAE

Afra Alkatheeri and James McElhinney (Khalifa University of Science and Technology & Masdar Institute, United Arab Emirates); Ayesha Al Marzouqi (Masdar, United Arab Emirates)

Cooling takes up to seventy percent of the power produced in the region, with much of this cooling provided by district cooling systems (DCS). In cooling systems, water provides the main heat transfer medium. Hence, the cooling industry takes up a considerable share of the water demand in the country. The large energy and water requirements for DCS function has prompted a great motivation towards optimizing DCS systems. The effective treatment of cooling water would minimize the issue and limit the consumption. Here, the impact of water quality on DCS performance has been investigated, across several systems in the country, through testing its chemical and biological parameters. The findings show that the system makeup water is clean across sites and the extent of its deterioration is site specific. Following steps will evaluate ultrafiltration as a potential treatment strategy for process water reuse in local DCSs.

A13: Chemistry & Chemical Engineering II

Chairs: Ioannis Zuburtikudis (Abu Dhabi University, United Arab Emirates), Muhammad Zafar Iqbal (UAE University, United Arab Emirates)

An Investigation of Anodic Adsorption Corrosion Inhibitors' Film Persistency with Batch Treatment by Electrochemical Techniques

Yansong Bai (Khalifa University of Science and Technology, the United Arab Emirates); Ning Wang (Khalifa University of Science and Technology, United Arab Emirates)

The carbon dioxide (CO2) internal corrosion of carbon steel (CS) pipeline has been one of the major issues in the oil and gas industry. In this work, some electrochemical techniques, such as Electrochemical Impedance Spectroscopy (EIS) and Linear Polarization Resistance (LPR), have been employed to study the film persistency of 3 anodic adsorption corrosion inhibitors (CI) on 1080 CS samples in stirred cells. 1% wt. NaCl solution was used with bubbling CO2 in the system. The results indicate that all of the 3 CIs' protection degrade to platform values after a film formation process and CI-A performs much resistant than the others. However, the maximum inhibition resistance—6.13 kohms comes from CI-B. The corrosion resistance data collected from the LPR and EIS are in good agreement.

Development of Polymeric Composite Material based on Bauxite Residue

Maissa Adi, Fatima Al Ghaferi, Sara Alyahyaee, Maryam Aljabri and Basim Abu-jdayil (UAEU, United Arab Emirates)

There are several advantages, either environmental or economical, of using waste-based composites over ordinary composites. This study aims to provide a preliminary evaluation on the possibility of using the bauxite residue (BR) as a filler in thermoset matrices of an insulating material to reduce the heat loss in buildings. Bauxite residue (BR) is a primary waste in alumina refineries. Unsaturated polyester blended with the filler with a given (BR) concentration (0-60 vol.%) was transformed into solid upon thermoset process. The solid samples produced have been then subjected to different physical and mechanical tests to come up with a product formulation having optimum properties. The results revealed that the BR proved to be a good filler that can be used with unsaturated polyester to produce stable composite. The low value of thermal conductivity (0.08-0.149 W/(m.K)) and very low water retention (< 1.65%) of BR-polyester composite showed promise for constructive applications as a thermal insulator.

Polymer Membranes Based on PTFE/PANI/ Ionic Liquids (IL) for High Temperature PEM Fuel Cells

Ahmed Haddad (Graduate, United Arab Emirates); Amani Al-Othman, Norhan Youssef, Paul Nancarrow and Yehya El Sayed (American University of Sharjah, United Arab Emirates); Hanin Mohammed (Graduate, United Arab Emirates); Mohammad Al-Sayah (American University of Sharjah, United Arab Emirates)

As the world turns its eye to the adverse effects of burning fossil fuels in our everyday application, the search for alternative, sustainable and renewable sources of energy is of high interest. Among these, Proton Exchange Membrane Fuel Cells (PEMFCs) are receiving considerable attention. DuPont's perfluorosulfonic acid membrane (Nafion) is the current most successful membrane for PEMFCs. Nafion depends solely on the presence of water molecules necessary for proton conduction [1]. Its conductivity is around 0.1 S cm-1 [2]. PEMFCs usually operate at temperatures around 80 °C [2]. Increasing the operating temperature (T>1200C) enhances the fuel cell performance in many ways: It increases the kinetics of the redox reactions, reduces catalyst poisoning by CO, higher chance of recovering useful heat as well as solving the problem of accumulated water in the cathode [3,4]. However, high temperature operation is not permitted with the current perfluorosulfonic acid (Nafion) membrane. It dehydrates at temperatures higher than 100 °C and its proton conductivity dramatically decreases. For example, , Nafion conductivity decreases from 0.066 to 0.00014 S cm-1 at 30°C when the relative humidity (RH) decreases from 100% to 34% [5]. Furthermore, the low glass transition temperature of Nafion (110 °C) is

problematic because above this point the polymer loses its mechanical stability and degradation eventually occurs [6]. Several studies were performed in the literature to either modify existing Nafion membranes or develop a new class of membranes as alternatives for Nafion. Solid proton conductors were proposed in this research. Zirconium phosphate (ZrP) was investigated as a proton conducting material [7]. Zirconium Phosphate was modified with Glycerol. ZrP was prepared by the reaction of Zirconium oxychloride solutions with phosphoric acid. Glycerol was used to modify the ZrP material. The modified ZrP material was then evaluated for proton conductivity using Electrochemical Impedance Spectroscopy (EIS). The preliminary experimental results indicated a higher conductivity compared to the modified ZrP on its own and that is mainly due to the addition glycerol. The second stage of the experimental work will focus on the synthesis of composite membranes based on ZrP and Glycerol. Polyaniline (PANI) and polytetrafluoroethylene (PTFE) are proposed as polymer supports. Polyaniline is a hydrophobic good conducting polymer that is formed from the polymerization of aniline followed by doping with sodium dodecyl sulfate (SDS) to modify its morphology and make it hydrophilic [8]. Initially, the polymerization of polyaniline on polytetrafluoroethylene (PTFE) alone has been conducted and promising conductivity results were obtained in the order of 10-5 S cm-1. Future work will aim at investigating ZrP. Glycerol and PANI supported on PTFE.

Catalytic and Photocatalytic Activity of CRGO-Cufe2o4 towards Phenol Degradation

Israa OThman and Mohammad Abu Haija (Khalifa University of Science and Technology, United Arab Emirates); Fawzi Banat (The Petroleum Institute, United Arab Emirates)

CRGO-CuFe2O4 was prepared using co-precipitation method and annealed at 400 oC and 500 oC. The prepared ferrites were characterized using XRD, FTIR and SEM to investigate the catalysts structures, chemical composition, purity, morphology and particle size. The photocatalytic and non-photo-catalytic activity of the catalysts were tested toward phenol degradation using high phase liquid chromatography (HPLC) to measure the phenol and its by-products presented in the reaction system.

Polymer Composite Paper: An Alternative to Wood-based Paper

Sidra Ahmed (United Arab Emirates University, United Arab Emirates); Ali Al-Marzouqi (UAEU, United Arab Emirates); Muhammad Zafar Iqbal (UAE University, United Arab Emirates)

The first use of paper dates to 2nd Century (BC). The consumption of paper worldwide has increased by 400% in the past 40 years leading to a rise in deforestation and consequently the global warming. This research focuses on developing calcium carbonate (CaCO3)/polymer composite sheets (paper) instead of the traditionally used wood fiber-based paper with higher mechano-chemical durability. The main aim of this research is to optimize CaCO3 and polymer contents, and their processing conditions for continuous manufacturing of polymer-based papers. Herein, CaCO3/polymer composite sheets with different compositions and their characterization using differential scanning calorimeter and thermogravimetric analyzer, will be presented.

A14: Mechanical Engineering-1

Chairs: Abdel-Hamid Ismail Mourad (Unietd Arab Emirates University, United Arab Emirates), Maen Alkhader (American University of Sharjah, United Arab Emirates)

Numerical Modeling of Solid Particle Erosion in Curved Converging Channel

Xijie Liu (The Petroleum Institute, a part of Khalifa University of Science and Technology, United Arab Emirates); Yit Fatt Yap (The Petroleum Institute, United Arab Emirates); Sami Ainane (The Petroleum Institute, a part of Khalifa University of Science and Technology, United Arab Emirates)

Solid particle erosion is considered as one of the major concerns in engineering applications which can lead eventually to failure of components and potentially result in hazardous catastrophic

consequences. The present work aims to investigate erosion in the curved converging channel. The model consists of three modules: Fluid Transport, Particle Transport and Particle Erosion. For Fluid Transport, Reynolds-Averaged Navier-Stokes (RANS) equations with standard k-ε turbulence model are used to model the flowing fluid. For Particle Transport, the particles are treated as dilute discrete phase and their trajectories are obtained through Discrete Particle Modeling (DPM). Turbulence dispersion and particle-wall rebound interaction are also modeled. Then for Particle Erosion, Oka erosion model is selected to compute the erosion rate. The results show that the maximum erosion rate increases sharply as the converging ratio decreases.

Analytical Model for a Laminated Shape Memory Alloy Beam with Piezoelectric Layers

Nguyen Viet (Khalifa University, United Arab Emirates)

We propose an analytical model for a laminated beam consisting of a superelastic shape memory alloy (SMA) core layer bonded to two piezoelectric layers on its top and bottom surfaces. The model accounts for forward and reverse phase transformation between austenite and martensite during a full isothermal loading-unloading cycle starting a full austenite in the SMA layer. In particular, the laminated composite beam has a rectangular cross section and is fixed at one end while the other end is subjected to a concentrated transverse force acting at the tip. The moment-curvature relation is analytically derived. The generated electric displacement output from the piezoelectric layers is then determined using the linear piezoelectric theory. The results are compared to 3D simulations using finite element analysis (FEA). The comparison shows good agreement in terms of electric displacement, in general, throughout the loading cycle.

Moisture Effect on the Notch Sensitivity of CFRP Composites

Mostafa Elyoussef, Wael Abuzaid and Maen Alkhader (American University of Sharjah, United Arab Emirates)

Carbon Fiber reinforced polymer (CFRP) composites are increasingly replacing metallic alloys in critical components of many applications. However, structural components made of composite materials often involve features such as drilled assembly holes. These induce stress concentrations in their vicinities and can reduce the overall load carrying capacity of the components. Damage resulting from such geometric features in CFRP composites has been extensively studied. Nevertheless, few works have investigated the behavior of notched CFRP composites under different environmental hazards. Accordingly, this work investigates the cooperative deteriorative effects of notches and moisture on CFRP composites. Tensile tests are conducted on aged and un-aged samples with circular hole to assess the notch-moisture potential synergy. Digital Image Correlation technique is employed to measure the full-field strains during tests.

Multi-objective Structural Optimization of Sandwich Structures Using Isight

Mohammed Saad (American University of Sharjah, United Arab Emirates); Ammar Ahmed (American University of Sharjah, United Arab Emirates); Mohammad Nazzal and Maen Alkhader (American University of Sharjah, United Arab Emirates)

The demands for material with high strength to weight ratio is rapidly increasing. Sandwich structures are a group of composite material structures that are fabricated to have light weights, relatively high strengths and good dynamic properties. The purpose of this work is to optimize the performance of different configurations multilayer honeycomb structure including hexagonal, triangular and a combination of both, under out-of plane compressive and three-point-bending loadings. The optimization was conducted using ABQUS ISIGHT tool, which is a powerful optimization tool that uses the genetic algorithm optimization technique. The results showed that the single layers is the optimum configuration for buckling resistance in terms of magnitude, while increasing the number of layers influences the buckling modes regardless of the buckling load. Also, it was found out that increasing the number of layers increases the flexural rigidity of the structure.

Full-Field Characterization Technique to Evaluate Recovery of Shape Memory Polymers

Mohamad ElMaoud, Wael Abuzaid and Maen Alkhader (American University of Sharjah, United Arab Emirates)

Shape memory polymers (SMPs) continue to capture interest of the aerospace industry due to their unique properties. Compared to shape memory alloys, this class of smart materials is lighter in weight and can undergo significantly larger recoverable deformations. Despite significant work on characterizing mechanical and recovery properties of shape memory polymers, studies lack full field characterization of local recovery properties. In addition, the focus has been on SMPs having low transformation temperatures below 100 ˚C. However, certain aerospace applications require SMPs with higher transformation temperatures to prevent undesirable actuation. This work aims to provide a full-field characterization technique to evaluate the recovery of a high temperature thermoset SMP.

Optimization of Process Parameters for Reducing the Wear Rate of Metal Matrix Composite Using Taguchi Technique

Amir Hussain Idrisi (United Arab Emirates University, United Arab Emirates); Abdel-Hamid Ismail Mourad (United Arab Emirates University, United Arab Emirates)

This paper presents the wear behaviour of the AMC (reinforced with micro (5%, 10%) and nano (1%, 2%) particles) fabricated using stir casting process was investigated under different conditions of applied load (10N, 20N, and 30N), operation time (30 mins, 60 mins, 90 mins, and 120 mins). The analysis carried out at room temperature under the constant speed of 1450 rpm. The effectiveness of nanoparticles as compared to microparticles also satisfied by using the statistical technique. For optimization of wear parameters, Taguchi's method was used. An L27 Orthogonal array was selected for analysis of the output. Furthermore, a regression equation was developed for AMCs reinforced with nano and microparticles individually. The "smaller is better" characteristic was chosen as the objective of this model to analyse the wear resistance. From this research, it is observed that experiment time and applied load have the significant effect followed by SiC wt. % for microparticles, whereas for nanoparticles, experiment time and SiC wt. % have the significant effect followed by applied load. Finally, the experimental results were validated by the confirmation tests based on available experimental data.

Sessions: B1–B14

B1: Humanities & Social Sciences III
Chair: Kristen Highland (American University of Sharjah, United Arab Emirates)

Effectiveness of Task- Related Learning and Assessment of an Employee with Cerebral Palsy at a Government Organization in Dubai
Samia Dhaoui (British University in Dubai, United Arab Emirates)

Workplace learning is a concept that is gaining importance because of its effect on the employees and the organization as a whole. In parallel, employing persons with disabilities is at the forefront of the UAE government agenda, which necessitates the provision of equal opportunities of learning and development to all, including employees with disabilities. However, the definition of both learning in relation to performed tasks and assessment of the acquired learning are still not well tackled and thoroughly understood vis a vis employees with disabilities. This paper presents a case study of a male employee with cerebral palsy to explore his task- related learning and how it is assessed, in the context of a government organization in Dubai. The experience of the employee was analysed by means of interviews, and document analysis. The findings show positive development in the employee's learning because of the supervisor's and colleagues' roles, the thoroughness of assessment, and the consideration of the employee's strengths, weaknesses, and interests in the task planning. Further improvement could be achieved from applying more employee self-assessment and reflection; supervisor's training to a more facilitating role, and assessment of the physical, informational, and structural environment of the organization.

The Downsides of Using Work-Based Emails for regular and Ongoing Communication In Schools
Lutfieh Rabbani (United Arab Emirates University, United Arab Emirates)

During the last two decades, Email hasn't become only a primary tool of communication, but also an integral part of any organization, including educational systems. Although Email has proved to encompasses much of benefits, however, it has a dark side too. What brought this issue into attention is that the management of this dark side in terms of Email usage and downsides is a major challenge and an international wide-spread concern.Therefore, this study was conducted to investigate the downsides of using school Emails for regular and ongoing communication from teachers perspectives in private schools in UAE. An additional goal of the current study was to explore the existing regulations exercised by school leaders in order to manage these downsides in an attempt to develop important practical implications which can serve as a foundation for "Email code of conduct".

The Relationship between Supervisor Interpersonal Approaches and Graduate Student Satisfaction at One University in the United Arab Emirates
Dalal Aldosari (United Arab Emirates University, United Arab Emirates)

This study is concerned with graduate students' thesis/dissertation supervisors' interpersonal approaches. As its framework, the study adopted Glickman, Gordon and Ross-Gordon (2013) four approaches to supervision: directive control, directive informational, collaborative, and non-directive. The purpose of this explanatory mixed method study is to describe students' perceptions of the approaches used, their satisfaction with these approaches. The study was conducted by distributing a questionnaire to all graduate students at one of the United Arab Emirates universities who have written a thesis/dissertation during 2015-2017 (N=213), and then, interviewing a group of them (N=16). The study revealed that the most used supervisory approach by the supervisors was the collaborative interpersonal approach. The level of graduate students' satisfaction with their supervisors' approaches was satisfied to highly satisfied. The more collaborative the supervisor was, the more satisfied the student became. In contrast, the more supervisor uses the non-directive interpersonal approach, the less satisfied students became.

Adopting Online Learning Systems in Lebanese Higher Education: Prospects and Barriers

Nessrin Shaya (British University in Dubai, UAE)

The main purpose of this mixed-method research study is to obtain a finer-grained understanding of the primary opportunities and barriers to adopt and accredit online learning in Lebanon, then offer a strategic plan for successful implementation. It aims to (1) reflect on the current status of online education in higher education, (2) examine the readiness amongst students and faculty members for online technologies, (3) explore the perception of other key stakeholders, and (3) investigate the prospects and challenges further to the systematic implementation of pioneering post graduate online diplomas. It is anticipated that the findings will bring about an urge for institutional adoption of online learning in higher education, and a proposal for national accreditation in Lebanon that comprises dynamics of change, perceived barriers, offered solutions and possible policy options.

The Challenges of Developing Inclusive Curriculum for Gifted Students in the United Arab Emirates

Maqsoud Kruse (British University in Dubai (BUiD), United Arab Emirates)

The objective of the paper is to map the challenges associated with developing inclusive curriculum for gifted students in the UAE and provide practical suggestions in order to develop an effective and inclusive curriculum that addresses the specific needs of gifted students within mainstream educational environments. Several questions were explored and multiple approaches were highlighted in an attempt to provide analytical, conceptual and empirical dimensions to the mapping effort of current challenges and future prospects of gifted education curriculum design and development. The outcome of the exploratory endeavor of the paper yields key conclusions and practical recommendations in four categories as the following: (1) policy consideration for gifted education; (2) licensure and qualifications for gifted education practitioners; (3) curriculum innovation, inclusion and cultural considerations; and, (4) gifted education and psychological science. In conclusion, active advocacy for giftedness and gifted education is necessary for the advancement of giftedness education and research.

Engineering Students' Perceptions of Flipped Learning

Raghad Nihlawi, Hazim El Baz and Cindy Gunn (American University of Sharjah, United Arab Emirates)

This research investigates engineering students' perceptions of flipped learning at American University of Sharjah (AUS). Two undergraduate and three graduate engineering classes were involved in this study. A mixed method design is utilized involving the collection and analysis of quantitative and qualitative data. The Revised Community of Inquiry framework (RCOI) was adopted to assess students' perceptions of their learning experience. Further, open-ended questions were adopted to get additional insight into the students' perceptions. In this paper, a discussion of the preliminary data analysis of how the students perceive the flipped learning environment will be shared.

B 2: Humanities & Social Sciences III

Chair: Mai Zaki (American University of Sharjah, United Arab Emirates)

Readdressing the Translation of Arabic Conjunction waw al-este'naf in the Glorious Quran

Mariam Ismail (American University of Sharjah, United Arab Emirates)

The main concern of this paper is to examine the notion of conjunction in both Arabic and English. It also seeks to assess the accuracy of the translations of the selected conjunctive waw al-est'enaf offered by two of translators of the glorious Quran; M. M. Pickthall and Muhammad Mahmoud Ghali. Surat Ya-seen has been chosen for the assessment. The adequacy of the translations of this conjunctive under investigation will be assessed in terms of its interpretation by Ibn-Ashour. The study concludes that translating the resumptive wa (waw al-este'naf) in the Quranic text is not

quite easy because of the inability of some translators to recognize the functions of conjunction wa, their tendency to translate the conjunction wa out of context, or their inattentiveness to most of the linguistic and exegetical works pertinent to conjunction wa.

Problems Encountered in Translating Public Signs

Aisha Uqba (University of Sharjah, United Arab Emirates)

This study investigates the errors committed in translating public signs. The major bulk of the study is based on a corpus of around 300 public signs collected from road signs, shop signs, advertisement brochures, and shopping receipts. It aims at identifying, analyzing, and remedying the errors found in the translation of public signs. The study analyses the types of errors present in public signs and categorizes them according to three groups: lexical, grammatical, and orthographic errors. The study then suggests possible translations and solution strategies to translate them. The study found that public signs constituted an immense source of faulty translations that reflected the translators' incompetence in the field of translation and language studies. Most of the errors identified in the study related to the translators' lack of knowledge of the source and target language in terms of lexis, syntax, and structure. Finally, the study suggested possible remedies and solutions to prevent these errors from reoccurring in the future. Furthermore, the study suggested that further research is needed in order to identify other types of translation errors in public signs and highlighted the dire need to implement a code of conduct and ethics for the translation of public signs in the middle East.

A Comparative Examination of Two Arabic Translations of John Steinbeck's Novella, the Pearl, with a Special Emphasis on Culture Specificity

Suzan ElShabrawy (University of Sharjah & UAE, United Arab Emirates)

This paper aims to conduct a comparative examination of two Arabic translations of one of Steinbeck's masterpieces The Pearl by Mahmoud Hosni (2017) and Mostafa Ali (2010). The comparative study intends to compare and contrast the two Arabic translations as it seeks to identify the culture-specific items based on Newmark's (1988) categorization, viz., ecology, material culture, social culture, organizations, customs, ideas, gestures, and habits, in addition to their translations in each version. Moreover, exploring the translation strategies adopted by each translator in rendering CSIs in The Pearl, based on Newmark's (1988) taxonomy of strategies, i.e. transference, naturalization, cultural equivalent, functional equivalent, descriptive equivalent, componential analysis, synonymy, through-translation, shifts or transpositions. Determining whether each translation applied one of Venuti's (1995) taxonomy of strategies, i.e. foreignization or domestication, according to the translation strategy used to find out which one is more domesticated; i.e. TL-oriented and which is more foreignized; SL-oriented.

Translators Vs Technology: Winner stands alone? A Need for a Collaborative Model

Ahmed Towman (American University of Sharjah, United Arab Emirates)

Ever since Translation and Interpreting were recognized as standing professions, Linguists have always paid close attention to technological advancement in order to explore opportunities for improving such rapidly changing and volatile field. Not only were translation subject-matter experts keen on coping with technological progression, rather their interest has grown over the years to seek innovative approaches to utilize technology for translation purposes. Fierce debates have sparked between Pro-Automation advocates and anti-tech Traditionalist's mindset of translators, the latter arguing against the poor quality translation produced by such systems that rely solely on Artificial Intelligence. It soon became obvious that, instead of elimination, there needs to be a balance between humans and machines in the translation process, in order to optimize performance. Whereas technology-aided tools enhance translators' efficiency, the human element proved to be fundamentally crucial and, somewhat, indispensable in all translation or interpreting related activities.

B3: Business & Management III

Chairs: Valerie Lindsay (AUS, United Arab Emirates), Stephen Wilkins (The British University in Dubai, United Arab Emirates)

Directors' Engagement with Corporate Purpose: the Case of Multinational Corporations

Selina Neri (The British University in Dubai & Hult International Business School, United Arab Emirates)

This paper presents an extract of the literature review, research agenda and initial conceptual framework for a doctoral thesis investigating how directors of multinational corporations (MNCs) engage with corporate purpose.In a twenty first century bedevilled by grand challenges,corporate purpose as the corporate contribution to humanity, next to shareholder value maximisation is being questioned. The thesis posits that if beneficial changes to the governance of MNCs are among the greatest challenges faced by humanity and MNCs are to deliver a positive contribution to society, then it is of critical importance to understand how directors who are members of corporate boards engage with purpose at MNC parent and subsidiary level, as governance operates at multiple levels and purpose can be the glue that binds together corporate policies and actions, ultimately adding or destroying value for society.

The Impact of Talent Management on Attracting Nationals for Nurse Career in UAE

Aisha Almesmari (British University in Dubai, United Arab Emirates)

People who are talented and skilled are completely different from those who are not in terms of performance, thinking, planning, and ability to change. On the other hand, it could be said that nurses staff are considered the backbone in any clinical or health facility whether public or private. So, health and medical hospitals con not do absolutely without nurses. They perform a very important role in to serve different type of patients. It should be indicated here some societies need more awareness and deep understanding concerning the importance of nurse career on the one hand, and the governments have to know how to empower and enhance graduates for applying for such human career by reconsidering those challenges and obstacles that may be causes to reject this career.

Is Dubai Challenged and Does Sports Have Impact on Working Performance

Godwin Francis (The British University in Dubai, United Arab Emirates)

The main purpose of the study was to find out the effect of sports activity on working employees in UAE. The healthier and active the person has more work performance in the organization. The research shows that employees who are involved in sports activities have positive energy, mental toughness, disciplined and had less visits to doctors. Quantitative survey method was adopted and total of 117 responses were filtered with target audience as Dubai working employees. SPSS analysis software was used to interpret the data. The results revealed that the sport and work performance were not limited to either to gender nor to role of employee. It was also discovered that the organizations across Dubai provided limited environment for such activities.

Influence of Person-Organization Fit on Organizational Outcomes and Success: Study of Supplementary, Complementary and Attraction-Selection-Attrition Perspectives

Fatima Al Ghaithi (The British University in Dubai & ADNOC Distribution, United Arab Emirates)

This research aims to investigate the influence of Person-Organization

(P-O) fit on the outcomes of the company through the study of supplementary and complementary perspectives on employee performance, satisfaction, commitment and turnover. In addition, the study seeks to provide the conceptual framework in order to bridge literature gap and to analyze the relationship between personal and organizational values based on Attraction-Selection-Attrition (ASA) framework and Job Stress (JS) theory as moderators. For accurate results, it is suggested to collect data using mixed methods to answer key research questions and achieve

research objectives. The qualitative approach will use to identify values and selection process. However, the quantitative method will support the hypotheses to test the variables and outcomes. The research expects the best integration of value within work environment for the sustainable outcome.

Authentic Leadership Study: Shaikh Zayed Bin Sultan Al Nahyan, The Founding Father of the United Arab Emirates

Maryam Al Ali (Georgia State University, United Arab Emirates)

By sunset, history was made, when Shaikh Saeed bin Rashid Al Maktoom shock hands with Shaikh Zayed Bin Sultan Al Nahyan saying: "With God's blessings and you are the president". Shaikh Zayed replied, "With God's blessings, we just set the foundation and we shall start building". This simple authentic story has led to what we know today as the United Arab Emirates. The story of Sieh Al Sedeera Sand Dune shows us authenticity in its most purified form. The presentation will show the links between Authentic Leadership and how it led to: -A vision for a country to bring civilization to its people. -A change of mindset for a whole nation. -A legacy that transformed to the current leaders and people of UAE. -A strong belief in the importance of women's contribution in the UAE's journey.

B4: Business & Management IV

Chair: Emin Gahramanov (American University of Sharjah, United Arab Emirates)

The relationship between Quality Management, Innovation and Business Performance: An empirical study in the United Arab Emirates

Mariam AlNuaimi (University of Dubai & Higher Colleges of Technology, United Arab Emirates)

This research is being conducted in public organizations in Dubai, United Arab Emirates and aims to study the relationship between quality management, innovation and organizational performance. The objective is to clarify this relationship and provide public firms a framework to implement both quality management and innovation while maintaining their competitive advantage.

Developing a UAE Water-Energy-Food (WEF) Nexus Model to Improve the Policy Decision-Making Process

Mohammed Alzaabi (Khalifa University, United Arab Emirates); Toufic Mezher (Masdar, United Arab Emirates)

Developing a UAE Water-Energy-Food (WEF) Nexus Model to Improve the Policy Decision-Making Process Mohamed Alzaabi and Toufic Mezher Khalifa University of Science and Technology PO Box 54224, Abu Dhabi, UAE Abstract: Water, energy and food security are very important issues for United Arab Emirates (UAE). Since the creation of UAE in 1971, many studies have been conducted related to water, energy and food, but none of them considered the nexus approach. The main objective of this research is to develop a water-energy-food nexus model for UAE in order to improve the policy decision-making process. Field data collected by the author (questionnaires), along with other available data, will be used in the construction of a qualitative model. The model intends to evaluate the current water, energy and food policies in UAE, highlighting strengths and challenges facing these policies and make recommendations to relevant authorities for improvement. The expected outcomes of this research should contribute towards achieving the UAE vision 2021, green growth economy 2015-2030 and sustainable development goals of the country.

The Impact of EFQM Excellence Model on Public Sector Results; Study on Governments of the UAE

Arif Fadhel Jasim (BUiD, United Arab Emirates)

Over Last three decades, business excellence instead of total quality management has become more common and more widely used. This happened since the promotion of self-assessment model by European Foundation for Quality Management (EFQM), the model that become one of most popular approach for business excellence, and often when governments around the world began to adopt concepts and applications of this model through the launch of excellence awards for both private and public sectors. On the contrary, quality has turned into systems and applications mostly represented in quality specifications and standards, this has been demonstrated by the successful and widespread of the ISO standards, and keenness of organizations to achieve these international certifications (QMSs). Quality and excellence have been one of the significant mindset of world business management. This study aims to investigate the gap found in previous research -which is explained later- by analyzing the impact of adopting EFQM model the most widely implemented in the UAE and Europe as well, within public sector on the results of government' entities, focusing on the view of the entities themselves, as this focus is, for the most part, put on the opinion of employees of these entities. which provides a more unbiased concept of the internal people who are practicing the model. the findings that obtained by this study could be compared with other results obtained in other countries.

Applying Technology Strategy Analysis on Amazon Kindle Product

Armin Alibasic, Abel Meza Talavera and Mohammed Omar (Khalifa University of Science and Technology, Masdar Institute, United Arab Emirates); Toufic Mezher (Masdar, United Arab Emirates)

We live in an era of digital revolutions, where technology is disrupting our lives at every moment. One of these disruptions was Amazon Kindle E-reader which revolutionized the way we are reading books today. In this paper, our aim is to analyze and give insights into how Amazon succeed into this on the first look impossible mission. We developed a systematic analysis using the Technology Strategy to create, capture and deliver value. In conclusion, we gave suggestions for the Amazon Kindle product for the following years to come.

Happiness at Workplaces

Salim Alowais (AUS, United Arab Emirates)

The purpose of this research is the development of a comprehensive analysis of the concept of organizational happiness in term of its primary constructs, its influence on organizational performance, and the relevant methodologies for the achievement of this organizational attribute. The primary study involved three research sample clustered into two groups, which are the UAE and the UK/US groups. The study was comprised of a survey-based quantitative research methodology designed through the utilization of Likert-styled questions that the randomized sample of respondents within each group were expected to answer. Subsequent to the attainment sufficient results which included a research sample of 800 respondents, a series of statistical analysis tools were employed including the Kruskal-Wallis Model, the Multi-Nominal Logistic Regression, and the Tree-Based Analysis, all of which worked collectively in order to identify the primary happiness constructs that are of relevance to the UAE.

B5: Clinical and Health II

Chair: Hasan Al-Nashash (AUS, United Arab Emirates)

Assessment of the Pharmacogenomics Educational Environment in the United Arab Emirates

Azhar Rahma (UAEU, United Arab Emirates); Fatima Al Meskari (Public Health Institute College of Medicine & Health Science, UAEU, United Arab Emirates); Iffat ElBarazi (Public Health Institute, College of Medicine & Health Science, UAEU, United Arab Emirates); George P Patrinos (Pharmacy, School of Health Sciences, University of Patras, United Arab Emirates); Bassam Ali (United Arab Emirates University, United Arab Emirates)

Background/Aims: Lack of standardised educational programs and courses in the area of genetics and pharmacogenomics are important barriers to the implementation of pharmacogenomics in health care. This study examines the educational environment of pharmacogenomics in the United Arab Emirates. Methods: A thorough search on the nationally accredited universities websites in United Arab Emirates for any educational courses or programs related to pharmacogenomics was conducted and a further interviewing for selected faculty members of the college of Pharmacies in United Arab Emirates about the education provided in this specific area. Results: Our findings show that pharmacogenomics education in the UAE is not homogeneously incorporated in universities' study plan and curriculum in United Arab Emirates and it is not a priority in their future agenda. Conclusions: Pharmacogenomics education as well as the appreciation of its value are vital toward the achievement of personalized medicine goals. Pharmacogenomics should become an integral part of pharmacy school's programs and is recommended to be taught as a stand-alone course to all healthcare providers at the undergraduate level. Moreover, having a shared standard course to ensure homogenous outcomes is advisable.

Assessment of Nutrition Knowledge, and Dietary Behavior of Post Bariatric Surgery Patients in Rashid Hospital Outpatient Clinic in Dubai, UAE

Souheir Alia, Habiba Ali and Sajid Maqsood (UAEU, United Arab Emirates); Taoufik Zoubeidi (UAE University, United Arab Emirates); Mariam Ahmed (Medical Intern, United Arab Emirates)

Obesity is regarded as an increasingly prevalent health problem accompanied by adverse health effects. Despite the vast research assessing nutrition knowledge of patients regarding several health conditions, existing research assessing the nutrition knowledge of post-bariatric surgery patients is limited, although this category of patients is very susceptible to malnutrition. The aim of this study was to assess the patients' general nutrition knowledge and knowledge specific to the dietary protocol post-surgery. This study assessed the medical and nutritional complications associated with surgery. Results showed that the questions assessing nutrition knowledge of the dietary protocol showed that 66.2% of the participants had average knowledge and most patients did not know what dumping syndrome. On the other hand, majority followed up with a dietitian, although only 30.1% showed compliance to the dietitian's instructions. This was strongly related to majority of patients (71.2%) finding the information conveyed as unclear. As for overall quality of life, most of the patients had better quality of life. Future research on this category of patients is definitely needed.

The Effective Integration of the Social Media In The Healthcare Practice

Joe Hazzam (The British University in Dubai, United Arab Emirates)

The objective of the research is to develop an integrated social media healthcare model to support the effective adoption of the social media by the healthcare professionals in practice; Moreover, it highlights the multiple factors that relate to the practitioner's behavioral usage of the platforms. The study will draw on the Integrated Behavioral Model as a theoretical background; Moreover, we will identify the influence of the habit and the environmental factors that facilitate or inhibit the successful integration of the behavior. The research will use mixed methods for data collection and analysis. The qualitative phase will explore the salient beliefs of the social media usage. The final stage will associate the variables quantitatively with the effective integration of the social media. The results and analysis of our research aim to inform the healthcare professionals about the best integration of the social media in practice for sustainable performance and health outcomes.

The Mother and Child Health Study - Mutaba'ah: A Pilot Study

Nasloon Ali and Luai Ahmed (United Arab Emirates University, United Arab Emirates)

Life course epidemiology dictates that health outcomes can be attributed to habits of the mother even before conception. We aim to investigate the issues which influence fetal and maternal

health. Emirati women were recruited between May and September 2017 at a private hospital in Al Ain. We collected information on demographic factors, previous pregnancies, and medication use among others through a self-administered questionnaire. Their medical records were also extracted. 169 women were approached, and 100 (59%) were recruited. Participants were mostly multigravida (56%) with an average of 3 children. Majority of the population was overweight or obese with BMI above 27. 4. 23% suffered from gestational diabetes. There are some challenges in recruiting the local pregnant population and prevailing issues in the community such as higher BMI and gestational diabetes. The overall cohort which aims to recruit 10 000 women will shed light into risk factors that attribute to poor health outcomes.

Implication of Homecare Accreditation on Patient safety and Quality of Care in the UAE

Murad Awad (British University in Dubai, United Arab Emirates)

The study aimed at investigating the perception on the impact of homecare accreditation on patients safety and quality of care which relate to infection rate, risk of fall, and medical documentation. The study will be a quantitative research method using a cross-sectional descriptive analysis and time series regression analysis which will test the theory that healthcare accreditation has a positive influence on patients safety and quality of care. The study is to be conducted in homecare facilities in the United Arab Emirates through sampling method for a group of 200 respondents to evaluate the impact of homecare accreditation. Questionnaires will be administered, and the response rate will be assessed using a Likert scale for measurement. The study results should assist in encouraging private and public homecare facilities to be accredited by international or national groups to achieve an optimum level of patients care at homecare setting.

B6: Life Sciences II

Chair: Samrein Ahmed (University of Sharjah, United Arab Emirates)

Manuka Honey Immunity and Cancer

Rasha Nasser (UAEU, United Arab Emirates)

Honey and its potential benefits are deeply engrained in our culture and religion. Manuka honey (MH), produced in New Zealand by bees that pollinate the Manuka bush, is one of the best studied honeys in the world. The medicinal properties of MH have been extensively studied, particularly in terms of its wound healing and antimicrobial activities. However, until recently, the scientific basis of Honey's effect on health and disease was largely unknown. Over the past eight years, we demonstrated the potential of using MH to prevent and treat cancer. So far, we have highlighted the beneficial effect of MH on breast, colon and skin cancers. We recently identified the precise molecular target of MH on human breast cancer cells. At present, we are continuing our work to characterize the precise mechanism(s) by which MH acts against different functional properties of cancer cells and map the potential active component responsible for each of its actions.

3D Spheroid Models for Functional Characterization of Gastric Stem Cells

Shakila Afroz and Sherif Karam (UAE University, United Arab Emirates)

The stem cells are becoming a powerful tool in different fields of biomedical research such as disease modeling, drug testing and tissue engineering for regenerative medicine. Because little is known about the characteristic features and functional properties of stem cells, isolating stem cells from organs and maintaining them to differentiate are challenging tasks. In this study, we have used two protocols of three-dimensional (3D) culture to reveal some properties of gastric stem cells. In the first model, an immortalized epithelial cell line with molecular and morphological features representative of the mouse gastric stem (mGS) cells has been used to develop 3D culture models known as spheroids. In the second 3D spheroids model, stomach glands isolated from neonatal mice were used. Spheroids are characterized by using RT-qPCR, electron microscopy and

immunohistochemistry to detect cellular phenotypes and any evidences of differentiation. These spheroids will remain as a valuable tool to develop models for various diseases such as Helicobacter Pylori and viral infections. In conclusion, this study will provide some data for the better understanding of the biological features of gastric stem cells in health and disease.

Characterization of Epithelial Cells in Mouse Uterine Cervix

Reem Shouk and Sherif Karam (UAE University, United Arab Emirates)

Cervical cancer is a global health problem that affect many women. Little is known about the cellular origin and the epithelial lining of the uterine cervix. The aim of this study is to characterize the cells lining the uterine cervix in mice using lectins histochemistry, immunohistochemistry and electron microscopy methods. To identify dividing cells and define their dynamics, the bromodeoxyuridine (BrdU) labeling technique is used. We noted that Griffonia simplicifolia agglutinin-1(GS-1) lectin was specific for the stratified epithelium in ectocervix region. Single injection studies of BrdU positive cells were scattered along the simple columnar glandular epithelium of endocervix and in the basal layer of the stratified squamous epithelium of ectocervix.

Role of Vitamin A in Mouse Gastric Stem Cell Proliferation and Differentiation

Neethu Vins and Sherif Karam (UAE University, United Arab Emirates)

The gastric stem cell proliferates and migrate bidirectionally to maintain the glandular homeostasis. Abnormality in this dynamic process leads to gastric diseases. Vitamin A influences the cell proliferation and differentiation of various epithelial tissues. This study aims to analyse the role of vitamin A in the development of gastric glands. Vitamin A free diet was given to establish vitamin A deficient (VAD) model. A reduction in cell proliferation and an increase in the census of surface mucus cells was observed in the vitamin A deficient gastric glands. The findings from this study suggested that the vitamin A is an important factor that controls cell proliferation and differentiation in the mouse stomach.

5-Aminosalicylate (5-ASA)-4-Thiazolinone Hybrid Derivatives Inhibit Protein Tyrosine Phosphatase SHP2 by Suppressing RAS/MAPK Pathway in Hela Cells

Wafaa Ramadan, Rafat El-Awady and Vazhappilly George (University of Sharjah, United Arab Emirates)

Src homology region 2 domain-containing protein tyrosine phosphatase2 (SHP2) is ubiquitously overexpressed in lung, breast, leukemia and cervical tumors. The phosphorylation of SHP2 activates RAS-MAPK, mTOR, and PI3K-AKT signaling pathways which involved in cell proliferation, invasion and metastasis. Therefore, targeting SHP2 pathway becomes a novel approach in therapeutic intervention to inhibit tumor progression and metastasis. In the present study, we have investigated the SHP2 inhibitory effects of two newly synthesized 5-aminosalicylate-4-thiazolinone derivatives (HH3 & HH13) in HeLa, MCF-7 and MDA-MB-231 cells. In-silico molecular docking studies showed preferential affinity of HH compounds towards the catalytic site of SHP2 enzyme. An enzymatic SHP2 allosteric inhibitory assay showed HH compound's potential to suppress SHP2 activity. A confirmatory western-blot result further demonstrate the inhibitory effects for SHP2 expression in HeLa cells as similar to a positive control (NSC 87877). Furthermore, our data showed that these compounds suppresses RAS/MAPK pathway and regulate STAT3 and JNK expression in HeLa cells and thereby inhibit tumor cell proliferation and migration. Overall, our novel HH compounds showed remarkable potential to inhibit protein tyrosine phosphatase SHP2 and can lead to the development of a successful anti-SHP2 drugs.

B7: Electrical & Computer Engineering II

Chair: Montasir Qasymeh (Abu Dhabi University, United Arab Emirates)

Stationary Target Detection Using FMCW Radar

Aamna Al Teneiji (Khalifa University, United Arab Emirates); Nazar Ali (Khalifa University of Science and Technology, United Arab Emirates); Muhammed Khan (Emirates Technology and Innovation Center (ETIC), United Arab Emirates)

Frequency modulated continuous wave radar is used to measure the target's distance and velocity. This paper elaborates the analysis of stationary target by using the FMCW radar. The radar was tested to detect a stationary target at considerable distances. Experimental results are compared with theoretical values to demonstrate the capability of the radar to detect targets.

Classification of Ground Moving Targets Using Convloutional Neural Networks

Esra Al Hadhrami (Emirates Technology and Innovation Center (ETiC) & Khalifa University, United Arab Emirates); Maha Al Mufti (ETiC/Khalifa University of Science Technology and Research, United Arab Emirates); Bilal Taha and Naoufel Werghi (Khalifa University, United Arab Emirates)

In this paper, we propose a transfer learning approach with Convolutional Neural Networks (CNN) for radar Automatic Target Recognition (ATR). Radar echo signals of moving targets introduce micro-Doppler signatures that can be analyzed using spectrograms. Spectrograms can show distinctive micro-Doppler signatures of different targets, and they are used in our approach as inputs. We are utilizing a pre-trained CNN as a feature extractor in which feature maps can be extracted from any of the layers to train a classifier. AlexNet was used as the pre-trained CNN and softmax was used as the classifier. Our approach was tested on RadEch database of 8 ground moving target classes. Our approach outperformed the state of the art methods, using the same database, and reached an accuracy of 99.9%.

SAR Automatic Target Recognition Using Deep Learning

Maha Al Mufti (ETiC/Khalifa University of Science Technology and Research, United Arab Emirates); Esra Al Hadhrami (Emirates Technology and Innovation Center (ETiC) & Khalifa University, United Arab Emirates); Bilal Taha and Naoufel Werghi (Khalifa University, United Arab Emirates)

In this paper, a deep learning approach for Synthetic Aperture Radar (SAR) Automatic Target Recognition (ATR) is proposed. The novelty of the proposed framework stems from the fact that it is based on a transfer learning scheme, where a pre-trained Convolutional Neural Network (CNN) is employed to extract learned features in combination with a classical Support Vector Machine (SVM) for classification. The efficiency of the presented approach is validated on the MSTAR dataset, where ten target classes are used. A classification accuracy of 99.27% is achieved

Detection and Identification of Natural and Man-made Objects in Thermal Images

Alia Aljasmi (Khalifa University, United Arab Emirates)

This paper presents a system that uses a thermal image as an input in order to detect and distinguish man-made objects, humans, animals, military targets or any other objects of prominent heat profile. The object's classification should be implemented based on the shape analysis of the object, and how this shape is changing over the time. Many techniques were provided in the literature for detection, description and identification of shapes. Therefore, it is very important to verify those techniques and select the applicable one for thermal shape processing. Moreover, there is a need to study pre-processing of thermal images to identify the most useful algorithm for shape detection. After completion of this project, the future work can be done on some specific applications, where the image that includes, for example, animals will be captured and the remaining images will be ignored (such as in visual surveillance of wild life at night and recognition of different types of animals).

Transmitter Based on Rotman Lens Phased Array Antenna

Ahood Aljneibi (ETIC & Khalifa University, United Arab Emirates)

This paper presents the design of a wideband 2-6 GHz phased array transmitter using Rotman lens. This transmitter can be used as a Radar system transmitter. The design is implemented and

analysed using SystemVue simulation tool, where different components of the transmitter are designed according to required specifications.

Frequency-Locked Loop for Single-Phase Systems

AbduLLahi Bamigbade and Vinod Khadkikar (Masdar Institute, United Arab Emirates); Mohamed Al Hosani (Masdar, United Arab Emirates)

Phase-locked loops (PLLs) are widely used in the synchronization of grid connected single-phase power electronic-based equipments due to their ease of digital implementation and satisfactory response. Generally in PLLs, the estimated frequency undergoes a large transient when a phase angle jump occurs. To resolve this problem, a frequency-locked loop (FLL) is proposed. In the proposed approach, frequency and phase estimation algorithms are developed such that the phase estimation loop is external to the frequency estimation loop, therefore, contrary to PLLs, the proposed FLL minimizes the coupling that exists between frequency and phase. This reduces the large transient experienced in the estimated frequency when a phase angle jump occurs. Simulation result is presented to demonstrate the effectiveness of the proposed approach.

B8: Electrical & Computer Engineering III

Chair: Mostafa Shaaban (American University of Sharjah, United Arab Emirates)

Understanding Socio-cognitive Behaviors of Crowds From Surveillance Data

M. Sami Zitouni (Khalifa University, United Arab Emirates); Andrzej S Sluzek (Khalifa University of Science, Technology and Research, United Arab Emirates)

Recent researches in cognitive visual analysis of crowd have indicated that crowd modeling is conventionally based on density analysis. However, socio-cognitive behavior studies have demonstrated that crowds often display a wide variety of behaviors that arise spontaneously from the collective motions of unconnected individuals. Therefore, behavior analysis employing physics-based approaches only, thereby neglecting the socio-psychological aspects, may present diverse challenges to accurate inference. This means that by identifying and modeling some of the interacting agents that underpin the evolution of such behaviors, we can deliver contexts that can help in the autonomous analysis of social and antisocial behaviors in crowded environments. This paper discusses these issues from the machine vision perspective. In particular, socio-cognitive models of crowds are linked to low-level mechanisms of crowd modeling and features extraction. A survey of recent works on crowd behavior analysis is conducted under a proposed behavioral categorization based on the level of the performed analysis and identified behaviors.

The Automatic Generation of FOL Rules from BPMN Process Model

Hamda Al-Ali (Khalifa University of Science, Technology and Reseach, United Arab Emirates); Ernesto Damiani and Mahmoud Al-Qutayri (Khalifa University, United Arab Emirates); Mohammad Abu Matar (Etisalat British Telecom Innovation Center at Khalifa University of Science & Technology, United Arab Emirates); Rabeb Mizouni (Khalifa University, United Arab Emirates)

Business Process (BP) is a set of activities performed to achieve specific organizational goals. The discipline that governs BPs is called Business Process Management (BPM), it includes different method for the modeling, executing and monitoring BPs. Typically, Business Rules (BR) are used to enforce regulations and policies on the BP. In this paper, we discuss a simple language for the generation of BR directly from BPMN models based on a fragment of First-Order Logic (FOL). The rules are based on control-flow aspects of the BPMN that is divided into a set of components. To automate the language, A JAVA-based tool to generate the FOL rules is implemented.

Memristor-based CAM Search Engine

Yasmin Halawani and Baker Mohammad (Khalifa University, United Arab Emirates); Said Al-Sarawi (The University of Adelaide & Director of Centre for Biomedical Engineering, Australia); Mahmoud Al-Qutayri (Khalifa University, United Arab Emirates)

Fast search engines are required for real-time decision making in various fields including computer vision, machine learning and object recognition. In the case of Internet of things (IoT) devices that need to implement fast search engines, it is of paramount importance to keep both area and energy costs at minimal. Conventional CMOS-based search engines suffer from density and power limitations. In this paper, we propose a reconfigurable memristor-based XNOR CAM cell (VR-CAM) that can support Binary-CAM (BCAM), Ternary-CAM (TCAM) and Approximate search. The proposed cell accepts the input search data as voltage and the database as memristor value (resistor). Whereas the output result in the form of voltage for TCAM and BCAM and resistance for approximate search. Based on this cell, a memristor-based CAM architecture is proposed. The architecture is composed of multiple banks of specially connected memristors for each bit. Simulations of the proposed architecture for search functionalities were carried out using LTSpice circuit simulator. The proposed CAM architectures achieves a 1-ns search cycle time. It utilizes 2 memristor devices per cell with option for stateful output.

Improving Connectivity for Cluster-Based QoS-OLSR Protocol in Urban VANET

Dalia Attia (Khalifa University, United Arab Emirates)

This paper addresses the connectivity issues in urban Vehicular Ad-Hoc Network (VANET) using the cluster-based QoS-OLSR protocol. VANET in urban suffers from frequent topology changes and disconnections due to several urban characteristics such as intersections, obstacles and traffic lights. Therefore, network connectivity is an important metric for routing in urban. The proposed protocol is an extension of the existing cluster-based QoS-OLSR which connects only 2-hop away heads through an MPR. The enhanced protocol connects 2-hop away heads as well as 3-hop away heads which increase the network connectivity. The proposed protocol outperformed the existing protocol in terms of packet delivery ratio and end-to-end delay.

Behavioral Modeling of RF Power Amplifiers Using Reduced Sampling Rate

Moustafa Abdelnaby (American University of Sharjah & FEWA, United Arab Emirates)

In this paper, a technique that explores a new scheme that is suitable for the available hardware requirements when modeling and linearizing the power amplifier (PA) with wide-band signals is proposed. The aim of the proposed technique is to relax the sampling rate requirements of the analog-to-digital convertors (ADC) in the digital pre-distortion (DPD) systems. The proposed resampling approach is based on under-sampling the output of the PA that results in a low-rate ADC, and efficiently restoring the under-sampled signal for DPD model extraction. The validity of the method is evaluated using a 20-MHz LTE input signal, and it shows excellent potential in restoring the full-rate signal from the under-sampled.

Adaptive Flight Software Development For Nano-Satellite Systems

Jasim Mohamed Alhammadi, Mahool Alhammadi and Panagiotis Dimitropoulos (Masdar Institute - Part of Khalifa University, United Arab Emirates); Prashanth Marpu (Khalifa University of Science and Technology, United Arab Emirates)

For space missions, the flight heritage of components is crucial, and it is a key element for mission success. One of the major components is the (FS) Flight Software, which is considered as an essential part of mission success. Hence, the same concept is applicable of the flight software since it is verified, and been tested in space. The FS process needs to be well defined in order to contain all the requirements, and avoid delays in the project. In this paper, we proposed a methodology for developing the flight software for nano-satellite systems. MYSAT-1 mission has been used as a case study for the proposed methodology.

B9: Civil & Environmental Engineering II
Chair: Seter Atabay (AUS, United Arab Emirates)

The Energy Performance of the Double Skin Facade in a Conventional Residential Building in Irbid, Jordan
Ahmad Abbadi (The British University in Dubai & Engineering Consultant Group, United Arab Emirates)

This paper aimed at investigating the thermal performance of Double Skin Façade (DSF) for an existing conventional residential building located in Irbid, Jordan. Special focuses were implemented on the different geometry shapes of the DSF to achieve the maximum benefits possible in attaining the thermal comfort zones with the minimum usage of the fossil-fuels based machinery. Simulation through the IES VE software confirmed that both the cavity width and geometry of the DSF have a massive impact in obtaining a relatively moderate thermal zone during winter seasons and an acceptable indoor temperature during summer seasons. All scenarios showed a significant improvement of the building's thermal performance in comparison to the base case, where this research focuses on selecting the most appropriate DSF's geometry in order to achieve the highest possible energy reduction.

Building Energy Efficiency of a Transit Oriented Development
Esra Trepci (Khalifa Institute of Science and Technology, United Arab Emirates)

Cities today, owing to the rapid urbanization and population increase, are grappling with several urban issues such as pollution, congestion, personal health, and safety. Sustainable development through new planning approaches such as Transit Oriented Development (TOD) is seen as a possible solution to mitigate these negative effects on the overall livability of the urban area. As part of possibilities for charting a more sustainable urban future, TOD and energy efficient buildings have gained attention in the recent years. However, most research has focused on the contribution of both these sustainable approaches separately. Little research exists that investigates the energy efficiency of recommending sustainable development such as a TOD in an urban area. Hence, this research examines whether a sustainable planning approach such as a TOD has a positive influence on the energy efficiency of its built urban area in comparison to a non-TOD type development.

Drivers of Energy Consumption in Abu Dhabi Mixed-Used Buildings
Min Lin (Khakifa University, United Arab Emirates); Elie Azar (Masdar Institute, United Arab Emirates)

A pre-requisite to reducing the energy intensity of the building sector is to assess and understand current drivers of energy consumption. Drivers include building design characteristics, outdoor environmental conditions, as well as the operation patterns of building systems by occupants. In the United Arab Emirates (UAE), where buildings consume more than 70% of the total electricity demand, a comprehensive analysis of the drivers of building energy performance has not yet been conducted. This paper proposes an approach, which is unique in its ability to capture the combined effects of technical, as well as, operation-related building parameters. A regression models is proposed and applied to data gathered from 713 mixed-use buildings in downtown Abu Dhabi. Results indicate that in addition to physical building parameters such as window tinting, operational parameters, including AC cleanliness, chiller condition, and thermostat temperature setting have shown significant impacts on energy consumption levels.

Design and Implementation of Fuzzy Controller for Non-linear Thermally Insulated MIMO Greenhouse Building Utilizing Weather Conditions and Underground Temperature
Raghad Alhusari (UAE University, United Arab Emirates); Moustafa Fadel (United Arab Emirates University, United Arab Emirates); Farag Omar (UAEU, United Arab Emirates)

Globally, biggest amount of water is consumed for agricultural purposes. Part of this consumption is due to the evaporation cooling technique that is typically used in cooling greenhouses. This

technique vastly consumes water and energy. Ground Heat-Exchanger is an environmentally-friendly solution used for heating/cooling and based on seasonal temperature difference between the ground and the ambient. A study was conducted on a ground-to-air heat exchanger used in thermally insulated greenhouse system equipped with actuated windows, LEDs fans, and sensors. A fuzzy controller was proposed to maintain the greenhouse environment by utilizing weather conditions through automated windows and ground heat through the ground heat exchanger. Results showed the heat exchanger can keep the greenhouse temperature at a constant level of about 26˚C. It hence can be used for pre-cooling in summer and heating in winter. The proposed controller was able to maintain the greenhouse temperature within the acceptable range.

Building an Optimization Model for Water-Energy Nexus for the United Arab Emirates: Economic & Environmental Perspectives

Layla Saleh (Masdar Institute, United Arab Emirates); Toufic Mezher (Masdar, United Arab Emirates)

The connection between energy and water in the UAE is very high: the rely is on desalination to ensure the domestic water demand. Thermal desalination technologies are the major techniques used in the UAE, therefore, cogeneration-based power desalination plants dominate the energy sector in the UAE, which ties the power and the water production together. This bond results in significant impact on the environment and the climate change due to GHG emissions and other solid and liquid waste. The purpose of this paper is to first examine all the existing technologies related to energy generation and desalinated water production, second to investigate the social cost and specify the socio, environmental and economic characteristics of the different present technologies. Third to find out the optimal water and energy production development strategy based on different scenarios.

B10: Civil & Environmental Engineering III

Chair: Magdi El-Emam (American University of Sharjah, United Arab Emirates)

Impact of Local Retrofit in Improving Lateral Capacity

Ghazanfar Anwar and Aman Mwafy (United Arab Emirates University, United Arab Emirates)

Existing RC building stock designed before the implementation of current design standards may require efficient seismic retrofit strategies to resist anticipated earthquakes. This study focuses on the effectiveness of RC jacketing, steel jacketing and FRP overlays on improving the seismic performance of low-to-midrise RC frame buildings. Two reference structures representing pre-standard RC multi-story buildings are selected for this study based on the current design practices of the region. Detailed inelastic pushover and incremental dynamic analyses are performed using 3D fiber-based numerical models for the assessment of the seismic response of the reference structures before and after retrofit. A parametric study is undertaken to investigate the impact of the jacket thickness and number of FRP layers on improving the seismic performance. It is concluded that both RC and steel jacketing is effective in improving the lateral strengths to meet current design standards, while FRP overlays are efficient in improving ductility.

Investigation of Soil-Structure-Interaction Effects on RC Shear Wall Structures via Nonlinear FEA

Dina Saadi and Mohammad AlHamaydeh (American University of Sharjah, United Arab Emirates); George Markou (Universidad Católica de la Santísima Concepción, Chile)

The Soil-Structure-Interaction (SSI) has a significant effect on the overall structural behavior of reinforced concrete buildings. This research work aims to study the SSI effect for the case of a 6-story building with a pile foundation. The numerical model foresees the study of the main shear wall of the structure with connected reinforced concrete slabs. The foundation system is a pilecap with three piles found within a soil class E, according to ASCE7-10. By using the hexahedral isoparametric finite element, the structure is discretized in 3D, where the adopted concrete material model is the smeared crack approach, and the steel bars are modelled by using embedded rebar elements. Both soil and concrete foundation are discretized with hexahedral elements.

Monotonic and cyclic analyses are performed in order to evaluate the behavior of the fixed-base structure and the corresponding SSI model that is founded on the flexible soil.

Flexural Behavior of BFRP-FRC Beams

Abdul Rahman Alhafiz (American University of Sharjah, United Arab Emirates); Farid Abed (American University of Sharjah, United Arab Emirates)

This paper aims to present an experimental program to investigate the flexural behavior of Fiber-Reinforced concrete (FRC) beams reinforced longitudinally with Basalt Fiber-Reinforced Polymers (BFRP) bars. The experimental program consists of material evaluation and flexure test. Material evaluation was performed in order to obtain the compressive strength of the proposed concrete mix and tensile strength of the internal rebars. Flexure test was conducted on each of the BFRP-FRC beams using four-point loading test setup to investigate any enhancements in the flexural behavior in terms of moment capacity, load versus mid-span deflection and crack behavior. The test matrix consists of 6 beams with different comparisons to mainly focus on studying the effect of BFRP reinforcement ratio and fibers type (Basalt and Synthetic).

Assessment of Building Dynamic Characteristics for Seismic Design

Aya Abuelhamd, ENG. (UAE University, United Arab Emirates); Aman Mwafy (United Arab Emirates University, United Arab Emirates); Suliman A. Gargoum (University of Alberta, Canada)

Evaluating the dynamic characteristics is a fundamental step for the design of buildings when subjected to earthquake loads. One of the essential dynamic properties of structures is the fundamental period. Several expressions for the calculation of the fundamental period have been proposed by building codes and previous studies. However, further assessment studies for the fundamental periods are still needed to provide more reliable formulas for seismic design. In this study, period data for 147 instrumented buildings with various lateral force resisting systems (LFRSs) are compared with different formulas from building codes and previous studies. Another set of period data are considered from selected simulated structures. Different LFRSs are considered, including RC moment resisting frames (MRFs), steel MRFs, RC shear walls, braced systems and masonry structures. The comparisons between the derived period expressions with those of the design provisions confirm the conservative code design approach for the considered systems.

Variation of P-Wave Velocity with Sand Properties

Mohammad Amer and Magdi El-Emam (American University of Sharjah, United Arab Emirates)

The main purpose of the current research is to implement different Geophysical Techniques (GT) in measuring wave velocity at different soil properties. For this purpose, twenty 6-in-diameter specimens have been prepared with different soil properties for index tests. In addition, two identical 1/3-scale strip footing model tests are constructed and instrumented with geophones, accelerometers, and load cells. The objectives of these large tests are to establish correlations between large and small strain wave velocity on granular materials. These relationships are necessary to predict, from in-situ velocity measurement, the velocity at large deformations required for numerical modeling of various soil materials. Index test results indicate that the P-wave velocity decreases as the soil water content and degree of saturation increases up to certain thresholds, which itself increases with the compaction effort. In addition, the wave velocity becomes larger as the soil includes more fine contents. The clay content affects the soil wave velocity; however, this affect varies with the specimen water content. Results also show that the effect of Portland cement on the soil wave velocity is significant, especially after 3-days curing time. Results of the scaled footing tests indicate that the P-wave velocity increases as the footing applied stress increases, and the largest value was measured directly at the bottom of footing. Finally, a relation that relates stress ratio with velocity ratio for strip footing is proposed for practical implementation.

B11: Biomedical Engineering II
Chair: Amani Al-Othman (American University of Sharjah, United Arab Emirates)

Microwave Tomography of Human Proximal Leg
Mohanad Alkhodari, Amer Zakaria, Hasan A Al-Nashash and Nasser Qaddoumi (American University of Sharjah, United Arab Emirates)

In this paper, a study is conducted to investigate the use of microwave tomography in the imaging of human proximal legs. In microwave tomography, the human leg is radiated with non-ionizing low-power electromagnetic signals; variations in the dielectric properties of the leg results in changes to the signals measured at receivers in the imaging system. The dielectric properties constitute of the relative permittivity along with the conductivity of the leg tissues. The study herein is carried numerically using a two-dimensional electromagnetic solver implemented using the finite-element method. The human proximal leg geometry is created and meshed using MATLAB and GMSH. The generated mesh is imported to the finite-element solver along with the values of electric properties of various tissues. The simulations show that variations in bone dielectric properties is highly correlated to the variations of the electric fields within the microwave tomography system.

Synthesis and Characterization of Flexible Implantable Electrodes
Aseel Alatoom and Amani Al-Othman (American University of Sharjah, United Arab Emirates); Hasan Al-Nashash (AUS, United Arab Emirates); Mohammad Al-Sayah (American University of Sharjah, United Arab Emirates)

Implantable bioelectrodes have the potential to advance neuroprosthetic therapy tremendously; however, current bioelectrodes have limitations ranging from mechanical mismatch to immunological responses. This paper discusses the preparation of novel, low-cost, flexible bioelectrodes, consisting of silicone polymer and titanium (IV) dioxide, and presents a study of the prepared electrodes' electrochemical and mechanical characteristics. The tested material exhibited ductile properties with samples approaching an elongation of 266% before rupture, and an elastic modulus of 6.6296 MPa, along with a satisfactory bulk impedance of 93 KΩ, thus supporting its' capability to be synthesized into implantable electrode.

Rapid Prototyping of Microfluidic Probes for Biomedical Applications
Ayoola Brimmo (New York University, United Arab Emirates); Roaa Alnemari (New York University Abu Dhabi, United Arab Emirates); Mohammad Qasaimeh (New York University, United Arab Emirates)

The microfluidic probe (MFP) is an open space microfluidic device that combines the concepts of hydrodynamic flow confinement (HFC) and scanning probes to overcome the closed channel restrictions of conventional microfluidic devices. In biology, this allows for analysis of mammalian cells, neurons and tissue samples that are otherwise difficult to culture in conventional microfluidic devices. In this paper, we demonstrate how 3-D printing can be used to expedite the design-test cycle of the MFP and hence democratize the concept. The 3D printing procedures were adapted in fabricating the MFPs that were used for all experiments. Characterization of MFP's flow profile footprints are performed by comparisons with numerically calculated profiles. Application of the MFP is then used to selectively label adherent cells cultured in a Petri dish, within their conventional culture environment. Results show that while the 3D printed probes contain some artifacts, they function just as well as MFPs microfabricated using conventional techniques. Overall, this fabrication demonstrates a rapid, easy, and affordable fabrication technique for the MFP.

Synchronization of C. elegans through High-Throughput Separation of Eggs in a Microfluidic Spiral Chip

Samuel Sofela and Sarah Sahloul (New York University Abu Dhabi, United Arab Emirates); Mehdi Rafeie (University of New South Wales, Sydney, Australia); Kwon Taehong and Jongyoon Han (Massachusetts Institute of Technology, USA); Majid Ebrahimi Warkiani (University of Technology Sydney, Australia); Yong-Ak Song (New York University Abu Dhabi, United Arab Emirates)

In this study, we report the use of a high-throughput microfluidic spiral chip to screen out eggs from a mixed age nematode population, which can subsequently be cultured to a desired developmental stage. For the sorting of a mixture containing three different developmental stages, eggs, L1 and L4, we utilized a microfluidic spiral chip with trapezoidal channel to obtain sorting efficiency (SE) above 97% and sample purity (SP) above 80% for eggs at different flow rates up to 10 mL/min. The result demonstrated a cost effective, simple, and highly efficient method of synchronizing C. elegans at high throughput (~4,200 organisms/min at 6 mL/min), while eliminating challenges of clogging and non-reusability of membrane-based filtration. Due to its simplicity, our method can be easily adopted in the C. elegans research community.

Identification of Fetal Cardiac Timing Events by Swarm Decomposition of Doppler Cardiogram Signal

Saeed Alnuaimi (Khalifa University of Science, Technology & Research, United Arab Emirates); Shihab Jimaa (Khalifa University, United Arab Emirates); Ahsan Khandoker (Khalifa University of Science, Technology and Research, United Arab Emirates)

Early diagnosis of the cardiac abnormalities during the pregnancy may reduce the risk of perinatal morbidity and mortality. Cardiotocography (CTG) is a means of recording the fetal heartbeat from the Doppler ultrasound (DUS) and the uterine contractions during the pregnancy and this method is commonly used to screen for fetal abnormalities. DUS, which is commonly used for monitoring the fetal heart rate, can also be used for identifying the event timings of fetal cardiac valve motions. In this study, a new technique called Swarm decomposition is proposed to analyze the fetal cardiac Doppler ultrasound signals for the fetal cardiac timing events estimation. Decomposing the fetal Doppler signal using the swarm intelligence achieved an excellent extraction of the fetal cardiac timing events in the most cases in early and late gestational ages of the pregnancy. Therefore, this technique would be useful for reliable screening of fetal wellbeing.

B12: Chemistry & Chemical Engineering III

Chair: Nabil Abdel Jabbar (American University of Sharjah, United Arab Emirates)

Simulation and Optimization of Air Liquefaction Plant using ASPEN Plus

Mohaned Elbasheer (UAE University, United Arab Emirates)

Liquefied gases are in common use for a variety of purposes, for example, liquid Propane serves as a domestic fuel, liquid Oxygen is carried in cylinders, and is provided to hospitals for patients suffering from breathing problems. In this study , simulation of air liquefaction process and its separation was done successfully using Advanced System for Process Engineering (ASPEN) Plus simulating tool in order to increase the quality of products and to decrease the operational cost simultaneously. The model under consideration was Linde single-column system. Also, the effect of variation of various process conditions on yield, purity of final product, and temperature were analyzed. Results obtained showed that by using Linde single column system, oxygen of almost 99% purity could be obtained. However, the purity of nitrogen obtained was only about 90%. As such, Linde single-column system can be used when oxygen is the desirable product. In the study, cost analysis of the processes was not considered. So, as a future recommendation, cost analysis can be done, leading to optimization of the entire process.

The Catalytic Activity of CoFe2O4 and CoxNi1-xFe2O4 Towards Phenol Degradation in Aqueous Solutions

Bayan Al Qassem (Khalifa University of Science and Technology); Mohammad Abu Haija (Khalifa University of Science and Technology, United Arab Emirates); Fawzi Banat (The Petroleum Institute, United Arab Emirates)

Pure cobalt ferrite and mixed cobalt nickel ferrites were prepared by sol-gel auto-combustion method. The structure was mainly investigated by X-Ray Diffraction. The catalytic activities of the prepared samples were investigated by studying the photo- and non-photocatalytic degradation of phenol using the High Performance Liquid Chromatography (HPLC).

Mixed Culture Cultivation of Marine Microalgae for Protein Production

Ramis Rafay (Khalifa Institute of Science & Technology, Masdar Institute, United Arab Emirates); Jorge Rodríguez R. and Joao Uratani (Masdar Institute of Science and Technology, United Arab Emirates)

Microalgae are generally mass produced in pure culture photobioreactors or in open ponds. While open ponds are generally cheaper to operate from a maintenance standpoint, an issue with them is that open systems allow for external microorganisms to interfere with the desired product yield. Understanding the effect of reactor conditions on co-culture setups of marine microalgae will allow for better design and operation to maximize product yield (in this case, single cell protein). The strains Nannochloropsis gaditana (CCAP649/5) and Tetraselmis chuii (UTEX LB232) are investigated in this study, first characterized separately and then co-cultured together.

Pilkington Activtm Glass: Characterization and Application to Organic Pollutant Degradation

Habeebllah Oladipo (Masdar Institute, United Arab Emirates)

Coupled with its superhydrophilicity, Titanium dioxide thin film owes its self-cleaning ability to organic pollutant degradation. Using commercially available titanium dioxide film by the Pilkington Glass, a model organic pollutant - 2-propanol - degradation was investigated under ultraviolet and solar simulated light irradiations. The photo-activities of both Pilkington ActivTM Clear (PAC) and Pilkington ActivTM Blue (PAB) under solar simulated light were comparable. However, irradiation under ultraviolet light enhanced 2-propanol photodegradation with PAC, whereas 2-propanol degradation was significantly reduced for PAB. Possible reasons for these variations were provided based on characterization results from Scanning Electron Microscopy (SEM), Atomic Force Microscopy (AFM), Raman Spectroscopy and UV-Vis Spectroscopy. Variation of the degradation product concentration as monitored by Gas Chromatography (GC) is also used to explain the possible mechanism of 2-propanol degradation.

B13: Mechanical Engineering II

Chair: Wael Abuzaid (American University of Sharjah, United Arab Emirates)

Techno-Economic Evaluation of a Chemical Looping Combustion Plant with Waste Heat Utilization

Oghare Ogidiama (Masdar Institute, Masdar City, United Arab Emirates)

Chemical looping combustion (CLC) is a promising candidate for cost-effective CO2 capture and better power plant performance. The CLC process uses an oxygen carrier for the separation of oxygen from air. The oxygen is then used for fuel combustion. In this paper, the technical and economic performance of a power plant using CLC with two methods of waste heat utilization from the plant exhaust gas streams is studied. The plant studied is a natural gas-powered plant of 50MWth gross energy. The waste heat is utilized either a steam turbine or absorption chilling. The economic analysis shows a higher economic value of the waste utilization for cooling purpose compared to additional power generation. For the absorption chilling system, the cost of electricity (COE) is about 5.5 cents/kWh and has a payback period of about 6.4 years.

Optical Characterization of a Floating Cover for Open-Tank Volumetric Solar Receivers

Miguel Diago (Masdar Institute of Science and Technology, United Arab Emirates); Melanie Tetreault-Friend (Massachussets Institute of Technology, USA); Peter Armstrong and Nicolas Calvet (Masdar Institute of Science and Technology, United Arab Emirates)

The thermal efficiency of open-tank volumetric solar receivers is limited by the excessive thermal losses consequent to high temperature operation. A transparent floating cover which limits the thermal losses by radiation and convection can be considered to substantially improve the thermal efficiency of the receiver. Herein, we describe the optical efficiency of a particular cover design. A ray-tracing tool is used on a solid model to determine the transmission though the elements of the cover. Optical efficiencies over 90% are reported.

Thermodynamic Model Development of a Solar Organic Rankine Cycle-Vapor Compression Refrigeration System

Yusra Ba Matraf and Valerie Eveloy (Khalifa University of Science and Technology, The Petroleum Institute, United Arab Emirates)

Solar Rankine refrigeration systems can be driven using low-grade heat from solar thermal collectors. In this paper the development and validation of a thermodynamic model of a coupled organic Rankine cycle-vapor compression refrigeration system (ORC-VCR) is documented. Good agreement is obtained with previously published reference data. Parametric system performance analyses to key design and operating parameters are presented.

Design and Performance Analysis of a Portable MD-based Hybrid Desalination Unit

Khadije El Kadi (Khalifa University of Science and Technology, Masdar Institute, United Arab Emirates); Isam Janajreh (Masdar Institute of Science and Technology, United Arab Emirates)

Gulf States are mostly arid and with little water precipitation and ground water that hardly supports 5% of the intense urbanization which have been developed and boomed in the last half century. Taking the advantage of having ten hours of sun in such regions, desalination by low energy membrane distillation (MD) can take a huge lead if hybridization with solar power takes place. In this work, we propose a small-scale applied solution by the low-energy solar-driven MD-based portable desalination unit. The hybrid system consists mainly of desalination unit, solar PV panel, and a solar collector. Moreover, a dual channel configuration of the DCMD is adopted, this will increase the apparent working area and thus increases the fresh water productivity. In ideal case, results show that the portable system is capable to produce 6.35 L/day of fresh water when feeding at 40°C. This high efficient energy-extensive design can serve as a prefect mobile survival kit for emergencies.

Performance Study of Delta Winglet Vortex Generator Pair in a Circular Tube for an Efficient Heat Exchanger

Chong Zhai and Md Didarul Islam (The Petroleum Institute, United Arab Emirates)

In this research experimental investigations have been carried out to study the effect of winglet vortex generator pairs on heat transfer and flow behavior. The delta winglet vortex generator (DWVG) pairs mounted on the inner wall of the tube with attack angle $\alpha=10°$, three different winglet heights (h=5, 7.5 and 10mm), and three spacings between leading edges (s=10, 15 and 20mm) are studied in terms of the Nusselt number and friction factor for the range of Reynolds numbers 5000-25000. The experimental results indicate that DWVG pairs result in a considerable enhancement in heat transfer rate (Nu) with some pressure penalty. It is observed that Nusselt number increases with Re and winglet's height. Friction factor decreases with Re but increases with winglet height. Middle spacing (s=15mm) yields highest heat transfer rate and pressure drop. The Highest thermal performance enhancement (TPE) was noticed for s=15mm, h=5mm at lower Reynolds number (Re=5000).

Variable Refrigerant Flow Cooling Assessment in Tropical Environments

Roba Saab (Khalifa University, United Arab Emirates); Mohamed I Ali (Masdar, United Arab Emirates)

This paper aims to present exergy/energy analysis of the VRF technology to investigate its performance in tropical region. VRF is an advanced air conditioning system that is developed to manage the load variability by controlling the compressor speed and the expansion valve. The system is proposed to be implemented in Masdar city that is located in Abu Dhabi. Parametric studies were done after modelling the system on EES, where both the high and low pressures in the cycle were varied to obtain the corresponding COP range. It was noticed that COP increases non-linearly with reducing the difference between the evaporator and the condenser pressures.

B14: Mechanical Engineering III

Chair: Muhammad Imran Qureshi (American University of Sharjah, United Arab Emirates)

Droplet Growth Dynamics for Water Condensation on Oil-Infused Superhydrophobic Surfaces

Qiaoyu Ge and TieJun Zhang (Masdar Institute of Science and Technology, United Arab Emirates)

Oil-infused surface is recently developed and widely studied for its promising droplet shedding capability and low surface energy to promote dropwise condensation for low-surface-tension fluids. Due to low surface tension of the infusing oil, it can spread on the condensate and form a cloaking layer, which will affect growth of the droplet. In this work, growth dynamics of condensed water droplets is studied both experimentally and theoretically. Water vapor condensation experiments on both oil-infused and un-infused superhydrophobic surfaces are carried out in environmental scanning electron microscopy (ESEM). A thermal resistance model for a water droplet system is demonstrated as well. Both experimental and predicted results show that droplets on oil-infused surface grows faster than that on un-infused nano-textured surface because the infusing oil replaces the vapor pocket beneath the droplet and increases thermal conductivity.

Laser Doppler Velocimetry Measurement in Turbulent Swirling Flow

Tianxing Zhang (Khalifa University, United Arab Emirates); Lyes Khezzar and Kharoua Nabil (The Petroleum Institute, United Arab Emirates); Mohamed Alshehhi (Petroleum Institute, United Arab Emirates)

Swirling flows in pipes can be found in many industrial applications for separation or mixing purposes. Turbulent swirling flow generated using a new swirl generator with multi-radial holes which is located inside a larger cylindrical housing, is studied. The swirling flow exiting from the Swirl Cage supplies a long pipe where the Reynolds number based on the pipe diameter and average velocity is equal to 40836.67. Velocity measurements were conducted using Laser Doppler velocimetry. The results are discussed in relation with the mean fluid velocity. It indicated the inflow was transformed successfully into a symmetrical swirling flow from the velocity profiles. Profiles of the mean tangential velocity reveal a Rankine vortex swirling flow structure along the pipe. Backflow flow occurred in the mean axial velocity when the swirl number was equal to 1.5.

Numerical Study of a Turbulent Swirling Flow Interacting with a Bluff Body

Jinli Song (Khalifa University of Science and Technology, United Arab Emirates); Kharoua Nabil and Lyes Khezzar (The Petroleum Institute, United Arab Emirates)

Phase separation using swirling flows is a technique used in inline separators. In the present study, an existing separator device uses swirling flow that interacts with a conical hollow bluff body to eliminate the air core. We use SST k-ω turbulence model to simulate and investigate the characteristics of unsteady single-phase turbulent swirling flow interaction with a solid conical bluff body on a laboratory model. The numerical results show good agreement with experimental data. The results show the interaction with the bluff body increases the flow oscillation, especially at near the bluff body region.

A Scalabale Microfluidic Device for Switching of Microparticles using Dielectrophoresis

Waqas Waheed (Khalifa University, United Arab Emirates)

A novel negative-dielectrophoresis based approach for switching of microparticles in microdevices is reported. Two sets of electrodes piercing the microchannel from both sides are used to generate an electric field that controls the location of the microparticles inside the microdevice. The microfluidic device consists of a glass substrate and a PDMS layer. The microfluidic device was fabricated using standard microfabrication. Several parameters that affect the switching of cells were numerically studied using FEM. Experiments were carried out using red blood cells to demonstrate the effectiveness of the microdevice in switching of cells to three sub-channels.

Downstream Fluidic Injection based Jet Noise Suppressor for High Speed Flows

Pankaj Rajput (New York University Abu Dhabi, United Arab Emirates & New York University, USA); Sunil Kumar (New York University Abu Dhabi, United Arab Emirates)

The main aim of this investigation is to design and implement a novel fluidic injection based jet noise suppressor for high speed flows. Contrary to previous studies which injected fluid either inside the nozzle or just at the nozzle exhaust, this injection scheme injects multiple microjets perpendicular to the jet axis at an axial location downstream from the nozzle exhaust via a coaxial injector tube. Microjet injection closer to the jet axis leads to the formation of counter rotating vortex pair (CVP) close to the injection location which further beaks down into stream-wise vortices as the microjet bends and follows core flow direction. Isothermal jet-injector configuration is tested for a Mach 0.9 single stream nozzle with continuous injection. Instantaneous aerodynamic fields are obtained using Large Eddy Simulation (LES) and the results are validated with previous experimental data. The results suggests that the presence of coaxial injector tube significantly alters the flow field leading to shorter jet core and a reduction in the far field noise. When the fluid injection is activated there is a decrease in the far field mixing noise due to the decrease in the turbulence in the jet resulting from enhanced mixing. The study involves analyzing the effect of multiple design and operating parameters on the mixing characteristics and far field noise.

Permeability Computation of 3D Preforms using In-Situ micro Computed Tomography

Muhammad Ali (Khalifa University of Science and Technology, United Arab Emirates); Rehan Umer and Kamran Khan (Khalifa University, United Arab Emirates)

Preform compaction and resin impregnation are two major steps in composite manufacturing by liquid composite molding processes. Understanding of the preform compaction and permeability characteristics is important for the process characterization and optimization. Existing methods either require a number of tedious experiments, at the cost of material and labor, or numerical simulations using geometric models of the reinforcement preform. Geometric modeling approaches of the preforms fail to capture the real architecture as well as the effect of the compaction of the reinforcements. This study presents numerical computation of through thickness permeability of two types of 3D woven fabrics by in-situ compaction characterization using micro X- ray computed tomography (µXCT). The study focuses on obtaining fiber deformations during compaction and converting them into computational mesh for flow analysis using ANSYS FLUENT. The real-time 3D images were obtained by in-situ compaction at four different fiber volume fractions. The µXCT analysis revealed significant microstructure changes at high compaction levels. The flow field analysis revealed three dimensional flow paths within the preform. The computed through thickness permeability values agree well with the experimental data.

Sessions: C1–C14

C1: Humanities & Social Sciences IV
Chair: Jerry Kolo (American University of Sharjah, United Arab Emirates)

The Impact of School Climate on Adolescents' Sense of Belonging in Al Ain Schools: A Mixed Research
Wafaa El Zaatari (UAEU, United Arab Emirates)

To improve students' achievement, the ADEK (Abu Dhabi Authority for Education and Knowledge) focuses more on improving policies, teaching practices, as well as curricula and focuses less on adolescents' developmental needs. Unfortunately, students in Al Ain schools are far from being ranked the best in the international exams. This could be explained in that the change did not consider changing different school climate practices that could satisfy the students' developmental need of belonging. This need is so crucial as it helps in increasing students' motivation to work harder and then to achieve more. Therefore, the main purpose of the study is to explore school climate factors and their influences on adolescents' sense of school belonging in Al Ain schools. A useful framework for exploring the school climate factors is Bronfenbrenner's ecological system theory (1979, 1993). This study will follow a sequential exploratory research design.

Families, Schools, and Community Educational Partnerships
Shereen Mahmoud (UAEU, Palestine)

This paper is part of a multiphase study aims to develop a program of Families, Schools and Community Educational Partnerships (FSCEPs). In this phase, the study questions are: 1) How are existing FSCEPs defined and implemented in the UAE context? 2) What are the barriers and opportunities that influence FSCEPs program implementation? 3) What suggestions do relevant stakeholders have to initiate, improve and sustain FSCEPs partnerships in the context of the UAE? The data was collected by using semi-structured interviews. The sampling technique that was used in this phase is the snowball sampling. The targeted population is the staff of ADEK and KHDA. The study results delineated the detailed description of the current FSCEPs in the UAE from the perspective of two main educational entities.

Teachers' Experience with School Inspection
Sameera Alhosani (UAEU, United Arab Emirates)

This study goes over the inspection of the Emirate of Abu Dhabi analyzing teachers' situation during and after the period of inspection. It investigates in particular the understanding of the teachers for the purpose of inspection, which is leading them to perform, communicate, receive feedback and urge them to raise the bar of their students' expectations in order to meet the high standards of the Inspection-Irtiqa'a program.

Cultural Responsive Teaching
Hanan Al Marashdeh (UAEU, United Arab Emirates)

United Arab Emirates is a multicultural country. Meeting the students need is crucial to improve the students' achievement. One important factor is addressing their cultural interests through teaching. In this research, grade five students will be taught a thematic unit depending on cultural responsive teaching. Achievement of the experimental group will be compared with the control group to examine the effectiveness of the cultural responsive teaching. More empirical research is needed. In addition, more training is required for teachers to be able to use the CRT in classrooms.

Urban Landscape of Abu Dhabi - Informal Spaces, the Result of Insufficiency in Formal Public Spaces
Hanu Dilip (Paris Sorbonne University, United Arab Emirates)

Along with the intensely discussed physical dimensions of a city, social dimensions also contribute towards the sustainability of its future. This research studies the public open spaces, which is a vital factor that adds to both the physical and social aspects of the city. The study mainly focuses on the importance that open spaces have in the daily lives of residents and how it contributes to the identity of the main island. The requirement is stressed upon considering the fact that a majority of the population is working, which has an indirect influence on the non-working population as well. The diverse nature of the city has led to the emergence of countless informal spaces, scattered across the island. As part of the research, a mapping of unbuilt urban spaces having special uses has been done, to provide a snapshot of Abu Dhabi residents' spatial practices within or outside of the existing formal recreational spaces.

C2: Business & Management V
Chairs: Valerie Lindsay (AUS, United Arab Emirates), Amjad Abuelsamen (Zayed University, United Arab Emirates)

The Barriers of Communication and their Effect on the Quality of Interpretation: Case study of the Abu Dhabi Judicial Department (ADJD)
Abdullah Hemayet Uddin (The British University in Dubai & Abu Dhabi Courts, United Arab Emirates)

The purpose of the research is to examine the barriers of communication and their effect on the quality of interpretation in the ADJD. The researcher adopted the quantitative research methodology. A survey of 15 questions was organized. The survey included the personal and the physical barriers of communication as dependant variables and the quality interpretation as an independent variable. The results showed that interpretation in the ADJD is conducted fairly, clearly and professionally, following the best standardizations.

The Effects of Social Media in UAE Emergency Management
Theyab Alketbi (Sharjah, United Arab Emirates)

In this paper we propose the importance and effects of social media in the United Arab Emirates emergency management. Social media platforms like Facebook and twitter can be of great use in the situation of emergency. A number of examples have been quoted in the paper for the clarification of the topic. However, the emergency situation and their cure with social media have also been mentioned.

Role of Strategic Place Branding in Attracting FDI: Toward A Sustainable Competitiveness of Places
Mohamed AlAnsaari (British University in Dubai & Mohamed Bin Rashid School of Government, United Arab Emirates)

The advancement of technology and globalization has developed a framework of unprecedented level of competitiveness between cities and nations worldwide. The ever changing market trends has made places very competitive in the strive to access and attract local, regional and international investments, talent and tourists. In this regard the notion of "place brand" has risen to become an important factor for cities and nations to get a competitive edge on their competitors. That said brand communication strategies deployed by governments can take different forms and measuring their impact and usefulness in enhancing the place image and ultimately ability to attract tourists, talents and foreign direct investment is a task not undertaken by many scholars. Thus this study intends to construct a measuring tool to identify place images and measure the impact of brand communication strategies deployed by governments on place brand image and ultimately its relation to attracting FDI. The study is of importance because generally quantitative studies in the domain of place branding are very limited and there has not been many rigorous attempts to develop measuring tools to assess place brand image, nor

connecting that to brand communication strategies. Additionally, research conducted on place branding communications constitute as an area of that has not been thoroughly investigated in the MENA region.

An Exploratory study of In-flight safety videos and Marketing

Nawal AlAnsari (American University of Sharjah, United Arab Emirates)

In-flight safety videos are used in the commercial aviation industry as a regulatory act set by the Federal Aviation Administration (FAA). As passenger safety is considered top priority for the government entity, it is essential that the in-flight safety briefings are presented in all commercial airlines to ensure that passengers on board are aware of safety procedures in case of an unfavorable emergency. However, passengers have reported these pre-safety briefings to be considered boring and repetitive, and are sometimes ignored [2]. The purpose of this paper is to explore in-flight safety videos presented to passengers as a form of marketing, for numerous airlines ranging from premium to budget airlines. Given the exploratory nature of this study, secondary data will be collected using a literature search. In addition, content analysis of numerous in-flight videos from various commercial airlines will also be explored.

Edutainment with Flipped IDEAS

Hachiva Parvin, Kevin Dias and Norita Ahmad (American University of Sharjah, United Arab Emirates)

The paper narrows down on optimizing edutainment in the classroom by strategically using the methods of flipped classroom and IDEAS. The study provides an explained framework that highlights what needs to be implemented on behalf of the instructor and what outcomes can be expected as a result. A study was conducted on students within a course at the graduate level in the UAE. The purpose is to justify based on the mentioned experimentation, the hypothesized outcomes of 1) Before classroom education 2) During classroom education and 3) After classroom education.

C3: Clinical & Health III

Chair: Rawy A Thabet (BUID, United Arab Emirates)

VKORC1 Variants as Significant Predictors of Warfarin Dose in Emiratis

Zeina Almahairi (UAEU, United Arab Emirates); Hayat Saad Al-Jaibeji (College of Medicine and Health Sciences, UAE University & Maastricht University, United Arab Emirates); Lihadh Al-Gazali (United Arab Emirates University, United Arab Emirates); George Patrinos (Zayed Center for Health Sciences, United Arab Emirates University, United Arab Emirates); Bassam Ali (United Arab Emirates University, United Arab Emirates)

Vitamin K epoxide reductase complex (VKORC) is known to be the target enzyme of warfarin. Single nucleotide polymorphisms (SNPs) in VKORC1 are reported to cause resistance to warfarin treatment. The aim of this study is to explore VKORC1 genotypes in the local citizens of United Arab Emirates (Emiratis) treated by warfarin and to correlate their genotypes to warfarin dose. Sanger sequencing of the whole VKORC1 gene was applied on samples from 90 Emiratis treated with warfarin. Multiple linear regression analysis was applied to determine the ability of age, gender, and VKORC1 genotypes to explain warfarin dose variation. 52.4% of the variability in warfarin dose was explained by the genotypes at rs9923231 and rs61742245 with age. This is the first report of the explanatory power of VKORC1 genotypes and non-genetic factors on warfarin dose in Emiratis. We highlighted the effect of considering rare pharmacogenetic variants on predicting warfarin dose.

Metabolic Signature of Iron Overload in Pancreatic B-Cells Revealed Elevation of Alanine and Lactate

Hayat Aljaibeji (University of Sharjah, United Arab Emirates); Muath Khairi Mousa Mousa (Sharjah University, United Arab Emirates); Mohammad semreen Semreen and Jalal Taneera (University of Sharjah, United Arab Emirates)

Iron is an essential nutrient for humans and has important functions as a cofactor for several enzymes and oxygen transporters. However, iron is potentially hazardous when present in excess amounts. In the last decade, several epidemiological reports have established an association between iron overload and risk of type 2 diabetes mellitus (T2DM). Still, the mechanism how iron overload impacts the function of pancreatic beta cells remains unclear. In this study, we utilized Gas Chromatography (GC)/Mass Spectrometry (MS) to profile and understand the metabolic changes triggered by iron content in the clonal rat (INS-1) pancreatic β-cells. INS-1 cells were treated with 1 mM Ferric Ammonium Citrate (FAC) for 24 hrs and quenched metabolic processes. Internal standards library that allows identification of metabolite masses is generated and metabolites are extracted from samples using one-phase liquid extraction, derivation and analyzed using GC/Ms. Herein, we will focus on polar metabolites. Result and Conclusion: Alanine and lactate, which are both generated from pyruvate, were elevated in pancreatic b-cell cells treated with 1 mM of Ferric Ammonium Citrate relative to control cells. In the ß-cell, glucose metabolism leads to increased cytosolic ATP, closure of ATP-sensitive Kþ channels (KATP-channels), initiation of electrical activity and Ca2þ dependent exocytosis of insulin-containing granules. These findings point to a clear metabolic defect in pancreatic ß-cell with iron overload.

Osteoporosis Markers among Emirati Females Based on Vitamin D Receptor Variants and Biomechanical Parameters

Leena Alkaabi (Khalifa University, United Arab Emirates)

Osteoporosis (porous bones) is a metabolic skeletal disorder clinically characterized by reduced bone mass density (BMD) and altered bone quality with microarchitectural and biomechanical abnormalities. This is a silent disease that is typically manifested by increased risk of fracture, hence leading to significant morbidity and mortality [1-4], Fractures can involve any bone; however the spine, hip, wrist and proximal humerus are the most commonly affected sites[5-7]. Traditionally, osteoporosis has been classified into Primary and Secondary types. Primary osteoporosis is usually associated with normal aging and decreased gonadal function, such as decreased levels of estrogen [8, 9], whereas secondary osteoporosis is caused by other disease process, including Vitamin D deficiency, diabetes type 2, cardiovascular disease and certain malignancies[10]. A multifactorial disease, Osteoporosis is instigated by complex interactions between genetic, metabolic and environmental factors, with a severe impact on the biomechanics of the musculoskeletal system. Environmental factors include low physical activity, smoking, alcohol, low sun exposure (decreased vitamin D production), and certain medications, such as glucocorticoids and anticonvulsants[11]. Ethnicity and race can also play a role that may influence the incidence of osteoporosis. Understanding the risk factors for osteoporosis is critical towards prevention, improved clinical management, and effective healthcare. Among the UAE female population, there is a higher rate of vitamin D deficiency and risk for osteoporotic fractures as compared to Europeans[11]. This is likely due to a combination of conservative dressing style minimizing exposure to sunlight, spending the majority of their time indoors due to the hot weather, as well as, genetic factors. To date, accurate epidemiological prevalence figures for osteoporosis in the United Arab Emirates (UAE) are not available. The UAE population above 50 years of age is estimated to be only around 7%. It is hence not surprising that the current total number of individuals with osteoporosis is relatively small. On the other hand, the prevalence of osteoporosis in the UAE is affected by the uniquely diverse population structure. The total population is around 4.9 million, with only 20% Emirati Nationals (female/male ratio of 1/1.1) and 80% expatriates (female/male ratio of 1 to 4). There is data documenting osteoporosis prevalence of approximately 2.5% at an average age of 42 years (based on screening of 1825 asymptomatic

individuals). To date, there is no National Hip Fracture registry in UAE. According to the records of a major hospital in Abu Dhabi there are 2.25 osteoporotic hip fractures per 100 individuals. This report recommends that the UAE Health Authorities should consider osteoporosis and hypovitaminosis D as major health challenges and should implement management guidelines and prevention programs in collaboration with the EOS, greater access to dual energy X-ray absorptiometry (DXA) scans, as well as increased awareness/education for health care professionals and for the public [12]. Despite the emergence of studies about osteoporosis and genetic variation in VTD receptor among UAE nationals, to date none had attempted to examine the association between the two in order to provide important insight about the involvement of genetic variation in disease pathogenesis. In addition, a holistic population-specific model, which integrates main risk factors (genetic, environmental and musculoskeletal), is still lacking for females in the UAE and the GCC. This project addresses a significant health challenge in the UAE and region, Osteoporosis. We propose to focus on the association between VTD genetic and musculoskeletal variants/paramters and osteoporosis, in addition to other risk factors such as poor diet and lack of exercise in order to develop a better screening tool for specific individuals. This more effective approach might reduce health costs associated with the control and treatment of osteoporosis and or its complications including fractures, hence facilitating the development of new more relevant population-based interventions which can specifically target "high risk patients" . Research Methodology The research methodology is divided into the follwoing four phases: Phase I Recruitment of Participants and Testing for Biochemical Markers 400 participants (200 diagnosed with osteoporosis and 200 healthy age-matched controls) from Mafraq hospital orthopedic clinic will be recruited. Participants will be UAE female nationals and postmenopausal (not suffering from any other serious chronic condition like diabetes or cardiovascular disease). Biochemical markers including VTD 1, 25 (OH) D, Calcium Ca and PTH , 5 ml blood sample will be taken by a nurse from the participants after their consent. A buccal swab will be also taken for DNA extraction by the experienced phlebotomist and directly immersed into the DNA preparation solution (from kit). Swabs are used to avoid using blood samples for DNA extraction. All safety measures as per Mafraq Hospital (SEHA) will be followed during this procedure and all samples will be processed only after blood is deemed "safe to handle" as per hospital guidelines. The participants will be asked to provide some information about life style and anthropometry to collect data about factors which play a role in the predisposition to osteoporosis like diet, exercise, and smoking. The information regarding participants' biochemical test results and treatment/ medication will be recorded in an attempt to correlate all biochemical parameters which characterize osteoporosis. Phase II. Identification of Genetic Variants by Polymerase Chain Reaction (PCR) Assays DNA will be isolated from collected epithelial swabs using DNA Geno_Teck Kit. Samples will be screened for sequence variations in the VTD receptor gene by real time PCR using thermal cycler and gel electrophoresis. All DNA isolation, PCR and agarose analysis will be carried out at ZU Phase III. Bone Densitometry and Fracture Assessment using DEXA: BMD values will be measured for all subjects by the standard DEXA machine and accelerometers. Bone shock absorption will be calculated based on the Frequency Response Function (FRF). Both static and dynamic measures are then combined with BMD to assess bone quality and risk of Osteoporosis. Phase IV. Data Analysis Several bioinformatics tools will be used to identify genomic segments within VTD receptor gene. Heritability will be calculated using the SOLAR package to evaluate the influence of genetic components on phenotypic variation. Data quality control will be performed using Hardy-Weinberg equilibrium (HWE) test. Preliminary Results and Future Work This study is still in the experimental part phase. Experimental data collection at the first clinical site has been very slow which prompted the investigators to engage other hospitals. Thus far, only 67 samples were collected from Al-Mafraq hospital in Abu-Dhabi. In parallel with the data collection phase, training on the DNA extraction, PCR and DEXA were performed. Furthrmore dNA extraction and PCR analyses were performed on the 68 samples, but the number of samples is still not sufficient for complete data analysis.. Data management algorothms have also been built to facilitate the

data analysis phase. Ongoing work includes changing clinical sitesleveland Clinic Abu Dhabi (CCAD) endocronology unit for better access to patients. On the other hand, once the experimental work resumes at CCAD, we anticipate fast progress as the framework has already been developed and tested.

Investigation and Modeling of Obesity and Low Back Pain in UAE

Ruqayyah Alkaabi (Khalifa University & Masdar Institute, United Arab Emirates); Toufic Mezher (Masdar, United Arab Emirates); Kinda Khalaf (Khalifa University of Science, Technology and Research, United Arab Emirates); Maher Maalouf (Khalifa University, United Arab Emirates)

Low Back Pain (LBP) and obesity have emerged among the very common health problems particularly in patients who are attending health care at primary levels in the United Arab Emirates. As such, the causal connection between obesity and LBP have for the past few years have piqued the interest of many researchers. There is still a wide range of controversy concerning the association between the two, in addition to the presence of conflicting observations. A significant challenge in the process of trying to ascertain the primary cause of LBP in association with obesity is the nature of the condition. This is mainly attributed to the fact that it is heterogeneous, comes in many dimensions in nature. This research proposes a clinically-driven collaborative research effort to investigate the spinal biomechanics of obesity and LBP in the UAE, a country where both obesity and LBP are more than double the global averages.

C4: Life Sciences III

Chair: Ghaleb Husseini (AUS, United Arab Emirates)

Origanum Majorana Essential Oil Possesses Anti-Colon Cancer Activities

Asma Alrashdi (UAE University, United Arab Emirates); Khawlah Athamneh (United Arab Emirates University, United Arab Emirates); Halima Al Samri and Rabah Iratni (UAE University, United Arab Emirates)

Colon cancer continues to be a major cause of cancer-related deaths in both genders. Currently, there are no defined treatments other than traditional clinical treatments which have severe side effects on health. Plants have been shown to be an excellent source of new drugs, including anticancer agents. Origanum majorana commonly known as majoram is a plant that is known to possess different therapeutic values including antioxidant and antimicrobial activities. In the present study, we investigated the anticancer effect of O. majorana oil on colon cancer (HT-29) cell line. We demonstrated that O. majorana oil inhibited the proliferation of HT-29 cell line in a time- and concentration-dependent manner. Colony formation assay illustrated that O. majorana oil reduced the ability of HT-29 to form colonies, and when established colonies were treated with O. majorana it showed that the oil was able to reduce colonies' proliferation at low concentrations while at higher concentrations the oil was able to demolish the already formed colonies. Moreover, The oil induced cell death and cell cycle arrest at G1 phase. Annexin V staining revealed an induction of apoptosis in HT-29 cells. These preliminary results make O. majorana oil a promising alternative candidate against colon cancer.

Rhus Coriaria Suppresses Metastasis and Tumor Growth of Breast Cancer through Downregulation of MMP-9, Pge2 and TNF-A Activated Huvecs

Halima Al Samri (UAE University, United Arab Emirates); Khawlah Athamneh (United Arab Emirates University, United Arab Emirates); Asma Alrashedi, Hussain El Hasasna, Nehla Benhalilou, Rabah Iratni and Yusra Al Dhaheri (UAE University, United Arab Emirates)

Breast cancer remains one of the most common cancers as well as one of the leading causes of worldwide cancer-related morbidity and mortality. Recently, we reported that Rhus coriaria exhibits anticancer activities by promoting cell cycle arrest and autophagic cell death of the metastatic triple negative MDA-MB-231 breast cancer cells. Here, we investigated the effect of

Rhus coriaria on the migration, invasion, metastasis and tumor growth of TNBC cells. Our current study revealed that non-cytotoxic concentrations of Rhus coriaria significantly inhibited migration and invasion, blocked adhesion to fibronectin and downregulated MMP-9 and prostaglandin E2 (PgE2). Not only did Rhus coriaria decrease their adhesion to HUVECs and to lung microvascular endothelial (HMVEC-L) cells, but it also inhibited the transendothelial migration of MDA-MB-231 cells through TNF-α-activated HUVECs. Most importantly, by using chick embryo tumor growth assay, we showed that Rhus coriaria suppressed tumor growth and metastasis in vivo. Our findings demonstrate that Rhus coriaria is a promising chemopreventive and therapeutic candidate that modulate triple negative breast cancer growth and metastasis.

Rhus coriaria Suppresses Angiogenesis and Metastasis of Breast Cancer Through Inhibition of STAT3, NFκB and Nitric Oxide Pathways

Khawlah Athamneh (United Arab Emirates University, United Arab Emirates); Halima Al Samri, Asma Alrashedi, Nehla Benhalilou, Hussain El Hasasna, Yusra Al Dhaheri and Rabah Iratni (UAE University, United Arab Emirates)

Plants have been shown to be an excellent source of new drugs, including anti-cancer agents. Rhus coriaria commonly known as sumac is a plant that is known to possess different therapeutic values including antioxidant and antimicrobial activities. Recently, we reported that Rhus coriaria exhibits anti-cancer activities by promoting cell cycle arrest and autophagic cell death of the metastatic triple negative MDA-MB-231 breast cancer cells. Here, we investigated the effect of Rhus coriaria on metastasis and angiogenesis of TNBC cells. We found that Rhus coriaria inhibited angiogenesis, reduced VEGF production in both MDA-MB-231 and HUVECs and downregulated the inflammatory cytokines TNF-α, IL-6 and IL-8. The underlying mechanism for Rhus coriaria effects appears to be through inhibiting NFκB, STAT3 and nitric oxide (NO) pathways. The results described in the present study identify Rhus coriaria as a promising chemopreventive and therapeutic candidate that modulate triple negative breast cancer growth and metastasis.

Differential Regulation of Autophagy in Bronchial Fibroblasts from Asthma Patients

Rakhee Ramakrishnan, Mahmood Hachim, Bassam Mahboub, Rifat Hamoudi and Qutayba Hamid (University of Sharjah, United Arab Emirates)

Subepithelial fibrosis is a difficult-to-treat feature observed in the remodeled airways of asthma patients. Novel insights into the pathogenesis of fibrosis are necessary to be able to target this irreversible structural change. Autophagy is a frequently dysregulated pathway in various fibrotic diseases. We, therefore, aimed to investigate the regulation of autophagy in bronchial fibroblasts from severe asthma patients by evaluating the expression of autophagy proteins in bronchial fibroblasts and performing bioinformatics analysis on publicly available datasets. Differential expression of LC3BII was observed in severe asthma and COPD when compared to control indicating an impairment in the autophagy pathway in severe asthma. Preliminary bioinformatics analysis revealed genes of the autophagy pathway to be differentially regulated in severe asthma when compared to control. Since current asthma medications have limited impact on subepithelial fibrosis, autophagy may present a potentially targetable pathway in order to ameliorate airway remodeling in the difficult-to-treat severe asthmatics.

Macrophage Mediated Gastric Stem Cell Differentiation

Subi Sugathan and Sherif Karam (UAE University, United Arab Emirates)

It is generally believed that sequential and coordinated cascade of macrophages is essential for not only removal of damaged tissues but also their repair. The gastric mucosa comprises significant number of connective tissue cells including macrophages. It is not known whether these macrophages play a role in the activation of gastric stem cells and regeneration of gastric mucosa following injury. To analyse the effects of macrophages on gastric stem cell.To obtain macrophages from hematopoietic stem cells, whole bone marrow cells were isolated from both the femur and

tibia of mice and cultured in the presence of macrophage colony stimulating factor in a non-cell culture treated petri dishes. Macrophages were treated with lipopolysaccharide (LPS) or IL-4 to induce their both pro-inflammatory and anti-inflammatory phenotypes, respectively. Condition media from these macrophage phenotypes were collected and added to cultured primary gastric stem cells for 24 hours. Then RNA was extracted from the stem cells and processed for RT-qPCR. While pro-inflammatory macrophage condition media had no effect of gastric stem cells, media obtained from cultured anti-inflammatory macrophages showed interesting effects. There was an induction of mRNA expression of genes specific for mucous (MUC6, TFF2) parietal (ATP4A) and endocrine (CHGA) cell lineages. The anti-inflammatory macrophages produce factors that play an important role in inducing gastric stem cell differentiation. Defining these factors will improve our understanding of the biology of gastric stem cells in health and disease.

C5: Electrical & Computer Engineering IV

Chair: Abdul-Rahman Al-Ali (American University of Sharjah, United Arab Emirates)

Mining Causal Relationships Between Diabetes Complications And Medical Tests

Aly Elhakim, Michel Pasquier and Assim Sagahyroon (American University of Sharjah, United Arab Emirates)

Machine Learning / Data Mining techniques have proven to be a key technology in data processing and analysis in many areas. In healthcare, we can use Machine Learning / Data Mining techniques to mine the data of medical records to make better sense of it, uncover new knowledge, and generally provide better and faster health services. Diabetes is one of the diseases that has been investigated using intelligent techniques. Still, diabetes-related research continues to take place, and the use of traditional as opposed to non-traditional diabetes Type-2 risk factors in prediction tools and decision support applications instead of normal blood tests is an open research problem. The objective of the research is to find the relationships (implications) between medical tests of diabetic patients and possible diabetes complications. Also, while many researchers focused on developing models that assist in predicting diabetes with accuracy higher than the baseline standards stated in the literature, the pre-mentioned objective stated is covered in a very limited scope. There is room for deeper investigation, and the topic needs to be further examined. This study aims at localizing the problem of diabetes type-2 Metabolic Syndrome complication diagnosis to GCC nationals and especially Emirati patients, taking into consideration common medical tests e.g., HbA1c, Fasting Glucose, Random Glucose, and Insulin; and Diabetes Complications e.g., Hyperthyroidism, Hypertension, Diabetic Foot and Metabolic Syndrome.

Photo Acoustic Tomography Using Compressive Sensing Framework

Maha Shehada, SH, Imad Barhumi and Hanan Al-Tous (United Arab Emirates University, United Arab Emirates)

Photo Acoustic Imaging has been recently used for several purposes, the modality has gained interest in medical applications. Photo Acoustic Tomography (PAT) is a biomedical imaging technique that depends on photo acoustic effect; which is the formation of sound waves following light absorption in a tissue sample. It is quantified by measuring the formed sound with appropriate detectors such as sensors. Compressive sensing (CS) is a new paradigm which is capable of reconstructing signals from fewer number of measurements than suggested by Nyquist rate. The objective of this paper is to show how to apply the CS framework to form a full view PAT image with less number of sensors. In this paper, numerical simulations are done to reconstruct PA image using CS framework. A comparison is done in terms of speed and quality between three different CS algorithms which are Alternating Direction Method of Multipliers, l_1-MAGIC and CVX toolbox.

A Biosensor Design Using SRR and CSRR Metamaterial

Nadin Alrayes and Mousa Hussein (UAE University, United Arab Emirates)

In this paper, a sensor is designed using a split ring resonator with the defected ground structure to classify three different types of breast cancer cell lines. The differentiation between the three types is based on measuring the reflection coefficient for each type.

Energy Transfer through Gas Pipelines with Optimized Pressure

Saif Alhazaimeh (Khalifa University, United Arab Emirates)

The aim of this paper is to spotlight on a novel approach for energy transfer utilizing the gas pipelines. The new proposed system will be converting the electricity from renewable energy to potential energy in the form of pressure. The exported gas in the gas pipelines can be compressed to higher pressure to act as an energy transfer medium. Later on, along the pipeline the pressure can be converted back to electrical energy. The proposed system dynamics will be analyzed and optimized using TRNSYS and MATLAB .

An Embedded Walk-cycle Monitoring System using Body Area Communication and Secure Low-Power Dynamic Signaling

Shahzad Muzaffar and Ibrahim M Elfadel (Masdar Institute of Science and Technology, United Arab Emirates)

The paper presents a novel ultra-low power, embedded, and wearable walk-cycle monitoring system with applications in areas such as health-care, robotics, sports medicine, physical therapy, prosthesis, and animal sports. Customized shoes with sensors continuously measure the forces, and an electronic digital assistant is used to analyze the acquired measurements in real time by employing an IMU free and self-synchronizing method in order to estimate weight and study motion patterns. To achieve ultra-low power operation, the human body is used as a communication medium between the sensors and the digital assistant. The single-channel behavior of the human body is accommodated with a novel, simple yet robust single-wire signaling technique, Pulsed-Index Communication (PIC), that significantly reduces the system footprint and overall power consumption as it eliminates the need for clock and data recovery. The system prototype has been rigorously and successfully tested.

On Suitability of Lyapunov Function based Backpropagation Algorithm for Neural Networks as Adaptive Inverse Controller

Muhammad Saleheen Aftab (United Arab Emirates University, United Arab Emirates)

Artificial neural networks are commonly known as Universal Approximators; a property immensely useful in system identification and control applications. Traditionally, neural networks are trained with gradient-descent backpropagation algorithms. However, these algorithms are computationally burdened and slow due to the calculation of error derivatives. As a result, the research focus has shifted to develop gradient-free neural algorithms. One famous approach is to incorporate Lyapunov Functions in network parameter optimization. In this paper, we briefly discuss and analyze one such recently developed algorithm from the point-of-view of its applicability in adaptive control paradigm. It has been found that with a few proposed modifications, this algorithm can work excellently as neuro-adaptive inverse controller.

C6: Information Security

Chairs: Mohammed Hussain (Zayed University, United Arab Emirates), Barlas Gerassimos (American University of Sharjah, United Arab Emirates)

Security Assessment of Low-Resource Edge devices for IoT Systems

Shams Y Shapsough, Imran A. Zualkernan and Fadi Aloul (American University of Sharjah, United Arab Emirates)

The rapid adoption of systems using IoT technologies is poised to create many exposed systems with new security vulnerabilities. IoT applications from a variety of domains may face severe security holes. Significant security risks to IoT systems come from the large number of edge devices. Edge-devices are very small, wireless-enabled microcontrollers running primitive operating systems. Their resource-constrained nature in an IoT eco-system poses a challenge to many aspects of security. The primary objective is to provide recommendations to improve an IoT system's overall security profile with minimum impact to its operations. Key use-cases in various application areas of IoT will be used to conduct an experimental evaluation of IoT systems to detect vulnerabilities. Their impact on IoT systems will be investigated, and counter measures will be proposed. Power consumption and resource utilization data will be collected and analyzed, and various networking profiles including 2G, 4G, and Wi-Fi will be simulated.

Stealthy Information Leakage Leveraging Structures and Peripherals in Modern Embedded Systems

Dimitrios Tychalas (New York University Tandon School of Engineering, United Arab Emirates); Michail Maniatakos (New York University Abu Dhabi, United Arab Emirates)

Embedded systems are being aggressively integrated in every aspect of modern life, and their uses range from personal devices for everyday use and convenience to devices deployed in critical systems, such as autonomous vehicles, aircrafts and industrial control systems. An often neglected attribute of embedded systems is cybersecurity, which often leads to an expanded attack surface in the systems they are deployed. In this paper we present a novel attack vector that enables stealthy information leakage from an embedded system. Specifically, we leverage structural components present in modern embedded systems, namely the Device Tree Blob, to extract information about the hardware profile of the system. Utilizing this information, we introduce a stealthy attack that leaks information from arbitrary memory locations taking advantage of the Direct Memory Access (DMA) controller and existing side-channels.

The Effects of Anonymization on Data and Analytics

Abdelrahman AlMahmoud and Ernesto Damiani (Khalifa University, United Arab Emirates); Hadi Otrok (Khalifa University, United Arab Emirates & CIISE, Concordia University, Canada); Yousof Al-Hammadi (Khalifa University of Science Technology and Research, United Arab Emirates)

Privacy requirements and the need for collaborative analysis has motivated a significant amount of research on anonymization techniques and privacy-aware analysis. Anonymization techniques are typically applied to data in order to retain the privacy of the data. Some anonymization techniques preserve certain distances and properties of the original data points without revealing compromising information about it which enables performing collaborative privacy-preserving analysis. However, typical Anonymization techniques require a lot of expertise and domain knowledge in order to be applied effectively because of the effects they have on certain properties of the data. In this paper we discuss the types of Anonymization techniques according to how it transformations the type of data.

A Modern Solution for Identifying, Monitoring, and Selecting Optimal Configurations for SSL/TLS Deployment

Lamya Alqaydi (Khalifa University of Science and Technology, United Arab Emirates); Chan Yeob Yeun and Ernesto Damiani (Khalifa University, United Arab Emirates)

A new open source project is introduced to simplify understanding of the limitations and security levels of configurations of SSL/TLS and ciphersuites.

Framework for Evaluation of Cybersecurity Effectiveness in the UAE, A Case Study of Abu Dhabi Government Entities

Abdulla Al Neaimi (Securetech, United Arab Emirates)

The cyberspace creates one of the new front lines for countries to demonstrate power. Vigilant governments and those that have successfully launched attacks could be the next global giants [1]. The UAE has been a target for most of the recent cyber-attacks due to hasty economic growth, technology and the rise of oil and gas sector accelerated by the wide spread of internet to the tune of 90% by the end of 2014 [2]. In this paper, a meticulous review of cyber-attacks has been conducted in addition to identifying factors deterring effectiveness of the available defenses. The role of technology, training, awareness, competence of staff and senior management in the prevention of cyber-attacks has been evaluated. Results reveal that senior management has the responsibility of establishing strategies and policies for prevention, detection and mitigation of cyber-attacks. Finally, a framework is proposed to help entities evaluate their cybersecurity systems.

Securing the Next Generation inVANETs

Wedad Al-Dhuraibi and Mourad Elhadef (Abu Dhabi University, United Arab Emirates)

Intelligent transportation system using intelligent vehicular ad hoc networks (inVANETs) is one the main building blocks of future smart cities. It provides wireless communication between vehicles and different objects in the road to increase efficiency and human safety using various applications. However, all the attractive features of inVANETs will increase security risks and privacy problems if security attacks is not studied and analyzed thoroughly and completely. Denial of service attack is one of the most dangerous attacks since it targets the availability of the network/target services. This paper provides a unique classification for security attacks in inVANETs as well as classifies different types of DoS forms according to the mechanisms used by each attack.

Memory Management for Higher Order Tensor-Based Applications

Mohammad Alhulayil and Ahmad Bani Younes (Khalifa University, United Arab Emirates); James Turner (Texas A&M University, USA)

Computational differentiation has existed since the 1960's as a scientific and engineering methodology for automatically generating sensitivity partial derivative models for stability assessments and optimization studies. Two fundamentally different solution strategies have been evolved for building sensitivity models. First, the analysts, i.e. expressed in FORTRAN, C, or other languages, is used as a template for writing an application-specific sensitivity software solution for the problem. Not surprisingly, this approach leads to a very large executable for numerically evaluating the partial derivative model. Only a first order sensitivity model is produced. In theory, the derived first-order model can then be used as a template for the second and higher order sensitivity models; unfortunately, experience has shown that the resulting software products can become large and unmanageable from a software perspective; as well as being unreadable by analysts. The second approach uses operator-overloading for generating higher-order sensitivity models. Derivative capabilities are created by embedding the chain rule of calculus in the operator overloaded math libraries, and defining n-tuple data structures for storing final derivative results and generating derivative derived intermediate results for application-specific calculations. At second order and beyond, one quickly realizes that computer memory and computation are severely impacted by nonlinear scaling laws for tensor operations. Fortunately, however one quickly observes that the gradient tensors generated at second order and beyond are symmetric, which creates significant opportunities for reducing variable memory requirements and associated computational effort.

C7: Energy & Fuels

Chair: Shayok Mukhopadhyay (American University of Sharjah, United Arab Emirates)

Evaluation of Direct Absorption Solar Collectors (DASCs) Based on Nanofluid Volumetric Absorbers

Omar Sharaf (Khalifa University, United Arab Emirates); Eiyad Abu-Nada (Khalifa University of Science, Technology and Research & College of Engineering, United Arab Emirates)

In this study, low-flux direct absorption solar collectors (DASCs) based on nanofluid volumetric absorbers were thermodynamically modeled and analyzed from first- and second-law perspectives. Radiation interfacial losses were accounted for in the present model where Rayleigh scattering approximation was used for finding the nanofluid optical properties. The radiative transfer and energy conservation equations were solved numerically using a second-order accurate scheme. The numerical model was validated against available experimental results in literature and was used to investigate the effects of various important parameters on the energy and exergy efficiencies. It was observed that despite the low exergy efficiency in low-flux DASCs, the design point at which exergy efficiency is maximized provides a balance between the power gain and temperature gain of thermal energy collected.

Optimizing the Production of Ammonia as an Energy

Ola Osman (Khalifa University, Masdar Institute, United Arab Emirates); Sgouris Sgouridis (Masdar Institute of Science and Tec, United Arab Emirates)

In light of the impacts of fossil fuel combustion and the mitigation efforts spearheaded internationally by the Paris Agreement, the UAE faces the challenge of reforming its domestic energy portfolio. This also consists of seeking sustainable alternatives for their primary sources of revenues, i.e. the export of crude oil and natural gas. The very high solar energy potential and large desert areas offer a significant opportunity to transition not only the domestic economy towards solar but also to become an exporter of solar energy through a suitable energy carrier. This work provides an in-depth analysis of a promising carrier option: ammonia. The objective is to optimize the design of a system for the large-scale production of ammonia as an energy carrier from renewably generated electricity as a form of Power-to-Liquids (PtL) in pursuit of developing an ammonia economy in the UAE. The hydrogen for this process is obtained from high temperature water electrolysis. It is then processed through a promising solution for ammonia production plants based on the Haber-Bosch process. We develop a chemical engineering simulation model of this process and perform an energy and economic analysis. We find that for a continuous large scale process producing about 1700 mt/day, the specific energy consumption of the entire process is approximately 13.0 kWh/kg of ammonia. The process consists of desalination, electrolysis, air separation, the Haber Bosch synthesis loop and storage and refrigeration of the produced ammonia. To accommodate for the intermittency of solar energy supply to the ammonia facility, the flexibility of each sub-system is investigated. For better understanding of the plant, system dynamics modeling is carried out to grasp the dynamic interaction between components in the system via illustrative and graphical means. Finally, results from this are used in a linear cost minimization model formulated to determine the capacities of desalination, electrolysis, hydrogen storage, PV scale, and batteries needed to run a continuous ammonia synthesis loop.

The Effects of Impurities on the Oxidation Treatments of MWCNTs and their Activities toward Vanadium Redox Flow Batteries

Ibrahim H. S. Mustafa, Chieh-Han Wu and Ayoob Al Hammadi (Masdar Institute of Science and Technology, United Arab Emirates); Fatima Ahmed (Masdar Institute of Science & Technology, United Arab Emirates); Rahmat Agung Susantyoko, Giovanni Palmisano and Saif Almheiri (Masdar Institute of Science and Technology, United Arab Emirates)

The presence of carbonaceous impurities within the strands of MWCNTs play an important role and our results reveal that the presence of impurities, in the form of both amorphous carbon (Carbon Black) and graphitic carbon (Fullerenes c60) provided a large amount of edge sites. The results give important directions for high performance electrode design for vanadium redox flow batteries. The findings suggest that costly purification processes may not be required for MWCNTs intended for electrode applications in VRFBs.

Produced Water treatment using Microbial Desalination Cells

Apoorva Goel (American University Of Sharjah, United Arab Emirates); Naif Abdelaziz Darwish and Ahmed Aidan (American University of Sharjah, United Arab Emirates)

Environment friendly discharge of produced water is pertinent for achieving sustainable development in the Oil & Petroleum industry. Globally, around 250 million barrels of produced water are generated daily compared to 80 million barrels of oil. Produced water is also highly contaminated. Its treatment requires great investments from oil industries. The microbial desalination fuel cell is an emerging desalination technology offering great promise of highly efficient desalination with low sludge production, low energy input, and electricity generation. The objective of this work is to vary certain parameters to find the optimum operating conditions for best performance.

Multi-Step Themochemical Splitting of H2S Using Metal Sulfides

Osahon Osasuyi (Khalifa Institute of Science and Technology, United Arab Emirates)

As the global demand for energy rises, a corresponding increase in the H2S emission is expected. For the safety and economic benefit of humans and the environment, the multi-step thermochemical splitting of H2S presents an approach to attain both the elimination of the toxic gas and the generation of H2 gas which can be applied in many areas. From the thermodynamic analysis, zirconium sulfide proved to be a promising metal sulfide for the two-step thermochemical splitting of H2S with an H2 yield of 91% along with a complete regenerative ability. Experimental studies were carried out to investigate the effect of temperature on the sulfurization reaction. Observations showed that a proper balance and tuning of operating conditions is required to effectively overcome the process constraints.

Market Design for Renewable Energy (RE) Adaptation for Abu Dhabi

Shaima Ahmed Alnaqbi (Khalifa University - Masdar Institute, United Arab Emirates); Toufic Mezher (Masdar, United Arab Emirates)

In order to implement RE strategies in any country, there is a need for a good market design in order to have successful outcomes. Market design depends of several factors such Infrastructure, Human Capacity and Institutions. This paper will explore that market design factors and sub-factors that are relevant for RE adoption. A case study of Abu Dhabi will be conducted in order to determine if the RE strategy is on the right track.

Nonlinear Dynamics of a Blade-Hub System

Ehab Basta (American University of Sharjah, United Arab Emirates); Mehdi Ghommem (American University Of Sharjah, United Arab Emirates); Samir Emam (American University of Sharjah, United Arab Emirates)

Vibrations of rotating blades have been a subject of constant research interest due to their practical significance. There have been numerous linear and nonlinear models with different levels of complexity reported in the literature. The present study is concerned with the in plane large-amplitude vibrations of a rotating Euler-Bernoulli beam following the model developed by Turhan and Bulut [1]. A reduced-order model has been derived to simulate the dynamic behavior of the rotating blades and the fixed points and their stability have been investigated. It is shown that some key parameters, such as the effective blade length and the hub rotational speed, affect the system stability. The analytical results obtained using the method of multiple scales and the numerical results are in good agreement.

C8: Materials Science

Chair: James Griffin (American University of Sharjah, United Arab Emirates)

Curing Kinetics and Mechanical Properties of Epoxy Coating Prepared with Organic Solvent Addition

Yi Cai (Khalifa University of Science and Technology, United Arab Emirates)

Industrial epoxy coating based on epoxy, amine curing agent and organic solvent were prepared, their mechanical property, curing kinetics were discussed in terms of solvent addition. The curing degree of epoxy coating was characterized by employing FTIR, the mechanical properties were studied by using tensile testing, the nonisothermal curing kinetics and glass transition temperature of the prepared epoxy coating were also investigated by differential scanning calorimetry (DSC). The results indicated that the addition of solvent could lower the curing degree which affect the formation of crosslinked structure, the tensile strength and modulus of elasticity were also weakened by the increasing amount of solvent, while the flexibility was highly improved in the presence of solvent. An lower curing rate was observed with solvent addition in comparison with that of pure epoxy, it also indicated that activation energy of curing reaction increases with rising conversion where crosslinking is regarded as diffusion controlled.

Mechanical Behavior of Carbon Nanotube/graphene Foam

Shaohong Luo (Khalifa University, United Arab Emirates); Kin Liao (Khalifa University of Science Technology and Research, United Arab Emirates)

In this study, a facile way was developed to fabricate flexible carbon (CNT)/graphene foam by dip-coating graphene oxide and carbon nanotube mixed solution on the polyurethane foam templated, followed by pyrolysis at 900° for 30 min. The experimental results show that addition of CNT can significantly increase the flexibility of graphene foam, which makes it a promising candidate into flexible energy device.

Curing Behaviour of High Performance Laminated Kevlar/Epoxy Composites

Abdel-Hamid Ismail Mourad (Unietd Arab Emirates University, United Arab Emirates); Farah Genena (UAE Univerity, United Arab Emirates); Mouza AlMansoori (UAE University, United Arab Emirates); Lamia Almarzooqi (UAE Univerity, United Arab Emirates); Nizamudeen Cherupurakal (UAE University, United Arab Emirates)

Curing is considered as the major factor in deciding the final mechanical performance of laminated Kevlar/epoxy composites. The parameters such as curing time, temperature and applied pressure during the hot pressing will affect the chemistry of crosslinking of the epoxy matrix and interaction of epoxy with the Kevlar fiber. The present study is carried out to evaluate the optimal curing conditions of the Kevlar/epoxy nanocomposites. DSC and TGA tests are carried out to determine the thermal stability and optimal curing conditions. Mechanical performance is investigated by drop weight tests. The results show that the optimal curing temperature for maximizing the mechanical properties is at 170oC. Peeling off the Kevlar layers are observed for nanocomposite samples cured under 100oC.

Fabrication of Highly Hydrophobic Electrospun Membranes for Membrane Distillation

Olawale Makanjuola (Khalifa University of Science and Technology, Masdar Institute, United Arab Emirates); Isam Janajreh (Masdar Institute of Science and Technology, United Arab Emirates); Raed Hashaikeh (Masdar, United Arab Emirates)

Highly hydrophobic composite membranes were prepared by electrospinning a suspension of teflon oligomers (OTFE) in poly(vinylidenefluoride-co-hexafluoropropylene) (PH) solution and were designated as PH-x%OTFE. Two sets of membranes with OTFE concentration of 39 and 64 wt.% were prepared. The composite membranes were hot-pressed to improve their structural integrity, mechanical strength, and the liquid entry pressure (LEP). The effect of OTFE addition as well as hot-pressing on the properties of the membranes were studied. Contact angle and LEP values of 135o and 33 psi, 138o and 19 psi, and 146o and 13 psi were obtained for the as-prepared membranes containing 0 wt.%, 39 wt.%, and 64 wt.% OTFE respectively, while contact angle and LEP values of 130o and 44 psi, 137o and 44 psi, and 138o and 25 psi were obtained for the hot-

pressed membranes containing 0 wt.%, 39 wt.%, and 64 wt.% OTFE respectively. The fabricated membranes showed stable flux and a salt rejection of about 100% for 42h of continuous flow when tested in direct contact membrane distillation. The composite membrane containing 64wt% OTFE had an average vapor flux of 10 kgm^(-2) h^(-1) which was comparable to that of the control PH membrane, while the composite membrane containing 39 wt.% OTFE had a lower average vapor flux of 5 kgm^(-2) h^(-1).

Fabrication of Antireflection and Anti-Soiling Coatings for Desert Based Solar Panels

Nujood Alshehhi and Khalid Askar (Khalifa University of Science and Technology, United Arab Emirates)

The proposed research method involves spray coating a polymer composite followed by plasma etching the surface to generate the necessary roughness. Different etching gasses and conditions are explored to tailor our generated coating to the desired optimum conditions. However, this process is still under research to improve its effectiveness and mainly its efficiency.

Integrated Biorefinery Process for Isolation of UAE Date Palm Waste Biomass Waste into Individual Lignocellulosic Fractions

Emmanuel Galiwango (Uae University, United Arab Emirates)

An integrated biorefinery process based on acidic leaching, alkaline treatment and concentrated sulfuric acid hydrolysis was developed for the simultaneous recovery of lignin, hemicelluloses, bleached cellulose from date palm lignocellulosic biomass waste. These fractions can serve as viable source of bio-chemicals with potential high-value applications. Thermogravimetric, Scanning Electron Microscopic and FTIR characterization results demonstrated that a combined acidic-alkaline treatment enhanced the degradation of lignin-carbohydrates complexes releasing lignin, cellulose and hemicellulose in higher yield than many traditional methods. Moreover, cellulose, lignin and hemicellulose components, 47.26, 17.92 and 2.35 %, yield was obtained, respectively. In terms of total mass balance, it was possible to refine the investigated biomass for production of lignin, hemicellulose and cellulose to about 67.53% of the feed.

C9: Civil & Environmental Engineering IV

Chair: Kazi Fattah (American University of Sharjah, United Arab Emirates)

Graphene-Enabled Ion Exchange Membranes for Electromembrane Desalination

Adetunji Alabi (Masdar Institute of Science and Technology, United Arab Emirates); Linda Zou and Ahmed Al Hajaj (Khalifah University, Masdar Institute, United Arab Emirates)

In order to address the increasing demand for fresh water due to accelerated social and economic growth in the UAE and the rest of the world, water treatment technologies, such as desalination, have been rapidly developed in attempts to safeguard water security. Electromembrane desalination processes, such as electrodialysis, belong to a category of desalination technologies which involve the removal of ions from ionic solutions with the use of electrically charged membranes termed ion exchange membranes (IEMs). The challenges associated with IEMs have drawn the attention of many researchers, who have investigated various approaches to enhance their properties. The incorporation of nanomaterials (NMs) is one of the popular approaches employed. This work investigates the incorporation of graphene-based NMs into the polymer matrices of IEMs with the aim of improving the desalination capabilities of IEMs.

A Novel Separation Material for Oil in Water Emulsion:Natural Sand Particles

Ning Wang and Yang Yang (Khalifa University of Science and Technology, United Arab Emirates); Kean Wang (The Petroleum Institute, United Arab Emirates)

In this study, natural sand particles were characterized and tested for oil in water emulsion separation. The sand particles were characterized using standard instruments and based on which

the separation mechanisms were proposed. Wettability of the natural sands was checked through WCA (water contact angle) and underwater OCA (oil contact angle) measurements. The top surface morphology of was characterized with SEM (scanning electron microscope). Separation efficiency was evaluated by testing reduction of turbidity and rejection of TOC (total organic carbon). Experimental results revealed that: 1) The naturally available cleaned sands show superhydrophilicity and underwater superoleophobicity; 2) Porous Sands bed could realize even higher separation efficiency than commercial PES and Nitrocellulose microfiltration membranes, with rejection of total organic carbon higher than 90% for Dodecane in water Emulsion, higher than 99% for Hexane in water emulsions.

Membrane Bioreactor- Desalination Microbial Fuel Cell Hybrid System

Noora Mukhtar, Sameer Al-Asheh and Ahmed Aidan (American University of Sharjah, United Arab Emirates)

Microbial desalination cell offers great promise of high salinity removal with zero energy input. Moreover, membrane bioreactors are of great reliability in treating wastewater. The objective is to introduce a hybrid system of membrane bioreactor and microbial desalination cell for simultaneous wastewater treatment, seawater desalination and electricity production. Synthetic wastewater,seawater, potassium hexacyanoferrate III, yeast and glucose are used as the anode feed, saline water feed, cathode oxidizing agent, microorganisms and substrate, respectively. The system is studied under open and closed circuit modes. A smaller scale system of 350 ml capacity with a side stream MBR is more efficient than its alternative of 4.5 L capacity with an immersed MBR. A reduced middle chamber size of 250 ml capacity achieved higher desalination percentage by 5.97%. Three external resistances are used, namely 10.2, 3833 and 302200 ohms. Highest total desalination rate, but lowest power density are obtained using 302200 Ω external resistance.

Preliminary Modelling of Photo-Degradation of 4-Nitrophenol in Microfluidic Photocatalytic Reactor

Ahmed O Yusuf and Giovanni Palmisano (Masdar Institute of Science and Technology, United Arab Emirates)

Heterogeneous photocatalytic reactions are typically mass transfer limited reactions. Coupling the remarkable properties of microfluidic reactors and use of thin layer of immobilized photocatalytic composites on glass substrate could improve the reaction efficiency. In this paper, the photo-degradation of 4-nitrophenol will be modelled and solved using MATLAB PDEPE. The expected result will be fitted to the experimental data obtained from the laboratory set-up.

Cloud Cover Climatology for the Arabian Peninsula

Latifa Yousef (Masdar Institute of Science and Technology & National Center of Meteorology and Seismology, United Arab Emirates); Marouane Temimi (Masdar Institute, Tunisia)

This study presents a climatology of cloud cover over the Arabian Peninsula. Monthly averages of cloud cover are used for the time period of 1983-2009, derived from the International Satellite Cloud Climatology Project (ISCCP) D2 dataset. Temporal analyses results indicate a decreasing shift in the monthly cloud. Change points are detected in the time series of cloud coverage between 1998 and 2000, which could be attributed to various factors related to climatic shifts and satellite artifacts. Spatial analyses display the distribution of cloud amounts over the area and corroborate its dependency on the region's climate and local topography.

Satellite Remote Sensing of Fog Formation in UAE

Mariam Almoosawi (Masdar Institute of Science and Technology, United Arab Emirates)

Fog is a natural phenomenon of suspended water droplets or ice crystals occurs near ground, and associated with poor visibility below 1 km. Such weather condition can have serious impacts on the everyday lives of people, services, and transportation. The United Arab Emirates is one of the countries that has frequent and dense fog events. The purpose of this research is to conduct a five-

year spatial and temporal analysis of fog trends in the UAE, through MSG-SEVIRI satellite imagery. The preliminary results indicates that fog formation occurred most frequently in areas near the UAE-Saudi border, close to, the Empty Quarter desert. Coastal regions and Northern Emirates showed less fog formation, in comparison with other areas in the UAE. The phenomenon's frequency was the highest during the fall season, especially in November, where the mean value of fog events was 26. Whereas, the lowest fog occurrence was during the summer season. Amongst all summer months, July had the lowest monthly fog mean of 1.4 events.

C10: Civil & Environmental Engineering V

Chair: Muhammad Saleem (American University of Sharjah, United Arab Emirates)

Effect of Contractors' Characteristics on Project Cost in the UAE Construction Industry

Khalid Alsuwaidi and Sameh El Sayegh (American University of Sharjah, United Arab Emirates)

Most construction projects end over budget. This could be due to the selection of the lowest bidder without looking at the key characteristics of the bidders. This paper evaluates the contractors' key characteristics that have impact on project success, specifically project cost. Being able to predict or forecast the project's success from the contractor's selection stage will definitely reduce the risks associated with the process extensively. A list of sixteen characteristics was identified through literature review. A survey was then developed. Forty-five respondents completed the survey. The results were analyzed using the Analytic Hierarchy Process. The results show that the top five characteristics with high impact on project success (cost) include project controls capability (0.126), number and qualifications of key personnel (0.103), communication and documentation (0.094), past performance - time and cost (0.093) and risk management capability (0.093). Clients need to evaluate these characteristics during bidding to ensure project success.

A Decision Support System for Highway Infrastructure Protection Planning against Sea Level Rise

Ilia Papakonstantinou (New York University Abu Dhabi, United Arab Emirates); Jinwoo Lee (Hong Kong Polytechic University, Hong Kong); Samer Madanat (New York University Abu Dhabi, United Arab Emirates)

Sea level rise predictions have motivated research towards the protection of shoreline infrastructures, including transportation systems. Transportation network interactions in cases of inundation can lead to severe disruptions, that cause considerable delays, especially due to congestion feedbacks. This paper describes a decision tool to support infrastructure protection planning against sea level rise. A simulation based bi-level model is designed to minimize delays in a transportation system under inundation, considering budget constraints, hydrodynamic interactions within the shoreline, as well as traffic dynamics in the network. The case study focuses on San Francisco Bay area, for a 0.5m sea level rise, expected in 2054. The results show that the optimal strategies vary according to the available budget, and that there exist relatively critical shorelines to protect in order to reduce traffic disruptions. We anticipate our research to provide a framework for transportation infrastructure protection planning against sea level rises.

New Configuration for the Location of Driver in Street Lighting Design

Amira AbouElhamd (UAE University, United Arab Emirates); Riad Saraiji (The British University in Dubai, United Arab Emirates)

The current street lighting standards use the horizontal illuminance or luminance measures at the pavement level as design targets. However, these standards receive several criticisms with regards to the values they use. Additionally, several studies have questioned the principles that were used to develop these standards and they pushed the need to improve them. Which pose a question on the suitability of the current configurations of the street elements that provide a realistic

picture of the street environment. Therefore, reviewing the current configurations in the current street lighting standards is a viable approach to understand the lighting environment for drivers.

Assessment of the Built Environment, Physical Activity and Public Transportation in Transit-Oriented Developments in Abu Dhabi

Allan Pimenta (Khalifa University of Science and Technology, United Arab Emirates)

Background: Walking, cycling and public transportation play significant roles in the development of sustainable cities. Their integration in transit-oriented developments (TOD) have been advocated and implemented across the world. Abu Dhabi is currently considered an automobile-oriented city, hence successful TODs may be critical to comply with the sustainability vision proposed by the government. Objective: To assess the correlations among the built environment, socio-demographics, public transportation and physical activity in transit-oriented developments in Abu Dhabi. Method: Self-reported data were collected through a survey for a sample size of 363 randomly selected respondents within 14 selected transit-oriented developments (TOD) in Abu Dhabi city. The survey was composed by 37 questions, divided into 3 major sections: socio-demographic, physical activity and built environment. Results: The results showed that the general profile of transit users in TODs in Abu Dhabi are 86% middle age, 72% low income, 65% male and 83% hold higher education degree. 47% of the respondents reported to use public transportation in a usual week. 60% of transit users walk and cycle at recommended levels, against 58% in the general average rate. Transit users also perform 3% more vigorous-intensity physical activity. The density and mix of land uses seemed to be positively relative to transit usage. Conclusions: Abu Dhabi presents unique socio-demographic characteristics, such as great majority of foreign expats, and high social and gender inequalities. The lack of public transportation subsidies for students may be a reason for low share of young transit users. Transit users were more physically active.

Analyzing Determinants of Violations and Accidents in a Multi-Cultural Setting: Case of Abu Dhabi, UAE

Ahmed Alfarra (Masdar Institute, United Arab Emirates); Praveen Maghelal (Masdar Institute, India)

The UAE Ministry of Foreign Affairs and International Cooperation permits 38 nationalities in the UAE to swap over their driving licenses for local driving licenses. This study aims at examining the impact of this policy on individual's general characteristics, violations, accidents and other driving behaviors in Abu Dhabi. Moreover, the study aims at examining the relationship of multi-cultural drivers on violations and accidents and how individuals of different origins, ages, income brackets and other characteristics would affect the driving behavior. Therefore, this study investigates the relationship between individual characteristics and driving behavior variables on the number of violations and accidents in Abu Dhabi. Responses (364 individuals) collected through a survey conducted in five ADNOC vehicle inspection centers (VIC) in Abu Dhabi were analyzed for this study. The data was analyzed using the two-way t-test, ANOVA, and regression. The study concluded there is sufficient evidence supporting the claim that the number of violations and accidents for drivers who swap their license and those who go through license tests are not different. Additionally, origin does not seem to have a statistically significant effect on violations and accidents.

C11: Biomedical Engineering III

Chair: Abdul Salam Jarrah (American University of Sharjah, United Arab Emirates)

Identifying Molecular Pathways in Lung Fibroblasts Unique to Idiopathic Pulmonary Fibrosis When Compared to Asthma Using Publicly Available Transcriptomic Data

Mahmood Hachim, Rifat Hamoudi, Qutayba Hamid and Bassam Mahboub (University of Sharjah, United Arab Emirates)

Idiopathic pulmonary fibrosis (IPF) is an incurable disease where matrix deposition is in access to a level that damage the normal lung parenchymal architecture. The main reason behind such fatal consequences is the lack of understanding of the molecular mechanisms driving the disease (that's why it is still called idiopathic). In Asthma, fibrosis is a key pathological features of airway remodeling that can induce disease severity and resistant to therapy. Further understanding of the underlying molecular pathways in the fibroblast can pave the way towards novel biomarkers discovery, better diagnosis of clinical cases and personalized targeted therapy for such life-threatening conditions. Here we used publicly available transcriptomic data from IPF patient's fibroblasts and Asthma mimicking cell model (Lung fibroblasts treated with IL-13) to identify novel signaling pathways that are specifically de-regulated in IPF and not Asthma to reveal possible discriminating diagnostic tool and therapeutic biomarkers. Transcriptomic profiling of lung fibroblasts cases was able to identify novel cellular pathways and molecular mechanism underlying IPF. Transcriptomic profiling is a promising free of cost tool that any researcher can use but in proper way to explain the previously unexplained clinical notes

Identification of Potentially Druggable Binding Sites on Human Rab5 Protein

Kenana Al Adem (Khalifa University of Science and Technology, United Arab Emirates); Namareq Widatalla (Tohoku University, Japan); Suryani Lukman (Khalifa University of Science and Technology, United Arab Emirates)

The use of computational methods has shown to complement the time-consuming experimental methods in identifying novel binding sites on proteins for potential therapeutic applications. This paper presents an approach for the discovery of novel binding site(s) on Rab5, a critical protein that plays vital roles in regulating early endocytic events such as the formation and the movement of endocytic vesicles. Pathologically, the over-expression of Rab5 is implicated in various cancer types including lung, liver and ovarian cancers. To discover novel binding sites, a structural analysis approach was performed to identify the representative structures of Rab5. This was achieved by utilizing multi-step principal component analysis (PCA). Subsequently, the identified representative structures were computationally mapped with 16 probe molecules to test for their corresponding binding sites affinities. This discovery could be further assessed for the design of a potential drug against Rab5 protein.

Biomimetic Lymph Node on a Chip

Aya Shanti (Khalifa University of Science and Technology, United Arab Emirates); Cesare Stefanini (Khalifa University, United Arab Emirates); Jeremy Teo (NYU AD, United Arab Emirates); Bisan Samara and Amal Abdallah (Khalifa University of Science and Technology, United Arab Emirates)

In the development of novel pharmaceutics and cell-mediated therapeutics, the immune system has to be well considered, as part of the delivery mechanism or as a potential collateral for drug toxicity. To reduce the attrition of such developments, the interaction of immune cells with the drugs and/or with other immune cell types should be mechanistically investigated. As the lymph node (LN) is the integrating center for immune cells, whereby the body invokes immune responses against foreign substances, we have developed an in vitro biomimetic LN to examine the effects of pharmaceutics to downstream immunology. We recreated the spatial biological scaffold and accurately reintroduced the cellular residents on a lab-on-chip device that facilitates biological investigations to cellular kinetics, cell-cell interactions, and sampling. The goal of this enabling platform is to contribute to increased safety, lowered cost, and shorter development cycles for pharmaceutical development.

Dynamics of Tumour-Immune System with Treatments and Optimal Control

Hebatallah Al-Sakaji (UAEU, United Arab Emirates); Fathalla Rihan (UAE University, United Arab Emirates)

We propose and investigate a family of ordinary and delay differential equations to model the dynamics of tumour growth and immune system interactions. The study will then describe

situations under where the tumour can be eradicated, we examine the dynamics and qualitative analysis of the model. The optimal control variables are assimilated to recognize the treatment procedure with minimum side effects by reducing the load of tumour cells and keeping the normal cells above the average of its capacity. This mathematical modeling can be used to make predictions about the inactive tumour cells. Keywords: Immune system; Tumour; Mathematical modeling; Optimal control; Delay differential equation.

Intraoral Camera for Supporting Assistive Devices

Muhammad Tily (American University of Sharjah, United Arab Emirates); Hasan Al-Nashash (AUS, United Arab Emirates); Hasan Mir (American University of Sharjah, United Arab Emirates)

Millions of patients around the globe are affected with paralysis which hinders the fulfillment of their basic needs such as mobility and speech. Several research topics have been dedicated to improve the livelihood of paralytic patients and a small subset of the topics has focused on capturing inputs from the tongue. Since the tongue is directly connected to the brain through a cranial nerve which is responsible for the motor functions of the tongue, its movements are not affected by spinal cord injuries, which are one of the major causes of paralysis. Given the importance of capturing inputs from the tongue, this research proposes a novel method of using an intraoral camera for this purpose. It discusses a method for capturing images, extracting features from it and finally classifying the data in order to produce specific outputs which could be used by paralytic patients as inputs to any external system.

C12: Chemistry & Chemical Engineering IV

Chair: Naif Abdelaziz Darwish (American University of Sharjah, United Arab Emirates)

Reverse Selective Carbon Membrane for Separation of Binary Gas Mixtures

Zhou He (Khalifa University of Science and Technology, United Arab Emirates & China University of Petroleum (East China), P.R. China); Kean Wang (The Petroleum Institute, United Arab Emirates)

Membrane technology, which has such promising features as high efficiency, low-cost and easiness to scale-up, has gained more and more attention in R&D. Its rapid progress urgently needs new technologies of membrane characterization and evaluation for both gas and liquid applications. This work reports a reverse selective anomaly regarding membrane separation for binary gas mixtures. It is mainly ascribed that adsorption-diffusion mechanism of the carbon membranes makes it a possible for larger diameter molecules to surpass the flux of smaller ones. This research laid solid fundamental for development of membrane technology

Effect of 1-Butyl-1-Methylpyrroldinum Chloride on The Phase Behavior of Water+2-Propanol System at 101 kpa

Faisal Mohammed, Muhammad Qasim, Naif Abdelaziz Darwish and Ahmed Aidan (American University of Sharjah, United Arab Emirates)

This work aims to study the effect of ionic liquid 1-Butyl-1-methylpyrroldinum chloride as an entrainer in the azeotropic distillation of water+ 2-Propanol. Up until today, many ionic liquids have been used to eliminate azeotropes in various systems, but few IL's have been studied with the water/isopropanol azeotrope. Most investigated ionic liquids are Imidazolium based. In this work, the studied ionic liquid is pyrrolidinium based. Vapor liquid equilibrium (VLE) data has been collected, and modelled with the Non-Random, Two-Liquid model (NRTL).

Removal of Heat Stable Salts via Electrosorption using Carbon-based Electrodes

Madeeha Durrani (Khalifa University of Science and Technology, United Arab Emirates); Fawzi Banat (The Petroleum Institute, United Arab Emirates); Mohammad Abu Haija (Khalifa University of Science and Technology, United Arab Emirates)

Alkanolamine systems are an integral part of Natural Gas plants. Which scrub H2S and CO2 from crude gas. Reactions between acidic contaminants and amine can produce thermally stable salts, called Heat Stable Salts (HSS). Since the technology is closed loop, these salts can accumulate overtime and can cause major operational problems in alkanolamine systems such as corrosion, foaming and reduced solvent efficiency. The current technologies available to treat and remove heat stable salts are inefficient and can lead to huge amine losses. Capacitive Deionization is an alternative technology for desalination that can be also applied to Lean Amine systems to remove HSS. In this research, a number of different carbon electrodes were prepared and tested in order to determine the most suitable one for HSS removal. Different biochars were also prepared, biochar prepared from Date Palm gave the highest removal. The Date Palm Activated carbon was characterized by XRD, SEM and Elemental Analysis. It was found that activated Biochar (or Activated Carbon) from Date Palm (DPAC550) gave the best results with 29% removal efficiency compared to all the other carbon electrodes that were tested. The surface area was found to be of 1659.484 m^2/g, and the carbon was rich with CO groups. Pseudo-first order model best represented the electrosorption of HSS by DPAC550.

Integrated Modeling of CO2 Bio-Fixation by Algae in Arid Environments

Hammed Abiodun Balogun (Khalifa University of Science and Technology, Masdar Institute, United Arab Emirates); Ahmed Al Hajaj (Khalifah University, Masdar Institute, United Arab Emirates)

Algae cultivation has been verified as means of CO2 utilization that can result in carbon footprint reduction. Hence, this paper presents an integrated modeling of algae cultivation for bio-fixation. This bio-mathematical framework, which incorporates the extracellular model of typical microbial culture with the genome-scale metabolic reconstruction via dynamic flux balance analysis (DFBA), was presented here and employed to evaluate the performance of algae pond as agents of carbon capture under the prevailing conditions of arid environments. The results show that any further increase in the CO2 fraction of the flue gas beyond 5mol% will lead to a decline in the amount of carbon utilized while the CO2 emission increases. The model can serve as a valuable tool in the designing of flue gas-based microalgae cultivation systems in the United Arab Emirates.

Synthesis of Sulfur Based Co-polymers via Inverse Vulcanization for Low Thermal Conductivity

Meera Yousef and Vijay Kumar (The Petroleum Institute part of Khalifa University of Science and Technology, United Arab Emirates); Saeed Alhassan (The Petroleum Institute, United Arab Emirates)

In this work, the abundant availability of elemental sulfur from oil and gas industries in the United Arab Emirates (UAE) was used to prepare sulfur copolymers via inverse vulcanization reaction. Elemental sulfur was reacted with cyclic monomers with different ring size (seven or eight membered ring) containing one or more double bonds. The structural property of the sulfur copolymers with respect to the ring size and the number of double bonds was established using DSC and TGA. The thermal properties like Tg and thermal degradation was found to increase with increasing in the ring size and number of double bond. The proton 1H NMR technique confirmed completion of crosslinking reaction. XRD reveals the conversion of crystalline sulfur into amorphous copolymer after cross-linking reaction. The prepared sulfur copolymers showed lowest thermal conductivity which can be used as an efficient insulators.

C13: Mechanical Engineering IV

Chairs: Sharul Sham Dol (Abu Dhabi University, United Arab Emirates), Bassam Abu Nabah (AUS, United Arab Emirates)

Study of Erosive and Wear Characteristics of Bakelite Coated with NiAl2O3 using Powder Spray Coating Method

John Christy (UAE University, United Arab Emirates); Abdel-Hamid Ismail Mourad (Unietd Arab Emirates University, United Arab Emirates)

As the friction and wear properties of a material are very much influenced by the tribological variables, a testing system is used which permits the use of a wide range of test speeds, loads conditions on coatings. In our previous work, the thermal spray (NiAl2O3) with inclusions of solid lubricants (Graphite) coats were developed on Bakelite and the condition of the coatings were evaluated for different wear rate against abrasive, erosive and adhesive wear. Erosive wear tester was used to study the wear rates for 30°, 60°, and 90° impingement angle on the substrate at RT and 160 °C and the results showed that maximum wear rate was observed at 30° and at elevated temperatures. This research shows the impact of reciprocating load on the coats and the study of wear rates. Reciprocating scratch tester Taber 5900, was used to estimate the wear rate of coated Bakelite. Normal load of 1N, 2N, 2.5N, & 3N with varying reciprocating speed of 20, 50, 55 and 70 cycles per minute were the test conditions observed. Keeping the stroke length constant, wear rate was observed on thermal coatings and the tests show that NiAl2O3 was thermally and tribologically stable.

Development of a Closed-form Expression for the Assessment of the Integrity of Internally Corroded Pipelines

Melad Fahed (Petroleum Institute & Khalifa University of Science and Technology, United Arab Emirates); Imad Barsoum (The Petroleum Institute, United Arab Emirates)

Carbon steel pipelines are renowned for their long-term resistance to the hydrostatic pressure of the transported fluid. Nevertheless, failure of carbon steel pipes due to corrosion can be catastrophic if not predicted or mitigated properly. The corrosion on pipeline walls will lead to severe loss of material and eventually cause complete loss of pipeline integrity. This study will assess the burst pressure of predefined internally corroded API carbon steel pipelines through finite element analysis (FEA). The mechanical response of the host carbon steel pipeline is empirically estimated. A set of corrosion defect geometrical sizes, such as depth, width, and length to be considered is carefully developed. Based on the parametric FEA results of corrosion-defected carbon steel pipelines, the Buckingham Pi-theorem modelling approach was used to derive an analytical closed-form expression. The establishment of this functional dependence will permit direct substitution of parameters to assess the defected pipe integrity.

In-Plane Modulus of Elasticity Homogenization of Arc-Tan Corrugation

Shamma Al Hemeiri, Kursat Kara and Ashraf N. Al-Khateeb (Khalifa University, United Arab Emirates); Shadi Balawi (Texas A&M University, United Arab Emirates)

Corrugated core sandwich panels are used extensively in the engineering field. To understand the behavior of the corrugated materials and identify their properties, these materials are investigated to establish their behavior pattern. One approach is to model the material and investigate the behavior under different loadings. To ease the modeling of a corrugated material, it has to go through a homogenization process to reduce the computational time needed. A homogenization method is derived for an arc-tan corrugation including the face sheets. The derivation is based on Castigliano's second theory. The model derived is only for the elastic modulus in x1 direction (E1), which is one of five properties that defines the orthotropic corrugated core sheets. The theoretical model derived is then compared to models found in the literature for validation.

Investigation of Welding Potential Sources - Voltage and Acoustic Signals for Monitoring the Weld Quality

Dinu Thekkuden (United Arab Emirates University, United Arab Emirates); Abdel-Hamid Ismail Mourad (Unietd Arab Emirates University, United Arab Emirates)

The paper investigates the possibility to inspect the weld quality from the voltage and sound signals. The voltage and sound data recorded while welding are analyzed for their behavior during arc instability. The result reveals that the sample points in the standard deviation or mean control chart scatter beyond the control limits for an unstable process at the disturbed region whereas

they lie within the control limits for all stable process. The frequency spectrum of the welding sound proved to have peak power at 216 Hz consistently for the quality welds. Noise at higher frequencies is observed in the unstable welds. The two techniques are highly adaptable for monitoring of the weld quality.

Metallic Coating Thickness Assessment over Nonmagneticmetals Using Single-Frequency Eddy Current Technology

Zain Ansari (American University of Sharjah, United Arab Emirates); Bassam Abu Nabah (AUS, United Arab Emirates); Maen Alkhader (American University of Sharjah, United Arab Emirates)

Advantages offered through eddy current technology delivers a promising solution to assess metallic coating thicknesses over nonmagnetic metals. Current single and multi-frequency impedance based methods are sensitive to different coating/substrate combinations as well as lift-off deviations from those used over the calibration blocks. With its frequency-dependent penetration depth, eddy current technology lends itself to asses such structures. Existing apparent eddy current conductivity (AECC) models are limited to smooth conductivity profiles. It was only until recently that a new AECC-based inversion algorithm was developed to capture the AECC spectrum of rectangular conductivity profiles at ±25.4 µm lift-off range [1]. This technique provided a one order of magnitude improvement in estimating coating thicknesses when compared to existing impedance-based models. However, drawbacks such as the requirement of a large coil diameter to meet the plane-wave approximation, numerous calibration blocks and a time consuming frequency sweep made this technique unpractical. Building on this algorithm's capabilities a new AECC-based inversion algorithm has been developed which takes measurements at a single frequency which helps in eliminating the limitations offered by the previous algorithm [2]. This work assesses 0.5mm Ti-6Al-4V (σc = 1.05 %IACS) coating over SS304 (σs = 2.40 %IACS) substrate using COMSOL to obtain its AECC spectrum, from which the optimum frequency is obtained where the rate of AECC change is maximum. This frequency is further tuned based on AECC change sensitivity to coating thickness variations using the plane-wave approximation. Finally, the model is validated for single-frequency AECC measurement using different coating thicknesses relevant to the industry.

Effect of Heat Treatment over the Mechanical and Electrochemical Properties of S275 Mild Steel Material in Sea Water and Nacl Solution

Shahid Parapurath (Khalifa University, United Arab Emirates); Ebru Gunister (Khalifa University of Science and Technology, United Arab Emirates); Ricardo Nogueira (Khalifa University, United Arab Emirates)

In this study the effect of heat treatment over the microstructural, mechanical and electrochemical properties of low carbon steel material is studied. Mainly quenching and annealing types of heat treatment was performed over the samples. Microstructure of the material before and after the treatments were examined by using optical microscope. Mechanical properties such as tensile strength, young modulus, and fracture strength and harness of the materials were also determined by tensile and hardness testers. Electrochemical measurements and corrosion testing are conducted using NaCl solution and sea water as the electrolyte. Hardness values were higher by 19 % for quenched sample than the original as the grain sizes were smaller for quenched sample and a less by 21% for annealed one from the original sample as the grain size was higher for the annealed sample from original sample.

Study of Naturally-Aged and As-Received Silvered-Glass Reflectors

Radia Lahlou (Masdar Institute, United Arab Emirates); Nicolas Calvet (Masdar Institute of Science and Technology, United Arab Emirates); Kholoud Al Naimi (Masdar Institute of Science & Technology, United Arab Emirates); Peter Armstrong (Masdar Institute of Science and Technology, United Arab Emirates)

Back-silvered glass mirrors exposed in Abu Dhabi outdoor conditions for 7 years along with corresponding as-received mirrors from the same manufacturing batch which were preserved in

a warehouse are analyzed in the present study. The availability of both the as-received mirrors and the exposed ones over a time longer than that in previous studies presents an opportunity to validate accelerated aging tests through comparison with naturally aged mirrors. The exposed mirrors showed substantial reflectance degradation. Scanning Electron Microscopy (SEM) and Energy Dispersive Spectroscopy (EDS) was used to characterize both as-received and exposed samples and compare the as-received sample to a reference mirror from the state-of-the-art commercial solar mirrors. The analyses identified 5 possible causes of the rapid degradation observed for the mirrors in question in comparison to the lifetime expectation for commercial solar mirrors. The findings serve to guide ongoing accelerated-aging studies on the same mirrors.

C14: Mechanical Engineering V

Chair: Mehdi Ghommem (American University Of Sharjah, United Arab Emirates)

Dynamic Response of Electrically-Coupled Microbeams in Shock Environments

Moustafa Sayed Ahmed (American University of Sharjah, United Arab Emirates); Mehdi Ghommem (American University Of Sharjah, United Arab Emirates)

In this work, we perform a nonlinear analysis of microcantilever beams subject to the combination of electrostatic forcing and mechanical shock for MEMS applications. Several research studies have showed that MEMS devices deploying electrically-actuated vibrating beams, such as resonant sensors and RF filters, may fail to operate when undergoing mechanical shocks due to the pull-in instability. The objective of the present study is to investigate the possibility to overcome or exploit this issue by considering different microsystem designs based on the application of interest. Towards this end, we develop a mathematical model to simulate the dynamic response of single and dual microbeams under varying electric actuation and shock loads. The actuation of the single-beam system is made via a fixed electrode (uncoupled actuation) while the dual-beam system, composed of two movable microbeams, is actuated by applying a voltage among them (coupled actuation). It is shown that dual-beam system is more robust in terms of resistance to mechanical shock than the single-beam system.

Lumped Parameter Model for Longitudinal In-palne Resonators with Zig-zag Elastic Elements

Bowei Chen (The Petroleum Institute, United Arab Emirates); Oleg Shiryayev (Sas al Nakhl Campus Khalifa University of Science and Technology, United Arab Emirates)

Tuned vibration absorbers have long been used as a mean to suppress vibration. Despite their simplicity and effectiveness, they have a significant drawback, which is their limited effective bandwidth. Recent research efforts have been focused on development of solutions for passive vibration suppression that are effective over a wide frequency range, which resulted in the invention of metastructures. Metastructures contain local resonators that are distributed along the structure and tuned to specific frequencies. In many applications the addition of significant mass to the structure in the form of resonators is prohibitive, hence resonators must be integrated into structural members. The proposed metastructure will contain in-plane resonators acting as distributed vibration absorbers. In this research, zigzag elastic elements connected to a small mass will be used to function as in-plane resonators, which enables realizing low enough stiffness within a confined space to achieve low resonant frequencies.We describe the development of a lumped parameter model that could be used as a tool for design and optimization of in-plane resonators, while being more efficient computationally than traditional finite element models. We verify the developed model by comparing its predictions with results obtained using finite element models.

Analytical and Finite Element Analysis of Pulling-In of a HDPE Liner in a Pipeline

Sanad Sulaiman (Khalifa University of Science and Technology, United Arab Emirates); Imad Barsoum (The Petroleum Institute, United Arab Emirates)

Corrosion of pipelines is one of the major problems faced by the oil and gas industry. Replacement or rehabilitation of the pipeline is the only option for corroded pipelines. Rehabilitation can be done by pipe-in-pipe technology which involves inserting a new pipe into an existing pipeline. However, the installation process of these liners is not an easy affair, and the pulling-in load has to be monitored carefully or else it might result in the failure of the liner. This paper involves the pulling-in analysis of a HDPE (High Density Polyethylene) liner through a pipeline. The simulation of pulling-in of the liner is conducted by using analytical as well as by using finite element analysis (FEA) on an arbitrary pipeline. The results obtained from both FEA model and the analytical model are to be compared.

FPGA Sensor Fusion System Design for IMU Arrays

Owais Talaat Waheed (iMicro, Masdar Institute of Science & Technology, United Arab Emirates); Ibrahim M Elfadel (Masdar Institute of Science and Technology, United Arab Emirates)

Different navigation systems have different requirements for attitude estimation, positioning, and control. For higher accuracy, one can use array of MEMS Inertial Measurement Unit (IMU) sensors, to replace a single, high performance, high-cost, power-hungry mechanical counterparts. The low-cost MEMS sensors require a sensor fusion processing unit that plays a key role in achieving the required performance and should support signal processing algorithms, such as the Kalman Filter (KF). This paper addresses the scalability problem of IMU array sensor fusion using a specialized vector processor designed specifically to achieve real-time, high-throughput and low-power. The vector processor has been implemented in Artix-7 FPGA and shown to outperform a scalar processor by 100% in latency for a 100-component vector with the throughput being linear in the number of IMU sensors up to the limits of the FPGA resources. The tradeoffs between vector size, memory requirements, and sampling rates are also fully quantified.

Comparison between Ziegler Nicholas and LQR Tuned PID Controllers for Quad-Copter in Yawing Flying Mode

Shamma Bin Safwan (Khalifa University, United Arab Emirates); Fatima Al Khoori (Emirates Technology Innovation Center, United Arab Emirates); Yahya Zweiri (Khalifa University, United Arab Emirates)

Unmanned Aerial Vehicles (UAVs) have been widely used in many industrial, civilian and military applications. Moreover, the control of small size UAVs faces many challenges such as sensitivity to disturbances and the need for responsive controller. The aim of this paper is to compare the performance of PID controllers tuned using two different methods. The first PID controller is tuned using Ziegler-Nicholas (ZN) while the second PID controller is tuned via full state feedback Linear Quadratic Regulator (LQR). The results show that the PID tuned via LQR gives better performance measures than the PID tuned using ZN approach.

Gravity Compensation of Parallel Kinematics Mechanism Using Torsional Springs

Abdur Rosyid, Bashar El-Khasawneh and Anas Alazzam (Khalifa University, United Arab Emirates)

Passive gravity compensation for a mechanism is usually preferred to the active one for some reasons including cost consideration. Many technologies based on counterweight and linear springs have been widely developed, whereas the use of torsional springs is rarely discussed due to unavailability of exact mathematical manipulation to determine the required spring constants to achieve the static balance. This paper proposes the use of torsional springs for passive gravity compensation applied to a parallel kinematics mechanism. The spring constants are determined by constrained optimization approach aiming at minimizing the total potential energy of the mechanism along a prescribed trajectory within the range of motion. It is shown that the solution provides almost-statically-balanced state of the mechanism within its range of motion. This accordingly reduces the required actuation forces/torques and hence the power consumption.

HUMAN-ROBOT Interaction APPLICATIONS: Remote Palpation using Passive Discrete Variable Stiffness Joint (pDVSJ-II)

Mohammad Awad and Irfan Hussain (Khalifa University of Science Technology and Research, United Arab Emirates); Tarek Taha and Jorge Dias (Khalifa University, United Arab Emirates); Lakmal Seneviratne (KURI, United Arab Emirates); Dongming Gan (Khalifa University of Science and Technology, United Arab Emirates)

In this paper, an example of applying the passive Discrete Variable Stiffness Joint (pDVSJ-II) is illustrated. A qualitative experiment in a teleoperation scenario is presented as a case study to demonstrate the effectiveness of the proposed haptic interface and to show how a human can take advantage of stiffness rendering by the proposed device in applications e.g. remote palpation. The results show that the device is capable of successfully providing information about the stiffness of two different objects through the forces acting at the remote site, thus improving the overall telepresence in such applications.

Poster Session A:

A Numerical Method for Solving a Class of Fractional Nonlinear Volterra Integro-Differential Type of Singularly Perturbed Problems

Mohammed Abu Omar and Muhammed Syam (UAE University, United Arab Emirates)

In this paper, we study a class of fractional nonlinear Volterra integro-differntial type of singularly perturbed problems with fractional order: We divide the problem into two problems. The first problem is the reduced problem when = 0: The second problem is fractional Volterra integro-differential problem. We use the finite difference method to solve the first problem and the reproducing kernel method to solve the second problem. The results show that the proposed analytical method can achieve excellent results in predicting the solutions of such problems. Theoretical results are presented. Numerical results are presented to show the efficiency of the proposed method.

Universal Constraints of Kleinian Groups and Hyperbolic Geometry

Hala Alaqad (United Arab Emirates University, United Arab Emirates)

Recent advances in geometry have shown the wide application of hyperbolic geometry not only in mathematics but also real world applications. As in two dimensions, it is now clear that most three-dimensional objects (configuration spaces and manifolds) are modelled on hyperbolic geometry. This viewpoint explains a great many things from large-scale cosmological phenomena, such as the shape of the universe, right down to the symmetries of groups and geometric objects and various physical theories. Kleinian groups are basically discrete groups of isometries associated with tessellations of hyperbolic space. They form the fundamental groups of hyperbolic manifolds. Over the last few decades, the theory of Kleinian groups has flourished because of its intimate connections with low-dimensional topology and geometry, especially with 3-manifold theory. In particular, we seek generalisations of known universal constraints for Fuchsian groups - discrete subgroups of isometries of hyperbolic plane. These generalisations will underpin a new understanding of the geometry and topology of hyperbolic 3-manifolds and their associated singular spaces, hyperbolic 3-orbifolds. The universal constraints for Kleinian groups we seek will in part arise from a novel description of the moduli spaces of discrete groups. This approach was successfully used to complete the solution to Siegel's famous problem on hyperbolic lattices, and offers further substantive advances to address the quite complicated analytic and topological properties of hyperbolic orbifolds. Our novel approach is to use a fundamental result concerning spaces of finitely generated Kleinian groups: they are closed in the topology of algebraic convergence. Indeed in this is also true in higher dimensions when fairly minor additional (and necessary) conditions are imposed - for instance giving a uniform bound on the torsion in a sequence, or asking that the limit set be in geometric position. In fact this property (which is basically a consequence of the existence of Zassenhaus neighbourhoods for semi-simple Lie groups) holds more generally for groups of isometries of negatively curved metrics because of the Margulis-Gromov lemma

The impact of urbanisation and climate change: case study of the Eastern Mangroves, Abu Dhabi UAE

Rim Meziani, Bethan Welling and Aya Dibaje (Abu Dhabi University, United Arab Emirates); Reem Al Ghifari (Jordanian Consulting Office, United Arab Emirates); Bana Eid (CIVILCO - Civil Engineering and Contracting Company, United Arab Emirates); Amal Al Ghifari (Jordanian Consulting Office, United Arab Emirates)

How does the domino effect Abu Dhabi's urbanization and climate change impact the mangroves? In this thesis we be focusing on the potential impact of urbanization and that of global change on the case study of the Eastern Mangrove National Park, Abu Dhabi. As we live in the city of Abu Dhabi, UAE that has rapidly urbanized and claimed its importance in trade after only becoming an

independent sovereign state in 1971. This means that the city has changed from a nomadic lifestyle to one that is highly urbanized, this puts pressure on the natural environment and its protection. Along with an international case study of the mangroves in Vietnam, we will be able to know the status of the mangroves in both locations, be able to compare their condition and protection methods through studying legislations, policies and other means of protection to sustain the natural reserve.

The Impact of Implementing Business Excellence Models On The Innovation Maturity In The Nuclear Energy Industry

Yousef Qteit (UAE, United Arab Emirates)

Business excellence is about achieving and sustaining an outstanding level of performance that exceeds the current and future needs and expectations of the entity's stakeholders. Business excellence evolved from the Concept of the total quality management (TQM) that was firstly formed and conceptualized in the early 1980's (Deming 1986 and Juran 1986). There is no consensus on the key constructs of total quality management (TQM) and business excellence, therefore, there is no unified and universally accepted approach to measure the impact of implementing total quality management (TQM) and business excellence on the financial and non-financial performance of the organizations (Santos-Vijande and Alvarez-Gonzalez 2007). The nature of nuclear industry makes it very challenging to adopt and harness innovation management practices. Still, one key element of the EFQM business excellence model implemented by Emirates Nuclear Energy Corporation (ENEC) is learning and innovation. Harnessing innovation and creativity is also one of the eight fundamental concepts of business excellence (EFQM 2013). This study will investigate the impact of implementing business excellence models on the innovation maturity in the Emirates Nuclear Energy Corporation (ENEC).

Extraction Of 2,4,6-Trichlorophenol And Pentachlorophenol From Wastewater Using Ionic Liquids As Green Solvents

Reyihangu Sulaiman (Masdar Institute, Khalifa Univ, United Arab Emirates); Enas Muen Nashef and Shadi Hasan (Masdar Institute of Science and Technology, United Arab Emirates)

Chlorophenols are considered hazardous pollutants due to their negative health effects such as carcinogenicity, thus the water contaminated by chlorophenols should be treated before discharged to the environment. Investigating the applications of Ionic Liquids (ILs) as green solvents in water treatment is important regarding their advantageous properties over organic solvents such as low vapor pressure and non-flammability. In this study, the extraction of 2,4, 6-Trichlorophenol (TCP) and Pentachlorophenol (PCP) from aqueous solution using six hydrophobic ILs was investigated. Results showed that the highest extraction efficiency for both TCP and PCP were 94.0% and 93.6% respectively,when 1-ethyl-3-methylpyridinium bis(trifluoromethylsulfonyl)imide ([1,3emPY][Tf2N])was used as extractant. This indicates the promising application of [1,3emPY][Tf2N] in wastewater treatment.

Wasta and Woman's Career in the United Arab Emirates

Saeeda Juma Al mehairi, ali (UAE & British University in Dubai, United Arab Emirates)

The paper investigates the phenomenon of wasta in the UA and its use by women to get career advancement. As wasta takes an essential role in the culture and social life of the Emirati people, it is present in many aspects of professional life. The study aims at discussing the main aspects of wasta, its use in the professional life, the problem of wasta in the UAE, and its impact on organizational development. Secondary data analysis has enabled to collect the data for analysis and provide proper conclusions. It has been found that wasta has numerous negative impacts not only on organizational development, but on the economic development of the country. It is suggested that a meritocratic approach can help to deal with the issue wasta. Finally, it is

recommended to conduct a further research to analyze the wasta use in different organizational structures

Lane Changing Strategies for Connected Vehicles Using Cooperative Game Theory

Dianchao Lin (New York University & New York University Abu Dhabi, United Arab Emirates); Li Li (New York University & New York University in Abu Dhabi, United Arab Emirates); Saif Eddin Jabari (New York University in Abu Dhabi, United Arab Emirates)

This paper proposed two new lane changing strategies for connected vehicles using cooperative game theory: the transferable utility strategy which allows side payment from one vehicle to another and the non-transferable utility strategy using Nash bargaining solution. When a side payment is allowed, a monetary payment from one vehicle to another is needed to achieve the solution. In this case, vehicles are actually making transactions on the right-of-way: they may have a chance to buy time from other vehicles at a reasonable price that satisfies both. For vehicles that are not willing to participate in transactions, Nash bargaining solution achieves a Pareto efficiency and ensures that no lane resource is wasted. Simulations using cellular automata showed that, cooperation between drivers could help achieve a win-win result. Besides, a properly designed utility function could encourage vehicles to participate in transactions, and prevent them from cheating in their value of time.

A Safety-oriented Car-following Model for Connected Automated Vehicles

Li Li (New York University & New York University in Abu Dhabi, United Arab Emirates); Dianchao Lin (New York University & New York University Abu Dhabi, United Arab Emirates)

Automated vehicle technique makes the car-following model cannot only be used in simulation as a description of real world, but also applied as a technical support in real world. As field application requires high level of safety, safety design in car-following model for automated driving environment becomes more important than in traditional simulation-only model. This paper presented a safety-oriented car-following model for connected automated vehicles, considering their different delays and unique information broadcasting features. The dynamic resistance, friction and propulsion were considered when formulating the vehicle's motion equation, and possible packet loss was also included. Simulation in urban road & highway scenario using the field data of connected vehicles from Ann Arbor, Michigan showed that the model can guarantee safety in different driving environments. Besides, it also demonstrated high efficiency and good stability.

The impact of overloaded Trucks on road infrastructures and needs to reactivation of the 1986 law (Heavy Vehicles Axle Load) in Abu Dhabi Emirate

Fatima Alkhoori (Khalifa University of Science and Technology, Masdar Institute Campus, United Arab Emirates)

An overload, in commuting system, is defined as a load that exceeds the legal truckload limit. The overload statistics depend on truck types specified by the number of axles. The truckload spectra generally represent a distinctly different pattern than that in lower load levels, which is especially true among trucks with five or more axles. The probability of occurrence of specific truck weights exceeding the legal load limit can be used to estimate the frequency of occurrence of heavier loads in transportation facilities and thus determine the damage potentials of overloads on the infrastructure. This information can be used along with routine engineering analyses that many pertinent road agencies conduct when issuing truck-overload permits.

The Heavy Vehicle Axle load regulations known as UAE "1986 Law", has not been put in enforcement since the time of its inception. However, the current situation with regard to truck weights in the UAE has negative implications for road safety and puts excessive stress on road infrastructure. This leads to more road traffic accidents, higher maintenance expenditure and risk of structural failures.

Diagenesis and Sedimentary aspects of Middle Jurassic Upper Araej Formation: A study case of tight carbonate reservoir in Onshore Abu Dhabi Oil Field

Mochammad Prahastomi (Khalifa University of Science and Technology, United Arab Emirates)

Many oil fields in Abu Dhabi have been producing primarily from Cretaceous Thamama reservoir both in Offshore and Onshore field. However, the oil and gas production from Middle Jurassic limestone in Onshore Abu Dhabi is very limited while it is one of the producing reservoir in the offshore Abu Dhabi and Qatar. The study concentrates on Middle Jurassic Upper Araej formation which comprises bioclastic-ooidal grainstone-floatstone, pelloidal packstone, and minor skeletal wackstone/mudstone. The objective of this study is to characterize, recognize, and constrain the impact of diagenetic process (e.g. cementation, dolomitization, dissolution, stylolitization) on the poor reservoir quality of the formation. Core logging, Optical petrography, Back-scattered electron imaging, Scanning Electron Microscopy, and Stable isotope (C-O) analysis are being conducted to examine and reveal the diagenesis of this formation. This study will help unravelling the thermal-geochemical conditions of diagenesis of the studied carbonate sediments. Optical petrography analysis has shown intensive cementation of grainstone and packstone units by drussy and blocky calcite cement which occlude all the pore systems, both in intra-granular and inter-granular pores. Along with BSEI and SEM analysis, the occurrence of anhydrate, fluorite, and saddle dolomite may give clues of certain fluid flow that affected the reservoir quality of Upper Araej Formation. A new potential of gas play probably exists in this tight reservoir.

Exploring the Potential of Algae Cultivation on Building Facade for Yielding Its Energy Demand

Aya Dibaje (Abu Dhabi University, United Arab Emirates); Bana Eid (CIVILCO - Civil Engineering and Contracting Company, United Arab Emirates); Amal Al Ghifari and Reem Al Ghifari (Jordanian Consulting Office, United Arab Emirates)

Over the past decades, people where relying on conventional methods for power generation. However, due to the climate change, escalating prices pf fuel and petrol, in addition to the rising realization of environmental pressures along with the widespread acknowledgment about the importance of following a sustainable path have motivated countries to seek alternative clean energy resources. Currently, researches are being done to switch from the depletion of fossil fuel to using biofuels through the usage of biomass within the microalgae. This is because algae are considered one of the renewable sources of biodiesel that is capable to meet the future global fuel demand. Algae can produce clean renewable fuels, moreover it has demonstrated its effectiveness in sequestering CO2, treating waste water and generate electricity. Architects are now inspired by the advanced algae cultivation technologies and exploring the potential of cultivating microalgae within their design to produce the building's energy demand. The goal of this research is to highlight the importance of micro-algae, examine the potential of cultivating algae within a building's facade and achieving the building's energy demand and it various cultivation methods and techniques. It will also give an insight about the conditions upon which algae can live and reproduce as well as its distinctive design implementation within architecture. A research methodology will be presented to further investigate and examine this research hypothesis. Finally, based on the information and the analysis conducted in this research, a summary of conclusion will be presented for any further development regarding algae cultivation within building design.

Urban Growth & Heritage Conservation: Towards the Sustainable Development of Al-Ain Oasis

Lina Zuaiter and Rim Meziani (Abu Dhabi University, United Arab Emirates); Yara Anbar (Teacher Assistant, United Arab Emirates); Huda Masalmeh, Baseema Nizar and Fatima Yammahi (Abu Dhabi University, United Arab Emirates)

The aim of this research is to identify the possible indicator threats that affect Al Ain Oasis along with the preservation methods taken by the responsible authorities. The goal is to achieve a

proposal that limits these threats and find a way to make the preservation of natural heritage more sustainable which will be a lesson shared with the next generation.

The Relationship between Business Professionals' Emotional Intelligence and Work-Life Balance

Zahraa Sajwani (Zayed University, United Arab Emirates)

The purpose of this study is to gather empirical evidence from the UAE to discover the relationship between business professionals' emotional intelligence and their ability to achieve a healthy work-life balance, within the context of UAE culture. A few similar studies about this topic have been conducted in the west, but there is a need to address the issue of work-life balance in this region to capture the cultural challenges that individuals face in the Arab and Islamic world. This paper lists the main theories related to the topics of work-life balance, emotional intelligence, and national culture. A mixed methodology is proposed to address this research problem. The study's anticipated results are discussed briefly as well.

Emiratisation in UAE private sector: Industry and city base analysis

Siham AlBalooshi (BUID, United Arab Emirates)

The foundation of Oil in the early 1970s in UAE change the country from a subsistence level to a considerable affluence. All those changes attract foreign investments to the country which result in the need of skilled labours to run the organizations due to lack of skilled national labours on that period. Through the years the total dependence on foreign labours results in increasing the unemployment rate among Emiratis due to different reasons. All researchers were mentioning the reasons and the challenges in general basis but my concern and question are does this challenges apply to all industries in private sectors. Adding to that there are different challenges facing Emiratis in accepting the private sector jobs and here where I want to examine and find if these challenges faced by all Emiratis or does it differentiate from city to other.

Does the length of service of Project Managers affect their awareness to the probability of Cash Flow risks?

Khalil Oudah (British University in Dubai, United Arab Emirates)

This paper presents a quantitative research done to find out if project managers with different years of experience perceive the probability of project cash flow risks differently. Our results show that project managers in different experience groups do not differ in their awareness of probability of occurrence of cash flow risks.

Ground Penetrating Radar Based Classification of Underground Rock Types

Hamad Al Yassi (Masdar Institute, United Arab Emirates)

Ground penetrating radar (GPR) are a useful and widespread geophysical tool for investigation of the shallow subsurface geological environment on Earth. GPR studies provide valuable insight into the physical properties of rock layers and their distribution within the shallow underground, and as a consequence a better understanding of the geological processes affecting a specific area. The research aims at studying, through a series of laboratory experiments, the suitability and potential of geo-radar in identifying gypsum rock, and associated karsts and sinkholes. These type of geologic features are not only a known hazard for Abu Dhabi, but previous research works highlighted the presence, on Mars, of karst-like landforms and morphologies that strongly resemble the karst morphologies found on the Earth. The research is carried out by building a laboratory analogue of the subsurface of Abu Dhabi. The results of this research can be used, on the one hand, to determine the suitability of GPR when identifying local gypsum rocks and karsts and develop recommendations for more extensive GPR karts detection field studies for field surveying, during planning and construction phases of large infrastructures projects, such as highway, metro, railway. On the other hand, these initial experiments will serve as basis for more advanced experiments on the use of GPR, and other geophysical techniques for characterization

of the shallow underground of other planetary surfaces, which could be of interest, for example, for the Mars exploration program.

Novel Nano/Micro-Structured Cloud Seeding Materials for Rain Enhancement

Haoran Liang (Khalifa University of Science and Technology, United Arab Emirates)

Water vapor in the atmosphere is a natural resource equivalent to about 10 % of all fresh water from rivers and lakes on Earth. Using cloud-seeding materials as cloud condensation nuclei (CCN) is an effective method to accelerate the formation of water droplets, and then harvest the water vapor in the atmosphere via rain precipitation. Hence, it is considered as the most promising water-augmentation technology to serve several weather modification purposes. It is crucial to understand and master these processes and capabilities to combat the current frequent occurrence of the extreme weather patterns around the world.

Plant osmoregulation as an emergent water-saving adaptation

Saverio Perri and Annalisa Molini (Masdar Institute of Science and Technology, United Arab Emirates)

Ecohydrological models have been extensively used to investigate the role of abiotic stress in shaping plant-water interactions and ecosystems productivity. In this context, the research effort has mainly focused on water-limited ecosystems under the hypothesis that water scarcity is the main source of stress. However, a number of ecological and plant physiological studies have pointed out how soil salinity represents a crucial stress factor for vegetation in salt-affected soils - estimated to cover already over 9 billion ha worldwide - and coastal ecosystems. The objective of this study is to model the effects of salinity on plant-water relations in order to better understand the interplay of soil hyperosmotic conditions and osmoregulation strategies in determining different transpiration patterns. Salinity reduces the water potential, therefore is expected to reduce stomatal and plant conductance (eventually leading to cavitation for very high salt concentrations). Also, plant adaptation to short and long-term exposure to salinity comes into the picture to maintain an efficient water and nutrients uptake. We introduce a parsimonious soil-plant-atmosphere continuum (SPAC) model accounting for both salt-exclusion at the root level and osmoregulation - i.e. the adjustment of internal water potential in response to salt-stress. The model is used to interpret a paradox observed in salt-tolerant species where maximum transpiration occurs at an intermediate value of salinity, and is lower in more fresh and more saline conditions. Such non-monotonic transpiration-salt concentration patterns can be largely explained by plant osmoregulation, while the peak of transpiration at tends to disappear over longer time scales, when ionic stress appears and morphological adaptations become predominant. Osmoregulation emerges here as a water-saving behavior similar to the strategies that xerophytes use to cope with aridity. The maximum of transpiration at is thus the result of a trade-off between the enhancement of salt-tolerance and optimal carbon assimilation.

Understanding the link between aridity and rainfall intermittency

Mariam ElYahyaei (Masdar Institute - Khalifa University of Science and Technology, United Arab Emirates); Annalisa Molini (Masdar Institute of Science and Technology, United Arab Emirates)

In day to day life the use of water has increased for domestic, industrial, agricultural purposes. Due to the rapid increase of the population and industrialization, that makes water an important resource to mankind making it essential to socio-economic sectors, this implies that any improvements regarding it's quantity is interconnected with future growth. Rainfall is a highly variable non-continuous process in space and time, the constant alteration between dry and rainy periods is called rainfall intermittency. This variation makes intermittency a difficult element to take into account in rainfall modeling. Also, this property of rainfall also plays a factor of uncertainty in forecasting. This contribution would play a role in understanding the link between intermittency and aridification, this would be vital for water limited regions, helping with

hydrological forecasting and water management. Hence, due to the little progress done in literature, this could turn into a stepping stone.

Thermogravimetric study of the combustion of pure glycerol, crude glycerol and diesel

Manar Almazrouei (Masdar Institute, United Arab Emirates)

Crude glycerol is the byproduct of the biodiesel production at a rate 10-20 depending on the process. As biodiesel is been pursued as strong alternative to petro-diesel due to fear of fossil fuel deletion and climate change glycerol production is at rise. Transesterification process is the most popular biodiesel production method and stochiometrically, one mole of glycerol is generated for each mole of lipid/triglyceride feedstock or per three moles of produced biodiesel. The quality and quantity of glycerol byproduct has been a burden for purification or direct combustion. Understanding the chemical and physical properties of this crude helps in proper utilization process. Thermal analysis techniques evaluate the physical and chemical properties of materials as a function of temperature or isothermally as a function of time in control conditions. The thermal behavior of pure, crude glycerol, and in comparison to diesel combustion process is investigated via thermogravimetric analysis. Results shows the single event devolatalization that emerges into combustion for the pure glycerol. The curd however was characterized with multiple events indicating its mixture status it also exhibited three combustion events. These behavior was clearly very different from diesel combustion.

Numerical Study of Water Invasion in Micro channel Sub-Surface Flow

Shahid Rabbani and Mohamed Sassi (Masdar Institute of Science and Technology, United Arab Emirates)

In the current study, a numerical model is formulated to investigate the effects of water invasion in complex micro-channels found in sub-surface structures. The formulation is based on Level-Set Multiphase Flow model where oil displacement phenomenon is studied using external water flooding. In sub-surface flow, effects of different ratios of water volume-fraction at inlet was studied. It is found that in micro-channel for sub-surface structures, displacement efficiency in micro-channel increase with the increase of volume fraction of invading water .

Energy Management of a Multi-Source Power System

Omar Salah, Abdulrahim Shamayleh and Shayok Mukhopadhyay (American University of Sharjah, United Arab Emirates)

Many industries are heavily dependent on fossil fuels to carry out their daily operations. As the deposits of fossil fuels deplete, the need for sustainable energy sources rises as well as the need to develop sustainable solution such as electric vehicles and drones. Companies have begun incorporating drones in their operations; from autonomous drone taxis to using drones for parcel deliveries. This work proposes an energy management system consisting of multiple energy sources integrated in a drone/robot to optimize the switching between different sources to increase the drone/robot's flight time and travel distance. Different constraints will be considered, primarily the state of charge of the batteries. The concept of scheduling components in a system to generate the optimal operating sequence could be used in many areas. By altering the inputs and constraints, this algorithm could be used to optimize the operations of electric vehicles, smart homes, and other applications.

Finite Element Modelling of BFRP-RC Columns

Nouran ElMessalami (AUS, United Arab Emirates); Farid Abed (American University of Sharjah, United Arab Emirates)

The use of non-corrosive fiber-reinforced polymers (FRPs) in reinforced concrete structures started in the 1960s as alternatives to steel reinforcements. Basalt fiber-reinforced polymers (BFRPs) have recently been introduced as new FRP bars for reinforced concrete structures. In this study, three dimensional (3D) finite element (FE) modelling is performed to evaluate the structural

performance of BFRP reinforced concrete (BFRP-RC) columns subjected to eccentric loading, using Abaqus®. This paper discusses the details of the FE model created for the BFRP-RC columns, followed by the model verification and the results. The 3D FE model was verified in the light of BFRP-RC columns tested experimentally under eccentric loading. After that, a parametric study was conducted to evaluate the effects of changing longitudinal reinforcement ratio and eccentricity on the behavior of the columns. Finally, several interaction diagrams were developed for the BFRP-RC columns using the FE model.

How much does the built environment influence the travel behavior of people working/studying in Masdar City?

Daniel Sierra (Masdar Institute - Khalifa University, United Arab Emirates)

In 2007 the government of Abu Dhabi published a plan for the year 2030, in which a thorough strategy of growth was shared, with Masdar City as a sustainable neighborhood to portray to the world what a zero-carbon emission city would look like. Nevertheless, the project has not reached the milestones at the times it was originally thought, and the transportation infrastructure has not made justice to the sustainability claims of the development. The built environment of Masdar City makes great proposals for environmentally friendly alternatives of transportation, but the isolation of the neighborhood has hindered this objective. In this research, different factors are compared to the travel mode and travel time of the people who work/study at Masdar City in order to compare the influence the neighborhood has on commute to work/studies and on non-work or studies related travel.

Cargo-Delivery-Box System for Modeling the Last Mile of Business-To-Consumer Logistics

Osama Qazi (American University of Sharjah, United Arab Emirates)

The paper aims at the last mile of a business to consumer delivery system, where the parcels ordered by a consumer online are delivered at the doorstep of the customer. Currently it is estimated that on average, the Last mile can contribute more than 15 % of the total logistics costs. This can be attributed to missed deliveries, cancelled orders, fuel price hikes, constant traffic blocks, unreasonable time windows for delivery. in addition consider, that a customer order a product from two different companies. Each company will delivery separately. contributing to the environmental pollution and each has its own delivery cost. This paper proposes a consolidation in the deliveries from all the companies. A delivery box (DB) system is proposed, where several deliveries, from several companies are consolidated according to the region at the Urban consolidation centers and are then delivered to a location that is within a close range of the customer. The DBs are delivered once every day and collected back every night, the uncollected parcels are added to the pool of deliveries for the next day. hence no additional costs are incured. the proposed model should decrease the total B@C logistics costs by a high margin.

Investigation of c-Si surface passivation with ALD deposited Al2O3 films annealed in ambient atmosphere

Bilal Rajab (Masdar Institute of Sciench and Tech, United Arab Emirates); Adel Gougam (Masdar Instiute of Science and Technology, United Arab Emirates)

The passivating properties provided by Al2O3 layers deposited by thermal ALD on p-type crystalline silicon is presented. Minority carrier lifetimes of 8.5 ms were obtained corresponding to an SRV of 1.5 cm/s after forming gas anneal. Similar lifetimes of 8.3 ms are achieved following an anneal in air of a 25 nm thick Al2O3 film. The passivation mechanisms are studied using C-V measurements, very low density of interface traps (<1011eV-1cm-2) and a high density of negative fixed charges (>2x1012cm-2) are largely responsible for this. We have shown that the lifetime can be maintained at reasonably high values of 3.4 ms for films of 10 nm. Further reduction of the film thickness results in a large decrease in lifetime down to 0.3 ms, a study is undertaken to determine the contribution of the field effect passivation and chemical passivation respectively in these films.

Conceptualization of the factors affecting the Potential of Success for Entrepreneurship in Landfill Gas Energy. Case of the UAE

Rasha Abou Samra (British University in Dubai & Higher Colleges of Technology, United Arab Emirates); Rashid Al Hashmi (Higher Colleges of Technology, United Arab Emirates)

Research shows that there is a great value for the alternative sources of energy that are sustainable and that are of less cost. This research is a mixed methods research that aims at evaluating the potential of success of landfill gas energy in the UAE. The researcher conducted semi-structured interviews with UAE families to estimate their awareness of biofuel gas energy. Researchers reviewed the literature systematically and prototyped the project of entrepreneurship in this field of industry. The aim of this research is to evaluate the readiness of UAE nationals and institutions to start this kind of alternative energy. To achieve this aim the researcher interviewed 60 respondents before and after prototyping the idea of this type of alternative energy. Researcher interviewed the decision makers in DEWA to test the acceptance of the prototype and the readiness for application.

Commissioning and optimization of a biomass thermal conversion reactor

Fatemeh Hassan Pour and Muhammad Khan (American University of Sharjah, United Arab Emirates)

Biomass thermal conversion is currently widely used for the production of renewable energy. The process involved high temperature processing of organic (carbonaceous) material in a controlled environment (reactor). Depending on the reactor operating condition (temperature and residence time) the process can be optimized to predominantly produce bio-gas (gasification), bio-oil (pyrolysis) or bio-char (carbonization). This study presents the details of commissioning and optimization of the biomass feeding in an augur reactor as part of a newly built lab-scale gasification/pyrolysis system. This reactor and its operating principles are less understood compared to other conventional types. The reactor feeding system comprises a biomass hopper, primary motor and screw feeder, a drop tube and a secondary motor connected to a main screw feeding directly to the heated reactor. Various biomass particle sizes and aeration gas flow rates have been tested to determine a correlation between the biomass mass flow and the motor speed (rpm). The results will be used for future mapping of the reactor performance in terms of the product yield, biomass feeding rate and particle size.

Investigation on the Effect of Water Mass flow rate on Gypsum Dissolution

Sara Mustafa Awadalla (Khalifa University / Masdar Institute, United Arab Emirates)

Sabkha is a salt flat that contains different types of evaporates like gypsum ($CaSO4.2H2O$) which is a semi-soluble salt. Gypsum rocks dissolves when it is subjected to water flow creating cavities in the subsurface threating by this the underground and above ground infrastructure safety.

This research aims at assessing the risks associated with evaporites by focusing on the gypsum behavior when it react with flowing water. Artificial gypsum samples are subjected to flow under confining pressures to simulate the underground conditions. The flow rate effect on the gypsum samples kinetics is studied.

The results show that when the flow rate increases, the concentration decreases but the total amount of the gypsum dissolved is higher when compared to the lower flow rate experiments. Also, the existence of an initial fracture (hole within the sample), increases the dissolution rate by increasing the contacting area between the flowing water and the gypsum.

Residential Area Energy Big Data Generation and Analytics

Ragini Gupta, Imran A. Zualkernan and Abdul-Rahman Al-Ali (American University of Sharjah, United Arab Emirates)

Smart homes are an integral part of smart city and can generate energy consumption data in the order of Petabytes. This thesis proposes an effective methodology on how to collect, transmit, store, analyze and visualize big data and develop meaningful insights to improve energy delivery and consumption. The

thesis utilizes the recent open source distributed file system techniques and map-reduce algorithms. The data processing, analysis and presentation will be developed individually to monetize the insight value of data in the form of dashboards consisting of charts, graphs, and reports. The dashboards can be accessed by utility and consumers to better operate and manage their energy generation, distribution, and consumption. Finally, a performance evaluation test will be conducted for each architecture implementation based on different qualitative parameters such as scalability, latency, and throughput. The outcome of the proposed techniques will be compared with the conventional existing dimensional modeling framework.

Multi-criteria evaluation of resources to achieve sustainable irrigated agriculture and enhance food security in the UAE

Amal Aldababseh (Masdar Institute of Science and Technology, United Arab Emirates); Marouane Temimi (Masdar Institute, Tunisia)

The aridity of climate requires accurate assessments of land suitability for optimum exploitation of irrigated agriculture which accounts for non-renewable sources. This research aims at assessing and prioritizing areas in the Emirate of Abu Dhabi for large-scale agriculture using a number of datasets (climate conditions, water potential, soil capabilities, topography, and land management). All datasets were systematically aggregated using an AHP-GIS model. A hierarchal structure is built and pairwise comparisons matrices are used to calculate weights of the criteria. In order to preserve some flexibility for future agricultural pathways, different types of crops are considered. Results show that jojoba and sorghum show the best capabilities to survive under the current conditions, followed by date palm, fruits, and forage. Introducing desalinated water and TSE enhanced land capability for irrigated agriculture. These findings have positive implications for the decision-making process of land alteration for agricultural use and addressing sustainable land management and food security.

Seismic Interpretation of Al Jaww Plain, Al Ain, UAE

Aneesa Rabbani (The Petroleum Institute, United Arab Emirates)

The aim of this study is to interpret a total of 16 seismic sections, 14 acquired in Al Jaww Plain (which lies adjacent to JabalHafit in Al Ain, United Arab Emirates) and 2 seismic sections north of Al Ain. Previous studies indicate the presence of four main sequences in the region namely: the Wasia Group, the Fiqa Formation, the allochthonous unit and the Tertiary and Upper Cretaceous units. Application of several attributes will reveal small-scale features such as faultss which would help draw a comprehensive picture of the subsurface. Moreover, Gardner's Equation/Lindseth's equation would be used to draw estimations for density which would then be used during seismic inversion. The main objectives of this study involve marking the horizons pertaining to the aforementioned formations, identifying the thickness of the evaporite beds atop the Fars formation, identifying the structural and stratigraphic trends in the study area, comparing the northern and southern areas of Al Ain for differences and confirming if the Juweiza formations serves as a glide plane.

Impact of Neighborhood Design Attributes on Solar Radiation in Abu Dhabi Neighborhoods

Abdulla Al Braiki (Khalifa University - Masdar Institute, United Arab Emirates)

This paper discusses the influence of urban design attributes (streets width, alleyways width, number of plots, plot coverage, and buildings heights) on the solar radiation on building facades and surrounding area (streets and open areas). The study is conducted to reduce the solar radiation in neighborhoods that is located in hot-arid climates where cooling demand is high and solar radiation is a major factor in the increase of temperature of buildings and surrounding area. Abu Dhabi neighborhoods where taken as a case study in this paper. 12 samples were selected from the different neighborhoods in Abu Dhabi. Solar radiation was measured using Rhino and Grasshopper.

Correlation between microbial community structure and efficiency of Al-Mafraq Water Treatment Plant

Amani Al Ali (Khalifa University of Science and Technology, Masdar City Campus, United Arab Emirates)

The biological treatment of wastewater relay on microbial metabolism; it considered as the main contributor which determines the wastewater treatment efficiency. Therefore, it is significant to define the composition of microbial community and examine if there is an association between microbial structure and having more cleaner water or the overall performance of the wastewater treatment plant. In addition, wastewater treatment has a valuable byproduct which is methane so, in this research also we will investigate on the relationship between the microbial community and the production of methane gas. The samples have been collected in the last six months and will continue for the next six months. DNA was extracted and they will be sent for sequencing. The results will be analyzed using QIIME software. The conclusion of this research will be examining if there is a significant association between microbial communities, treatment efficiency and methane gas production

Abu Dhabi walk to school: Understanding the behavior, perception, and attitude towards walking to schools in Abu Dhabi

Abeer Anes Wahdain (Khalifa University, United Arab Emirates); Praveen Maghelal (Masdar Institute, India)

Obesity is a big challenge facing many adolescents nowadays. The obesity rate among the United Arab Emirates youth is two to three times greater than the international standards. This paper aims to study the factors that contribute to the decision making of walking to and from school. It also presents how the urban form (built environment) effects and facilitates the active travel of students to and from school. The study assesses and measures the walkability around schools. The data used for this study is collected from surveys distributed to students, parents, and school administrations. The questionnaires administrated the barriers and perception of students and their parents about walking to school in Al Ain. This study could potentially contribute to the decision making by targeting the policymakers as such factors could lead to consider infrastructure improvements, pedestrian and bicyclist safety education and finally traffic enforcement. Moreover, the aim is to increase the demand for sustainable traffic mode.

Sustainable Mosques by Exploiting Wasted Ablution Water and Installing Solar Panels

Omar Albadwawi and Mohammed Al Hashemi (Khalifa University of Science and Technology, Masdar Institute Campus, United Arab Emirates)

More than 5000 mosques located in UAE. A certain methodology can direct the mosque into sustainability. Electricity and water one of the main issues concerning sustainability.

Ablution has been performed by Muslims every day. Many prayers waste more than 30% of clean water during the ablution. This wasted water goes to drain without a second use. Although the skin of human has been interacted with this water without including any chemicals or harmful contaminations. The methodology is to direct this waste water to irrigate green lands. The second method is to use the potential solar power generation space located in the mosque to supply the grid network. A field case study has been managed to look for a suitable mosque which sustain a good use of his property. Additionally, running a survey have been accomplish, which helps to understand the society awareness level and rise it at the same time.

Poster Session B:

Optimal Ground Station Operation for Tracking Multiple Satellites

Hoda Alyammahi (Masdar Institute, United Arab Emirates)

Within UAE's vision of space exploration, Masdar Institute of Science and Technology (MIST) have adopted a graduate program for space concentration. Students under the program are required to produce a CubeSat that serves educational purposes for the institute and the country. In order to provide full control over the small satellite, a ground station (GS) was established within the campus. A software is required to deliver total controllability over the communication between the GS and the satellite. The GS software presents the users with the ability to send and receive data from and to the satellite. The software utilizes North American Aerospace Defense Command (NORAD) database in a Two-Line Element (TLE) format of every satellite's orbital information to provide automatic tracking of the chosen one. The software is able to extract information from different satellites that provide open data and display it as text or graph for easy analysis. Since the satellite have a small window of interaction with GS, multiple GSs in different areas may help in obtaining more information. A common platform in which these GSs can share what they have is needed. This paper introduces GS software and a network website that allows other GSs to contribute in data and knowledge sharing.

Defining and Analyzing Mesh-LBP Variants

Claudio Tortorici and Naoufel Werghi (Khalifa University, United Arab Emirates)

Extending the concept of texture to the geometry of a mesh manifold surface, opened the way to the idea of classifying 3D relief patterns as an emerging topic in 3D Computer Vision, with several potential applications. In this paper, we propose an original modelling solution to address this novel task. Following the recent introduction of the LBP computation framework on mesh manifolds (mesh-LBP), we first extend this framework to the different variants of 2D LBP by defining mesh-LBP variants. The compliance of these extensions with the original LBP in terms of uniformity is also investigated.

Optimization Of Energy Consumption In Cloud Computing Datacenters

Ahmed Osman, Assim Sagahyroon, Raafat Aburukba and Fadi Aloul (American University of Sharjah, United Arab Emirates)

Cloud computing datacenters consume hundreds of KWs of power per hour, thus promoting the need for optimizing the energy consumption of datacenters. Job scheduling is at the heart of any successful power management technique used in datacenters. Power consumption of computing nodes in datacenters is mainly determined by the CPU, memory, disk storage and the network interfaces, with the CPU consuming the major portion. Therefore, in this work we focus on the efficient utilization of datacenter CPUs to optimize energy consumption. The scheduling problem is modeled using Integer Linear Programming (ILP) techniques, where a model is formulated with the objective of minimizing the total power consumed by the active and idle cores of the CPUs while meeting a set of constraints. This work focuses on assessing the performance of state-of-the art generic ILP and 0-1 SAT-based ILP solvers in solving ILP formulations of the scheduling problem.

Dynamic Nuclear Spin Polarization in Semiconductor Devices and Materials

Tamador Elboshra Alkhidir and Abdel F. Isakovic (Khalifa University, United Arab Emirates)

Dynamic nuclear polarization (DNP) effect is used to enhance the nuclear magnetic resonance (NMR) by adding paramagnetic polarizing agents (containing unpair electrons) to the tested sample. Those polarizing agents are usually organic materials with a limited number of unpair electrons. Semiconductor materials along with spintronic devices provide alternative and more efficient substitute for the polarizing agents. Since, the number of spin polarized electrons can be

controlled by changing doping profile and biasing conditions. We discussed the DNP effect in semiconductor materials along with spintronic devices.

A Distributed IoV-Based Traffic Control Approach

Iman Saeed and Mourad Elhadef (Abu Dhabi University, United Arab Emirates)

With the recent advances in internet of vehicles (IoV), the traditional traffic control problem at intersections is being revisited to cope with the future intelligent transportation systems. In this paper, we introduce the performance evaluation of a distributed IoV-based intersection traffic control protocol. Extensive simulations have been conducted using various real traffic scenarios to evaluate the efficiency and the dynamics of the newly proposed traffic control approach that gives the intelligent vehicles full autonomous control of crossing intersections using vehicle-to-vehicle and vehicle-to-infrastructure communications. Simulation results using the tools OMNet++, VEINS, and SUMO showed that the new approach is a viable alternative and addition to the existing traffic control approaches.

A Citywide Intelligent Vehicular Ad-hoc Network-Based Protocol for Improving Traffic

Sarah Baras and Mourad Elhadef (Abu Dhabi University, United Arab Emirates)

Wireless communications makes the delivery of real time information at hands. This includes information from Vehicle to Infrastructure (V2I) and Vehicle to Vehicle (V2V) communications. In this paper, the focus will be on the flow of traffic across number of adjacent Road Side Units (RSU) in various intersections. The objective is to allow RSUs' (I2I) cooperation by exchanging information that is originally collected from vehicles through (V2I). Advanced knowledge of the moving vehicles will lead to better traffic management at intersections and will reduce waiting time

Simulating VANETs Mobility Using SUMO: Abu Dhabi City Case Study

Ayesha Anzer and Mourad Elhadef (Abu Dhabi University, United Arab Emirates)

Simulations on Vehicular Ad Hoc Network (VANET) relies on many parameters such as speed, driving skills, lane changing, etc. It is desirable to reproduce such conditions in a simulation environment. Recently, we have seen lots of developments in this area for example projects like OMNet++, Network Simulator 3, OPNET, and others. All these projects require a way to import real data from map sources to make the model more realistic. A road or highway with its main conditions is today feasible with many collaborators in projects like OpenStreetMap which offers map data for research which must be imported into a simulation scenario. We propose a procedure to achieve this with SUMO (Simulation of Urban Mobility) so that it generates a network mobility file that could be used for further studies in VANET simulations. In this procedure, a quantity of vehicles and inherent features of exported maps are considered.

Multi-Mode Resource-Constrained Project Scheduling Problem with Material Ordering to Maximize the Net Present Value (MMRCSPMODC)

Nour Kashwani (American University of Sharjah & Ministry of Infrastructure Development, United Arab Emirates)

Project management is critical for companies to stay competitive which make material and human resources management an issue of increasing importance. The project management scheduling process of deciding when an activity start and how resources will be used will highly impact the project duration and cost. Resource-constrained project scheduling problem (RCPSP) considers activities of known durations linked by precedence relations and resource requests from resources of limited availability to find a schedule of minimal duration. Traditionally, the RCPSP considered the objective of makespan minimization to plan the overall project; however, since the value of money decreases with time, it is critical to incorporate the financial aspect of the project and schedule the activities in such a way that will maximize the profit. In this work, we will propose a

mathematical model for the multi-mode resource-constrained project scheduling problem with material ordering to maximize the net present value (MMRCSPMODC). The problem will be subjected to precedence constrains, project completion constraints and materials constraints as well as penalties that will be imposed in the case of any delays. Project scheduling and material ordering decisions will be emphasized to determine the time and quantity of an order since setting the material ordering decisions after the project scheduling phase leads to non-optimal solutions. In addition to the developing the mathematical model, we will propose a heuristic approach to obtain near optimal solution since the problem under study is NP-hard.

Multi- Objective Design of Fractional Slot Concentrated Winding Permanent Magnet Synchronous Machine

Saleh Edhah (The Petroleum Institute, United Arab Emirates)

This work considers a design model for a Fractional Slot Concentrated Winding (FSCW) Permanent Magnet Synchronous Machine (PMSM) for an Electric Vehicle (EV) to obtain a minimal loss and machine mass. A population-based multi- objective optimization design is utilized to design and determine the machine parameters. The results of the optimization show there is an inverse relation between the total loss and total mass of the machine. Validation of the results is achieved by means of two dimensional Finite Element Analysis (FEA).

Fixed Point Hardware Implementation for Artificial Neurons with sigmoid activation function

Lilas Alrahis (Khalifa University of Science Technology and Research, United Arab Emirates); Hani Saleh (Khalifa University of Sciente, Technology & Research, United Arab Emirates)

The goal of this work is to present a suitable hardware realization for an artificial neuron with a sigmoid activation function and fixed-point data representation. Therefore, this paper presents all the fixed-point arithmetical operations needed to realize a neuron with a sigmoid activation function. In addition, the paper summarizes the different hardware implementations of the required operations on Field Programmable Gate Array (FPGA). All in all, the paper provides an analysis of the different implementation possibilities.

Load Frequency Control of a Photovoltaic Connected Power Grid

Samar Emara (RIT Dubai, United Arab Emirates); Abdulla Ismail (Sharjah, United Arab Emirates)

In this paper, Load Frequency Control (LFC) is designed to a single-area power grid connected to a photovoltaic (PV) system. Both the power grid and the PV systems have been modeled separately. Three controllers have been designed for this connected system: Linear Quadratic Regulator (LQR), PI, and Fuzzy Logic Controller (FLC) to regulate the error of frequency deviation. A comparison has been carried out between the three methods to check the best performance in terms of settling time, undershoot and steady state error. The criteria to be met in the power plant according to UAE standards are settling time less than 3s, undershoot less than 0.02 Hz and a steady state error of 0. LQR met all three criteria for the system under study, FLC improved the system response greatly and is useful for systems with complex models, while the PI did not meet two of the specifications required.

Variation of Inductance in a Switched Reluctance Motor under Various Rotor Faults Using Finite Element Analysis

Saad Khan (United Arab Emirates University, United Arab Emirates); Atif Mahmood (COMSATS Institute of Information & Technology, Pakistan); Muhammad Saleheen Aftab (United Arab Emirates University, United Arab Emirates)

This article elaborates the novel approach for air-gap magnetic field analysis of switched reluctance motor in case of rotor cracks and rotor tilt around its shaft axis. The fault diagnosis is illustrated on the basis of a 3-D model of the SRM using of a technique known as finite element analysis (FEA). The flux linkage analytical equations are used for the derivation of inductance

expressions. The results obtained from the 3-D FEA of a SRM having 6 stator and 4 rotor poles shows the variation of mutual inductance with the cracked rotor conditions and the tilting of rotor shaft. The results obtained explain the usefulness for the detection of cracked rotors and shaft tilting.

Maximizing the State Of Health of a Li-Ion Battery for Satellites by Scheduling the Charging and Discharging States of the Battery

Mahmoud Lami (American University of Sharjah, United Arab Emirates)

Satellites have tangible impact on our daily lives; they revolutionized our everyday living. Satellite batteries are expected to deliver the power demand at any time during the period of an eclipse or when the power received from the solar panel is not sufficient. This study is performed in order to develop a scheduling algorithm that augments the runtime/lifetime of the battery; which will consequently aim on diminishing the State of Health (SOH) degradation of the battery. Data will be collected for an existing satellite, such as Nayif-1, in order to analyze battery behavior in space. In parallel, an accurate State of Charge (SOC) estimation technique will be simulated and validated. Finally, a simulation model through Matlab will be also developed to compare and validate the results.

Predicting Workforce Demand In Service Organizations Using AI Techniques

Sara Sharif (Khalifa University, United Arab Emirates)

Prediction is basically about making claims of the future based on past information and current state. Predicting demand for the future can help many service organizations to adjust their resources thus reach their goals. In this paper, a complete framework for predicting workforce demand in service organizations using several techniques is provided. Moreover, two case scenarios of two service organizations requiring forecasting of demand are discussed. Also, this paper provides an initial test results of applying Moving average, Linear regression and Neural network techniques.

Kernel Density Estimation and Gaussian Mixture Models: A Comparison for Wind Speed Density Estimation

Maisam Wahbah (Khalifa University, United Arab Emirates); Omar Alhussein (University of Waterloo, Canada); Tarek El Fouly, Bashar Zahawi and Sami Muhaidat (Khalifa University, United Arab Emirates)

Accurate estimation of wind speed probability density distribution at a relevant wind generation site is crucial in maximizing the yield of the wind farm, and optimally utilize clean sources of energy. This goal calls for devising models with adaptable algorithms that accurately fit wind speed distributions regardless of the wind farm location and the distribution type. In this paper, the performance of the Kernel Density Estimation wind speed model is compared with that of a Gaussian Mixture Model, in which the optimal number of components of the Gaussian mixture model probability density function is obtained using the Bayesian Information Criterion approach.

Drone Based Outdoor Insulator Inspection

Danial W Amin, Shayok Mukhopadhyay and Ayman El-Hag (American University of Sharjah, United Arab Emirates); Usman Tariq (AUS, United Arab Emirates)

Over the past few decades, interest in unmanned aerial vehicles and in particular quadcopters has increased due to the wide range of possible research applications that can benefit from the use of quadcopters. Insulator inspection on overhead lines has traditionally relied heavily on visual inspection. This task is both cumbersome and relies heavily on the experience of the inspector. It is also extremely dangerous as the inspector needs to work in close proximity with overhead lines, and contact with these lines can be fatal. This paper focuses on the development of a quadcopter based system that is able to inspect insulators on overhead power lines autonomously.

Adaptive Shaping Function for Envelope Tracking Applications

Mohammad Abo rahama (American University of Sharjah, United Arab Emirates)

Envelope tracking is one of the methods used to enhance the efficiency of power amplifiers. Shaping function is a mathematical model used in envelop tracking that shows the relation between the biased voltage and the input power of the amplifier. In this paper, a new shaping function, that will allow the user to control the performance of the amplifier with the best possible efficiency, is introduced. The introduced shaping function could be used for any amplifier and could be modified to achieve any desired performance.

Doherty CMOS Power Amplifiers for 5G Technology

Nourhan El Sayed (Khalifa University of Science, Technology and Research, United Arab Emirates)

Currently, there is a large move towards 5G wireless technology beyond the existing, widely used 4G technology due to an increased use of smart devices, and multimedia content. 5G technology is expected to operate at high frequencies between 15 GHz and 100 Ghz opening up a new horizon for spectrum constrained future wireless communications. Designing high efficiency power amplifiers for such high frequencies presents a new challenge. This paper presents different designs of integrated PAs operating at 15-100 GHz for 5G applications.

An Efficient Multi-output Switched Capacitor Converter for Energy-quality Scalable SoCs

Dima Kilani and Baker Mohammad (Khalifa University, United Arab Emirates); Mohammad Alhawari (Khalifa University of Science, Technology and Research, United Arab Emirates); Hani Saleh (Khalifa University of Sciente, Technology & Research, United Arab Emirates); Mohammed Ismail (Khalifa University, United Arab Emirates)

This paper presents an area and power efficient multi-output switched capacitor (MOSC) DC-DC buck converter for energy-equality scalable SoCs including wearable biomedical devices. The MOSC converter has an input voltage range between 1.05V to 1.4V and generates two simultaneous regulated output voltages of 1V and 0.55V. The MOSC consists of two main blocks; a switched capacitor regulator and an adaptive time multiplexing (ATM) controller. The switched capacitor regulator generates a single regulated voltage using pulse frequency modulation based on a predetermined reference voltage. In addition, the ATM controller generates two simultaneous output voltages using pulse width modulation and eliminates the reverse current during the switching between the output voltages. Addressing the reverse current problem is important to reduce the voltage droop at the output resulting in a better performance.

Multi-Objective SPUDD used by Single Objective POMDP Solver

Hend Al Tair, Tarek Taha, Jorge Dias and Mahmoud Al-Qutayri (Khalifa University, United Arab Emirates)

In this paper we evaluate our proposed modification in the Stochastic Planning Using Decision Diagrams (SPUDD) to explicitly include and describe multi-objective problems. In order to test that we have used single objective Symbolic Perseus which is a Partially Observable Markov Decision Processes (POMDP) solver. We have created a parser that reads the multi-objective costs from the SPUDD and a scalarization function in Symbolic Perseus so it can be solved. In this paper we show promising results of experiments conducted to evaluate the parser and the scalarization function with different set of weights and compare it to the original SPUDD format.

Machine Learning-Based Approach to Map Low-Level Event Logs to Process Model Activities

Ghalia Tello (Khalifa University, United Arab Emirates)

Process mining is an emerging discipline that aims to analyze business processes using event data logged by IT system. Most of existing process mining techniques assume that there is a one-to-one mapping between process model activities and the events that are recorded during process execution. However, event logs and process model activities are at different level of granularity. In this paper, we present a machine learning-based approach to map low-level event logs to high-

level activities. With this work, we can bridge the abstraction levels when labels are not available. The proposed approach consists of two main phases: automatic labeling and machine learning-based classification. In automatic labeling a modified k- prototypes clustering approach has been used in order to obtain the labeled examples. Then, in the second phase, we trained different machine learning classifiers using the obtained labeled examples. We verified our proposed approach using a real-world event log.

Medical Image Generation using a Novel Artificial Neural Network Interpolation Algorithm

Yasser Abdelsamie and Salam Dhou (American University of Sharjah, United Arab Emirates)

A method for reducing streaking artifacts in 4D-CT reconstruction by generating additional projections is proposed. The proposed method uses an Artificial Neural Network (ANN)-based interpolation algorithm for image generation. Deformable image registration algorithm is used to estimates the motion between the original images. Then, a multi-layer perceptron feedforward neural network with an adaptive learning procedure is used to interpolate the in-between images from original ones. Phantom and real-patient Computed Tomography (CT) scans are going to be used to test the algorithm. The generated images will be compared to the original ones to test the accuracy of the proposed algorithm.

Simulating an Adaptable inVANETs-Based Intersection Traffic Control Using OMNet++

Hadeel Tabaza and Mourad Elhadef (Abu Dhabi University, United Arab Emirates)

It is known that there have been numerous improvements in the field of Intelligent Transportation Systems using VANETs which encouraged many to develop intelligent traffic control approaches to replace the current technology using traffic lights. One approach was proposed by Elhadef in [3], which was to improve the inVANETs-based intersection control algorithm that was developed by Wu et al. to adapt to real life traffic scenarios or accidents. It is implemented using vehicle-to-vehicle or vehicle-to-infrastructure communications as the vehicles exchange messages to get the opportunity to cross the intersection. In this paper, we present our work in simulating inVANETs-based traffic control for future smart cities using OMNet++, SUMO, and VEINS simulation tools.

Towards Satellite Image Registration using Deep Convolutional Neural Network

Prajowal Manandhar (Masdar Institute of Science and Technology, United Arab Emirates); Prashanth Marpu and Zeyar Aung (Khalifa University of Science and Technology, United Arab Emirates)

We demonstrate an integrated model to retrieve and map satellite image from the image warehouse. Our idea is to detect the geographical location of remote sensing images using deep convolutional neural network (CNN). We train the VGGNet-16 model employing Fully-Connected2 (FC2) features based on a reference dataset based on the closest match found. Once, we obtain the closest match, we use Speeded-Up Robust Features (SURF) to detect the tie points between the new image and reference image. The tie points can be used to register the test image with the reference image automatically. Performance evaluation of our proposed model is performed on satellite image acquired in 2015 using WorldView-2 satellite over Abu Dhabi, United Arab Emirates. We also perform experimentation with Google Earth image of different resolution to demonstrate the robustness of our approach.

Urban Vehicular Ad Hoc Networks: A Street Connectivity Routing Protocols Review

Maha Kadadha (Khalifa University, United Arab Emirates)

Vehicular Ad Hoc Networks (VANETs) are emerging as an enabler for distributed transport application such as traffic management and multimedia sharing. In urban VANET, basic routing protocols are affected by the urban environment elements such as intersections and traffic lights which lead to frequently changing network topology and uneven vehicle distribution. Multiple routing protocols overcome this problem by introducing a street connectivity metric for relay

selection. This paper presents a survey of routing protocols using street connectivity prediction in urban VANETs. Moreover, a discussion of the limitations in the surveyed protocols is presented.

Sampling Bitcoin User Graph

Hamda Al Breiki (Masdar Institute, United Arab Emirates)

In the last decade network science emerged as a new discipline that highly impacted scientific research. Data availability and advanced computational resources attracted researchers to dive in network science looking for new insights and discoveries in almost all disciplines. We are surrounded by networks and the size of these networks is growing exponentially. Bitcoin network is one example of the complex networks that are growing exponentially. In this paper we worked with Bitcoin user graph and applied network sampling to generate sample graphs. We analyzed the basic network properties for original and sampled user graphs to evaluate the sampling method we used in this paper.

Hand Gesture Recognition Using Recurrent Neural Networks For Smart-TV Applications

Buti Al Delail (Khalifa University of Science, Technology and Research, United Arab Emirates); Harish Bhaskar (Khalifa University of Science Technology and Research, United Arab Emirates); Mohamed Jamal Zemerly and Naoufel Werghi (Khalifa University, United Arab Emirates)

In this paper, we propose a vision-based hand gesture recognition system for interaction with a Smart-TV under varying illumination conditions. Vision-based hand gesture recognition systems are employed as human-computer interfaces to increase the comfort of the user, and provide a more intuitive interaction. In our algorithm, a convolutional long short-term memory (LSTM) network is used to classify features extracted from video sequences of hand gestures captured under varying illumination conditions. We experimented this approach with our hand gesture detector, and report a superior classification accuracy on our hand gesture dataset, the dataset consists of eight different hand gestures performed at night-light room ambient lighting conditions six gestures of which are used to be recognised in this paper.

mmWave Measurements in UAE Environment

Mohammad Abo rahama, Yamen Hatahet, Amer Zakaria, Mahmoud H. Ismail Ibrahim and Mohamed El-Tarhuni (American University of Sharjah, United Arab Emirates)

In this paper, the procedures that will be used to implement pathloss measurements for different indoor and outdoor scenarios at a frequency of 28 GHz in the United Arab Emirates will be discussed. The measurements will act as a vital step to understand the behavior of mmWave channels in the desert-like environment. It is expected that the results will show differences in channel behavior in comparison to other countries due to the special weather conditions existent in the United Arab Emirates environments.

An EEG Based System for Detection of a Real and A Fake Smile

Meera Alex (American University of Sharjah, United Arab Emirates)

The Pursuit of happiness is of much interest but what exactly we can do to measure the state of happy emotion and how to distinguish it from a fake emotion. The main aim of this project is to classify a fake and a real smile using EEG signals. It focuses on using the EEG signals in order to classify a True versus a fake smile. The project involves stages of data acquisition followed by feature extraction and Classification. The data collection involves the recording of EEG signals in response to external stimuli that can elicit a fake smile and a genuine smile. This recorded data is then preprocessed to remove artifacts. The preprocessed signals are utilized for feature extraction using source localization techniques. Source localization technique has been used for feature extraction due to fact that it provides a good estimate of the brain cortex activity and also due to the role of different brain regions to facial expression. Finally, the features extracted are fed onto a classifier.

Medical Equipment Efficient Failure Management in IoT Environment

Jumana Farhat and Abdulrahim Shamayleh (American University of Sharjah, United Arab Emirates); Hasan Al-Nashash (AUS, United Arab Emirates)

There is an urgent increasing need for healthcare to be efficient. Healthcare is highly impacted by medical technologies since it is one of the main drivers of healthcare performance and cost. The number of medical equipment and their complexity force hospitals to adopt different maintenance strategies to enhance the performance of their devices in addition to attempting to reduce their maintenance cost and effort. In this work, we are proposing a predictive maintenance strategy that relies on real online data through using the Internet of Things (IoT) technology to predict failure before it occurs. This maintenance strategy along with IoT will form a successful combination to improve the reliability of medical devices and make good use of maintenance resources. We developed a simulation setup to test the methodology using two online tools developed by IBM to show how failure can be predicted and equipment's availability can be improved.

Using Lactose and Ultrasound to Deliver Chemotherapeutics

Rand Abusamra (American University of Sharjah, United Arab Emirates); Ghaleb Husseini (AUS, United Arab Emirates)

The fight against cancer has pushed scientist and researchers into exploring new effective and innovative forms of cancer therapy. Nanomedicine to deliver site specific chemotherapy is studied to enhance drug delivery by reducing side effects experienced by patients and drug toxicity to non-cancerous cells, improving drug accumulation and specificity in the tumor site. With cancer affecting several organs and tissues, each type is treated differently by choosing the most effective nanocarriers, such as liposomes, dendrimers or micelles among others. The use of active targeting by attaching the suitable ligand to the nanocarriers will enhance the drug delivery process. Stealth properties, enhanced permeability and retention effect (EPR), biocompatibility and ease of syntheses are all factors that must be considered when choosing the most effective form of the drug delivery system

Transcriptomic Profiling of Severe Asthma using Publicly Available Data

Mahmood Hachim, Rifat Hamoudi, Qutayba Hamid and Bassam Mahboub (University of Sharjah, United Arab Emirates)

Asthma is a chronic inflammatory disease that is treatable but incurable affecting more than 14% of the UAE population. Asthma is still a clinical dilemma as there is no proper clinical definition of asthma, unknown definitive underlying mechanisms, no objective prognostic tool nor bedside noninvasive diagnostic test to predict complication or exacerbation. Here we used a novel in house bioinformatic method on publicly available database to identify novel gene signatures and pathways that can explain the heterogeneous nature of asthma. Our approach showed that Transcriptomic profiling of asthma cases can infer their different phenotypes and can shed light on the cellular pathways and molecular mechanism underlying asthma

Incident Command Virtual Reality (ICVR) Training Tool

Abdulla Abu Haleeqa (The Petroleum Institute, a part of Khalifa University of Science and Technology & ADNOC Gas Processing, United Arab Emirates)

This paper discusses utilizing virtual reality simulation enhancement to Incident Command (IC) training. Emergency Response is one of the toughest tasks that come mostly unannounced, especially due to the limitations of knowns during the occurrence and time to react properly and decisively. Professionals in IC require clear priorities to coordinate the response according to importance. This makes communication and swift decisions very critical to control the risk. Virtual simulation training has been utilized in many industries and businesses to train and assess professionals in their jobs. Even emergency response training centers utilized generic virtual

environments for that purpose. This project mimics an existing facility into virtual environment to train and assess Incident Management Team (IMT) members according to the identified credible scenarios. The result exceeded expectations leading to efficient unified approach in the IMT as the several subject trainees learned from mistakes, instructor and peers guidance to achieve the objective of their specific role.

Optimal Large-scale Deployment of Renewable Energy Systems for the UAE Electricity sector

Abdulrahman Alzaabi (Masdar Institute of Science and Technology, United Arab Emirates); Sgouris Sgouridis (Masdar Institute of Science and Tec, United Arab Emirates)

The United Arab Emirates (UAE) consumed 0.514 TJ of energy per capita in 2016; one of the highest per capita energy consumption rates while highly depending on fossil fuels for energy production accounting for 99.7% electricity production in the UAE. Moreover, renewable energy (RE) sources for electricity generation are gaining popularity for large-scale adoption. Therefore, we explore the optimal mix of RE and storage for the UAE conditions to meet the demand and supply for different RE adoption (50, 75,100%). For the case of 100% RE adoption, results show that shares of electrical generation of RE technologies, PV, CSP, and Wind are 40.1%, 53.8%, and 5.3% respectively of total electricity generation and total electrical discharge of storage technologies, battery, thermal and hydrogen are 11.5%, 77.1% and 11.4% respectively of total storage generated electricity.

Performance Comparison of TCP Algorithms for device-to-device communication in LTE-A

Fatima Qatan and Rana Ahmed (American University of Sharjah, United Arab Emirates)

Recent massive growth in the connected devices as well as the traffic on wireless cellular networks is posing serious issues in achieving higher data rates. Device-to-device (D2D) communication has received a great attention to meet such massive demands. D2D communications allow two devices to communicate directly without going through the base station. Therefore, D2D communications have potential contribution in offloading the traffic from the core network and improving the overall throughput. In this paper, we evaluate the performance of TCP flows in D2D communications in LTE-A networks using the system-level simulator called SimuLTE. This paper presents the results on the comparison of the throughputs obtained with various TCP implementations in D2D communications in LTE-A networks. It also provides explanation to the variations in the throughputs resulting from changing the receive window size and the way the mode switch is handled in different TCP implementations.

Comparative Analysis of the PPP Guidelines in UAE, UN and EU

Abdul Razak Alozi and Mhd Anas Chamieh (University of Sharjah, United Arab Emirates)

This study has been conducted to assess the newly released PPP guidelines of the UAE (2017) and compare them with two international guidelines - selected based on date of release and level of development - which are the United Nations guidelines for local governments and the European commission guidelines; the study is based on comparison by two methods: • Plus/delta Analysis • Significance comparative analysis The results show that the UAE guidelines have great potentials but still require some improvements in some points; some suggestions for the improvements have been given in the plus/delta analysis while in the significance analysis these points were assessed and quantified. In summary, while detail amount in the UAE guidelines is beneficial, they don't have to be listed in the way they are. Mainly, if most of the steps are revised and summarized, and if the sequencing is modified, the UAE guidelines could be more reliable.

Two-Relay Controller Test Approach to Non-parametric PID Tuning of a Magnetic Levitation System

Samia Mahil (The Petroleum Insitiute, United Arab Emirates); Igor Boiko (Petrolum Institute, United Arab Emirates)

A non-parametric PID tuning approach for a Magnetic Levitation System (MLS) is proposed in this paper. The proposed tuning method is non-iterative and is based on a test involving the two-relay controller that provides identification at frequencies higher than the phase cross over frequency of the process. The tuning procedure has two consecutive stages. First, generating self-excited oscillations in the closed loop of the MLS using the two-relay controller test, and measuring the ultimate frequency and ultimate amplitude of the generated oscillations. Second, using the results obtained from the test and certain non-parametric tuning rules, the parameters of the PID controller are determined. The tuning rules that are produced and used guarantee the specified gain margin. We validate the approach using the Inteco MLS experimental setup. The simulations and the experimental results show the effectiveness of the proposed approach.

Critical Success Factors For Renewable Energy in UAE

Nawal Y. Alhanaee (The British University in Dubai, United Arab Emirates); Hanan Taleb (British University in Dubai, United Arab Emirates)

Applying Renewable energy (RE) resources can reduce the power shortages demand along with reducing the power consumption which leads to reduce the GHG emissions. RE is an essential part of the green initiatives market and defined as the important physical infrastructure schemes that reinforce the development of zero carbon society. Climate change alarmed and motivated efforts to rise the share of a power generation from RE. This paper will focus on determining the potential of establishing a large-scale RE project in Fujairah, UAE. It explores the technical and economic aspects of launching large-scale solar plants and wind farms in the region. The paper outcomes are expected to identify the necessary tools and critical success factors (CSF) needed to enable the different energy stakeholders to make cost-effective decisions. Similarly, it will deliver the best technical and economic implementation plans taking into consideration the necessary upgrade for the current policies and regulations.

Poster Session C:

Design of an Attitude Determination and Control for small satellites in low altitude orbits

Adham Alkhaja (Masdar Institute, United Arab Emirates); Prashanth Marpu (Khalifa University of Science and Technology, United Arab Emirates)

This paper will discuss techniques for attitude determination and control in small satellite at the low earth orbit. Investigating optimal solutions for attitude control is essential for regulating the maneuvers of the spacecraft in order to point to a certain location or track an object. This can be a challenge due to the presence of uncertainties and external torques that has not been accounted for. The paper will discuss a solution for spacecraft attitude determination and control.

Targeted Energy Transfer Using Nonlinear Energy Sinks

Adnan Saeed (Khalifa University, United Arab Emirates); Mohammad Alshudeifat (Khalifa Universiy, United Arab Emirates)

During the past decades, an increasing interest in passive Targeted Energy Transfer (TET) for vibration mitigation and energy harvesting purposes has been observed. Therefore, extensive investigations for employing nonlinearly coupled dynamical attachments known as nonlinear energy sinks (NESs) with primary linear structures have been conducted in different related engineering applications. Due to their nonlinear coupling, NESs are capable of performing rapid, passive and nearly irreversible TET from the linear primary system for a broadband energy-frequency domain through single or cascade of resonance captures. To this end, many types of NESs which have been categorized according to their nonlinear coupling element and force were extensively investigated via analytical, numerical and experimental techniques.

Thermochemical Analysis of Flat Composite Panel

Mariam Al Dhaheri (Khalifa University of Science, Technology & Research, United Arab Emirates); Kamran Khan, Wesley Cantwell and Rehan Umer (Khalifa University, United Arab Emirates); Frank van Liempt (Design Engineering & Strata, United Arab Emirates)

Composite structures are cured in the autoclave under high temperature cycle that introduces thermal residual stresses which remain in the structure after it cools down. They rise as a result of temperature variation within the part due to different factors such as the anisotropy nature of the composite material, tool and part interaction, etc. The relaxation of residual stresses leads to spring in/back in curved structures and warpage in flat structures. This paper discusses the variation in temperature responses, degree of cure and cure rate of a flat composite structure that includes different design features, e.g. core ramp and monolithic area with variant thicknesses, using COMPRO thermochemical analysis run. Simulation and experimental results showed good correlation which allowed for further investigation of the uneven cure rates across the panel, obtained by simulation, that led to the rise of thermal stresses causing warpage in the panel.

Analysis of Sweeping Jet Actuator Frequency: Numerical and Experimental Study

Bartosz Jurewicz (KUSTAR, United Arab Emirates); Kursat Kara and Vladimir Parezanovic (Khalifa University, United Arab Emirates)

Innovative aerodynamic technologies will play a key role in improving the next-generation aircraft's performance. Active flow control using the Sweeping Jet (SWJ) actuators is one of the most promising technologies to solve critical problems of aerospace industry such as drag and weight reduction, flow separation, and noise. Initial applications showed that SWJ actuator has the advantage of having no moving parts, robustness and reliability, manufacturability and ease of system integration. However, a lack of knowledge continues regarding the actuator's properties, underlying physical flow mechanisms, and governing parameters for flow control applications. The main objective of this paper is to understand internal flow physics, jet oscillation process, and pressure drop mechanism using Two-Dimensional-Unsteady Reynolds-Averaged-Navier-Stokes

simulations. This understanding will help to the development of design methodologies for the sweeping jet with minimum pressure losses, controllable sweeping frequency, and a more efficient flow control actuator for required conditions. The design rules and scaling laws may increase not only the technology readiness level (TRL) but also manufacture readiness level (MRL) by two folds.

Ultrasound Triggered Release and Cellular Uptake of Trastuzumab-Conjugated Immunoliposomes Targeting Breast Cancer

Amal Ahmed (American University of Sharjah, United Arab Emirates); Ghaleb Husseini (AUS, United Arab Emirates); Rana Sabouni (American University of Sharjah, United Arab Emirates)

Conventional treatment for cancer has many side effects which limited its use. This augments the need for new smart drug delivery systems, which are nanocarriers that can shield the healthy cells from the adverse side effects of chemotherapy and enhance the drug's pharmacokinetics. One type of biodegradable nanocarriers are liposomes. Once these drug loaded liposomes reach the tumor, their release can be triggered using ultrasound, an external modality capable of accelerating the cytotoxic effects of the drug and subsequent accumulation inside tumor cells. The purpose of this study is to test the ultrasound-triggered release and cellular uptake of immunoliposomes that have increased affinity toward breast cancer cells. Proteins attached on the surface of the liposomes will guide them to the tumor that overexpresses receptors for that protein. Frist the attachment is confirmed, then ultrasound triggered release is studied.

The Effects of the Environmental Factors on the Absorbency of Superabsorbent Hydrogels

Noun Abdelwahab (American University of Sharjah, United Arab Emirates)

Superabsorbent hydrogels are the hydrogels that can absorb and retain huge amount of water. Acrylic acid is the most frequently used chemical in preparing superabsorbent hydrogels. The swelling properties of poly acrylic acid hydrogels (commercial hydrogels) were investigated and developed in many published works. In this study, the effects of the environmental factors on the absorbency of commercial hydrogels have been examined using two-level factorial design. These factors include the amount of applied hydrogel, swelling time, pH and temperature. It has been found that the absorbency increases with the swelling time and the temperature. On the other hand, it decreases as the amount of hydrogel or the pH increases.

Evaluation of the Performance of Amine Based Deep Eutectic Solvents for Post Combustion Carbon Capture by the Conductor-like Screening Model for Real Solvents

Idowu Adeyemi (Masdar Institute & Masdar Institute, United Arab Emirates); Enas Muen Nashef and Mohammad Abu-Zahra (Masdar Institute of Science and Technology, United Arab Emirates)

Advancements in post combustion carbon capture through solvent based absorption process require extensive development and screening of a new combination of solvents which can address the drawbacks inherent in amine based absorption systems. Amine based deep eutectic solvents (DES) have emerged as promising solvents to tackle some of the issues associated with amine absorption systems, whilst maintaining the important qualities and benefits of amines. In this study, the effect of different parameters on the CO2 absorption capacity of 105 amine based deep eutectic solvents has been determined with conductor like screening model for real solvents (COSMO RS). The amine DESs utilized for this study consists of different combinations of hydrogen bond donors (HBD), salt anion, salt cation and salt-to-HBD molar ratio. The effect of temperature and gas pressure on the CO2 absorption capacity for the amine based DESs was studied. Results showed that the pressure has a linearly increasing nature on the solubility of CO2 in the amine based DESs.

An In-Situ DRIFTS/MS Study of the Photocatalytic Degradation of EDTA over TiO2

Reem Al Sakkaf (Khalifa University, United Arab Emirates); Giovanni Palmisano (Masdar Institute of Science and Technology, United Arab Emirates)

Among the various applications of photocatalysis, this research focuses on the photocatalytic degradation of Ethylenediaminetetraacetic acid (EDTA) over TiO2. The study investigates the mechanism and optimum conditions of the reaction. The objective is to describe the degradation mechanism of EDTA under irradiation, and thereby, determine the best conditions for the reaction to take place efficiently. The mechanism is studied in situ by running DRIFTS-MS investigation, while the reaction takes place inside a reaction cell exposed to radiation from lamps simulating solar or UV-visible broad range radiation to assess the influence of radiation on performance. Other factors, such as the type of reactant gas, flow rate and the presence of humidity, are manipulated and studied individually as well.

Process Simulation and Modelling of Air Cooled Condenser Using Aspen EDR

Zhou He (Khalifa University of Science and Technology, United Arab Emirates & China University of Petroleum (East China), P.R. China); Arjun Ravikumar (The Petroleum Institute Abu Dhabi, United Arab Emirates); Kean Wang (The Petroleum Institute, United Arab Emirates); TieJun Zhang (Masdar Institute of Science and Technology, United Arab Emirates)

An Air-cooled condenser is a device for rejecting heat from a fluid directly to ambient air. The obvious advantage of an Air-cooled condensers is that it does not require cooling water, which means that plants requiring large cooling capacities need not be located near a supply of cooling water. Air cooled condensers are integral part of the process industries and power plants, In natural gas processing plants, air-cooled condensers are popularly used in separation units and this phase changing units controls the economics of the process. An air cooled condenser in Natural Gas Liquid (NGL) plant is modelled using Aspen EDR software, an optimized model is developed by investigating different geometrical parameters of the air cooled condenser. The developed model is validated using the industrial operation data available before performing the simulations. To effectively improve the performance of air-cooled heat exchangers, enhancement techniques are often employed, The Inside and the outside heat transfer coefficients are enhanced using nanostructured condensers and this results are incorporated with the Aspen EDR model so that the fan power cost and the process economics are evaluated. The fan power is evaluated at different operating conditions (summer /winter) and at different air humidities and air velocities. The results showed favorable outcomes based on the simulation and optimization, the operating cost of the practical process can be reduced by a great extent (up to 30%).

Molecular Dynamic Simulations of Low Global Warming Potential Refrigerants

Yuting LI (Khalifa University of Science and Technology, P.R. China); Wael Fouad (Petroleum Institute, United Arab Emirates); Lourdes F Vega (The Petroleum Institute, United Arab Emirates)

Recently, global warming has attracted widely attention. With the upsurge of replacing the third generation refrigerants with low global warming potential (GWP) alternatives, the fourth generation refrigerants mainly promote unsaturated HFCs such as hydrofluoroolefins (HFOs). However, up to date, there are only few compounds available for this new generation, making the search for new ones and blends fulfilling the required conditions in terms of efficiency, safety and environmental is a high priority from the research point of view. Understanding the liquid-vapor interface behavior and predicting reliable thermodynamic properties are important for determining suitable refrigerants for next generation, as thermodynamics rules most of their efficiency. Extensive experimental data should be obtained, and for a wide range of conditions, before a new molecule can be put into the final application. In addition to experimental methods, molecular simulations and theories, such as the statistical associating fluid theory (SAFT), can also provide appropriate ways to describe the phase transition behavior, including interfacial and transport properties. The advantage of using molecular simulations versus theory is that, although more time consuming, they provide additional information at the molecular level, such as orientation of the molecules, accumulation at the interface, etc., not achievable by theory, but essential to understand the behavior of the system. However, to our knowledge, the calculation

of the HFOs interfacial properties and mixtures by molecular simulation has not been published yet. In this project, we aim to use MD simulations to study the vapor-liquid interface of different HFOs and their binary mixtures with HFC and alkanes as alternatives to third generation refrigerants. We will also provide predictions on their interfacial properties (such as the corresponding density profiles, thickness of interface and surface tension) from the statistical associating fluid theory (SAFT). Results will be compared to the experimental data and Reference Fluid Thermodynamic and Transport Properties Database (REFPROP). Simulations will allow assessing the quality of the established HFO models in the literature and the performance of SAFT.

Molecular Simulations of Nature-inspired Hierarchical Porous Materials for Energy Storage

Mostafa Elabyouki (Khalifa University of Science and Technology, United Arab Emirates); Lourdes F Vega (The Petroleum Institute, United Arab Emirates); Maryam Khaleel (Khalifa University of Science and Technology, United Arab Emirates)

Climate change and energy are two of the major challenges facing modern society, with the development of greener and more efficient energy conversion and storage technologies critical for the mitigation of greenhouse gas emissions and meeting the global energy demand in the future. The Lithium ion rechargeable battery provided a breakthrough in modern energy storage; however they are reaching their maximum predicted energy capacity. As a result, scientists are keen to explore rechargeable batteries with higher specific (gravimetric) energy. Among the leading candidates is the lithium-air battery since it is predicted to have the highest theoretical specific energy density among all rechargeable battery devices (3500 Wh kg-1). However, there are some issues which need to be resolved before the launch of a commercial lithium-air battery. Electrode passivation is the leading cause for early cell death due to the diminishing electrode/electrolyte interface. A genuine solution explored in this thesis is the design of hierarchically porous materials like 3DOM porous carbon and hierarchical graphene as "air" electrodes. Hierarchically structured porous materials are nature inspired structures in which the porosity is engineered such that the resulting material composes various porosity scales. The utilization of hierarchical porous materials as cathodes for the Li-air battery could offer several advantages which we aim to verify. Namely, the porosity offers a higher interfacial contact between the electrode and the electrolyte resulting in higher capacity. Moreover, the presence of wider voids in the form of mesopores and macropores offers transport "highways" for faster charge and molecular transport. Most importantly however, the macropores offer the possibility of discharge product (Li2O2) storage without clogging the micropores and mesopores ensuring continuous oxygen transport to the reaction centers and reducing passivation. In a field where the fundamental understanding of electrochemical mechanisms is of great significance, we aim to conduct first principles molecular simulations to model the phenomena occurring at the electrode/electrolyte interface of a Li-air battery. In addition, classical molecular simulations will be utilized to model and characterize the hierarchical porous materials such as 3DOM carbon and hierarchical graphene as cathodes for Li-air batteries. Molecular simulations should provide insights into the possible reaction mechanism occurring on hierarchical cathodes. The main purpose of the thesis is to explore the feasibility of the hierarchical cathodes in improving the efficiency of the Li-air battery, through the proposed improved diffusion and discharge product storage.

Absorption of Carbon Dioxide via Single and Blends of Aqueous Amine Solutions and Nanofluids in Gas-Liquid Hollow Fiber Membrane Contactor

Zia Ur Rehman Said (UAE University-Tawam Hospital, United Arab Emirates)

In this work, CO2 was absorbed from nitrogen in Polyvinylidene fluoride (PVDF) hollow fiber membrane contactors by using a variety of single and blends of aqueous amine solutions and nanofluids. An ultrasonic dispersion method was used to prepare nanofluids where SiO2 nanoparticles and carbon nanotubes (CNTs) were dispersed in deionized (DI) water without adding

any surfactant. The prepared solvents were fed into the tube side of the membrane module, whereas the gas mixture of nitrogen and carbon dioxide (N2/CO2) was passed through the shell side. CO2 absorption experimental runs were carried out at four different liquid flow rates: 10, 20, 30 & 40 ml/min. CO2 concentration was fixed at 20 vol.% in the CO2/N2 gas mixture. The whole experiments were conducted at ambient temperature and atmospheric pressure and absorption by pure deionized water in the same module was used as a reference. The effects of different parameters on the removal efficiency of CO2 were checked and analyzed with a focus on concentrations and types of amines and nanoparticles and liquid flow rate.

Waste Water Treatment Using Functionalized Graphene Oxide Hydrogels

Fathima Arshad and Munirasu Selvaraj (Khalifa University Of Science and Technology, United Arab Emirates); Fawzi Banat (The Petroleum Institute, United Arab Emirates)

The paper focusses on treatment of water containing heavy metals like Hg (II), Pb (II) and Cd (II). An alginate based graphene oxide hydrogel is used as the adsorbent for the same. The kinetics, isotherm and thermodynamic studies are done and discussed.

Energy Assessment for Mission Completion for Aerial Transportation via Multi-Rotor

Abdullah Mohiuddin (Khalifa University, United Arab Emirates)

Recently, multi-rotors are being considered for the transportation of payloads by delivery companies such as Amazon. Transporting a payload to the desired location using a multi-rotor without considering the mission completion feasibility could result in a failure during the transportation mission and cause the multi-rotor to enter fail-safe mode. The outcome of entering into a fail-safe mode could be landing of multi-rotor-payload into an unsafe location, hence a chance of theft or tampering. The following paper presents a method of assessing the chances of a successful mission by using a model of multi-rotor. The model inputs are the multi-rotor parameters, the desired trajectory and the output of the model is the decision whether to start the mission or abort it.

Object Based Landmark Detection in SLAM

Rana Azzam and Tarek Taha (Khalifa University, United Arab Emirates); Lakmal Seneviratne (KURI, United Arab Emirates); Yahya Zweiri (Khalifa University, United Arab Emirates)

A Graph SLAM algorithm along with an object detection module based on deep learning are employed in order to generate an estimated map of a previously unexplored area. A ZED camera, which provides RGB and depth images, is mounted on a ground vehicle which is moved in the area to be explored in order to collect the required data for mapping. While maneuvering in the environment, the wheel encoders embedded in the ground vehicle are used to estimate the robot's position using dead reckoning.

A Review of Robot Exploration Methods

Reem Ashour (Khalida University of Science and Technology, United Arab Emirates); Lakmal Seneviratne (KURI, United Arab Emirates); Tarek Taha and Nawaf Almoosa (Khalifa University, United Arab Emirates)

Robotic Urban Search and Rescue (USAR) is a challenging yet promising research area which has potential applications as proven throughout the rescue and recovery operations in real-world disasters. The main challenge for rescuers is to adapt to the unique conditions of the indoor USAR environment including the inflexible navigation and the harsh conditions. In this paper, we study the different approaches used for exploration in an indoor unstructured environment and propose an efficient exploration method to enhance the existing state of the art exploration strategies. The proposed method considers in the exploration algorithm the extracted contextual information gathered from images. The comparison between the state of the art exploration method is provided.

Implementation of a Visual Feedback Control of a 5-DOF Robot Manipulator

Omer Abubakr and Mirghani Daffalla (American University of Sharjah, United Arab Emirates); Lotfi Romdhane (American University of Sharjah & AUS, United Arab Emirates); Mohammad A. Jaradat (American University of Sharjah, United Arab Emirates)

This paper experimentally illustrates the modeling and simulation of the Lynxmotion Robot, using the robotics toolbox under MATLAB. This project is part of a graduate course on robotics. The main objective of this paper is to control the robot to perform a pick and place task. The task is simulated under MATLAB, where the robot picks objects from known positions and stacks them in target positions. The command is then sent to the robot to execute this task. Furthermore, the robot, with the aid of a vision system, is programmed to work as an autonomous robotic arm that picks up colored objects, and then places them in different positions, based on their colors.

Implementation of the Rapidly-Exploring Random Tree Star (RRT*) Path Planning Algorithm on a Kobuki Mobile Robot

Hussein Mohammed and Mohammad A. Jaradat (American University of Sharjah, United Arab Emirates); Lotfi Romdhane (American University of Sharjah & AUS, United Arab Emirates)

In this paper, the objective is to present the Rapidly-Exploring Random Tree Star (RRT*) algorithm both in simulation and application. The purpose of this algorithm is to generate probabilistically complete and cost-effective paths in static or dynamic environments. This algorithm is implemented to drive a Kobuki mobile robot using MATLAB.

A New Genetic-Based Algorithm for the Interpretation of Pressure Transient Response in Naturally Fractured Reservoirs

Zinab Al Maqrami (PI, United Arab Emirates); Chakib Kada and Mohammed Al Kobaisi (Petroleum Institute, United Arab Emirates); Dachang Li (ADNOC Offshore, United Arab Emirates)

Integration of multi-data sources (static and dynamic) is vital to the understanding of the mechanisms of fluid flow present in a given reservoir. Calibration of geologic-based models (conditioned by static data) to flow-related data (well test and production data) can dramatically reduce the uncertainty in reservoir models. In this work, we present a new development to further reduce the uncertainty in the characterization of fracture properties (e.g., orientation, conductivity, aperture, length and density) from well test pressure responses (e.g., permeability-thickness product, storativity, and interporosity). The optimization problem is addressed using a direct search method. A novel multi-level genetic algorithm is developed to find the optimum solution space of the fracture properties by minimizing the error in a new multi-objective function. The proposed algorithm was benchmarked against the industrial software FracaFlow©. Our results clearly show further reduction of uncertainties in fracture property estimation compared to FracaFlow©.

A New Analytical Model for The Multi-Fractured Horizontal Well In The Naturally Fractured Reservoir

Yuan Gao (Khalifa University of Science and Technology, United Arab Emirates)

This study mainly puts forward a new analytical trilinear dual-porosity & dual-permeability flow mode for the multi-fractured horizontal well (MFHW) in the naturally fractured reservoir (NFR) based on the trilinear dual-porosity flow model[1]. This model is an upgraded trilinear flow model, a simple but versatile one to integrate horizontal-well-related parameters and petrophysical characteristics of the naturally fractured reservoir, including wellbore storage, chocking skin factor, intrinsic properties of matrix and fracture systems, and even different properties of the stimulated area and the unstimulated area. The model incorporates a dual-permeability model for the stimulated flow region and a dual-porosity model for the unstimulated flow region respectively. In common sense, the traditional flow model for the fractured horizontal well with the line-source solution is computationally intensive and time-consuming, while this model makes itself a practical alternative with computational convenience and also incorporates most of the

distinct flow patterns identical as the line-source solution does. The new trilinear flow model would show a field-friendly way to analyze the transient pressure behavior of the multi-fractured horizontal well in the reservoir with well-developed natural fractures.

Novel Insights into Capillary Number Equation and Wettability Quantification: Electrostatic Colloidal Perspective

Obaid Alhmoudi (Khalifa University of Science, Technology and Research, United Arab Emirates); Mariam Malas (Khalifa University of Science and Technology, United Arab Emirates); Islam Elseaday (The Petroleum Institute, United Arab Emirates); Hadi Belhaj (Hadi Belhaj, United Arab Emirates)

The aim of this research was to investigate the mechanisms leading to enhanced oil recovery in limestones by simple chemical manipulation of the injection water, while taking the equation of capillary number into consideration. A main objective of this study was to gain insights regarding the quantification of wettability alteration, as the existing equation fails to describe how wettability alteration could lead to enhanced oil recovery in non-water wet plugs.The existing mathematical description of wettability " Cosine function" into the capillary number equation poses a dilemma that hinders the up-scaling of low salinity and smart water flooding processes. As per the results of this research, there is strong evidence that wettability alteration by means of electrical double layer expansion is the mechanism that leads to additional oil recovery in some cases In all tests, only the brines that triggered increased electrostatic repulsion between the two interfaces, resulted in incremental oil recovery.

Boron-Lined NaI Detector For He-3 Free Neutron Detectıon System

Amira Emam (United Arab Emirates University, United Arab Emirates); Walid Metwally (Nuclear Engineering, United Arab Emirates)

He-3 detectors are considered as the main component of most of the neutron detection system in various nuclear fields because of their high thermal neutron cross section. Due to the worldwide shortage of He-3 gas after 2009 and the consequent huge price increase, many researchers directed their efforts to find an efficient replacement. In this work an alternative neutron detection setup is introduced and modeled. The setup is composed of a NaI detector covered with a thin layer of boron. For comparison, common neutron detectors like He-3 and BF3 are also modeled. The results show a good sensitivity of the three detectors when exposed to various neutron flux distributions with a higher efficiency of boron-lined NaI detector than He-3 and BF3. An additional benefit is the ability of the boron-lined NaI detector to detect gamma rays from the surrounding medium.

CVD Graphene Strain Sensor Based On Microfabricated Membrane Structure

Lina Tizani (Masdar Institute of Science and Technology, United Arab Emirates); Irfan Saadat (Faculty - Masdar Institute of Science and Technology, United Arab Emirates)

in this paper, cavities were etched in SiO_2 over Si substrate and then graphene film was transferred forming the graphene membrane over the cavity. Raman spectroscopy of graphene on top of cavities showed significant redshift in the 2D band (0.14 cm^{-1} per 1µm of cavity), because of the elongation of the carbon-carbon bonds. This indicates the feasibility of using graphene membrane as a strain sensor.

Design Considerations of Fabricating Microfluidic Channels on A CMOS Platform

Aamenah Siddiqui (Khalifa University of Science Technology and Research, United Arab Emirates); Jaime Viegas (Masdar Institute of Science and Technology, United Arab Emirates)

In this paper, an alternative method of fabricating microfluidic channels is presented. Microfluidic channels have an array of applications including drug delivery, lab-on-a-chip, fluid and gas sensing. However, the current methods to fabricate these channels involve processes and materials that are not compatible to the state-of-the-art CMOS process flow, making them expensive and

unviable for on-chip integration and hence limiting their applications. This work presents an alternative approach to fabricate microfluidic channels that uses materials and processes commonly used in CMOS processes. The proposed microfluidic channel design is based on silicon nitride, and requires few deposition and etching steps, and only two lithography steps, simplifying the fabrication substantially and opening new avenues for the use of microfluidic channels in various applications.

Studying the Impact of Depth of Focus on Patterned Resist Profile

Mohammed Ziauddin (UAEU, United Arab Emirates); Abdel-Hamid Ismail Mourad (Unietd Arab Emirates University, United Arab Emirates); Saud Khashan (UAE University, United Arab Emirates)

The study focuses on using simulating tool to study direct laser lithography. GenISys - lithography simulation software was used as it is thoroughly observed in the literature. The LAB Module of this software was adopted for modelling and simulating effect of Depth of Focus in the direct laser lithography process. A negative photoresist material was used for simulation and results were obtained by keeping constant exposure dosage by varying Depth of Focus. The 3D resist profile was obtained for evaluating the effect of Depth of Focus. The results showed that, good quality resist profile is obtained at 45 mJ/cm2 and -15µm Depth of Focus.

Influence of Nanoparticles on Surface Tension

Fan Xue (Khalifa University of Science and Technology, United Arab Emirates); Afshin Goharzadeh and Yit Fatt Yap (The Petroleum Institute, United Arab Emirates)

This study focuses on the effect of nanoparticles on the surface tension of liquids. Nanofluid is characterized by liquid that contains nanometer-sized particles. The surface tension of two nanofluids SiO2 and TiO2 are measured using drop volume method. Measured surface tension is compared with that of DI-water. It is observed that nanoparticles affect significantly the surface tensions. Measurements shows that SiO2 nanoparticles have a tendency to increase the surface tension and TiO2 nanoparticles lead to a decrease of surface tension.

A Review of the Thermal Crystallization Kinetics of Different Fillers/Polyolefin Nanocomposites

Leher Farooq (UAEU, United Arab Emirates)

This paper reviews the synthesis and applications of different nanofillers which are carbon black, carbon nanotube, clay and graphene. Next, it discusses various combinations of the nanofillers/polymer nanocomposites and the thermal crystallization kinetics of these nanocomposites. To analyze the data for the isothermal crystallization kinetics, the Avrami method is used. To analyze the data for non isothermal crystallization kinetics, the Avrami equation was insufficient. Therefore, a modified Avrami model was used. The ozawi and Mo models were also used. The type of crystal growth were determined. Recently, polymer based nanocomposites have gained increased attention by the academic and industrial community due to their unique properties and applications. These fillers, due to their exceptional properties have attracted a great deal of interest. The fillers were found to have a nucleating effect on the matrix. However, in some cases, increasing the filler content resulted in a decrease in the nucleating effect.

Combined Effect of Shot Peening and Application of Corrosion Inhibitors on the Stress Corrosion Cracking Behavior of 316L Stainless Steel

Prince Johnson (Khalifa University & Sas Al Nakhl Campus, United Arab Emirates); Ebru Gunister (Khalifa University of Science and Technology, United Arab Emirates); Paul Rostron (Khalifa University, United Arab Emirates)

Stress corrosion cracking (SCC) is a type of corrosion which causes failure of metals due to the combined effect of tensile stress and a corrosive environment. Generally, sudden and unpredictable failure of materials takes place due to SCC. This is an examination on the combined

effect of shot peening and application of corrosion inhibitors on the stress corrosion cracking (SCC) behavior of Austenitic stainless steels (316L) in high pH chloride solutions using a U-bend. Electrochemical techniques such as linear polarization resistance (LPR), Tafel analysis and open circuit potential (OCP) are used to determine the electrochemical behavior of 316L stainless steel in different cases. The 316L fracture and surface morphology in different cases are studied using SEM analysis and different characterization techniques including XRF, hardness measurement, tensile tests, optical microscopy, EDS and XRD are performed to study the changes in material properties before and after corrosion.

Effects of Erosion-Corrosion on Mild Steel in the Presence of Corrosion Inhibitor Using Submerged Impingement Jet Apparatus

Danny Diab (Khalifa University, United Arab Emirates); Sami Ainane (The Petroleum Institute, a part of Khalifa University of Science and Technology, United Arab Emirates)

In this study, experimental testings were conducted on mild steel in brine solution containing 3.5 % NaCl in the presence of imidazole as corrosion inhibitor to determine the critical velocity and Reynolds number limit below which erosion-corrosion is tolerated and beyond which the inhibitor loses its effectiveness and adherence using an empirical relation which will be developed from experimental results. Moreover, this study investigates the temperature's effect on erosion-corrosion of mild steel in the presence of corrosion inhibitor. Finally, the study explores the optimal inhibitor concentration to be used for best performance. The critical velocity was found to be 20 m/s. It was also observed that temperature has a significant effect on the results with the corrosion rates increasing proportionally as the temperature increased. Finally, the optimal inhibitor concentration was found to be 50 ppm.

A study of the elastic properties of Bandera Brown sandstone under different loading conditions

Roshan Saji (Masdar Institute of Science and Technology & Khalifa University of Science and Technology, United Arab Emirates); Rita L Sousa (Masdar Institute, United Arab Emirates); Mohamed Sassi (Masdar Institute of Science and Technology, United Arab Emirates)

It is vital to understand the influence of loading conditions on the behavior of the rock formation in order to predict their utility in various industries like construction and drilling. In this paper two Bandera Brown sandstone samples were tested under monotonic and cyclic loading conditions in order to get a preliminary understanding of their behavior and to serve as a basis for planning future tests.

A parametric study of out-of-plane Characteristics of Sandwich Structures

Ammar Ahmed (American University of Shrjah, United Arab Emirates); Farid Abed and Maen Alkhader (American University of Sharjah, United Arab Emirates)

Sandwich structures are special types of composite materials, constructed by attaching a thick and porous core material between two thin and stiff sheets, and became commonly used in applications where stiffness to weight ratio is to be maximized. The overall structural rigidity depends on the amount of material used in constructing the cores, which basically governed by the core cell size(d) and thickness(t). Different loading conditions and different loading orientations play a big role in the selection criteria of the best fit cell size and thickness, so this work aims to characterize the out-of-plane attributes of Aluminum sandwich structures considering a wide range of cell sizes and thicknesses as well as different cell configurations, and relating the field output to the relative density. The study stated that the out-of-plane properties depends on the amount of material used, (i.e. known as the projected area), regardless of the cell size and thickness.

Experimental and Numerical Study of Oil Diplacement

Somayya Esmat ElShabrawy (Khalifa University of Science and Technology, United Arab Emirates); Hamid Abderrahmane (Masdar, United Arab Emirates)

In this study, we conducted experiments and numerical simulations on water flooding, which is one of the techniques used in enhance oil recovery operation. The experiments were conducted in a 3D printed model of a cross section rock matrix, obtained from high-resolution microcomputed tomography. The experimental results were compared with those obtained from the numerical simulations, conducted in COMSOL. The study shows a good agreement between the experiments and the simulations. The study shows also that foam improves the recovery of the displacement of oil with water.

A Novel Method to Predict the Baking Level of Carbon Anodes during Aluminum Production: A Thermodynamics and Phase-Field Theory based Model

Zahid Ahmed Qureshi (Khalifa University of Science and Technology, United Arab Emirates); Rashid Abu Al-Rub and Abdul Raouf Tajik (Masdar Institute of Science and Technology, United Arab Emirates); Tariq Shamim (University of Michigan-Flint, USA)

Carbon anode baking is one of the most important and costly step in Aluminum production. The unbaked (green) anode are formed by compaction of base ingredients; i.e. coal tar pitch, calcined coke and recycled anode butts. The green anode does not possess the necessary thermo-electro-mechanical properties necessary to withstand the harsh thermo-electrical conditions in the electrolysis pot. Hence, baking them in a furnace modifies their microstructure making them utilizable in the electrolysis cell. This research work aims at applying thermodynamics and phase-field theory to evaluate the baking level at any stage of the baking process. The evolution of baking level would in turn governs the evolution of materials properties of the anode. The developed evolution equations of material properties are calibrated using available published experimental data.

Heat Transfer Enhancement Analysis of Pressurized Water Reactor's (PWR) Fuel Rod Bundle

Omar Darwish Al Hammadi, Fadi Al Naimat and Bobby Mathew (UAE University, United Arab Emirates)

This article investigates the thermal - hydraulic characteristics behaviors of Pressurized Water Reactor (PWR) via computational fluid dynamics (CFD). The results obtained from this analysis including flow, turbulence and the heat transfer can assist in the improvement and to achieve the optimum design of the fuel rod bundle for the PWR's core to achieve better performance. In this study, a three-dimension (3D) CFD model with standard k-ε turbulence model proposed to simulate a single sub-channel of the coolant within the rod bundle and subsequently evaluate the effect of different flow rates on flow mixing and heat transfer. The turbulent heat convective for heat removal is numerically investigated by applying standard k-ε turbulence model using ANSYS FLUENT. It is shown in the simulation results that increasing the inlet velocity will influence on the fluid turbulence by increasing the flow mixing which has significant effect on enhancing the heat transfer capability.

Pore structure & Electrochemical Response of Redox Flow Batteries' Electrodes

Mariam Bin Ari (Masdar, United Arab Emirates); Rahmat Agung Susantyoko and Saif Almheiri (Masdar Institute of Science and Technology, United Arab Emirates); Raed Hashaikeh (Masdar, United Arab Emirates)

In term of material used in redox flow batteries, electrodes nano-material carbon-based composites are the most common (including carbon nano-tubes and graphene). Such materials have high porosity, enlarging the active surface area of the electrode. In these Nano- porous materials the electrolyte flow through a 3D electrode. Unlike in planar materials the electrolyte flow past 2D electrode. To study the effect of porosity on electrical properties and electrochemical response of the electrode; porosity and morphology of the sample were varied in a systematic

approach. Then the effect on electrochemical response and kinetics were captured by cyclic voltammetry. This allows correlating pore structure variation to electrochemical properties. This have shown that the increase in porosity results in an enhancement in the diffusivity and kinetics.

Fabrication of Self-Healing Coating for Withstanding Desert Based Climate Conditions

Fatima AlHameli (Masdar Institute & Khalifa University, United Arab Emirates); Khalid Askar (Khalifa University of Science and Technology, United Arab Emirates)

Development of optical epoxy coating with self-healing abilities to withstand the harsh desert environment. Two self-healing approaches, intrinsic and capsule based, are incorporated into the epoxy using Cellulose Acetate Butyrate as the self-healing agent. Fabrication methods of the mixture preparation and coating technique are briefly discussed along with the outdoor testing of samples and the results obtained.

Characterization of novel hygroscopic materials based on NaCl-TiO2 and NaCl-SiO2 particles

Marie Bermeo Vargas (Masdar Institute, United Arab Emirates)

The ability of hygroscopic materials to adsorb moisture (H2O) from the humid air has been extensively studied and their applications are countless. Hygroscopic materials used as cloud seeding are capable to modify weather conditions and augment precipitations. Conventional cloud seeding such as NaCl has a limited water uptake performance. This study demonstrates that novel hygroscopic materials of NaCl coated with thin layer of either TiO2 or SiO2 show better hygroscopic properties and water uptake capacity.

Evaluation of Alumina (Al2O3) Dispersed UHMWPE Nanocomposites for Biomedical Applications

Omar Ayad (United Arab Emirates University, United Arab Emirates); Abdel-Hamid Ismail Mourad (Unietd Arab Emirates University, United Arab Emirates); Yaser Greish (United Arab Emirates University, United Arab Emirates)

In order to partially or totally replace defective hard tissues, biomaterial scientists have been looking for synthetic ceramic-polymer composites to match the composition, microstructure and properties of natural hard tissues.This work aims at the study of using alumina (Al2O3) nanoparticles as a reinforcing agent for a polymeric matrix based on ultrahigh molecular weight polyethylene (UHMWPE). Groups of alumina nanoparticles (Al2O3) dispersed UHMWPE samples were prepared using injection molding technique at different nanofiller concentrations. The mechanical and thermal properties of the injection molded samples were measured to investigate the impact of alumina nanoparticles concentration on the characteristics of the produced composites. Different characterization techniques have been used. Among these tensile testing, thermo-gravermetric analysis (TGA), differential scanning calorimetry (DSC), and scanning electron microscope (SEM).

Low Frequency Wave Propagation in Periodic Cores Used In Sandwich Structures

Ammar Ahmed (American University of Shrjah, United Arab Emirates); Maen Alkhader (American University of Sharjah, United Arab Emirates); Bassam Abu Nabah (AUS, United Arab Emirates)

Light weight cores are widely used in composite sandwich structures due to their unique ability to provide low weight and high stiffness to weight ratios. These unique properties stem from cores' highly porous structure, which also renders them inherently weak. Accordingly, cores used in sandwich structures are susceptible to sustain damage due to inadvertent loading. Since the honeycomb is sandwiched between two sheets, nondestructive methods are much more appealing. However, common nondestructive techniques have limited effectiveness in inspecting light weight cores as their porous structure renders them dispersive to ultrasound waves, while inspecting them using sub-ultrasound frequencies has been introduced lately as a promising alternative to ultrasound inspection. However, this approach requires a priori knowledge of the wave propagation characteristics in the inspected material. Accordingly, this work relies on finite

element computations to quantify the phase velocities and dispersive properties of low frequency elastic wave propagating in aluminum honeycombs.

Devulcanized Rubber-Polystyrene Insulator Composite

Waseem Hittini (United Arab Emirates University, United Arab Emirates); Basim Abu-jdayil (UAEU, United Arab Emirates); Abdel-Hamid Ismail Mourad (Unietd Arab Emirates University, United Arab Emirates)

Pollution is one of the main problems that today's world is facing. It can be of different types such as air and soil pollution. This research aims to reduce these kinds of pollution by reducing the space cooling, energy consumption and recycling tire rubber waste. While polystyrene (PS) was used as a matrix in this research, Devulcanized rubber (DVR) was used as a filler in the matrix. The measured thermal conductivity of 30 % DVR composite is lower than that of scrape rubber-polyester composite, crumb rubber-concrete panel and plaster-rubber board, by 46.5 %, 73.34 % and 54.11%, respectively. This makes DVR-PS developed composites good alternatives to be used in building insulation industries. In addition the developed DVR-PS has good thermal properties, if they were compared with the available commercial thermal insulators.