

جامعة الملك فهد للبترول والمعادن  
King Fahd University of Petroleum & Minerals



عمادة البحث العلمي  
DEANSHIP OF SCIENTIFIC RESEARCH

# أنباء البحوث RESEARCH NEWSLETTER



# RESEARCH NEWSLETTER

*July, 2012*

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**RESEARCH NEWSLETTER**

VOLUME 35 • NUMBER 2 • July 2012

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Dhahran, Saudi Arabia

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under No. 17/3021 on 29/10/1417H  
ISSN No. 1319-8025

Printed in the Kingdom of Saudi Arabia by  
King Fahd University of Petroleum & Minerals Press

## FOREWORD

This second issue of the University *Research Newsletter* for the Academic Year 2011-2012 provides up-to-date information about the research and other scholarly activities undertaken by the University faculty members for the period from January 2012 to June 2012. A healthy research program has the advantage of attracting the best faculty and students. The scope of research support has been expanded in response to global technological challenges and in order to support and sustain diverse faculty research interests. Our goals are to promote creativity; to address critical, scientific, technological and managerial issues; to encourage research in areas of national importance; and to improve the quality of graduate education. This *Research Newsletter*, published by the Deanship of Scientific Research on a semi-annual basis, provides an overview of our faculty's research output, as well as the funding which the University provides its faculty to pursue research and scholarship. In particular, the *Research Newsletter* reports on faculty publications, conference presentations, funded projects, and many other features.

The Deanship of Scientific Research is making its best efforts to promote the new research grants among the faculty members so that they can actively participate in research, which is not only beneficial to their own professional career but also to the development of society at large.

Our sincere appreciation is due to Mr. R. Jayaraman for compiling this edition of the *Research Newsletter*.

**Dr. Nasser Al-Aqeeli**  
**Dean of Scientific Research**



## 2. ABSTRACTS OF SELECTED RESEARCH PROJECTS

### Abstract for Approved Research Projects during the Spring Semester 2011-12

IN111030

**Dr. Mahmood Niazi**

**Dr. Mohamed El-Attar**

**ICS**

#### **GlobReq: A Framework for Improving Requirements Engineering in Global Software Development Projects**

In global software development (GSD), a company (client) contracts out all or part of its software development activities to another company (vendor), who provides services for remuneration. GSD has been growing steadily and an 18-fold increase in the outsourcing of IT-enabled business processes is projected (United-Nations, 2004). However significant failure rates have also been reported in GSD projects (Foote, 2004). Although a variety of software development tasks are outsourced previous work suggests that most of the factors contributing to the failure of projects are related to requirements (Oza and Hall, 2005a; Oza and Hall, 2005b). This is not surprising given that the requirements engineering (RE) process has a huge impact on the effectiveness of all software development processes. This project brings together the research team's previous work on GSD and RE to develop a framework for the requirements engineering process of GSD projects (GlobReq). We will collect detailed empirical data from GSD organisations to construct and validate the GlobReq framework. Managers of GSD projects will be able to use GlobReq to plan a RE process suitable for a specific GSD project. Our framework could have a significantly positive impact on the high number of failures currently reported for GSD projects, the root cause of which is often related to requirements problems (Oza and Hall, 2005a). As GSD is set to further increase, the design and development of a GlobReq framework for GSD projects is indeed timely. The work proposed will bring together and advance the work that has been undertaken on frameworks and models for RE. Our contribution to improving RE in GSD will provide other researchers with a firm basis on which to develop different requirements processes that are based on an understanding of how and where they fit into the GSD activities. New requirements processes could then be developed targeting GSD projects.

IN111031

**Dr. Mohammad Fettouhi**

**Dr. Bassam El Ali**

**CHEM**

#### **Towards single-molecule magnets with nonlinear optical properties. Synthesis and characterization of polynuclear complexes based on new push-pull derivatives of 2-(hydroxymethyl)pyridine)**

This research work is a contribution to the ongoing efforts in the field of multifunctional molecular magnets with nonlinear optical properties. The main objectives of this project are the synthesis and the characterization of single-molecule magnets based on push-pull derivatives of 2-(hydroxymethyl)pyridine. Two new ligands bearing 2-(hydroxymethyl)pyridine with a conjugated bridge and electron donating groups will be synthesized and characterized. These two new ligands will be used to synthesize a series of polynuclear complexes based on different metal ions and auxiliary ligands in order to achieve single-molecule magnetic properties in combination with nonlinear optical properties. Attempts to obtain single crystals suitable for X-ray analysis will be carried out in order to investigate the structure-properties correlations.

**IN111032****Dr. Sadiq Sohail****Dr. Robert Opoku****MGT MKT****Applying the Animosity Model in Foreign Products Purchase: Evidence from an Emerging Nation**

A limited number of studies have examined consumer animosity in the Arab world although this region can provide a relatively strong test of this phenomenon and an interesting context for such a study. The objective of this proposed study is to examine the impact of animosity and consumer ethnocentrism, and the availability of both local and foreign brands, on consumers' attitudes towards the purchase of foreign products in Saudi Arabia, a country with a high level of foreign trade. The war and economic animosity measurement items will be modified to fit the Saudi-American situation. 500 Saudi consumers are expected to respond to a self-administered survey. Through this proposed study, existing foreign businesses can fine-tune their marketing communication efforts in the Arab world whilst international companies yet to enter the unique Saudi market can derive useful information from this study to enable them to plan ahead on how to deal with animosity and consumer ethnocentrism.

**IN111033****Dr. Magdi Mahmoud****SE****Distributed Control and Filtering for Industrial Systems [Bookwriting Project] to be published by the Institute of Engineering and Technology, UK**

In recent years, we have witnessed wireless technologies replacing wired counterparts in all applications where it can be securely and reliably implemented. This book is about distributed control and filtering algorithms with particular emphasis on industrial applications. An attractive approach for the control of large-scale networked systems would be the decentralized approach that concentrates the design function at the subsystem level. This might, however, lead to a severely deteriorated global performance. On the other hand, a centralized optimization-based approach, for example model predictive control, could be much better, but is often impractical due to communication constraints and an overwhelming number of decision variables. Distributed control/optimization, where the global control/optimization problem is decomposed into many smaller control/optimization sub-problems that can be solved locally for each subsystem, is therefore appealing. In this distributed framework, the interaction between subsystems is taken into account, while the flexibility of the decentralized approach is still there. The book is primarily intended for researchers and engineers in the systems, control and communication community. It can also serve as complementary reading for elective courses for distributed control and estimation at the postgraduate level.

**IN111034****Dr. Nasser-eddine Tatar****MATH****Viscoelastically Damped Timoshenko Beams**

Of concern is a viscoelastic beam modelled using the Timoshenko theory. A theory which is widely used to describe the dynamics of a beam when the transverse shear strain is significant. This theory applies to many flexible structures in mechanical engineering, civil engineering, electrical engineering and space science. In the derivation of Timoshenko equation, it is assumed



that the plane cross-sections remain plane but could be oblique to the centreline after deformation. Internal or external forces are transformed into mechanical vibrations. Often, these vibrations are harmful to the structure and may result in its malfunction, or in discomfort or annoying noise. Different types of dampers already exist in the market such as smart materials (piezoelectric, piezoceramic) in the form of sensors and actuators, friction dampers, viscoelastic dampers, tuned mass dampers, tuned liquid dampers and tuned mass liquid dampers. In this project we shall use viscoelastic dampers to establish the exponential decay of solutions to the equilibrium state. We plan to enlarge the class of viscoelastic materials through their relaxations functions by weakening the existing conditions on them. Our current assumptions impose to these functions to be strictly decaying to zero at a certain rate. We intend to relax this condition and try to find an appropriate material starting from a prescribed wanted decay rate of solutions.

**IN111035**

**Dr. Baseer Haider**

**Dr. S.M.A. Durrani**

**Dr. Mohammad Al-Kuhaili**

**PHYS**

**Dr. Iman Rogan**, Consultant from KAUST, Jeddah

**Growth and Characterization of Ti doped ZnO: A Potential Dilute Magnetic Oxide**

For the past few decades, III-V compound semiconductors, especially GaN, have attracted much attention. Due to its direct and wide bandgap, GaN is one of the best candidates for optoelectronic devices such as solar cells, photodetectors, light emitting diodes, and lasers. Moreover, GaN can potentially be used as a gas sensor. GaN has been grown using various techniques including molecular organic vapor phase epitaxy (MOVPE) and molecular beam epitaxy (MBE). We are proposing to grow this material using Pulsed Laser Deposition (PLD). After the growth, samples will be characterized using X-ray diffraction to measure the crystallinity of the sample. Surface study of the grown films will be performed using atomic force microscopy. Chemical surface and bulk analysis of the grown films will be performed. Optical properties of the grown GaN thin films will also be studied as a measure of the quality of the films.

**IN111036**

**Dr. Syed Ibrahim**

**Mr Hassan Al Moslim**

**Dr. Abdussalam Kanniyan**

**PE**

**Plasma Lipid, Lipoprotein Levels and Blood Glucose: The Effects of Combined Aerobic Resistance Training on Morbidly Obese Men**

Obesity is a major public health problem all over the world. Studies have linked obesity to a positive energy imbalance. The accumulation of fat is a visible manifestation that more food energy has been stored than expended. Many studies have concluded that obesity leads to hypokinetic diseases like increased risk of diabetes, hypertension, cardiovascular diseases, dyslipidemia and certain types of cancer. Recent studies have suggested that obesity may hinge more on a decrease in energy expenditure than on an increase in calorie intake. Accordingly exercise or increased physical activity should be a key component of a gradual weight control program. The specific roles of diet and exercise during weight reduction have been the focus of considerable research. In addition, obesity is associated with an increased risk of very low density lipoprotein (VLDL) cholesterol, low density lipoprotein cholesterol, triglycerides, blood pressure,

glucose tolerance and a decrease in high density lipoprotein cholesterol and physical activity (Bradon and Proctor, 2011). Several studies have investigated the effects of dieting and exercise training independently or in combination on obese subjects (Thomas et al. 2006). Other investigators studied the effects of resistive training programs on lipoprotein-lipid on obese and overweight males (Hazley et al. 2010). This study is an attempt to treat morbidly (severely) obese males whose body mass index is  $40+ \text{ kg/m}^2$  and more with a combined aerobic and resistance training program and to determine how the body mass index, lipids, lipoproteins, glucose and heart rate are affected. Twenty healthy sedentary, morbidly obese males between the ages of 18 and 25 years will be recruited from volunteers responding to the advertisement in the local news papers and the notice circulated in the King Fahd University of Petroleum & Minerals (KFUPM) campus as subjects. The selection criteria of the subjects for the study will be based on the BMI, with subjects required to have a BMI of  $\geq 40 \text{ kg/m}^2$ . This will be decided after taking the weight of the subject in kilograms and dividing by his height in meters<sup>2</sup>. The subjects will be divided into two groups of 10 each with an experimental group and a control group. The training program will be for a duration of 14 weeks, 5 days a week, and for a period of 90 minutes per session. The training program will consist of 4 methods, namely walking, cycling, aquatic and resistance exercises. Energy intake will also be calculated before the start and at the end of the training program. Blood samples will be tested before and after the 14 weeks of training for the plasma lipid, total cholesterol, high-density lipoproteins, low-density lipoproteins, triglycerides and blood glucose. The data collected will be analyzed statistically using paired 't' test and one-way analysis of variance (ANOVA) to find the significance difference. The level of significance will be fixed at  $p > 0.05$  level of confidence.

**IN111037**

**Dr. Izhar Ahmed**

**Dr. Soliman Al-Homidan**

**MATH**

**Dr. Mohammad Shamsuzzoha, CHE**

### **Optimality Conditions and Duality in Interval-Valued Multi-Objective Optimization**

Optimality conditions and duality theory for multi-objective problems have grown and become one of the most interesting topics in optimization. If the data in optimization problems are closed intervals, they are categorized as interval-valued optimization problems. In this project, we shall develop the optimality conditions for an interval-valued multi-objective optimization under generalized convexity assumptions. We shall also formulate dual models for an interval-valued optimization problem. Duality theorems will establish under suitable conditions. Moreover, saddle-point optimality conditions will also be present by introducing the Lagrangian functions for interval-valued multi-objective optimization.

**IN111038**

**Dr. Adel Khalafallah**

**MATH**

### **A New Nonstandard Topology and F-asymptotic Hulls**

In this project we construct a new topology, the quasi-standard (QS.) topology, on a nonstandard extension of a metric space  $(X, d)$ . The QS-topology depends on a given convex subring of  ${}^*\mathbb{R}$ . In the literature, there are two topologies defined on a nonstandard extension of a topological space, the S-topology and the Q-topology, both introduced by Robinson. The QS-topology is "intermediate" between the S-topology and the Q-topology and shares some properties with

both of them. Next, the  $F$ -asymptotic hull of a metric space will be constructed and its canonical topology will be investigated.

**IN111039**

**Dr. Balarabe Yushau, Dr. Abdulaziz Al-Assaf**

**PREP Math**

**Dr. Mohammad H. Omar, Math Dept.**

**Investigating the Link between the English Language Proficiency Level of Students and Their Mathematics Achievement (Societal Grants)**

The crucial role of language in the teaching and learning of mathematics cannot be over-emphasized, and has been acknowledged in many curricula. The interest of Mathematics educators has been recently reignited in this area of study because English is increasingly becoming the language of instruction in many higher institutions. As a result, many students across the world are now learning Mathematics in their second or third language. One class of students that are facing this challenge is the students of the Preparatory Year Programs in various higher institutions in the Middle East. Clearly, one of the fundamental problems they are facing is the problem of proficiency in English – the new language of instruction. Although this problem is well acknowledged by students, teachers, parents and administrators, no scientific study has been done to ascertain the depth of the problem especially as it relates to the students' performance in their Preparatory Year Mathematics courses. This study is a step in this direction.

**IN111040**

**Dr. Abdulazeez Abdulraheem, PETE**

**Dr. Abdurrahman Howsawi, IAS**

**Dr. Essam E.F.O. Abu Gharbiyyah, IAS**

**Teaching Arabic to Non-Arabic Speakers through the Qur'an**

The objective of the proposed project is to prepare the groundwork for teaching the Arabic language through the Qur'an. The specific objectives of this project are to conduct developmental work in three parallel tracks in two languages: (1) databases for the examples grammar rules; (2) Databases for additional vocabulary for communicating in Arabic; and (3) software development for quizzes and memorization. The Kingdom of Saudi Arabia also has more than a million Non-Arab Muslim expatriates working in different sectors of the Kingdom. The Kingdom is home to the two grand mosques which are visited by millions of Non-Arab Muslims every year. The results of the project will have a direct impact on a significant part of the expatriate society living in the Kingdom. It will function as a groundwork for a number of institutions that teach Arabic throughout the world. Through the Internet, the databases and the quizzes/games can immediately be made available to the masses around the world. Faculty from Islamic and Arabic Studies will participate in this project.

**IN111041**

**Dr. Tarek Al-Naffouri**

**Mr. Muhammad Saqib Sohail**

**EE**

**Dr. Aris L. Moustakeas, Consultant**

**Statistical Characterization of Indefinite Quadratic Forms and Their Applications**

In this work, we propose a transparent and efficient approach to evaluating the CDF of indefinite quadratic forms and their ratios for Gaussian data. Such a quantity appears in the analysis of different receivers in communication systems. For example, this quantity appears in

the mean-square-error (MSE) analysis of the normalized least-mean-square (NLMS) adaptive algorithm. The trick of the proposed approach is to replace inequalities that appear in the CDF calculation with unit step functions and to represent the latter as a complex integral. Complex integration allows us then to evaluate the CDF in closed form or as a single dimensional integral. With the aid of complex integration, this allows us to represent such a CDF in closed form. Moreover, we suggest extending the approach to non-Gaussian inputs (isotropic random variables) and to joint distributions of quadratic forms or ratios of such forms. The outcome of our approach is the evaluation of closed form expressions for different performance measures in a simple and transparent manner.

**IN111042**

**Dr. Adrian Bejan**

**Dr. Bekir Sami Yilbas**

**Dr. Ahmet Sahin**

**ME**

**Dr. S. Lorante**, Consultant, France

### **Constructual Renewable Energy Design of the Landscape**

To design sustainable urbanization means to meet certain objectives while proposing the best use of available resources that are finite in bulk, or finite per unit time. These requirements are both internal and external to the urban area. Essentially, they facilitate the movement of people, and their access to necessities such as food, shelter, heating, cooling, electricity, information, leisure, etc. Urbanization that is sustainable must also offer solutions to the access of resources to the urban zone, together with the removal and treatment of waste. The Constructual Theory will be applied to the design of renewable energy production, distribution and use, in the Kingdom of Saudi Arabia.

**IN111043**

**Dr. Sulaman Pashah**

**Dr. Abul Fazal M. Arif**

**Dr. Yaagoub Al-Nasser**

**ME**

### **Fitness for Service Analysis for Pipe with Metal Loss Defect Using Non-Dimensional Finite Element Method**

Pipes and piping systems have a wide range of applications in industry. During the service life of metallic pipes, degradation occurs due to corrosion and erosion. The degradation effects can be very localized in nature resulting in local metal loss. It is not always desirable to replace a pipeline with such defects for economic and technical reasons; rather it is preferred to verify its fitness for service. The fitness for service may or may not include the remedy of a pipeline containing defects. The decision is made on the nature and severity of the defect. Finite Element Analysis is among the major steps of an assessment process. Nevertheless, the finite element method does not provide a closed form solution and so a new solution must be obtained if any of the problem parameters is changed. This aspect can partially be addressed by using the non-dimensional finite element method that would broaden the applicability of finite element results for a class of problem with the same values of relevant dimensionless parameters. The dimensionless finite element results can therefore be used to develop charts for fitness-for-service analysis. The charts would be in the form of governing non-dimensional parameters related to material, geometry (pipe and defect) and loading. The charts would be helpful in obtaining guidelines, based on the pipe defect conditions, for making an appropriate fitness-for-service decision.

**IN111044****Dr. Mohammad Ba-Shammakh**  
**CHE****A General Stochastic Model for Refinery Planning Under Uncertainty**

The critical objective of a refinery operation, as in any other business-oriented venture, is to generate maximum profit by converting crude oils into valuable products such as gasoline, jet fuel, and diesel. Expectedly, there are many decisions to be considered to achieve an optimal operation for a refinery. At the planning level, these include the need to decide the types of crude oil(s) to process, the types of products to produce, the operating route to use, the best operating mode for each process, and so on. Refinery planning problems are subject to uncertainty in many factors, which primarily include fluctuations in the price of crude oil and saleable products, market demand for products; and production yields. The objective of this study is to develop a general stochastic model for oil refinery planning in order to maximize the profit while meeting the quality constraints.

**IN111045****Dr. Ali Al-Awami, EE**  
**Dr. Eric Sortomme, Consultant, USA****Stochastic Charging of Electric Vehicles**

Recently, there has been great interest in re-thinking the way we produce and consume energy. This is due to concerns of global warming and energy security, among other reasons. Therefore, on the electric power generation side, there has been a worldwide boom in the utilization of sustainable energy resources. On the consumption side, a lot of efforts are geared toward making electric loads more energy-efficient and more responsive so that a better utilization of resources is achieved. For the same reasons, the transportation sector is experiencing a wave of electrification. Transportation electrification will definitely have a positive impact on the environment. However, it is seen as an extra burden on the existing, already stressed, energy grids. Therefore, vehicle-to-grid (V2G) services have been proposed as a way to 1- mitigate the negative impact of electric vehicles (EV) on the energy grid, and 2- increase the adoption rate of these vehicles. Unidirectional V2G is especially attractive because it requires little, if any, additional infrastructure other than the communication between the EV and an aggregator. The aggregator, in turn, combines the capacity of many EVs to bid into energy markets. This project proposes a new optimal charging strategy for electric vehicles using V2G technologies. This strategy is intended for use by an aggregator. The objective will be to maximize the aggregator profitability by optimally scheduling V2G services. Because of the several sources of uncertainty, such as regulation and ancillary service prices, the V2G scheduling problem will be formulated as a stochastic program. That is, the optimal solution will be obtained taking into account multiple scenarios for each stochastic variable with their corresponding probabilities. In addition, the risk attitude of the aggregator will be considered. The risk metric to be used is the conditional value at risk (CVaR). The proposed algorithm will be tested using real power system conditions.

**IN111046****Dr. Abeeb A. Awotunde**  
**PETE****Multi-objective Well Placement Optimization for Improved Oil Recovery**

To achieve optimum production from petroleum fields, the type and location of wells used in the development of the field are important. When horizontal or multilateral wells are used, the

challenge of well placement and type becomes daunting and hence well type and location optimization becomes necessary for field development. Horizontal and multilateral wells have proven to be efficient in their use to attain high sweep efficiency. In this research, Particle Swarm Optimization (PSO), Differential Evolution (DE), Covariance Matrix Adaptation Evolution Strategy (CMA-ES) and Ant Colony optimization (ACO) algorithms are used to determine the optimum well placement and interval control valves (ICV) configuration for multilateral wells in oil reservoirs. Optimal placement of multilateral wells in heterogeneous oil reservoirs undergoing waterflooding is investigated. The net present value (NPV) and the voidage replacement ratio (VRR) for a fifteen-year development scenario are used as the objective function to determine the best location of wells and their laterals. From the cases studied, the optimum production and injection rates and maximum sweep efficiencies are determined. Based on this study, recommendations for the best field development scenarios are made. Based on the best performing algorithms, hybridization could be made between them to increase their computational efficiency.

**IN111047**

**Dr. Nedat Ratrouf, CE**

**Dr. Syed Masiur Rahman, RI**

#### **PARAMICS Model Development for Local Traffic Conditions in Saudi Arabia**

The recent development in computer technology and increased computational capability have contributed significantly in improving microscopic traffic simulation models and in broadening the areas of applications ranging from the modeling of specific components of the transportation system to a whole network having different kinds of intersections and links, even in a few cases combining travel demand models. Unfortunately, only a few microscopic simulation models such as NETSIM, TRANSYT, SimTraffic, and VISSIM models are calibrated and validated using local traffic conditions and behavior in Saudi Arabia. This is despite a few case studies clearly demonstrating the unique traffic behavior prevalent in the Kingdom, which justifies the model calibration and validation with the help of local data. Initially, this study will review the unique traffic characteristics of the Kingdom. It will investigate particularly the calibration and validation process for the PARAMICS using local traffic conditions and behavior. The selected PARAMICS model is suitable for evaluating intelligent transportation system (ITS) applications and it can model both surface streets and freeway road networks simultaneously. Due to the availability of the application programming interface (API) of this model, the researchers can modify the basic model significantly to meet their research needs. A comparative study will be conducted to evaluate the performance of PARAMICS models with respect to both SimTraffic and TRANSYT-7F models. It is expected that the obtained PARAMICS model can be used to investigate different ITS applications and provide a seamless model of surface streets and freeway road networks. It is expected that a number of scientific manuscripts will be published based on this study and it will enhance the capability of the Department of Civil Engineering in handling a model which provides API. Ultimately, it will contribute toward increasing the exposure of practitioners to PARAMICS. This research will enable graduate students to obtain an in-depth idea of calibrating and validating microscopic simulation models, both manually and automatically, and improve the basic model using API, which is rarely explored in the Kingdom. It is noteworthy to mention that it will require no major additional equipment to conduct this research.

**IN111048****Dr. Ihsan-ul-haq Toor****Dr. Naseer Al-Aqeeli****Mr. Faheemuddin Patel****Mr. M Ali Baig Mirza****ME****Electrochemical investigations on the corrosion behaviour of Si containing stainless steel alloys**

Stainless steel and Ni base alloys are widely used in different industrial applications due to their excellent corrosion resistance and mechanical properties. Along with Ni and Cr, many other alloying elements such as Si, Cu, Mn, Sn, Mo, and W are used depending on final application requirements. However, metals, including Fe, Ni, Cr, Al, Ti, Pb, W,, are spontaneously oxidized by reacting with water and/or oxygen in a terrestrial environment. In spite of the high thermodynamic reactivity of metals, what makes our metals-based civilization possible is the phenomenon of passivity. Passivity infers the kinetic stability of reactive metals and alloys in contact with oxidizing aqueous environments, when thermodynamics indicates a large driving force (negative change in the Gibbs free energy) for the reaction of the metal with oxygen (either from  $O^2$  or  $H^2O$ ). The observed kinetic stability is due to the formation of a “passive” reaction product film on the surface that effectively isolates the reactive metal from the corrosive environment. Different alloying additions in stainless steel alloys affect the structure and composition of their thin oxide film differently, so understanding the role of individual alloying elements on the passive film composition and localized corrosion is very important in order to design and develop new corrosion-resistant alloys for the industry. In this proposed research, we intend to investigate the effect of Si in a commercially available 304Si alloy on its localized corrosion in terms of its metastable pitting event density, electrochemical impedance properties and its effect on the passive film by XPS/AES studies. Si is a ferrite forming element and is considered to have a positive effect on stainless steel properties. There are not many studies showing its effect on metastable pitting, impedance behavior in stainless steels (both wrought and sintered) and contribution to the passivity of stainless steels. So in this proposed research work, we will investigate its effect on impedance behavior, localized corrosion and passive film of stainless steels alloy 304Si. Efforts will be made to develop an in-house Fe-Cr-xSi ( $x=0,1,2$ ) alloy, both by vacuum arc melting and by the sintering process, to investigate the independent effect of this element on the corrosion properties. Its effect on passive film structure and composition will be examined using X-ray photospectroscopy in chloride containing borate buffer solutions.

**IN111049****Dr. Samir Mekid****ME****Design and Test of Miniature Dynamometer for Cutting Forces Measurement in Meso/Micro Scale NC Machining**

The miniaturization of machine components is currently perceived as a core requirement for ongoing technological development for meso/microscale features. The emerging miniaturized ‘high-tech’ products are required to have increased functionalities of systems within a size on the order of  $1\text{ cm}^3$ . It requires mesoscopic parts with complex microscopic features of a few mm in length with machining accuracy of less than 1 micrometer and surface integrity as components will require high surface finish, tensile stress and crack free surfaces in order to function reliably. One of the characteristics to be measured is the cutting forces on the parts being machined. Since a CNC micromachining facility is being developed at the department of Mechanical

Engineering having a workspace within 50x50x50mm with high motion axis resolution, it is intended in this proposal to design, manufacture and validate a miniature dynamometer capable of measuring cutting forces within a low range of 100N but with a resolution better than 1 mN and high frequency since the micromachining involves small cutting forces but the spindle rotates at high speed. The dynamometer will be able to measure forces in five directions ( $\pm x$ ,  $\pm y$ , and  $-z$ ). This instrument will support on-going and future research in micro engineering. This instrument will help in predicting the surface finish and chip thickness but will also monitor tool wear evolution and hence will prevent/reduce tool breakage known to be one of the main issues in micro milling.

**IN111050**

**Dr. Atia Khalifa**

**Mr. Anis**

**ME**

### **Investigating the Effect of Impeller Blade Exit on Pressure Fluctuations Inside a Double-Volute Pump**

The flow-induced vibration in large and high power boiler feed pumps is one of the most challenging problems that limits the pump design and operating conditions. The pump design and pump requirements of flow rate and pressure delivery play a major role in inducing high-pressure pulsation inside the pump. These pressure pulsations/fluctuations are released as vibrations that propagate to all the pipelines and instrumentations connected to the pump that may lead to frequent shutdowns. The blade exit shape and the effective gap between the rotor and stator are the most important design parameters in this regard. Flow instability and separation usually occur in this region especially at off-design flow conditions. The proposed work aims to experimentally test new designs for the impeller blade exit in order to reduce the flow-induced vibration of a boiler feed pump. The study will correlate the blade exit shape with the effective gap under different operating conditions to select the best shape to produce minimum vibrations. The study also aims to compare cutting the blade exit with trimming the impeller diameter for the same effective gap. Trimming the impeller is a very easy process but it affects the pump performance. Thus, it is not recommended to a certain extent. This study leads to suitable solution(s) to the root cause of the flow-induced vibration problem of the boiler feed pump caused at the blade passing frequency. Based on the experimental results, new modification(s) will be recommended for application. Pump manufacturers can benefit from this study by modifying the current designs based on our recommendations. The current users (like Saudi Electricity Company) can also modify their pumps to extend the system lifetime and reduce the number of shutdowns needed for maintenance.

**IN111051**

**Dr. Shamsuzzoha**

**Dr. Abdallah Al-Shammari**

**CHE**

**Dr. Izhar Ahmed, MATH**

### **Plant-wide Control System Design for the Vinyl Acetate Monomer Process**

The proposed work presents the control system design of an industrial process for the manufacture of vinyl acetate monomer production plant. The vinyl acetate monomer (VAC) production plant has been introduced as a plantwide control benchmark problem by Luyben et al. The VAC process is large enough to be representative in its essential features of many chemical processes. This process model contains 246 states, 26 manipulated variables, and 43 measurements. There are many typical process units involved in a VAC production plant and



some of them are highly nonlinear e.g. the azeotropic distillation tower. The analysis of a model includes detailed reactor behavior and ideal separation with gas and liquid recycle. The analysis and simulation has performed to identify the optimal operating condition of the VAC plant. The simulations presented in the proposed study also show the agreement with earlier results. The objective of the proposed project is to provide a readily available simulation that can be used as a testbed for advanced control approaches, such as plant-wide control design and optimization, model predictive control and process monitoring for the vinyl acetate monomer (VAC) production plant.

**IN111052**

**Dr. Nasser-eddine Tatar**

**MATH**

### **Non-Lipschitz Activation Functions in Hopfield Neural Networks**

Of concern in this proposal is a Hopfield Neural Network Problem which arises in many fields of science and engineering. The model involves "activation" functions which were assumed to be monotonic and bounded or differentiable. Recently, these conditions have been relaxed to a Lipschitz condition. According to real-life problems, activation functions are not necessarily Lipschitz continuous. Therefore there is a need to study such situations not only from the mathematical point of view but also from the engineering point of view. Considering Non-Lipschitz continuous activation functions leads to several difficulties. Indeed, it is well-known in ordinary (as well as partial) differential equations that Non-Lipschitz nonlinearities may cause non-uniqueness of solutions and also non-existence of equilibrium. In this proposal we would like to address this challenging issue and try to gain some insight on this situation. We would like to establish some "reasonable" assumptions allowing us to prove exponential stability of the system in addition to the well-posedness.

**IN111053**

**Dr. Naim Fakir**

**Dr. Reyad A. Shawabkeh**

**CHE**

### **Adsorption of Carbon Dioxide Gas by Chemically Treated Limestone**

Natural gas contains a slight level of carbon dioxide which leads to several industrial and domestic heating problems. In addition, it is one of the main greenhouse gases that contribute to global warming, where its pollution is a wide-spread problem arising from a wide range of industries, leading to a complex contaminant in the atmosphere. Given the increasing pressures worldwide to minimize the emission of greenhouse gases into the atmosphere,  $\text{CO}_2$  must be remediated efficiently and cost-effectively. In this research proposal, a chemically treated limestone will be utilized for removal of  $\text{CO}_2$  from natural gas using a combined adsorption-chemical reaction process. Treatment of the limestone will be conducted using different oxidizing agents such as sulfuric, nitric and/or phosphoric acids followed by a specific functionalization to obtain an adsorbent with a high surface area. This functionalized limestone will be fully characterized according to its surface area, pore size distribution and surface morphology. The following techniques will be employed: BET surface area analysis, Fourier Transform Infrared Spectroscopy (FT-IR), Transmission Electron Microscopy (TEM) and Scanning Imaging Microscope (SEM) and X-ray diffraction. The produced adsorbent that shows the higher surface area, best surface morphology and functional groups will be tested for selective and efficient removal of carbon dioxide from the gas stream. The maximum adsorption capacity will be measured which could be achieved within a short period of time at fixed operating conditions. The obtained results will be modeled and simulated in order to predict the

removal efficiency of the produced adsorbent at extreme conditions which could not be attained experimentally.

**IN111054**

**Dr. Mahmood Niazi**

**Dr. Mohammad Al-Shayeb**

**Dr. Sajjad Mahmoud**

**ICS**

### **Enhancing Global Software Development Productivity Through Social Computing**

Over the last decade, many firms in the world have started global software development (GSD). In GSD, a company (client) contracts out all or part of its software development activities to another company (vendor), who provides services for remuneration. Previous work suggests that half of the companies that have tried GSD have failed to realize the anticipated outcomes which has resulted in poor outsourcing relationships, misunderstanding of projects' requirements, high costs and poor services. One of the major issues in the GSD is that many organizations start global contracts prior to testing their abilities to enable them to interact and collaborate with each other, resolve issues, distribute and advertise project information. This proposal directly addresses this problem by combining the GSD skills of the project team (from Saudi Arabia and Australia) to explore the understanding, motivation\de-motivation and adoption of social computing in the context of GSD. The objective of this research is three-fold: 1. To highlight the understanding of social computing by GSD organizations. 2. To identify the key motivators\de-motivators that may support\undermine the adoption of social computing in GSD organizations. 3. To explore the challenges of social computing adoption in GSD organizations. The aim of this research is to assist GSD organizations in better understanding and adopting of social computing systems in globally distributed projects. We will employ novel approaches in order to address our objectives, e.g. the systematic literature review and Delphi studies. Our results will significantly impact on the high number of failures currently reported for GSD projects, the root cause of which is often related to the social computing. In addition, this project will establish a long term research collaboration between Saudi Arabia and Australia, as the project team will be acting as a catalyst for further collaborations. The work proposed will bring together and advance the work that has been undertaken in the area of GSD. Our contribution in assisting GSD organizations for successfully adopt social computing will provide other researchers with a firm basis on which to develop different social computing systems for GSD that are based on an understanding of how and where they fit into the GSD activities. New social computing systems could then be developed targeting GSD projects.

**IN111055**

**Dr. Guoping Jiang**

**Dr. Ahmad Bendania**

**GS**

### **Social, Institutional and Psychological Determinants of Smoking Initiation and Smoking Cessation among Male University Students in Saudi Arabia**

Health is a universal human aspiration and a basic human need. Many factors compromise human health; cigarette smoking is one of them. Illness due to tobacco smoking currently leads to nearly 5 million annual deaths worldwide; more than the total of AIDS, drugs, homicides and accidents (WHO, 2006). Smoking is the largest single cause of preventable death and disease in the world (WHO Report on the Global Tobacco Epidemic, 2008). Although there are health warnings on tobacco products, laws banning advertising, and increasing levels of taxation on

tobacco, smoking keeps rising and sales go up yearly (Chaloupk, 1998). Therefore, finding out the determinants of smoking initiation and cessation is of significance since these mechanisms have strong policy implications for smoking prevention, especially, in Saudi Arabia, where statistics have been showing sharp increases in smoking among the population, especially the youth. Research reported different percentages (ranging between 21-35%) of smoking prevalence in the Saudi population (e.g. Bassiony, 2009; Jarallah et al., 1999; Siddiqui, Ogbeide, & Al Khalifa, 2001; WHO, 2011). It is widely acknowledged that the university period is likely to be very important in terms of tobacco use. Initiation as well as escalation from intermittent to regular smoking (Maziak & Mzayek, 2000) most often occurs at this stage of life. This is common because youth begin to grow up psychologically and socially. Research on the causes of smoking initiation identified various factors (Cook 2003; Flay, Petraitis & Hu, 1999; Wen, Van Duker & Olson, 2009; Wilcox, 2003). For example, they want to have their own opinion, their own ways of solving problems, and their own life style. Also, smoking, teenagers think, can help them get a foothold in school, communities or the workplace (WHO, 2006). This study adopts a quantitative approach to address the social and psychological determinants of smoking initiation and smoking cessation among male university students. A social contextual perspective on development of youth cigarette smoking will be adopted because adolescents live in numerous social contexts and learn from the social context including friends and peers, families, neighbors, community, city and state. The critical influence of social contexts in a young person's life suggests that we can find clues to youth smoking through their social life. Our purpose in this project is to examine the concurrent and joint factors, such as social, psychological, and economic, that contribute to youth smoking initiation and cessation in Saudi Arabia.

**IN111056**

**Dr. Bekir Yilbas**

**Dr. S. Zaman Shuja**

**ME**

### **Laser Surface Processing and Model Studies**

Lasers are widely used in surface engineering because of their advantages over the conventional surface treatment methods. Some of these advantages include precision of operation, fast processing, and localized treatment. Laser surface treatment involves solid heating and phase change at the irradiated surface. The solid heating at the surface of the substrate material can be described through introducing laser conduction limited heating situation; in which case, the absorption of irradiated laser energy results in heat conduction only and it does not cause the phase change at the irradiated surface. When the laser beam interacts with a solid surface, electrons in the irradiated region absorb the incident energy and increase their excess energy in this region. This, in turn, results in thermal separation of the electron sub-system from the lattice sub-system. Electrons and lattice phonons thermally communicate to each other and electrons undergo several collisions with lattice phonons through which some of the electron's excess energy transfers to lattice phonons. Since the number of collisions and the electron's excess energy in the electron sub-system define the rate of energy transfer from the electron sub-system to the lattice sub-system, the duration of electron excess energy transfer becomes important for the type of energy transport in the solid substrate, such as equilibrium or non-equilibrium transport. Thermal equilibrium between electron and lattice sub-systems can be achieved when the interaction time becomes on the order of the thermalization time of the substrate material; therefore, for short interaction durations, non-equilibrium energy transport governs the heating process. The equilibrium-based Fourier heating law for heat conduction is not applicable to describe the non-equilibrium energy transfer in a solid substrate. In addition, the absorption depth of the incident radiation is small for metallic substrates and heat wave propagation at a finite speed takes place in the irradiated region. The Fourier heating law fails to predict the

correct temperature rise in this region due to the consideration of infinite heat wave speed in the irradiated solid. The phase lagging in energy transfer takes place in the solid because of the short duration of heating and the small size of the absorption depth. In such heating situations, model studies associated with thermal wave propagation, such as telegraph equation, or two-temperature model, or electron kinetic theory approaches should be incorporated to describe the temperature field during the thermal loading. In general, most of the laser treatment processes associated with the surface engineering application are involved with durations longer than the thermalization time of the substrate material, and the use of the Fourier diffusion law becomes appropriate to describe the heating process.

In this book, the laser treatment of metallic surfaces in relation to engineering applications is presented. The thermal analyses incorporating the analytical consideration and numerical treatment are given in explicit steps. The applications of analytical and numerical solutions to the heating problem are presented and the findings are discussed in detail in the relevant chapters. The practical applications of laser treatment processes are also provided to demonstrate the morphological and metallurgical effects of laser heating processes. Three cases, namely shock processing, gas assisted nitriding, and treatment of pre-prepared surfaces, are presented to illustrate the practical applications of the laser treatment process, and many other laser surface treatment processes are possible. These are not presented in this book due to space limitations. Future treatments will review the other processes.

**IN111057**

**Dr. Rakesh Tomar**

**Mr. Mohammed Hamdan**

**PE**

#### **Effect of Physical Exercise on Glycemic Control in Type 1 Diabetes Mellitus Adolescent Patients**

Type 1 Diabetes Mellitus is characterized by the autoimmune destruction of pancreatic beta cells, i.e., the immune system destroys the special cells that make and secrete insulin. Physical conditioning has major effects upon the metabolism of glucose and other metabolic fuels. Regular physical exercise together with insulin therapy and a correct diet has long been acknowledged to be beneficial in the management of type 1 diabetes. Despite decades of improved insulin therapy and significant advances in blood glucose monitoring, large excursions in blood glucose concentration remain a major challenge for an active person with type 1 diabetes mellitus. For patients with either type 1 or 2 diabetes, there are both benefits and risks of regular physical exercise. The ultimate goal of this research project is to study the effect of physical exercise on glycemic control of type 1 diabetic adolescent patients. This could be achieved by the following objectives: 1. To design an effective program; 2. To implement the program; 3. To supervise the training; and 4. To make recommendations. Twenty-four male adolescent patients with type 1 DM from the Diabetes Clinic at King Fahd Hospital of the University (KFHU) will be selected; a referral hospital (the University of Dammam (UD)) serving the population in the Khobar area of the Eastern Province of Saudi Arabia will be chosen. These 24 patients will act as subjects for the purpose of the present study. The age of the subjects will range from 12-17 years. Subjects will be divided into 2 equal groups (12 patients each). The first group will be the control group and will follow their normal lifestyle. The second group will be the experimental group and will undergo the prescribed exercise programme for 12 weeks. The blood samples before and after 12 weeks will be collected and analysed for glycemic control as well as their lipid profile and daily insulin requirements. The database of the subjects will include their age, nationality, duration of Type 1 DM, total daily dose of insulin, growth parameters, school level, vital signs, physical examination, and fitness level. Consent forms will be signed by

the subjects and their parents after a thorough explanation by the researcher to give consent for participation in the study. The study protocol will be approved by the UD Ethics Committee. The biostatistical analysis of results will be done at Dammam University using the latest version of SPSS to find the correlations between 1. exercise and HbA1c, 2. exercise and daily glucose levels, 3. exercise and daily insulin requirements, and 4. exercise and blood tests profiles.

**IN111058**

**Dr. Zafarullah Khan**

**Mr. Sarfaraz Ahmed Furquan**

**ME**

### **Development of Electrospun Nanofiber Mats for Filtration Media**

Filtration is one of the core sectors in today's engineering environment. Among the various methods used for filtration, membrane filtration has become common in the industry. The membrane is a woven or a non-woven mesh, which filters out the required liquid, gaseous or the molecular content from a mixture of the same. The filter medium is usually a fiber mat. One of the factors affecting the efficiency of the filter media is the fiber diameter. The filtration efficiency is observed to increase with a decrease in the fiber diameter and a good arrangement of the fibers. A lot of research has been carried out in the past in trying to decrease the fiber diameter. It is now possible to achieve fiber diameters less than 1  $\mu\text{m}$  using different processing techniques. However, with the decrease in fiber diameter, the other properties such as the toughness of the mats and their durability are considerably affected. Polymers are the most commonly used material in membrane preparation. The filtration is carried out across high pressures, and it is extremely important to have a robust mat to resist those high pressures. Different filler materials are added to strengthen the polymeric nanofiber mat. Carbon Nanotubes (CNT) are a potential reinforcing material to strengthen these nanofibers, known for their extremely high strength and modulus. Electrospinning is a technique which is capable of producing fibers with nano-size diameters. In the proposed research work, the electrospun polymer/CNT nanofiber mats will be produced. The effect of the polymer and the CNT concentration on the quality of the nanofiber mat will be investigated. The different electrospinning parameters such as the spinning voltage, material feed rate, and the distance between the needle tip and collector will be studied. The analytical and mechanical characterization of the nanofiber mats will be carried out using the SEM, FTIR, contact angle and tensile test measurements.

**IN111059**

**Dr. Muhammad Riaz**

**MATH**

### **On the Performance of Different Linear Profile Methodologies**

There are many practical situations where product quality is a function of two or more related quality characteristics of interest which may establish a linear relationship leading to linear profile analysis, with the resulting control charts being known as linear profile control charts. In this study we will consider different methodologies based on linear profile datasets for paired observations in the form of dependent and independent variables. We intend to investigate the performance of different linear profile methodologies and implement a variety of runs rules/sampling schemes in order to enhance the performance of the methodologies for an improved statistical process control. In this study we plan to cover different linear profile methodologies and evaluate their performance ability under diverse runs rules/sampling schemes to detect the shifts in different parameters including intercept, slope and process variance under special process scenarios. We will also include the application examples for illustration purposes.

**APPROVED JUNIOR FACULTY GRANTS PROJECTS DURING THE SPRING  
SEMESTER, 2011-2012**

**JF111005****Dr. Kamal Harb****Dr. Samir Abdul Jauwad****EE**

**A Study to Maintain QoS in Weather-impacted Satellites**

Enhancing the estimation of channel attenuations can be of immense value in improving the quality of signals in high-frequency satellite communications. Such a presentation of weather-related attenuation factors for the impending weather conditions in Saudi Arabia, is one of the objectives of this project. The project will also introduce a new achievement that uses my previous work in this area and the work made for dust and sandstorm, combined in order to improve the quality of service (QoS) in channels that are impacted by the weather attenuations in the area under study. Based on that, a three-dimensional relationship will be proposed using a new adaptive scheme to estimate atmospheric attenuations with both propagation angle and estimated weather changes at a given location along with operational frequency. This novel method of predicting weather characteristics supplies valuable data for mitigation planning and subsequently for developing an enhanced back propagation-learning algorithm to iteratively improve signal-to-noise ratio (SNR) values to their optimal values for different cases. The ultimate outcome is the maximization of the capacity of the network under different weather conditions. Simulation results will be presented to show the effectiveness of the proposed scheme.

**JF111006****Dr. Abeeb Awotunde****PETE**

**Reservoir Parameter Estimation Using Time-Lapse Seismic with Wavelet Transform**

Improvements in seismic data acquisition have made seismic technology a viable source of information for locating hydrocarbon deposits and also for describing the spatial variability of reservoir parameters. While 3D seismic technology is already a well established means of locating hydrocarbon deposits, the 4D (or time-lapse) seismic is gradually becoming a source of reservoir variability description. In particular, time-lapse seismic is increasingly becoming a useful source of information about fluid migration and pressure changes in the reservoir. In recent years, time-lapse seismic data has been used to estimate spatial distribution of reservoir parameters through history matching. However, successful application of the method to give an accurate description of reservoir parameter variability remains a challenge. Two major challenges in the application of time-lapse seismic data in reservoir model history match are poor resolution of the seismic data and the massiveness of the data itself. Repeat seismic data in the form of maps of changes in reservoir saturation or pressure are blurred or low-resolution maps of trends in reservoir properties especially the distribution of permeability. These trends, when used judiciously, are however a good source of information that can help in reducing the uncertainty associated with reservoir parameter estimates. Obtaining the most useful information from a voluminous seismic dataset is challenging and is still an active area of research. In this work, we shall study how time-lapse seismic data can be integrated efficiently into reservoir model history matching using wavelets. This work will involve transforming seismic data into a wavelet space and then history-matching some selected wavelets to obtain estimates of reservoir parameters. Sample applications based on simulated data with added Gaussian noise will be used to test the suitability

of the approach. Comparisons will also be made to conventional approaches.

**JF111007**

**Dr. Jafar Albinmousa, ME**

**Dr. A.F.M. Arif** (Consultant)

### **Modeling Anisotropic Cyclic Behavior Using Finite Element Method**

Machine components are usually subjected to cyclic loading. These components generally have notches that result in stress concentration which could lead to local yielding. As a result, cyclic plasticity becomes an essential tool in the design process load-bearing components. Due to the complexity of the geometry, finite element analysis (FEA) is used to analyze machine components. However, current FEA packages don't have built-in material models capable of analyzing anisotropic cyclic behavior. Because the density of magnesium is 2/3 that of aluminum, magnesium alloys are gaining attention for use as lightweight structural materials. However, magnesium alloys such as AZ31B extrusion possess strong anisotropic behavior. Such anisotropy appears as a significant difference in the yield in tension and compression which results in asymmetric cyclic behavior. Therefore, analyzing materials that possess anisotropic behavior cannot be done using conventional FE software. The proposed work aims to develop a User Material Subroutine, which can be fed into one of the conventional FE software, capable of capturing the anisotropic behavior of AZ31B magnesium extrusion. Cyclic axial loading will be considered. The obtained FE results will be compared and verified with available experimental results available in the literature.

**JF111008**

**Dr. Mohammed Abdul Samad, ME**

**Dr. Amro Al-Qutub** (Consultant)

### **Development of a Plate-on-disc Tribometer for Tribological Testing of Polymer Films under Dry and Lubricated Conditions**

Recent research has shown that polymer coatings and thin films have excellent tribological properties when coated on various substrates. The polymer coatings, if used effectively in mechanical bearing systems, may succeed in reducing the overall consumption of lubricants and contribute to lubricants with low additive content or biodegradable fluids leading to an environmentally friendly lubricant technology. To evaluate the tribological properties of these polymer coatings of a few microns ( $\leq 50 \mu\text{m}$ ) thick, proper equipment/instrumentation such as tribometers and data acquisition systems are required. Tribometers serve to characterize the friction and wear behavior of materials. They are the basis for tribologically oriented development of materials and lubricants to serve quality assurance. The most widely used tribometer for wear and friction testing is the Pin-on-Disc type and Ring-on-disc type. Some companies like Falex Corporation, CSEM Instruments, CETR Incorporated are currently dealing in the high-temperature tribometer business, but the cost of their tribometers (in excess of \$1,27,000 ) is too high. The present document is a proposal to develop a versatile tribometer capable of conducting plate-on-cylinder and ball-on-disk tests simulating a line contact as in a journal bearing and a point contact as in a ball bearing, respectively, with various other capabilities.

**JF111009****Dr. Nabeel Salim Abo-Ghander****CHE****Optimal Control of a Coupling Membrane Reactor Integrating Dehydrogenation of Ethylbenzene with Hydrogenation of Nitrobenzene**

Dehydrogenation of ethylbenzene and hydrogenation of nitrobenzene form an interesting pair of reactions to be coupled in a catalytic membrane reactor. While the dehydrogenation of ethylbenzene is an endothermic and thermodynamically limited reaction producing hydrogen, the hydrogenation of nitrobenzene is exothermic and uses hydrogen as a reactant. When the two processes are coupled in a catalytic membrane reactor, the thermodynamic limitation of dehydrogenation of ethylbenzene is shifted and more styrene is produced, i.e. ~50% for the co-current configuration and ~55% for the countercurrent configuration compared to the 20% for a reactor without coupling. The optimal design of the coupled reactor has been addressed by Abo-Ghander et al (2010a) considering maximizing production of styrene on the dehydrogenation side and production of aniline on the hydrogenation side, simultaneously. A total number of twelve (12) design and operating parameters were considered and two numerical techniques were applied to confirm the results obtained, i.e. the normalized normal constraint and the normal-boundary intersection method. The optimal design was able to offer a coupled membrane reactor capable of producing a ~97% styrene yield while the production of industrial units can't exceed ~50% due to the thermodynamic limitation. The model of the coupled reactor was updated by Abo-Ghander (2010b) so that the effect of intraparticle mass and heat resistances was considered. It was found that the homogeneous model overestimates the prediction of the performance of the reactor with a maximum deviation of ~11%. In this project, the objective is to obtain the spatially varying optimal temperature and hydrogen profiles on both sides of the coupled reactor maximizing both the production of styrene on the dehydrogenation side and the aniline on the hydrogenation side. These profiles will greatly assist in designing and operating the coupled reactor especially when they are compared to their non-optimized ones. For this type of reactors, the problem considered in this project is being addressed for the first time as it has not yet been discussed in the literature due to the mathematical complexity involved. The possibility of publishing this work in mainstream journals is very high.

**JF111010****Dr. Salem Bashmal****Prof. Yehia Khulief****ME****Vibration Analysis of Micro-Beam with Flexible support conditions**

Microcantilever sensors have been widely used to measure physical, chemical and biological quantities. They have several advantages over the conventional sensors in terms of their high sensitivity, low cost and quick response. A microcantilever acts as a sensor by detecting the change in the bending vibration frequencies due to change in the mass, viscosity, flow rate, etc., of the surroundings. The accuracy of the measured signal from the microcantilever is dependent on the accurate estimation of the elastic properties of the micro-structure. Due to the limitation in the fabrication of the microcantilever, the support of the cantilever has some inherent flexibility. Therefore, the boundary conditions are not rigid as assumed by most of the studies in the literature. This flexibility affects the free and forced responses of the structures. While there are few studies on these effects at the macro-scale level, there is a need for more investigations on their effects at the micro- and nano- scales. The objective of this study is to develop a realistic mathematical model to analyze vibration characteristics of a microcantilever beam with flexible



boundary conditions. The developed model accommodates for various classical and non-classical boundary conditions. The static and dynamic behavior due to external excitations, such as capillary forces, shock loads and electric forces that may exist in micro-applications, is investigated. Moreover, the study will examine the coupling between in-plane and out-of-plane modes of vibration of a microcantilever beam in the presence of flexible supports using a two-dimensional model.

**JF111011**

**Dr. Hassen Ouakad**

**Dr. Husain Al-Qahtani**

**ME**

**Investigation for the Effect of Nonlinearities on the Response of Cantilever  
ME-MS Sensors under Mechanical Shock and Electrostatic Loading**

The effect of nonlinearities on the response of micro-cantilever MEMS sensors under mechanical shock and electrostatic loading are to be investigated using nonlinear structural mechanics theory. Two types of cantilever beams are to be studied: a microbeam with a free end and another one with a rigid plate attached to its tip (both used for gas sensing purposes). A nonlinear theory is to be used to model the microbeams, accounting for cubic geometric as well as inertia nonlinearities. In addition, a nonlinear electrostatic force expression will be added to the model. The system of integro-partial-differential equations is to be discretized using a Galerkin procedure to extract a reduced-order model, which is then used for dynamic simulations of the system responses. The influences of the different components of nonlinearity will be examined. The results of the nonlinear model are compared to results obtained from linear beam theory and finite-element simulations. For mechanical shock loading, both quasi-static and dynamic responses will be considered and shock spectrum analysis will be carried out

**APPROVED SABIC/FAST TRACK GRANTS PROJECTS DURING THE  
ACADEMIC YEAR 2011-2012**

**SB111011**

**Dr. Haider Madani**

**Mr. Muhammad Islam**

**ACCT MIS**

**Adoption of Audit Software in GCC Countries: A Cross-Country Comparison**

This study addresses the issues related to the adoption of audit software by internal auditors and IT professionals in the Gulf Cooperation Council (GCC) countries. While recent studies provide ample empirical evidence on the role technological, organizational and external factors play in adoption decisions, the studies are mostly based on data collected from US and European industries. As a result, the nature and form of the relationships between these factors, as well as their impact on adoption decisions by the core user of audit software in the Middle East, remains to be explored. This is an extension of our previous research where our data was collected from internal auditors and IT professionals working in Saudi Arabian industries. Therefore, in this research, we would like to focus on industries in the GCC countries. The focus of this research is to explore and compare the influence of demographic area (country) and psychometric factors related to adoption decisions using a model, and a web-based survey instrument. The reliability score of each construct will be measured with Cronbach's alpha test. Results from descriptive statistics, correlation, ANOVA and regression will be used to examine the influence of factors on adoption decision. This research will extend current technology adoption knowledge by focusing on a geographical area where similar research has not been done before. The results of this research will help industries in the area understand software adoption issues (positive and negative) by their employees and will be beneficial for vendors of audit software in their product development, marketing strategies, and software implementation for Middle Eastern industries.

**SB111012**

**Dr. Azzedine Zerguine**

**Mr. S Muhammad Azad**

**EE**

**Mr. K Masood - HBCC**

**Adaptive Decision Feedback Equalization for Wideband MIMO Systems Using  
Constrained Optimization Techniques**

Multiple-input multiple-output (MIMO) communication systems offer the potential for a significant increase in spectral efficiency over their single-input single-output (SISO) counterparts by enabling simultaneous transmission of independent data streams. On the other hand, they suffer from both inter-symbol interference (ISI) and inter-user interference (IUI) which need proper mitigation through the use of decision feedback equalizers (DFE). In this work, we propose Least Mean Squares (LMS)-based constrained adaptive DFEs for MIMO systems with a faster convergence rate and slightly higher complexity compared to the standard LMSbased DFE. The proposed equalizer consists of a parallel structure of as many multi-input-single-output (MISO) DFEs as the number of transmitter antennas. Different constraints are proposed to overcome the problem of slower convergence of the LMS algorithm where constraints will be imposed on *a posteriori* error of the adaptive filter. Moreover, it is aimed to investigate the convergence performance of the proposed DFEs analytically and through simulations. Furthermore, extensive simulations will be carried out in order to assess the performance of these DFEs when compared to some of the recently proposed MIMO DFEs.

**SB111013****Dr. Essam Hassan****Dr. Hassan Ragheb****EE****Novel Technique for Measuring the Dielectric Constant and the Conductivity of Substances through Open-End Waveguide Radiating Into Cavity Resonator**

The problem of determining the dielectric constant and the conductivity of substances that can be made to fit inside a cavity resonator is tackled. The procedure is to build an open end waveguide radiating into a cavity resonator. With proper manipulation of the field distributions inside the waveguide and the cavity, an expression for the reflection coefficient of the fundamental mode may be obtained. This expression is a function of the dielectric constant and the conductivity of the substance filling the cavity. Once the reflection coefficient is measured through the Vector Network Analyzer (VNA), the values of the dielectric constant and the conductivity are obtained

**SB111014****Dr. Sheikh Sharif Iqbal****Dr. Hassan Ragheb****EE****Design of Directive Ferrite-Loaded Waveguide Antennas for Multi-directional Beam Steering**

Beam steering in microwave radars is often achieved using phased array antennas, which require lossy and costly network of power dividers and phase shifters. In addition, these array antennas are susceptible to damage and are limited by their power handling capability. This motivated a continued interest in the design of a simple and effective steering mechanism, particularly for the outputs of high-power microwave tubes. Circular waveguide horn antennas are widely used to excite high-power multimode signals due to their good radiation properties [1-3]. Although different methods are documented to improve the gain [4], side lobe level [5] and directivity [6] of a signal circular waveguide antenna, limited research is carried out on the beam-forming properties. Magnetized ferrites are also popular in providing the externally controllable beam forming or steering capability of a microstrip [7], a waveguide [8] and phased-array [9] antennas. In this research work, a circular waveguide unit will be centrally loaded with a ferrite cylinder or rod to introduce an externally controlled beam-steering capability. For a Z-directed propagation, the location, position and dimension of the coaxial input will be optimized to produce multidirectional beam steering. Mode charts will be plotted by solving Characteristics equations of the partially ferrite filled circular waveguide will be derived to plot the associate mode chart. This will allow the selection of low loss operating regions of the device. Professional software will be used to model the designed ferrite loaded circular waveguide antenna. The directivity of the antenna will be enhanced by employing a partial reflector, optimally positioned in the radiating end of the waveguide [12]. The experimental prototype of the designed antenna will be fabricated to verify the simulated reflection response ( $S_{11}$ ) and the radiation pattern (for  $H_0=0$  KA/m). Note that results from the professional simulators are widely accepted nowadays, provided the simulation model is created by a competent user. The authors have already published papers, where simulated results using the same software (HFSS) are experimentally verified [9].

**SB111015****Dr. Hassen Muttalak****Dr. E. El-Sawi****MATH****Inference on the Exponential Parameters under Noise Perturbations**

The two-parameter location and scale exponential distribution is applied in very wide statistical procedures. In this study the focus will be on drawing appropriate inferences on the location and scale parameters of a two-parameter exponential distribution based on the noise-multiplied distribution version. The usual moment estimates, maximum likelihood estimates, and Bayes estimates will be developed, and their frequentist properties will be studied.

**SB111016****Dr. Alexi Nzila****Dr. Assad Al-Thukair****CHEM****Studies on Micro-organisms that Degrade Petroleum Products in the Coastal Region of the Jubail Industrial Area**

Petroleum-based products are the major source of energy worldwide and leaks and accidental spills occur regularly during the exploration, production, refining, transport, and storage of petroleum products. It is estimated that more than one million liters of petroleum products contaminate the environments every year. In the Kingdom of Saudi Arabia (KSA), especially the coastal part of the Eastern Province where most oil-related industries are located, incidents of oil spills are relatively frequent, due to accidental oil spills from pipelines, oil terminals and ships. Spilled petroleum products end up eventually in the marine environment. This release of hydrocarbons into the environment is a main cause of water and soil pollution, posing serious problems to the coastal marine environment. Thus, the challenge of cleaning up the marine environment of these products is enormous. Several methods of decontamination have been evaluated. So far, the most promising one is bioremediation, which is defined as the use of micro-organisms to detoxify or remove pollutants. Bioremediation exploits the ability of oil-degrading micro-organisms (ODM) to use oil products or hydrocarbons as a source of carbon. Thus, these ODMs would grow and proliferate in areas contaminated with oil products. This bioremediation consists of two processes, bio-stimulation and bio-augmentation. Bio-stimulation consists of adding new nutrients to stimulate the activity of the naturally existing ODM while the second, bio-augmentation, involves the addition ODMs in a contaminated environment in order to accelerate oil degradation. The use of bio-augmentation generally involves a consortium of different ODMs, and many commercial products are available. However, though bio-augmentation is a promising approach, its efficacy is not fully demonstrated yet. This shortfall can be explained by the lack of complete knowledge of the micro-organism biology responsible for bioremediation. For instance, little information is known about the specificity range of ODMs for hydrocarbon substrates. Different types of compounds are found in oil, and ODMs often have the capability to biodegrade small and linear hydrocarbon molecules, while long-chain molecules, aromatic and poly-aromatics, resin and asphaltene are difficult to biodegrade. Thus there is a need to fully understand the biology of ODMs, and to identify and characterize ODMs that can biodegrade complex oil products. In KSA, owing to the occurrence oil spills as a result of oil exploitation, coupled with the importance of the oil industry (which generates oil-product waste in the environment), it is conceivable that many micro-organisms have evolved to degrade and decontaminate petroleum products. However, the area of bio-remediation has received little attention in KSA. We have, at KFUPM, initiated a research program aimed to investigate, identify, isolate and characterize oil degrading micro-organisms from KSA. The ultimate goal of

our research program is to develop and test bioremediation strategies to decontaminate oil products either in the field or in a controlled environment (management of oil waste products). The current SABIC project is the first step towards achieving this objective. Here, we propose to isolate and characterize ODMs that are present in the coastal region of KSA, mainly in the Abu Ali, and Jubail areas.

**FT111009**

**Dr. Iyad Zaharnah**

**Dr. Mohammad Habib**

**ME**

**Dr. Moustafa El-Shafei, SE**

#### **Effect of Boiler Swing Rate on NO<sub>x</sub> Emissions**

Nitrogen oxides (NO<sub>x</sub>) are among the most harmful pollutants emitted from the combustion operations of industrial boilers. Changes in firing rates or steam flow rates in industrial boilers, as required by the process demand, affect the NO<sub>x</sub> formation levels. In this work, it is suggested to investigate the effects of boiler swing rates (firing, steam flow and water flow) on the transient and steady-state formation levels of drum boilers. A nonlinear state space dynamic model will be developed to relate the NO<sub>x</sub> emissions of drum boilers to other state variables (drum pressure and water volume in drum). The drum boiler system will include the boiler drum, the riser and downcomer as its major components. A Matlab program will be developed to: 1) conduct numerical calculations that provide heat flux variations along the riser and downcomer tubes of different water circulation circuits and 2) compute the dynamic response of the system's state variables (including NO<sub>x</sub> formation) due to the firing, steam and water flow swing rates. It is assumed the outcomes of this proposed work will help in developing an insightful understanding of the NO<sub>x</sub> formation due to the combustion operations of industrial drum boilers. The developmental and investigative research activities will contribute toward filling the gaps in the literature regarding NO<sub>x</sub> formation in industrial boilers, and these include: 1) integrative approaches for relating NO<sub>x</sub> formation with the operational parameters of drum boilers and 2) the effects of swing rates on the NO<sub>x</sub> formation levels.

**APPROVED RESEARCH GROUP PROJECTS DURING THE  
ACADEMIC YEAR 2011-2012**

**RG1208****Dr. Salaheddine Kabbaj****MATH**

**Prüfer Conditions in Amalgamated Duplications**

This research project will investigate ideal-theoretic as well as homological extensions of the Prüfer domain concept to commutative rings with zero divisors in an amalgamated duplication of a ring along an ideal. The new results should both compare and contrast with recent results on trivial ring extensions as well as yield original families of examples issued from amalgamations subject to various Prüfer conditions.

**RG1209****Dr. Mihai Halic****MATH**

**Cohomological Splitting Criteria for Vector Bundles over Surfaces**

Projective surfaces have been investigated from an enormous number of different points of view. This is natural because, after the projective curves, surfaces are the next simplest geometrical objects. It is therefore surprising that there is such a restricted number of splitting criteria for vector bundles over projective surfaces. The goal of the proposal is to investigate this issue.

**RG1210****Dr. Abdelsalam Mimouni****MATH**

**Integral Domains in which Every Ideal is Protectively Equivalent to a Prime Ideal**

In this project we will investigate classes of integral domains such that every nonzero ideal is projectively equivalent to a prime (resp. invertible, resp. principal) ideal in different contexts of integral domains such as integrally closed domains, Noetherian and Mori domains, power series rings and pullbacks. For this purpose, we extend the notion of projectively equivalent ideals in a natural way to arbitrary rings (outside the context of Noetherian rings where this notion is originally defined), and we say that two regular ideals  $I$  and  $J$  of an arbitrary ring  $R$  are projectively equivalent if  $(I^{\wedge \{n\}})' = (J^{\wedge \{m\}})'$  for some positive integers  $m$  and  $n$  where  $A'$  denotes the integral closure of  $A$  in  $R$ , that is,  $A' = \{z \in R \mid z \text{ satisfies an equation of the form } z^r + a_{r-1}z^{r-1} + \dots + a_0 = 0 \text{ where } a_i \in I^{\wedge \{i\}} \text{ for each } i\}$ . Our aim is to study the above notion from a theoretic-ideal point of view.

**RG1211****Dr. Abdelsalam Mimouni****MATH**

**Factoring Ideals and Stability in Integral Domains**

In this project, we will investigate a special factorization of ideals in integral domains, that is, ideals that can be factorized as a product of an invertible ideal and an idempotent ideal. For this purpose we introduce and study the notions of  $IE$ -ideals (resp.  $IE$ -domains), as ideals  $I$  of an integral domain  $R$  that can be written as  $I = JE$  where  $J$  is an invertible ideal of  $R$  and

$E$  is an idempotent ideal of  $R$  (resp. domains such that every nonzero ideal is a  $E$ -ideal) in various contexts of integral domains such as Noetherian domains, valuation and Prüfer domains, polynomial and power series rings, pullbacks and more. Mainly, we will establish a strong connection of the above notions with the different kind of stabilities of integral domains such as Lipman stability, Sally-Vasconcelos stability, Eakin-Sathaye stability, etc.

**RG1212**

**Dr. Salaheddine Kabbaj**

**MATH**

### **Embedding Dimension of Tensor Products of $k$ -Algebras and Defect of Regularity**

The purpose of this research project is to study the embedding dimension of local constructions,  $R$ , arising as tensor products of  $k$ -algebras, with respect to the defect of regularity (i.e.,  $\text{embdim}(R)/\dim(R)$ ). Due to the known behavior of tensor products under regularity, the project deals mainly with Noetherian tensor products  $K \otimes_k A$  where  $K$  is an (algebraic) extension field of  $k$  and  $A$  is an arbitrary local  $k$ -algebra. We will envisage two cases, namely, when  $K$  is separable or purely inseparable over  $k$ . The latter case will offer more interesting options on account of our very recent results [5] on (ir)regularity in various settings of pure inseparability.

**RG1213**

**Dr. Jawad Abuhlail**

**Dr. Othman Echi**

**MATH**

### **Unifying Zariski-like Topologies for Modules**

In this project, we carry out a systematic study of the (dual) Zariski-like topologies and provide general frameworks which unify them. Moreover, we study the interplay between the topological properties of these spaces and the algebraic properties of the modules under consideration. Classes of (co)attached prime ideals related to annihilators of suitable factor modules or submodules in (co)prime spectra will also be investigated. Moreover, we figure out the properties of the topological space of fully coprime subcoalgebras of a coalgebra over a field which distinguishes such a topology from the other ones.

**RG1214**

**Dr. H. Bahlouli**

**Dr. Saeed Al-Marzoug**

**Dr. Saeed Al-Amoudi**

**PHYS**

### **Forecasting and Manipulating Rogue Waves in Nonlinear Media**

Rogue waves are extreme events occurring in nonlinear media. They are high-amplitude waves that seem to appear from nowhere and disappear without trace. They are localized in both space and time. Rogue waves appear in different environments such as ocean rogue waves, optical rogue waves, plasma rogue waves, and essentially in any other nonlinear medium. Due to their high amplitude and localization, rogue waves are now a subject of intensive interest from both the fundamental and applied points of view by researchers in a variety of fields. On the fundamental level, these are excitations that appear solely from the nonlinearity in the system which makes the understanding of their cause and the prediction of their appearance not a trivial task from the mathematical and physical perspectives. On the applied level, rogue waves in the ocean cause unpredicted deadly attacks on ships or oil platforms. Such attacks appear tens of

times a year all over the world. In optical fibres, rogue optical pulses appear and destroy any sequence of data through the fibre. In the study of rogue waves, the two most important points to address are: i) the cause of rogue waves and ii) the prediction of their appearance. Another equally important aim will be: iii) finding ways of manipulating the appearance, amplitude, and localization of rogue waves, which will be valuable to the above-mentioned applications. The methods used to reach the aims of the project will mainly be: i) the Darboux transformation method, ii) the Variational method, and iii) the Numerical method. The first method provides exact rogue-wave solutions to the problem. The present group of researchers are experts in this method and have developed a new technique that facilitates the derivation of new solutions. In fact, this is the strong point of the team since our new method will enable us to obtain analytic solutions to rogue waves, which will significantly enhance our understanding of their cause. The second method is an approximate analytic method that helps to provide an insight whenever the first method is not applicable. The last method is a powerful technique that will be used in all cases, especially when the first two methods are not applicable. Here also, the present research team is expert in numerical methods which have been used successfully in previous projects.

**RG1215**

**Dr. Enamul Hossain**

**Dr. Hasan Al-Yousef**

**PETE**

#### **A Study to Predict Permeability Using Mercury Injection Data**

Reservoir characterization is one of the key issues in hydrocarbon recovery. Permeability has been recognized as one of the controlling parameters during hydrocarbon extraction which needs to be properly characterized. Knowledge of reservoir permeability is essential to understand the displacement mechanisms, and to develop mathematical models for achieving higher recovery factors. The other related properties of the reservoir need to be addressed properly for an effective approach to enhance oil recovery significantly. Mercury Injection Capillary Pressure (MICP) data can be used as a direct way to identify and characterize pore geometrical distributions and pore-throat properties. For that reason, MICP data offers a direct indication of permeability that is controlled by those properties. The literature has reported many permeability models that use different parameters. Some models are purely empirical and some have some theoretical background by considering a porous medium as a bundle of capillary tubes. The inherent oversimplified assumptions of the latter approach may not represent the real phenomena adequately. Finding the best model to use in order to obtain an accurate permeability prediction is quite a challenge. In this study, a thorough comparison of the major permeability models available in the literature will be conducted and evaluated against a large data set of MICP experimental tests done on carbonate samples. In addition, an in-depth investigation of pore throat approximation for a complex pore geometry of carbonate reservoirs will be considered. A method to check and screen MICP data received from the laboratory will also be presented. Finally, a new approach to estimate permeability will be demonstrated.

**RG1216**

**Dr. Azzedine Zerguine**

**Dr. Ali Al-Awami**

**Dr. Ali Al-Shaikh**

**EE**

#### **Adaptive Channel Equalization Using Particle Swarm Optimization**

Adaptive equalization is important due to the need for decreasing intersymbol interference (ISI) in digital communication. In this work, particle swarm optimization (PSO) is adopted for



designing adaptive equalizers. The objective is to modify the basic PSO algorithm [1] so as to achieve a satisfactory steady-state error but with a lower computational complexity. The basic concept is based on implementing a PSO algorithm that “forgets” the group’s best solution after several iterations. Two ways of implementing the “forgetting factor” are proposed: localized search (LS) and train and verify (TV). An exhaustive simulation-based sensitivity analysis of the proposed PSO algorithms, with respect to their underpinning parameters, will be carried out here so as to select the “best” (or near optimal) values of these parameters. The performance of the proposed PSO algorithms and other well established algorithms, e. g., LMS and RLS algorithms, is compared in the context of adaptive channel equalization to that presented in [1] through extensive simulations. This performance will be tested on both time-invariant and time-varying channels. It is expected that the proposed algorithms can achieve almost the same steady state error of the basic algorithm with a significant reduction in the computational complexity.

**RG1217**

**Dr. Saeed Al-Marzoug**

**Dr. H. Bahlouli**

**PHYS**

### **PI-Symmetric Potential Effect on Nonlinear Wave Equation**

We study the effect of PT-symmetry on both the nonlinear Schrodinger equation and optical wave equation. Optical systems are expected to exhibit novel features with no analog in real-potential systems, double refraction and phase transitions are just a few of the many features that characterize PT-symmetric optical systems. Soliton solutions in PT-symmetric nonlinear Schrodinger equations, and their stability analysis as a function of the non-Hermiticity parameters will be conducted in this project. In particular, we will search for new exact solitonic solutions for different PT-symmetric potentials and investigate the integrability of the most general nonlinear wave equation. Numerical methods such as Time-split step Fourier and Crank-Nicholson proved to be very accurate in this kind of problem. However, full numerical results will be complemented, whenever possible, by variational methods to support our findings.

**RG1218**

**Dr. Khaled Gasmi**

**Dr. Abdulaziz Al-Jalal**

**PHYS**

### **NO<sup>2</sup> Detection Using Tunable Diode Laser Absorption Spectroscopy in Blue Spectral Region**

An instrument based on Tunable Diode Laser Absorption Spectroscopy (TDLAS) will be developed to measure Nitrogen dioxide (NO<sup>2</sup>) trace gas in ambient air. Micrometeorological data (wind direction, wind speed, temperature, pressure, humidity and other factors) will be recorded together with the signals from the TDLAS instrument, to generate a complete data set for analysis.

**RG1219****Dr. Mohammad Sharawi****Dr. Wessam Mesbah****Dr. Oualid Hammi****EE****Compact-size Meta-material-based Antennas for Broadband Wireless Handheld Devices**

Broadband communications support instantaneous bandwidths of 1MHz or more and data rates greater than 1.5 Mbps. Some of the key enabling technologies of broadband communications are the use of multiple-input-multiple-output (MIMO) systems, the use of adaptive modulation and coding schemes as well as the use of multiplexing schemes such as orthogonal frequency division multiple access (OFDM). The use of MIMO systems (and MIMO antennas) has allowed for a linear increase in the channel capacity. MIMO wireless systems are being used in 4G wireless standards. MIMO antenna systems will be used in 4G wireless standards. They are already being used in WLAN 802.11n, and WiMAX. Long term evolution (LTE) will kick off with 2-element antennas at the user handset. The use of multiple antennas can linearly increase the channel capacity and allow for higher data rate transmissions, and thus give the user a greater multimedia experience. The design of MIMO antenna systems for user handsets poses a real challenge because of the size limitations, especially for lower frequency bands, such as the 700 MHz band, with bandwidths of 20 MHz or more. Metamaterials (MTM) or Left handed materials (LHM) (as opposed to right handed material -RH- with positive material properties) are synthesized material with properties that do not naturally occur. Such materials when used with RH materials can be utilized for a number of innovative applications. These applications include, but are not limited to, phase compensation, electrically small resonators and antennas, negative refraction, sub-wavelength imaging and photon tunnelling. The use of MTM-based structures has been demonstrated in different microwave applications. The use of MTM within antenna substrates or superstrates has led to antenna miniaturization, and characteristics improvement. In this work we propose the design of a dual-band broadband MTM antenna that has a compact size and covers the 700 MHz band of the LTE standard as well as a higher frequency band (i.e. WLAN 2.45 GHz or WiMAX 3 GHz bands) with a minimum bandwidth of 40 MHz and isolation of more than 15dB. The antenna will be fabricated and characterized in the laboratory environment, and its radiation characteristics will be tested in an outdoor antenna range facility in the USA. This MTM dual-band antenna will be used to build a 4-element dual-band broadband MIMO antenna system that fits within a standard wireless handheld device of 50 x 100 x 3 mm<sup>3</sup>. The MIMO antenna system will be tested and characterized.

**RG1220****Dr. Oualid Hammi****Dr. Mohammad Sharawi****EE****Behavioral Modeling and Impairments Compensation of Broadband Transmitters for LTE-Advanced Applications**

The LTE-advanced standard sets stringent linearity requirements on the radio front-end of the wireless transmitter and especially its power amplifier. This is mainly due to the broad bandwidth of the used signals that varies between 40MHz and 100MHz when carrier aggregation is employed. The observed nonlinear behavior of the power amplifier stimulates extensive behavioral modeling and predistortion-based impairment compensation research work. However, due to the broad bandwidths, conventional characterization and modeling approaches based on standard test equipment-based measurements cannot support such bandwidths. The

objective of this project is to develop an advanced technique for the characterization and impairment compensation of power amplifiers driven by LTE-advanced signals. This will be achieved by proposing a digital signal processing-based approach to circumvent the bandwidth limitation of the receivers used for the characterization and predistortion of power amplifiers. LTE-advanced test signals will be generated and applied for the characterization of a state-of-the-art broadband amplifier such as class J. The results will be used to build accurate behavioral models of the device under test as well as appropriate predistortion algorithms that can compensate for the nonlinearity exhibited by the power amplifier.

**RG1221**

**Dr. G. D. Khattak**

**Dr. M.A. Gondal**

**Dr. Abdelkrim Mekki**

**Dr. M.S. Kariapper**

**Mr. M.A. Dastageer**

**PHYS**

### **Effects of Pulsed Nd:YAG Laser Fluence on the Structural Properties and Valence States of Transition Metal Ions in Phosphate Glasses**

The effect of laser irradiation using three different wavelengths (IR, Visible and UV) generated from a Nd:YAG laser on the local glass structure and on the valence state of the transition metal (TM) ions on three sets of phosphate glasses of the nominal compositions  $[(\text{TMO})_x (\text{P}_2\text{O}_5)_{1-x}]$  where  $x = 0.30, 0.35, 0.40, 0.50$  and TMO stands for transition metal oxides CuO, V<sub>2</sub>O<sub>5</sub> and Fe<sub>2</sub>O<sub>3</sub> is proposed for investigation by various analytical techniques such as X-ray photoelectron spectroscopy (XPS), Fourier transform infrared spectroscopy (FT-IR) and Photoluminescence spectrometry. This research will include fabrication of these glasses and determination of the actual composition of the grown glasses using inductively coupled plasma spectroscopy (ICP). The amorphous nature of these glasses will be confirmed by the absence of any crystalline peak in the X-ray powder diffraction (XRD) spectra. The presence of asymmetry and satellite peaks in the Cu 2p, V 2p and Fe 2p spectra for the prepared samples will be the main indicators of the presence of two or more different valence states of the transition metals. Hence, the ratios,  $\text{Cu}^{2+}/\text{Cu}^{\text{total}}$ ,  $\text{V}^{3+}/\text{V}^{\text{total}}$ ,  $\text{V}^{4+}/\text{V}^{\text{total}}$ ,  $\text{Fe}^{3+}/\text{Fe}^{\text{total}}$ , etc., will be determined from the 2p core level XPS spectra. Furthermore, as XPS can be a useful quantitative probe of the short-range structure, in particular, resolving an O 1s spectrum into two peaks can be used to determine the contributions from bridging oxygen and non-bridging oxygen atoms in these glasses. Photoluminescence in the UV-VIS region is a very sensitive analytical technique to study the optical properties of glasses for various applications which depends strongly on active centres, surrounding host glass composition and their interactions as a result of laser treatment. Infrared absorption and reflectance spectra of glasses using an FTIR spectrometer is important to study the shift in various vibrational modes or absorption band peaks due to the ion exchange resulting from laser treatment. This shift in IR spectra could be interpreted on the basis of structural changes in the glasses after laser treatment. These proposed glasses are of both academic and commercial interest. The obtained results will be of great interest to the scientific community working in this field. The duration of the project is twenty-four working months.

**RG1222****Dr. Muhammad Baluch****Dr. Ali H. Al-Gadhib****Dr. M.K. Rahman****CE****Heat of Hydration-based Modeling for Mass Concrete Characterization**

The hydration of cement in mass concrete structures produces high temperature. The temperature in the core of the mass concrete structures is higher than the temperature in the surfaces that are closer to ambient air. This temperature gradient leads to the development of thermal stresses, which may cause cracking if the thermal stresses exceed the tensile strength of concrete at an early age. This research focuses on conducting an experimental program for different mixes, typical of use in mass concrete structures in Saudi Arabia, using iQdrum heat signature and isothermal calorimeter to obtain the heat of hydration and temperature rise. The measurement of the temperature rise and the peak temperature for mass concrete at an early age in mock-up and in actual structures such as thick raft foundations will be monitored. The viscoelastic behavior of early-age mass concrete will be simulated by using the finite element nonlinear approach and the effect of fly ash and GGBFS admixtures in reducing the heat of hydration will be studied. The finite element model will predict the distribution of temperature within the mass concrete, and the thermal stresses, and it will indicate whether cracks will form or not. Based on experimental and numerical investigations, guidelines will be developed for mass concrete in KSA. These guidelines will help in reducing the risk due to the high temperature gradient between the core of concrete and its surface and in mitigating the risk of cracking due to delayed ettringite formation.

**3. RESEARCH PROPOSALS SUBMITTED DURING  
THE SPRING SEMESTER OF 2011-2012 UNDER REVIEW**

Project code	Title	PI Department	Investigators
IP112-CASS-03	Effect of Physical Exercise on the Glycemic Control in Type 1 Diabetes Mellitus Adolescent Patients	Physical Education	Dr. Rakesh Tomar, Physical Education Mr. Mohammed Hamdan, Physical Education and Dr. Mohammad Hussain Al-Qahtani, External-PI
IP112-CASS-10	Plasma Lipid, Lipoprotein Levels and Blood Glucose: The Effects of Combined Aerobic- Resistance Training on Morbidly Obese Men.	Physical Education	Dr. Syed Ibrahim, Physical Education Mr. Hassan Al Moslim, Physical Education Dr. Abdussalam Kanniyan, Physical Education
IP112-CASS-13	A Critical Analysis of Hypoxi Training Effects on the Body Composition, Anthropometric Measurements and Selected Physiological Variables of Obese Males	Physical Education	Dr. Syed Ibrahim, Physical Education Dr. Kaukab Azeem, Physical Education
IP112-CASS-14	Evaluating the Attitude of Students Towards Physical Activities at Different Academic Levels on the KFUPM Campus	Physical Education	Dr. Abdulhamed Al Ameer, Physical Education Mr. Mohammed Hamdan, Physical Education
IP112-CCSE-02	Enhancing Global Software Development Productivity through Social Computing	Information and Computer Science	Dr. Mahmood Niazi, Information and Computer Science Prof. Sajjad Mahmood, Information and Computer Science Prof. Mohammad Alshayeb, Information and Computer Science Dr. Asif Qumer Gill, External-PI
IP112-CCSE-16	Distributed and Collaborative Agents-Based Surveillance System for Securing Strategic Area	Information and Computer Science	Dr. Tarek Ahmed Helmy El-Basuny, Information and Computer Science Dr. Mahmoud Elish, Information and Computer Science
IP112-CCSE-28	Control of Wireless Biosensor Networks with Partially Observable States	Computer Engineering	Dr. Yahya Osais, Computer Engineering Dr. Uthman Baroudi, Computer Engineering

Project code	Title	PI Department	Investigators
IP112-CES-04	Constructual Renewable Energy Design of the Landscape	Mechanical Engineering	Dr. Prof. Adrian Bejan, Mechanical Engineering Prof. Prof. Bekir S. Yilbas, Mechanical Engineering Prof. Prof. Ahmet Z. Sahin, Mechanical Engineering Prof. Prof. S. Lorente, External-PI
IP112-CES-06	Adsorption of Carbon Dioxide Gas by Chemically Treated Limestone	Chemical Engineering	Dr. Naim M. Faqir, Professor, Chemical Engineering Dr. Reyad A. Shawabkeh, Associate Professor, Chemical Engineering
IP112-CES-07	Investigating the Effect of Impeller Blade Exit on Pressure Fluctuations inside a Double-Volute Pump	Mechanical Engineering	Dr. Atia E. Khalifa, Mechanical Engineering
IP112-CES-12	Multi-objective Well Placement Optimization for Improved Oil Recovery	Petroleum Engineering	Dr. Abeeb A. Awotunde, Petroleum Engineering
IP112-CES-17	Investigation and Modeling of Moisture Damage in Asphalt Binder at Nanoscale: Computational Intelligence Approach	Civil Engineering	Dr. Muhammad Arifuzzaman, Civil Engineering Dr. Anwar Ul-Hamid, Research Institute Dr. Nedal T. Ratrout, Civil Engineering Mr. Mirza Ghouse Baig, Civil Engineering Dr. Rafiqul A Tarefder, Civil Engineering
IP112-CES-18	Statistical Characterization of Indefinite Quadratic Forms and their Applications	Electrical Engineering	Dr. Tareq Y. Al-Naffouri, Electrical Engineering Mr. Muhammad Saqib Sohail, Electrical Engineering Prof. Aris L Moustakas, Physics
IP112-CES-19	Design and Test of Miniature Dynamometer for Cutting Forces Measurement in Meso/Micro Scale NC Machining	Mechanical Engineering	Dr. Samir Mekid, Mechanical Engineering

Project code	Title	PI Department	Investigators
IP112-CES-20	Electrochemical Investigations on the Corrosion Behaviour of Si-containing Stainless Steel Alloys	Mechanical Engineering	Dr. Ihsan-ul-haq Toor, Mechanical Engineering Dr. Naseer Al-Aqeeli, Mechanical Engineering Mr. Faheemuddin Patel, Mechanical Engineering Mr. Murtuza Ali Baig Mirza, Mechanical Engineering Prof. H.S.Kwon, Mechanical Engineering
IP112-CES-22	A General Stochastic Model for Refinery Planning Under Uncertainty	Chemical Engineering	Dr. Mohammed Ba-Shammakh, Chemical Engineering
IP112-CES-23	Development of Electrospun Nanofiber Mats for Filtration Media	Mechanical Engineering	Dr. Zafarullah Khan, Mechanical Engineering Mr. Sarfaraz Ahmed Furquan, Mechanical Engineering
IP112-CES-25	Fitness-for-Service Analysis for Pipes with Metal Loss Defects Using Non-Dimensional Finite Element Method	Mechanical Engineering	Dr. Sulaman Pashah, Mechanical Engineering Prof. Abul Fazal M. Arif, Mechanical Engineering Dr. Yaagoub N. Al-Nassar, Mechanical Engineering
IP112-CES-27	PARAMICS Model Development for Local Traffic Conditions in Saudi Arabia	Civil Engineering	Dr. Nedat T. Ratrou, Civil Engineering Dr. Syed Masiur Rahman, Research Institute
IP112-CIM-24	Adjustment of Foreign Faculty in Saudi Arabian Universities – Their Role in Self-Initiated Expatriate Specific Human Resources Management Practices	Management and Marketing	Dr.. Muhammad Jameel Qazi, Management and Marketing
IP112-CIM-26	Forecast Efficiency of Three Major Macroeconomic Variables	Finance	Dr. Fazlul Hoque Miah, Finance Dr. Khaled Binali, Finance Prof. Muhammad Saifur Rahman, Finance
IP112-CS-01	A New Nonstandard Topology and F-asymptotic Hulls	Mathematical Science	Dr. Adel Khalfallah, Mathematical Science
IP112-CS-05	Symmetry Analysis of Heat Equation on Surfaces of Revolution	Mathematical Science	Dr. M. Tahir Mustafa, Mathematical Science Prof. Hassan Azad, Mathematical Science
IP112-CS-08	Non-Lipschitz Activation Functions in Hopfield Neural Networks	Mathematical Science	Dr. Nasser-eddine Tatar, Mathematical Science

Project code	Title	PI Department	Investigators
IP112-CS-09	Viscoelastically Damped Timoshenko Beams	Mathematical Science	Dr. Nasser-eddine Tatar, Mathematical Science
IP112-CS-11	Investigation of Doping and Lattice Distortion Effects on the Evolution of the Magnetic and Transport Properties of $\text{Nd}(1-x)(\text{Sr}(1-y)\text{A}'y)\text{xMnO}_3$ Manganite.	Physics	Dr. Ahmad I Mansour, Physics Prof. Khalil H. Ziq, Physics Dr. Ahmed F. Salem, Physics
IP112-CS-15	Determination of Nitrosoamines in the Water Samples Using Polymer-Coated Membrane Extraction	Chemistry	Dr. Chanbasha Basheer, Chemistry
IP112-CS-21	Optimality Conditions and Duality in Interval-Valued Multi-objective Optimization	Mathematical Science	Dr. Izhar Ahmad, Mathematical Science Prof. Izhar Ahmad, Mathematical Science Prof. S. Al-Homidan, Mathematical Science Prof. Mohammad Shamsuzzoha, Chemical Engineering
IP112-CS-28	Growth and Characterization of Ti-doped ZnO: A potential Dilute Magnetic Oxide	Physics	Dr. Baseer Haider, Physics



**4. JUNIOR FACULTY GRANT PROPOSALS RECEIVED  
IN THE SPRING SEMESTER OF 2011-12 UNDER REVIEW**

Project code	Title	PI Department	Investigators
JP112-CES-02	Investigation for the Effect of Nonlinearities on the Response of Cantilever MEMS Sensors under Mechanical Shock and Electrostatic Loading	Mechanical Engineering	Dr. Hassan Ouakad, Mechanical Engineering Dr. Hussain Al-Qahtani, Mechanical Engineering
JP112-CES-03	Reservoir Parameter Estimation Using Time-Lapse Seismic With Wavelet Transform	Petroleum Engineering	Dr. Abee A. Awotunde, Petroleum Engineering
JP112-CES-04	Development of a late-on-isc Tribometer for Tribological Testing of Polymer Films under Dry and Lubricated Conditions	Mechanical Engineering	Dr. Mohammad Abdul Samad, Mechanical Engineering Prof. Amro Al-Qutub, Mechanical Engineering
JP112-CES-05	Optimal Control of a Coupling Membrane Reactor Integrating Dehydrogenation of Ethylbenzene with Hydrogenation of Nitrobenzene	Chemical Engineering	Dr. Nabeel Salim Abo-Ghander, Chemical Engineering Prof. Jan Van Impe and Dr. Filip Logist, Chemical Engineering
JP112-CES-06	Vibration Analysis of Micro-Beam with Flexible Support Conditions	Mechanical Engineering	Dr. Salem Bashmal, Mechanical Engineering Prof. Yahia Khulief, Mechanical Engineering
JP112-CES-08	Modeling Anisotropic Cyclic Behavior Using Finite Element Method	Mechanical Engineering	Dr. Jafar Albinmoussa, Mechanical Engineering Prof. Abul Fazal M. Arif, Mechanical Engineering
JP112-CIM-07	Enterprise Resource Planning System Workaround Practices: A Cybernetic Perspective	Accounting Management & Information Systems	Dr. Ahmed Alojairi, Accounting Management & Information Systems
JP112-CS-01	Clustering Edges and Vertices in a Network Using Fuzzy Logic, Case Study: News Documents.	Mathematical Science	Dr. Walid Sharabati, Mathematical Science Prof. Hassen Muttlak, Mathematical Science



**5. BOOKWRITING PROPOSALS RECEIVED**  
**IN THE SPRING SEMESTER OF 2011-12 UNDER REVIEW**

Project code	Title	PI Department	Investigators
BW112-HBCC-01	Computer Applications: Practical Perspective	Hafr Al-Batin Community College	Dr. Mubarak S. Almutairi, Hafr Al-Batin Community College Dr. Mohammed Lawan, Hafr Al-Batin Community College
BW112-CES-02	Laser Surface Processing and Model Studies	Mechanical Engineering	Dr. Bekir Sami Yilbas and Dr. Shahzada Zaman Shuja



**6. FAST-TRACK PROPOSALS RECEIVED FOR FUNDING DURING THE SPRING  
SEMESTER OF 2011-2012**

Project code	Title	PI Department	Investigators
FT112-CCSE-01	Model Predictive Control of Small-Scale Reverse Osmosis Desalination Unit	Systems Engineering	Dr. Muajhed Al-Dhaifallah, Systems Engineering
FT112-CES-02	Effect of Boiler Swing Rate on NOx Emissions	Mechanical Engineering	Dr. Iyad Alzaharnah, Mechanical Engineering Dr. Iyad Alzaharnah, Mechanical Engineering Prof. Mohamed Habib, Mechanical Engineering Prof. Mustafa Al-Shafei, Systems Engineering
FT112-CES-03	Adaptive Decision Feedback Equalization for Wideband MIMO Systems Using Constrained Optimization Techniques	Electrical Engineering	Dr. Azzedine Zerguine, Electrical Engineering Mr. Syed Muhammad Asad, Hafr Al-Batin Community College Mr. Khalid Mahmood, Hafr Al-Batin Community College Dr. Muhammad Moinuddin, Electrical Engineering
FT112-CES-04	Performance of Dual-Hop Relay Networks Employing Fixed-Gain Amplify-and-Forward with Interference at Destination	Electrical Engineering	Dr. Salam A. Zummo, Electrical Engineering
FT112-CES-05	New Relay Selection Schemes for Amplify-and-Forward Dual-Hop Relay Networks Based on Switch-and-Stay and Switch-and-Examine Combining	Electrical Engineering	Dr. Salam A. Zummo, Electrical Engineering
FT112-CES-06	Novel Technique for Measuring the Dielectric Constant and the Conductivity of Substances Through Open-end Waveguide Radiating into Cavity Resonator	Electrical Engineering	Dr. Essam E. Hassan, Electrical Engineering Prof. Hassan A. Ragheb, Electrical Engineering

Project code	Title	PI Department	Investigators
FT112-CES-07	Design of a Directive Ferrite Loaded Waveguide Antenna for Multi-directional Beam Steering	Electrical Engineering	Dr. Sheikh Sharif Iqbal Mitu, Electrical Engineering Prof. Hassan Raghav Aly, Electrical Engineering
FT112-CES-08	Novel Alternative Designs of Pipe Sleeves	Mechanical Engineering	Dr. Hussain Al-Qahtani, Mechanical Engineering Prof. Abul Fazal Arif, Mechanical Engineering Dr. Shafique Khan, Mechanical Engineering Dr. Hussain Al-Musalm, Mechanical Engineering
FT112-CS-09	Diffusion of Inertial Particles in Turbulent Flows	Mathematical Science	Dr. Nadeem Malik, Mathematical Science
FT112-CS-10	Symmetry Classification, Noether Symmetries, Conservation Laws and Exact Solutions of Wave Equation on Surfaces of Revolution	Mathematical Science	Dr. M. Tahir Mustafa, Mathematical Science Dr. Ahmad Y. Al-Dweik, Mathematical Science
FT112-CS-11	Symmetry Analysis of the wWave Equation on a Non-static Analogue of the Bertotti-Robinson Spacetime	Mathematical Science	Dr. M. Tahir Mustafa, Mathematical Science Prof. Asghar Qadir, Mathematical Science Dr. Ahmad Y. Al-Dweik, Mathematical Science
FT112-CS-12	Inference on the Exponential Parameters under Noise Perturbations	Mathematical Science	Dr. H. Muttalak, Mathematical Science Prof. E. Al-Sawi, Mathematical Science
FT112-CS-13	Studies on mMicro-organisms that Degrade Petroleum Products in the Coastal Region of the Jubail Industrial Area	Chemistry	Dr. Alexis Nzila, Chemistry Prof. Dr. Assad Al-Thukair, Chemistry

**7. LIST OF RESEARCH GROUP PROPOSALS SUBMITTED FOR FUNDING  
DURING THE SPRING SEMESTER OF THE ACADEMIC YEAR 2011-2012**

Project code	Title	PI Department	Investigators
RG112-CCSE-06	Distributed Control over Wireless Networks	Systems Engineering	Dr. Abdul-Wahed A. Saif, Systems Engineering Dr. Uthman Baroudi, Computer Engineering Prof. Magdi S. Mahmoud, Systems Engineering Dr. Marwan H. Abu-Amara, Computer Engineering
RG112-CES-01	Compact-size Metamaterial-based Antennas for Broadband Wireless Handheld Devices	Electrical Engineering	Dr. Mohammad S. Sharawi, Electrical Engineering Dr. Wessam Mesbah, Electrical Engineering Dr. Oualid Hammi, Electrical Engineering Prof. Daniel N. Aloj, Electrical Engineering
RG112-CES-03	A Study to Predict Permeability Using Mercury Injection Data	Petroleum Engineering	Dr. M. Enamul Hossain, Petroleum Engineering Dr. Hasan Al-Yousef, Petroleum Engineering
RG112-CES-08	Behavioral Modeling and Impairments Compensation of Broadband Transmitters for LTE-Advanced Applications	Electrical Engineering	Dr. Oualid Hammi, Electrical Engineering Prof. Mohammad S. Sharawi, Electrical Engineering Dr. Souheil Bensmida, External-PI
RG112-CES-09	Heat of Hydration-based Modeling for Mass Concrete Characterization	Civil Engineering	Dr. M.H. Baluch, Civil Engineering Dr. M.K. Rahman, Centre of Engineering Research Dr. A.H. Al-Gadhib, Civil Engineering
RG112-CES-12	Adaptive Channel Equalization Using Particle Swarm Optimization	Electrical Engineering	Dr. Azzedine Zerguine, Electrical Engineering Dr. Ali Al-Awami, Electrical Engineering Dr. Ali Al-Shaikhi, Electrical Engineering
RG112-CES-13	Design of a Metamaterial-based Directive Microstrip Antenna Array with	Electrical Engineering	Dr. Sheikh Sharif Iqbal Mitu, Electrical Engineering Prof. Sheikh Asrar Ul Haq, Electrical Engineering Prof. Raj Mittra, Electrical Engineering

Project code	Title	PI Department	Investigators
RG112-CS-02	Effects of Pulsed Nd:YAG Laser Fluence on the Structural Properties and Valence States of Transition Metal Ions in Phosphate Glasses	Physics	Dr. Prof. G. D. Khattak, Physics Prof. Mohammed Ashraf Gondal, Physics Dr. Abdelkrim Mekki, Physics Dr. M.S. Kariapper, Physics Mr. M.A. Dastageer, Physics
RG112-CS-04	Unifying Zariski-like Topologies for Modules	Mathematical Science	Dr. Jawad Abuihlail, Mathematical Science Prof. Othman Echi, Mathematical Science  Dr. Parsa Bakhtari, Mathematical Science
RG112-CS-05	PT- Symmetric Potential Effect on Nonlinear Wave Equation	Physics	Dr. Saeed Al-Marzoug, Physics Prof. Hocine Bahlouli, Physics  Prof. Abdelmajid Taki, Physics
RG112-CS-07	Forecasting and Manipulating Rogue Waves in Nonlinear Media	Physics	Dr. Bahlouli, Physics Prof. Al-Marzoug, Physics Prof. Al-Amoudi, Physics Prof. Al-Khawaja / Taki, Physics
RG112-CS-10	NO <sub>2</sub> Detection Using Tunable Diode Laser Absorption Spectroscopy in Blue Spectral Region.	Physics	Dr. Khaled Gasmi, Physics Dr. Abdulaziz Aljalal, Physics
RG112-CS-14	Embedding dimension of Tensor Products of k-Algebras and Defect of Regularity	Mathematical Science	Dr. S. Kabbaj, Mathematical Science



**LIST OF SPECIAL SOCIETAL GRANT RESEARCH PROPOSALS SUBMITTED  
FOR FUNDING DURING THE SPRING SEMESTER OF THE ACADEMIC YEAR  
2011-2012**

<b>Project code</b>	<b>Title</b>	<b>PI Department</b>	<b>Investigators</b>
SS112-CASS-01	Saudi Arabia and the United States of America: A Multidisciplinary Exploration of Views & Attitudes	General Studies	Dr. Shafi Aldamer, General Studies Dr. Christopher Garris, General Studies
SS112-CASS-02	Social, Institutional and Psychological Determinants of Smoking initiation and Smoking Cessation among Male University Students in Saudi Arabia	General Studies	Dr. Guoping Jiang, General Studies Dr. Ahmad Bendania, General Studies
SS112-CS-03	Investigating the Link between the English Language Proficiency Level of Students and their Mathematics Achievements	Mathematical Science	Dr. Balarabe Yushau, Mathematical Science Dr. M. H. Omar, Mathematical Science Dr. Abdulaziz Al-Assaf, Mathematical Science



## **8. PUBLICATIONS IN REFEREED JOURNALS REPORTED AFTER JANUARY 2012**

### **College of Engineering Sciences**

#### **Electrical Engineering**

1. "Utility Maximization for Layered Transmission Using the Broadcast Approach," **Shafeq, M., Mesbah, W. and Alnuweiri, H.**, Wireless Communications IEEE Transactions, Volume 11, Issue 3, pp. 1228 – 1238, March 2012.
2. "A New Diode-based Curve-fitting Predistortion Lineariser for GaN power Amplifier," **Abuelma'atti, M. T., Abuelma'atti, Abdullah M. T. and Yeung, T. K.**, International Journal of Electronics, Vol. 99, 2012, pp. 719-734.
3. "Improved Analysis of the Intermodulation Performance of Ferroelectric Thin-film and Bulk-based Varactors," **Abuelma'atti, M.T.**, Analog Integrated Circuits and Signal Processing, Vol. 71, pp. 237-244, 2012.
4. "Aperture Stacked Microstrip Equal/Unequal Power Divider," **Sheikh, S. I., Taiwo, S. L. and Sharawi, M. S.**, Microwave and Optical Technology Letters (MOTL), Vol. 54, No. 3, pp. 784-785, March 2012.
5. "A Compact Dual-Band RF Front-End and Board Design for Vehicular Platforms," **Sharawi, M. S. and Aloï, D.**, International Journal of Electronics, Vol. 99, No. 3, pp. 333-349, March 2012.
6. "A 4-Shaped 2x2 Multi-Standard Compact MIMO Antenna System for LTE Mobile Handsets," **Sharawi, M. S., Jan, M. A. and Aloï, D.**, IET Microwaves, Antennas and Propagation, Vol. 6, No. 6, June 2012.
7. "Spatial Estimation of Wind Speed," **Mohandes, M., Rehman, S. and Rahman, S. M.**, International Journal of Energy Research 2012, 36:545-552.
8. "A Signer-Independent Arabic Sign Language Recognition System using Face Detection, Geometric Features, and a Hidden Markov Model," **Mohandes, M., Deriche, M., Johar, M. and Ilyas, S.**, The Journal of Computers and Electrical Engineering, Vol. 38, Issue, 2, March 2012.
9. "An Optimized Low Latency Digital Predistorter Implementation for FPGA Processors with Signal Bandwidths up to 60MHz," **Kwan, A., Ghannouchi, F. M., Hammi, O., Helaoui, M. and Smith, M. R.**, IET Science Measurements & Technology, Vol. 6, Issue: 3, pp. 181-188, May 2012.
10. "Generic Load-pull Based Design Methodology for Performance Optimization of Energy-efficient Doherty Amplifiers," **Darraj, R., Ghannouchi, F. M. and Hammi, O.**, IET Science Measurements & Technology, Vol. 6, Issue: 3, pp. 132-138, May 2012.
11. "An Optimized Low Latency Digital Predistorter Implementation for FPGA Processors with Signal Bandwidths up to 60MHz," **Kwan, A., Ghannouchi, F. M., Hammi, O., Helaoui, M. and Smith, M. R.**, IET Science Measurements & Technology, Vol. 6, Issue: 3, May 2012, pp. 181-188.

12. "Generic Load-pull Based Design Methodology for Performance Optimization of Energy-efficient Doherty Amplifiers," **Darraji, R., Ghannouchi, F. M. and Hammi, O.,** IET Science Measurements & Technology, Vol. 6, Issue: 3, May 2012, pp. 132-138.

#### Mechanical Engineering

1. "Fatigue Crack Growth Behavior in Powder-metallurgy 6061 Aluminum Alloy Reinforced with Submicron Al<sub>2</sub>O<sub>3</sub> Particulates," **Gasem, Z.,** Composites Part B, DOI: 10.1016, May 2012.
2. "Effect of Vanadium Contaminated Fuel on Bond Coat and Bond Coat/Top Coat Interface of Thermal Barrier Coatings," **Khalid, A., Gasem, Z.,** Applied Mechanics and Materials , Vols. 110-116, 2012, pp 886-891.
3. "Investigation on Wall Mass Transfer Characteristics Downstream of an Orifice," **Al-Gammal, M., Ahmed, Wael, H. and Ching, C. Y.,** Nuclear Engineering and Design, Vol. 242, pp. 353-360, 2012.
4. "Computation Fluid Dynamic Simulation of Small leaks in Water pipelines for Direct Leak Pressure Transduction," **Ben-Mansour, R. Habib, M. A., Khalifa, A., Youcef-Toumi, K. and Chatzigeorgiou, D.,** Journal of Computer & Fluids (2012), doi:10.1016/j.compfluid.2011.12.016.
5. "Acoustic Detection of Leaks in Water Pipelines Using in-pipe Measurements," **Khulief, Y. A., Khalifa, A., Ben-Mansour R. and Habib, M.,** ASCE's Journal of Pipeline Systems - Engineering and Practice. Accepted June 2011, May 2012 issue.
6. "Exploring the Effect of a V-Shaped Cut at Impeller Blades Exit on Flow Induced Vibration and Performance of a Boiler Feed Pump," **Al-Qutub, A., Khalifa, A., Al-Sulaiman, F.,** J. Pressure Vessel Technol., April 2012, Volume 134, Issue 2, 021301 (8 pages), doi:10.1115/1.4004798.
7. "Modeling of Droplet Entrainment in Co-current Annular Two-Phase Flow: A New Approach," **Al-Sarkhi, A., Sarica, C. and Qurashi, B.,** International Journal of Multiphase Flow, March 2012, Vol 39, pp 21-28.
8. "Effect of Mixing on Frictional Loss Reduction by Drag Reducing Polymer in Annular Horizontal Two-phase Flows," **Al-Sarkhi, A.,** International Journal of Multiphase Flow, Vol. 39, March 2012, pp186-192.
9. "Exploring Fog Water Harvesting Potential and Quality in the Asir Region, Kingdom of Saudi Arabia," **Gandhidasan, P. and Abualhamayel, H. I.,** Pure and Applied Geophysics, Vol. 169, Nos. 5-6, 2012, pp. 1019-1036.

#### Petroleum Engineering Department

1. "Prediction of Crude Oil Viscosity Curve Using Artificial Intelligence Techniques," **Al-Marhoun, M. A., Nizamuddin, S., Abdul Raheem, A. A., Shujath, A. S. and Muhammadain, A. A.,** Journal of Petroleum Science and Engineering, Vol. 86-87, pp.111-117, April 2012.

2. "Comprehensive Modeling of Complex Petroleum Phenomena with an Engineering Approach," **Hossain, M. E.**, (2012). Journal of Porous Media. Vol. 15, No. 2, pp. 173 – 186.

### College of Sciences

#### Chemistry Department

1. "Polyzwitterion-to-Polyampholyte Transition Using pH-Responsive Cycloterpolymer of Diallyldimethylammonium Chloride, (N,N-Diallylammonio)methanecarboxylate and Sulfur Dioxide," **Al-Muallem, H. A.**, Journal of Applied Polymer Science, Vol.125, Issue 3, August 2012, pp. 1959-1969.
2. "Compositional Dependence of DC Electrical Conductivity of SrO-Vanadate Glasses," **Khattak, G. D., Mekki, A. and Siddiqui, M. N.**, Solid State Ionics, March 2012, Vol. 211, pp. 5-11.
3. "Morphology and Antifungal Effect of NanoZnO and NanoPd Doped NanoZnO against Aspergillus and Candida," **Gondal, M. A., Alzahrani, A. J., Randhawa, M. A. and Siddiqui, M. N.**, Journal of Environmental Science and Health Part A, May 2012, Vol. 47(10), 1413-1418.
4. "Chromium Removal from Water by Activated Carbon Developed from Waste Rubber Tires," **Gupta, V.K., Ali, I., Saleh, T.A., Siddiqui, M. N. and Agarwal, S.**, Environmental Science and Pollution Research, 2012 pp. 1-8.
5. "Intrinsic Fluorescence of High Density Polyethylene Films," **Than Htun, M.**, Journal of Polymer Research, vol. 19, 2012, pp. 1-6.
6. "Combination of Probenecid-sulphadoxine-pyrimethamine for Intermittent Preventive Treatment in Pregnancy," **Gutman, J., Kachur S. P., Slutsker L., Nzila A. and Mutabingwa, T.**, Malaria Journal 2012, Vol. 11, Issue 39, pp.1-10, doi:10.1186/1475-2875-11-39.
7. "Analytical Method Development Using Functionalized Polysulfone Membranes for the Determination of Chlorinated Hydrocarbons in Water," **Nuhu, A. A., Basheer, C., Abu-Thabit, N. Y., Alhooshani, K. and Al-Arfaj, A. R.**, Talanta, Vol 87, 2011, page no 284-289.
8. "Electromembrane Extraction and HPLC Analysis of Haloacetic Acids and Aromatic Acetic Acids in Wastewater," **Alhooshani, K., Basheer, C., Kaur, J., Gjellstad, A., Rasmussen, K. E., Pedersen-Bjergaard, S. and Lee, H. K.**, Talanta, Vol 86, 2011, page nos 109-113.
9. "Carbon Nanofibers Extracted from Soot as a Sorbent for the Determination of Aromatic Amines from Wastewater Effluent Samples," **Vadukumpully, S., Basheer, C., Jeng, C. S. and Valiyaveetil, S.**, Journal of Chromatography A Vol 1218, 2011, page nos 3581-3587.
10. "Liquid-phase and Dispersive Liquid-liquid Microextraction Techniques with Derivatization: Recent Applications in Bioanalysis," **Nuhu, A. A., Basheer, C. and Saad, B.**, Journal of Chromatography B, Vol 879, 2011, page no 1180-1188.

11. "Application of Porous Membrane Protected Micro-solid-phase-extraction Combined with Gas Chromatography–mass Spectrometry for the Determination of Estrogens in Ovarian Cyst Fluid Samples," **Kanimozhi, S., Basheer, C., Narasimhan, K., Liu, L., Koh, S., Xue, F., Choolani, M. and Lee, H. K.**, *Analytica Chimica Acta*, Vol 687, 2011, page nos 56-60
12. "Novel on-site Sample Preparation Approach with a Portable Agitator Using Functional Polymer-coated Multi-fibers for the Microextraction of Organophosphorus Pesticides in Seawater," **Basheer, C., Balaji, G., Chua, S. H., Valiyaveetil, S. and Lee, H. K.**, *Journal of Chromatography A*, Vol 1218, 2011, page no 654-661.
13. "Application of Ionic-liquid Supported Cloud Point Extraction for the Determination of Microcystin-leucine–arginine in Natural Waters," **Pavagadhi, S., Basheer, C. and Balasubramanian, R.**, *Analytica Chimica Acta*, Vol 686, 2011, page nos 87-92.
14. "Recent Analytical Strategies on "Date-Rape, Drugs and its Metabolites," **Basheer, C.**, *Journal of Applied Pharmaceutical Science*, Vol 06, 2011, page nos, 21-28.
15. "Photo-catalyzed Degradation of Hazardous Dye Methyl Orange by Use of a Composite Catalyst Consisting of Multiwalled Carbon Nanotubes and Titanium Dioxide," **Saleh, T. A. and Gupta, V. K.**, *Journal of Colloid and Interface Science*, 371 (2012) 101-106, doi: 10.1016/j.jcis.2011.12.038.
16. "CNT/Magnesium Oxide Composite for Lead(II) Removal from Water," **Gupta, V. K. and Saleh, T. A.**, *Environ Sci Pollut Res*, 19 (2012) 1224–1228, DOI: 10.1007/s11356-011-0670-6.
17. "Synthesis of Nickel Oxide Nanoparticles Using Pulsed Laser Ablation in Liquids and their Optical Characterization," **Gondal, M. A., Saleh, T. A. and Drmosh, Q. A.**, *Applied Surface Science*, 258 (2012) 6982-6986 Doi.org/10.1016/j.apsusc.2012.03.147.
18. "Portable System of Programmable Syringe Pump with Potentiometer for Determination of Promethazine in Pharmaceutical Applications," **Saleh, T. A. and Abulkibash, A. M.**, *Pharmaceutical Journal*, 20 (2012) 155–160 DOI:10.1016/j.jsps.2011.08.005.
19. "Visual Detection of Single-base Mismatches in DNA Using Hairpin Oligonucleotide with Double-target DNA Binding Sequences and Gold Nanoparticles," **Hea, Y., Zhang, X., Zhang, S., Kris, M., Man, F., Kawde, A. and Liu, G.**, *Biosensors and Bioelectronics*, vol. 34 no.1, p37-43, 2012.

#### Earth Sciences Department

1. "Reply to Comment on Shear Wave Profile from Surface Wave Inversion: the Impact of Uncertainty on Seismic Site Response Analysis," **Boaga, J., Vignoli, G. and Cassiani, G.**, *Journal of Geophysics and Engineering*, 9, (IF=0.805; IRA=C). 2012, 244-246. DOI:10.1088/1742-2132/9/2/244.
2. "From Surface Wave Inversion to Seismic Site Response Prediction: Beyond the 1D Approach," **Boaga, J., Renzi, S., Vignoli, G., Deiana, R. and Cassiani, G.**, *Soil Dynamics and Earthquake Engineering*, 36, 2012 (IF=1.010; IRA=A), 38-51. DOI:10.1016/j.soildyn.2012.01.001.

3. "Malignant Mesothelioma: Facts, Myths and Hypotheses," **Carbone, M., Ly, B. H., Dodson, R. F., Pagano, I., Morris, P. T., Dogan, A. U., Gazdar, A. F., Pass, H. and Yang, H.**, Journal of Cellular Physiology, 2012, (IF=3.986; IRA=A), 227:44-58, DOI: 10.1002/jcp.22724
4. "Quantitative Mineralogical Properties (morphology-chemistry-structure) of Pharmaceutical Grade Kaolinites and Recommendations to Regulatory Agencies," **Dogan, M., Dogan, A.U., Aburub, A., Botha, A. and Wurster, D.E.**, Microscopy and Microanalysis, (IF=3.259; IRA=B), 2012, 18:143-151.
5. "Bounds for the Resistivity Anisotropy Ratio in Thinly-laminated Sand-shale," **Korvin, G.**, Petrophysics, The SPWLA Journal of Formation Evaluation & Reservoir Description. (IF=0.315; IRA=not listed), 2012, 53(1): 14-21.
6. "Campanian Agglutinated Foraminifera from the Lomonosov Ridge, IODP Leg 302, Arctic Coring Expedition," **Setoyama, E., Kaminski, M. A. & Tyszka, J.**, Micropaleontology, (IF=0.561; IRA=C), 2012, 57(6): 507-530.
7. "*Arthrodendron borberensis* sp. nov., a Large Protist (Foraminifera) from the Pagliaro Formation (Paleocene), Northern Apennines, Italy," **Uchman, A., Kaminski M. A. and Rattazzi, B.** Geological Quarterly, Adquisiciones (IF=0.500; IRA=C), 51(1) Published online March 2012.
8. "Selective Mineral Composition, Functional Test Morphology and Paleoecology of the Agglutinated Foraminiferal Genus *Colominella* Popescu, 1998 in the Mediterranean Pliocene (Liguria, Italy)," **Mancin, N., Basso, E., Pirini C. and Kaminski, M. A.**, Geologica Carpathica, (IF=0.909; IRA=C) in press.
9. "Deep-sea Benthic Foraminiferal (Calcareous Elongated Cylindrical) Record across the Eocene-Oligocene Transition in the North Atlantic Ocean (ODP Hole 647A)," **Ortiz, S. and Kaminski, M. A.**, Journal of Foraminiferal Research, (IF=1.431; IRA=B) in press.
10. "Geophysical Characterization of a Small Pre-Alpine Catchment," **Vignoli, G., Cassiani, G., Deiana, R., Rossi, M., Boaga J. and Fabbri, P.**, Journal of Applied Geophysics, (IF=1.185; IRA=B), 2012, 80, 32-42. DOI:10.1016/j.jappgeo.2012.01.007.
11. "The Camoebian Assemblages as Proxies of Seasonality in Sadatal: A Lake in the Ganga-Yamuna Plains of North India," **Farooqui, A., Kumar, A. and Swindles, G. T.**, Palaeontologia Electronica (IF=not listed; IRA=C), 2012 (PE Article Number: 15.1.3A), 15(1): 1-19.
12. "Guest Editorial, Paleotsunami Issue," **Kumar, A. and Nistor, I.**, Natural Hazards (IF=1.398; IRA=B) 2012 DOI: 10.1007/s11069-011-9967-5, p. 1-4.
13. "Hydrocarbon Exploration and Production-a Balance between Benefits to the Society and Impact on the Environment," **Adebayo A., and Tawabini, B.** Pet Environ Biotechnol, 2012, Vol. 3, Issue No. 3.
14. "Constrained Polynomial Fitting for Recovery of Regional Gravity," **Abokhodair, A., A.**, Geophysical Prospecting, 2011, 59, 749-759.
15. "Least Squares Digital Differentiators (LSDD) - The 2-D Subclass," **Abokhodair, A. A.** Int'l Conf. Scientific Computing - CSC'11, 2011, 322-324.



16. "Passive Microseismic Experiments at King Fahd University of Petroleum and Minerals in Saudi Arabia," **Kaka, S., I.**, 2012, Seismological Research Letters, in press.

#### Department of Mathematics & Statistics

1. On the Conservation Laws for a Certain Class of Nonlinear Wave Equation via a new conservation theorem," **Al-Dweik, A. Y.**, Communications in Nonlinear Science and Numerical Simulation, 17, no. 4, (2012), 1566-1575.
2. "Closed Form Solutions for Thermal Stress Field Due to Nonequilibrium Heating during Laser Short-pulse Irradiation," **Yilbas, B. S. and Al-Dweik, A.Y.**, Physica B: Condensed Matter, 407, no. 12, (2012), 2169-2175.
3. "Duality in Nondifferentiable Minimax Fractional Programming with B-(p,r)-invexity", **Ahmad, I., Gupta, S. K., Kailey, N. and Agarwal, R. P.**, Journal of Inequalities and Applications, 75, (2011), 1-4.
4. "Invariant Boundary Value Problems for a Fourth-order Dynamic Euler-Bernoulli Beam equation," **Bokhari, A. H., Mahomad, F. M. and Zaman, F. D.**, Journal of Mathematical Physics, 53, 043703 (2012).
5. "Approximate Conservation Laws of Nonlinear Perturbed Heat and Wave Equations," **Bokhari A.H., Johnpillai, A.G., Mahomed, F.M. and Zaman, F.D.**, Nonlinear Analysis-Real world Applications, doi:10.1016/j.nonrwa.2012.04.011.
6. "Complementarity Problems via Common Fixed Points in Vector Lattices," **Abbas, M., Khan, A. R. and Nemeth, Z.**, Fixed Point Theory and Applications, (2012), 2012:60.
7. "An Implicit Algorithm for Two Finite Families of Nonexpansive Maps in Hyperbolic Spaces," **Khan, A. R., Fukharuddin, H. and Khan, M. A. A.**, Fixed Point Theory and Applications, (2012), 2012:54.
8. "Common Fixed Point and Approximation Results for Generalized (f,g) Weak Contractions," **Akbar, F., Khan, A. R. and Sultana, N.**, Fixed Point Theory and Applications, (2012), 2012:7.
9. "Unified Higher Order Duality in Nondifferentiable Multiobjective Programming Involving Cones," **Ahmad, I.**, Mathematical and Computer Modelling, 55, no.3-4, (2012), 419-425.
10. "Quasihomogeneous Toeplitz Operators on the Harmonic Bergman Space," **Louhich, I. and Zakariasy, L.**, Archiv der Mathematik, 98, no.1, (2012), 49-60.
11. "Uniform Decay in Viscoelasticity for Kernels with Small Non-Decreasingness Zones," **Tatar, N.-e.**, Appl. Math. Comput., no.218 (2012), 7939-7946.
12. "Integral Domains with Boolean t-Class Semigroups," **Kabbaj, S. and Mimouni, A.**, Arabian Journal of Mathematics, vol. 1, (2012), 89-95.
13. "Trace Properties of Integral Domains, II" **Lucas, T. G and Mimouni, A.**, Communications in Algebra, 40, no.2, (2012), 497-513.



14. "Duals and Transforms of Ideals in PVMDs," **BenObaid, A., and Mimouni, A.,** Communications in Algebra, 40 , no.1, (2012), 233-247.
15. "Well-Centered Overrings of a Commutative Ring in Pullbacks and Trivial Extensions," **Mahdou, N., and Mimouni, A.,** Rocky Mountain Journal of Mathematics, 42, no.1, (2012), 223-234.
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### **College of Industrial Management**

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## **9. RESEARCH PAPERS PRESENTED AT CONFERENCES REPORTED AFTER JANUARY 2012**

### **College of Engineering Sciences**

#### **Civil Engineering**

1. "Corrosion-based Service Life Prediction of RC Structures Uses Electrochemical and Gravimetric Methods - A Comparative Study," **Al-Ghamdi, S. A., Ahmad S. and Lawan A.**, Paper accepted for presentation and publication in the Proceedings of 1st International Congress on Durability of Concrete (ICDC2012), to be held in Trondheim, Norway, June 18-21, 2012.
2. "Loss of Strength of Reinforced Concrete Members from Corrosion Damage", **Azad, A. K., Al-Osta, M., Ahmad, S. and Maslehuddin, M.**, Paper accepted for presentation and publication in the Proceedings of the 4th Middle East Corrosion Conference to be held in Bahrain, February 12-15, 2012.

#### **Electrical Engineering**

1. "Narrow-band Interference Cancellation in OFDM: A Structured Maximum Likelihood Approach," **Sohail, M. S., Al-Naffouri, T. Y. and Al-Ghadhban, S.**, Proceedings of the IEEE International Workshop on Signal Processing Advances in Wireless Communication (SPAWC), Cesme, Turkey, June 2012.
2. "Application of Tagged User Analysis to FU-FB Slotted ALOHA Performance over Frequency Selective Fading Channels," **Masood, K., Sohail, M. S., Sheikh A. U. H. and Haleem, M. A.**, Proceedings of the IEEE Vehicular Technology Conference (VTC), Yokohama, Japan, May 2012.
3. "Enhanced Delay Alignment Method for Behavioral Modeling of Power Amplifiers Exhibiting Memory Effects," **Hammi, O.**, 16<sup>th</sup> IEEE Mediterranean Electrotechnical Conference (MELECON2012), Yasmine Hammamet, Tunisia, , pp. 404-407, March 2012.
4. "Error Sources in COTS WSN Platforms for Impulsive Signal Acquisition Applications," **Ali, H., Sharawi M. S. and Al-Naffouri, T. Y.**, 19<sup>th</sup> IEEE International Conference on Telecommunications, (ICT 2012), Jounieh, Lebanon, April 2012.
5. "A Tunable Dual-Band Dual-Element MIMO Antenna System with Compact Size," **Sharawi, M. S., Jan M. A. and Aloï, D. N.**, 6<sup>th</sup> IEEE 6th European Antennas and Propagation Conference, (EuCAP 2012), Prague, Czech Republic, March 2012.
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8. "A Broadband 1x4 Power Divider with Improved Phase Balance," **Khan, M. U. and Iqbal, S. S.**, 3rd Saudi Scientific Conference, Khobar, pp. 53, May 2012.
9. "Microwave Measurement of the Dielectric Properties of Sand," **Al-Fouri, Y. and Sheikh, S.I.**, 24<sup>th</sup> ARMMS RF & Microwave Society Conference (ARRMS'12), Steventon, England, 23-24 April (2012) (accepted).
10. "A Compressed Sensing Based Method with Support Refinement for Impulsive Noise Cancellation in DSL," **Quadeer, A. A., Sohail, M. S. and Al-Naffouri, T. Y.**, International Conference on Information Science, Signal Processing and their applications (ISSPA), Canada, July 2012.
11. "RIR Estimation Using Impulsive Sources with Sub-Nyquist Sampling," **Rauf, O., Quadeer, A. A., Sharawi, M. S. and Al-Naffouri, T. Y.**, International Conference on Information Science, Signal Processing and their applications (ISSPA), Canada, July 2012.
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13. "Enhanced Delay Alignment Method for Behavioral Modeling of Power Amplifiers Exhibiting Memory Effects," **Hammi, O.**, 16<sup>th</sup> IEEE Mediterranean Electrotechnical Conference (MELECON2012), Yasmine Hammamet, Tunisia, pp. 404-407, March 2012.
14. "Optimizing the Controller of PV System To Enhance The Dynamic Stability of Smart Grid Network," **Khan, M. H. and Abido, M. A.**, The Third International Conference on Intelligent Systems Modelling and Simulation (ISMS 2012), Kota Kinabalu, Malaysia, pp. 96-101, February 8-10, 2012.
15. "RTDS Implementation of the Optimal Autonomous Control of an Inverter-Based Microgrid Using Particle Swarm Optimization," **M. A. Hassan and M. A. Abido**, International Conference on Renewable Energies and Power Quality (ICREPQ'12), Santiago de Compostela, Spain, March 28-30, 2012.
16. "Design and Simulation of Supercapacitor Energy Storage System," **Al-Ramadhan, M. and Abido, M. A.**, International Conference on Renewable Energies and Power Quality (ICREPQ'12), Santiago de Compostela, Spain, March 28-30, 2012.
17. "Optimal Design of Autonomous Microgrid Using Particle Swarm Optimization," **Hassan, M. A., Abido, M. A. and Rahim, A. H. A.**, The 21<sup>st</sup> International Symposium on Power Electronics, Electrical Drives, Automation and Motion (SPEEDAM'12), Sorrento, Italy, June 20-22, 2012.
18. "The psilon-Normalized Sign Regressor Least Mean Fourth (NSRLMF) Adaptive Algorithm," **Ulla Faiz, M. M. and Zerguine, A.**, The 11th International Conference on Information Science, Signal Processing and their Applications (ISSPA'12), July 2012, Montreal, Canada.
19. "Convergence Analysis of a Modified Armijo Rule Step-Size LMF Algorithm," **Asad, S. M. and Zerguine, A.**, The 11th International Conference on Information Science, Signal Processing and their Applications (ISSPA'12), July 2012, Montreal, Canada.

Mechanical Engineering

1. "Hot Corrosion of Air-plasma Sprayed Thermal Barrier Coatings Used in Land-based Gas Turbines," **Gasem Z. and Khalid A.**, 14th Middle East Corrosion Conference and Exhibition, February 12-15, 2012, in Manama, Kingdom of Bahrain.
2. "Water Infiltration in ZSM-5 Zeolites: Effect of Pore Volume and Water Structure," **Maroo, S. C., Humplik, T. Laoui, T. and Wang, E. W.**, Proceeding of the ASME 2012, 3rd Micro/Nanoscale Heat and Mass Transfer International Conference MNHMT2012, 3-6 March 2012, Atlanta, Georgia, USA, pp. 1-7.
3. "Influence of Synthesis Parameters on MFI Zeolite Layer for Reverse Osmosis (RO) Water Desalination Process," **Baroud, T. N. and Laoui, T.**, Proceedings of the 3<sup>rd</sup> National Saudi Student Conference, Al-Khobar, KSA, 28 April – 2 May 2012.
4. "Effect of Seeding Conditions on the Morphology of MFI Zeolite Membrane," **Baroud, T. N., Laoui, T., Muraza, O., Patel, F. and Wang, E.**, Poster paper presented at European Membrane Society – Middle East School of Membrane Technology for Sustainable Water Desalination and Reuse, King Abdullah University of Science and Technology (KAUST), April 28 – May 3, 2012. **The poster paper received the European Membrane Society (EMS) Award for the Best Poster Presentation.**
5. "Removal of Phenol by Carbon Nanotubes and Activated Carbon-a Comparative Analysis," **Hamza, H. A., Atieh, M. A. and Tahar Laoui**, Proceedings of Sixteenth International Water Technology Conference, IWTC, 16, 7-9 May 2012, Istanbul, Turkey, pp. 1-7.
6. "Characterization of Graphene Membranes for Nanofiltration," **O'Hern, S. C., Lee, J., Jain, T., Idrobo, J-C., Laoui, T., Atieh, M. and Karnik, R.**, Abstract in Materials Research Society, Spring Meeting, San Francisco, CA, 9 – 13 April, 2012
7. "Vapor-trapping Membrane for Water Desalination," **Lee, J., O'Hern, S., Rahman, F., Laoui, T. and Karnik, R.**, Abstract in Conference and Exhibition on Desalination for the Environment Clean Water and Energy, Barcelona, Spain, 23 – 26 April, 2012.
8. "Performance Assessment of a Solar Driven Combined Steam and Organic Rankine Cycles," **Al-sulaiman, F. A. and Sahin, A. Z.**, World Renewable Energy Forum, Denver, CO, USA, 13-17, may 2012.

Petroleum Engineering Department

1. "Drilling Fluid: State of the Art and Future Trend," **Apaleke, A. S., Al-Majed, A. and Hossain, M. E.**, Presented at 2012 SPE North Africa Technology Conference and Exhibition (NATC), Paper ID: SPE- 149555, 20-22 February 2012 in Cairo, Egypt, 2012.
2. "Estimating Layers Deliverability in Multi-Layered Gas Reservoirs Using Artificial Intelligence," **Alarfaj, M. K., Abdulraheem, A., Al-Majed, A., and Hossain, M. E.**, presented at the 2012 SPE Saudi Arabia Section Technical Symposium and Exhibition SPE-SAS-321, Al-Khobar, Saudi Arabia, 8–11 April 2012, 2012.
3. "State of the Art and Future Trend of Drilling: An Experimental Study," **Apaleke, A. S., Al-Majed, A. and Hossain, M. E.**, presented at the 2012 SPE Latin America and Caribbean Petroleum Engineering Conference, Paper ID: SPE- 153676, 16-18 April 2012 in Mexico City, Mexico, 2012.

4. "Development of New Gas Viscosity Correlations," **Al-Nasser, K. S. and Al-Marhoun, M. A.**, Production and Operations Conference and Exhibition held in Doha Qatar, 14–16 May 2012. Paper SPE 153239.
5. "New Correlations for Dew-Point Pressure for Gas Condensate," **Al-Dhamen, M. A. and Al-Marhoun, M. A.**, SPE Saudi Arabia section Young Professionals Technical Symposium, 14-16 March 2011, Dhahran, Saudi Arabia.
6. "Effects of Oil Compressibility on Production Performance of Fractured Reservoirs Evaluated by Streamline Dual-Porosity Simulation," **Tanaka, S., Arihara, N. and Al-Marhoun, M. A.**, Annual Conference and Exhibition held in Barcelona, Spain, 14–17 June 2010. Paper SPE 130397, SPE EUROPEC/EAGE.
7. "Evaluation of Oil Compressibility Effects on Pressure Maintenance in Naturally Fractured Reservoirs Using Streamline Simulation," **Tanaka, S., Arihara, N. and Al-Marhoun, M. A.**, Paper SPE 131716, Proceedings, CPS/SPE International Oil & Gas Conference and Exhibition in China held in Beijing, China, 8–10 June 2010.

### College of Sciences

#### Chemistry Department

1. "Bis-Ligated Ti and Zr Complexes of Chelating N-Heterocyclic Carbenes," **El-Batta, A. and Grubbs, R. H.**, 243<sup>rd</sup> American Chemical Society National Meeting, San Diego, USA, March 25-29, 2012.
2. "Non-catalytic Deep Desulfurization of Model Fuel Oil," **Siddiqui, M. N.**, Alhooshani, K. R. and M. A. Gondal, 243<sup>rd</sup> ACS National Meeting & Exposition, Anaheim, CA, USA, Preprints, Division of Fuel Chemistry, 57(1), 764-765, March 25-29, 2012.
3. "Development of Automated Liquid-Phase Microextraction-Gas Chromatography/Mass Spectrometry," Lahey, C. M., **Basheer, C.**, Loo, L. C., Lee, H. K., 59<sup>th</sup> American Society for Mass Spectrometry (ASMS) Conference on Mass Spectrometry and Allied Topics. Denver, CO, USA. From 5.–9. June 2011.
4. "Novel Analytical Method Development Using Electrical Potential," **Basheer, C.**, American Chemical Society 241<sup>st</sup> National Meeting, Anaheim (CA From 27-31 March 2011.
5. "Miniaturized Analytical Techniques for Environmental and Reaction Engineering Applications," **Basheer, C.**, 2<sup>nd</sup> international Laboratory technology conferences and Exhibition, Qatar, 8-12-Oct-2011.
6. "Removal of Polycyclic Hydrocarbons Using Calcium Carbonate Nanoparticles from Avian Eggshell," **Basheer, C.**, 14<sup>th</sup> Asia Pacific Confederation of chemical engineering congress (APCCHE 2012), Singapore, February 2012, 21-24.
7. "Field-Deployable Electrochemical Sensors for Heavy Metals in Potable Waters of Saudi Arabia," **Kawde, A.**, The 85<sup>th</sup> Petroleum Environmental Research Forum (PERF) Meeting, Saudi Aramco, Technical Exchange Center, Dhahran, Saudi Arabia, March 10– 11, 2012.
8. "Analytical Determination of Trace Ciprofloxacin Antibiotic Concentrations Inpure and Drug Formulation Forms," **Kawde, A.**, The 243<sup>rd</sup> ACS National Meeting, San Diego, California, March 25-29, 2012.

9. "Development of point-of-care biosensor: Astep forward toward breast cancer diagnosis," **Liu, G., Alhooshani, K., Diab, A. and Kawde, A.,** The 243<sup>rd</sup> ACS National Meeting, SanDiego, California, March 25-29, 2012.
10. "Electrochemical Investigation and Analyticaldetermination of Ciprofloxacin in Pure and Drug Formulations Forms," **Odewunmi, N. A. and A. Kawde** The 3<sup>rd</sup> Scientific Conference of Higher Education Students, Khobar, April 30<sup>th</sup> – May 3, 2012.

#### Earth Sciences Department

1. "High Resolution Stratigraphy and Modeling of the Late Jurassic Arab D Reservoir: An Outcrop Analog Study from Central Saudi Arabia," **Abdullatif, O., Makkawi, M., Al-Ramadan, K., Eltom, H., Abdelgadir, M. and Sitouah M.,** Middle East Geosciences Conference, March, 2012, Bahrain.
2. "High Resolution Sequence Stratigraphy, Diagenesis and Porosity Evolution: Outcrop Analog of the Upper Jurassic Arab D Carbonate Reservoir, Central Saudi Arabia," **Abdullatif, O., Makkawi, M., Al-Ramadan, K., Eltom, H. and Abdelgadir, M.,** International Conference Proceeding on the Geology of the Arabian Plate and the Oman Mountains 7-9<sup>th</sup> January, 2012.
3. "Facies Modeling of Dam and Hofuf Formations: Outcrop Analog of Mixed Carbonate and Siliciclastic (Miocene-Pliocene) Succession, Eastern Saudi Arabia," **Abdullatif O. and Yassin, M.,** European Geosciences Union General Assembly, Wien, Austria 2012,. (Poster presentation).
4. "The Evolution of Paleozoic Wajid Sandstone Formation in Saudi Arabia: Petrographic and Geochemical Approach Utilizing Major, Trace and Rare Earth Elements," **Abdullatif, O., Sidiqi, S., Abdelkadir I. and Mahgoub, M.,** Middle East Geosciences Conference, Bahrain March, 2012,.
5. "Reservoir Modeling of Samaa and Yabus Formation (Tertiary) Agordeed Field, Melut Rift Basin, Sudan," **Badi, A. A., Ali, O. E., Farwa, A. G. and Abdullatif, O. M.,** Sudanese Association of Petroleum Geoscientists (SAPEG) SAPEG 2012 Conference and Exhibition, Khartoum 28<sup>th</sup> February, 2012 (*Oral presentation*)
6. "Geophysical Mapping of Soil Static Characteristics and Monitoring of Soil Dynamic States: An Example on Agricultural Land," **Cassiani, G., Ursino, N., Deiana, R., Vignoli, G., Boaga, J., Rossi, M., Perri, M. T, Blaschek, M., Duttman, R., Meyer, S., Ludwig, R., Soddu, A., Dietrich, P. and Werban, U.,** European Geoscience Union General Assembly, Wien, Austria, 2012 (*Oral presentation*)
7. "Overview of the Sarah Formation, NW Saudi Arabia: An Example for Unconventional Tight Gas Sandstones," **Dogan, A. U., Al-Ramadan, K. and Senalp, M.,** Geological Society of America (GSA) Rocky Mountain Section – 64<sup>th</sup> Annual Meeting, Albuquerque, New Mexico, USA, 9-11 May 2012,.
8. "Quantitative Mineralogy of 'Erionite-Meso' Villages of Cappadocia, Turkey: 'Original-Old' vs. 'Relocated-New' Sarihidir Villages," **Dogan, A. U., Dogan, M. and Ballirano, P.,** Geological Society of America (GSA) Rocky Mountain Section – 64<sup>th</sup> Annual Meeting, Albuquerque, New Mexico, USA 9-11 May 2012.



9. "Microporosity Estimation of the Upper Jurassic Arab-D Carbonate Reservoir: Outcrop Analog Approach, Central Saudi Arabia," **Eltom, H., Abdullatif, O. and Makkawi, M.**, AAPG 2012 Annual Convention and Exhibition, in Long Beach, California, USA.
10. "Characterization of Porosity and Permeability of the Upper Jurassic Arab-D Carbonate Reservoir Using 3D Outcrop Analog, Central Saudi Arabia," **Eltom, H., Makkawi M. and Abdullatif, O.**, European Geoscience Union General Assembly 2012, Wien, Austria (Poster presentation).
11. "New Agglutinated Foraminifera, Including Multichambered Taxa, from the Middle Ordovician Hanadir Shale of Northern Saudi Arabia," **Ghazwani, A., Kaminski, M. A. and Babalola, L.**, Ninth International Workshop on Agglutinated Foraminifera, Abstract Volume. 2012.
12. "New Trochamminids with Radially Elongated Chambers from the Paleozoic Black Shales of Saudi Arabia: An Adaptation for Survival in Dysoxic Environments?," **Kaminski, M. A.**, Ninth International Workshop on Agglutinated Foraminifera, Abstract Volume. 2012.
13. "The New and Reinstated Genera of Agglutinated Foraminifera Published between 2008 and 2012," **Kaminski, M. A.**, Ninth International Workshop on Agglutinated Foraminifera, Abstract Volume. 2012.
14. "A "Flysch-type" Agglutinated Foraminiferal Assemblage from the Lower Carboniferous Black Shales of Northern Saudi Arabia," **Kaminski, M.A., Hughes, G.W. and Hooker, N.**, Ninth International Workshop on Agglutinated Foraminifera, Abstract Volume, 2012.
15. "Pliocene Dysoxic Agglutinated Foraminiferal Assemblages from IODP Hole 1341B in the Bering Sea: Initial Results from IODP Expedition 323," **Kaminski, M. A. and Kender, S.**, Ninth International Workshop on Agglutinated Foraminifera, Abstract Volume, 2012.
16. "Morphogroup Analysis of Late Cretaceous–Paleogene Agglutinated Foraminifera from Indian Harbor M-52 well, Labrador Sea," **Setoyama, E., Kaminski, M. A. and Tyszka, J.**, Ninth International Workshop on Agglutinated Foraminifera, Abstract Volume, 2012.
17. "Palaeobiogeography of Late Cretaceous Agglutinated Foraminifera in the Arctic, Atlantic and Tethyan Regions," **Setoyama, E., Kaminski, M. A., Tyszka, J. and Radmacher, W.**, Ninth International Workshop on Agglutinated Foraminifera, Abstract Volume, 2012.
18. "The Life Cycle of *Entzia* (Foraminifera) in the Salt marsh at Turda, Romania," **Telespan, A., Kaminski, M. A., Bălc, R., Filipescu, S. and Varga, I.**, Ninth International Workshop on Agglutinated Foraminifera, Abstract Volume, 2012.
19. "Pliocene-Pleistocene Benthic Foraminiferal Assemblages in the Southern Bering Sea, (IODP Expedition 323)," **Kaminski, M.A., Kender, S., Ciurej, A. and R. Bălc**, European Geoscience Union General Assembly 2012, Wien, Austria (Poster presentation).
20. "Campanian Agglutinated Foraminifera from the Lomonosov Ridge, IODP Leg 302 (ACEX): Implications for Arctic Late Cretaceous Paleogeography," **Setoyama, E. Kaminski, M. A. and Tyszka, J.**, European Geoscience Union General Assembly 2012, Wien, Austria (Poster presentation).

21. "Bering Sea Deep Water Ventilation over the Last 2 Ma, Evidence from Foraminiferal Assemblages and Stable Isotopes," **Kender, S., Ravelo, C., Asahi, H., Becker, J., Hall, I., Leng, M., Kaminski, M. A., Radi, T. and Aiello, I.,** European Geoscience Union General Assembly 2012, Wien, Austria (Oral presentation).
22. "Upper Cretaceous to Paleocene Deep-Water Agglutinated Foraminifera from the Contessa Highway Section, Umbria-Marche Basin, Italy," **Kaminski, M. A., Cetaan, C. G., Bălc, R. and Coccioni, R.,** In: Coccioni, R. (ed.), Geo-Histories from the Umbrian Apennines, Conference Abstract volume.
23. "Environmental Control on Shell Structure and Composition of Agglutinated Foraminifera in the Marmara Sea," **du Chatelet, E. A., Bout-Roumzeilles, V., Coccioni, R., Frontalini, F., Guillot, F., Kaminski, M. A., Recourt, P. Riboulleau, A., Trentesaux, A., Tribovilliard, N. and Ventalon, S.** Ninth International Workshop on Agglutinated Foraminifera (IWAF9).
24. "High Resolution Sequence Stratigraphy, Diagenesis and Porosity Evolution: Outcrop Analog of the Upper Jurassic Arab-D Carbonate Reservoir, Central Saudi Arabia," **Abdullatif, O.,** Oman & Arabian Plate Conference 2012.
25. "Occurrence of Testate Amoebae in Palynological Preparations: Potential Source of New Information," **Kumar, A. and Farooqui, A.,** The 6th International Symposium on Testate Amoebae (ISTA6), Xiamen, China, October 15-18, 2012,.
26. "Thecamoebians as Indicators of Seasonally Induced Hydrological Changes in Ponds of Lucknow District in the Ganga-Yamuna Plains of North India," **Farooqui, A. and Kumar, A.,** The 6th International Symposium on Testate Amoebae (ISTA6), Xiamen, China, October 15-18, 2012,.
27. "A Preliminary Report on Thecamoebians from Environmentally Stressed Himalayan Lake Nainital, India," **Farooqui, A. and Kumar, A.,** The 6th International Symposium on Testate Amoebae (ISTA6), Xiamen, China, October 15-18, 2012.
28. "Biofacies and Palaeoenvironments of the Mishrif Formation in Saudi Arabia," **Hughes, G. W.,** GEO2012 10<sup>th</sup> Middle East Geosciences Conference and Exhibition, 4-7 March, 2012.
29. "Biofacies and Sedimentology of the Dammam Dome, Saudi Arabia," **Hughes, G. W., Lindssay, R. F., Cantrell, D. L. and Naji, N. G.,** GEO2012 10<sup>th</sup> Middle East Geosciences Conference and Exhibition, 4-7 March, 2012.
30. "Meso- and Micro-scale Lithofacies Heterogeneity and Impacts on Reservoir Quality and Architecture of the Carbonate-Siliciclastics Rocks of Dam and Hofuf Formation (Miocene-Pliocene), Eastern Region, Saudi Arabia," **Yassin, M. A., Abdullatif, O. M. and Al-Ramadan, K.,** GEO2012 10<sup>th</sup> Middle East Geosciences Conference and Exhibition, 4-7 March, 2012.
31. "The Evolution of Paleozoic Wajid Sandstone Formation in the Saudi Arabia: Petrographic and Geochemical Approach Utilizing Major, Trace and Rare Earth Elements," **Abdullatif, O. M., Siddiqi, S., Mahgoub, M. and Abdulkadir, I.,** GEO2012 10<sup>th</sup> Middle East Geosciences Conference and Exhibition, 4-7 March, 2012.

32. "Seismic Noise Study for a New Seismic Station at King Fahd University of Petroleum and Minerals in Saudi Arabia," **Kaka, S. I.**, Geophysical Research Abstracts, v. 14, EGU2012-1077, EGU General Assembly 2012.
33. "Electrical Resistivity Tomography for the Detection of Subsurface Cavities in the Hofuf area of Eastern Saudi Arabia," **Ahmed, H. R., Kaka, S. I. and Al-Mulhim, A.**, Geophysical Research Abstracts, v. 14, EGU2012-1948, EGU General Assembly 2012.
34. "Potential Formation of Bromoform and Bromate in Blended Water Samples Disinfected With Chlorine Or Ozone," **Tawabini, B.**, Sixteenth International Water Technology Conference (IWTC16), Istanbul – Turkey, 7 – 10 May 2012.
35. "Assessing the Removal Efficiency of MTBE and Benzene from Water Using UV- Peroxide Advanced Oxidation Processes," **Tawabini, B., Abu Saud, B., Khalil, A. and M. Sievers.** The IWA Sixth Advanced Oxidation Processes (AOP6). Goslar, Germany May 7-9, 2012.
36. "Seismic Noise Study for a New Seismic Station at King Fahd University of Petroleum and Minerals in Saudi Arabia," **Kaka, S. I.**, Geophysical Research Abstracts, Vol. 14, EGU2012-1077, 2012, EGU General Assembly 2012.
37. "Measurements Over a Non-Producing Reservoir in Dhahran, Saudi Arabia," **Popoola A. and Kaka, S. I.**, AGU Fall Meeting, 5-9 December 2011, at the Moscone Convention Center, San Francisco, California, Abstract control #1186024.

#### Department of Mathematics & Statistics

##### Conferences in GCC:

1. "Stability in a System of a Twth Second Sound," **Messaoudi, S. A.**, The Joint AMS and The Fourth International Conference on Mathematical Sciences – ICM2012, Al-Ain, UAE, March 11-14, 2012.
2. "An Exponential Decay Result for a Porous System of Thermoelasticity Type III," **Messaoudi, S. A.**, The Joint AMS and The Fourth International Conference on Mathematical Sciences – ICM2012, Al-Ain, UAE, March 11-14, 2012.
3. "Hyperbolic Embeddability and Extension of Pseudo-holomorphic Curves," **Khalfallah, A.**, The Fourth International Conference on Mathematical Sciences-ICM 2012, Al-Ain, UAE, March. 11-14, 2012.
4. "On  $(1 - t) - 1$  Weighted Orthogonal Polynomials: Applications and Computational aspects," **Bokhari, M. A.**, ICM 2012, UAE University Al-Ain, UAE, March 14, 2012.
5. "The Control of Thermoelastic Systems by Viscoelastic Damping of General Type," **Mustafa, M. I.**, Fourth International Conference in Mathematical Sciences ICM, UAE, Al Ain, March 11-14, 2012. Presentation:

##### Conferences in side Kingdom :

1. "Stabilization of Hopfield Neural Network," **Tatar, N-e.**, Second Math Days, King Saud University, Riyadh, March 14-15, 2012.



2. "General Stability for a Porous Thermoelastic System with Memory," **Messaoudi, S. A.**, The 2<sup>nd</sup> Math-Days of King Saud University, Riyadh, March 14-15, 2012.
3. "Planary Lecture: General Decay for a Porous Thermoelastic System with Memory," **Messaoudi, S. A.**, Fifth Saudi Science Conference (SSC5'2012), Makkah, April 6 – 18, 2012.
4. "General Decay for a Porous Thermoelastic System with emory", **Messaoudi, S. A.**, Fifth Saudi Science Conference (SSC5'2012), Makkah, April16 – 18, 2012.
5. "4th Annual IAMCS Spring Symposium," **Boubaker, S.**, King Abdullah University of Sciences and Technology (KAUST), Jeddah, May 6-7, 2012.
6. "Feynman graph representations of a SPDE driven by Levy noise." **Boubaker, Smii**, King Abdullah University of Sciences and Technology (KAUST), Jeddah, May 2012.
7. "A New Vision of the Role of Basic Sciences in Development", **Mustafa, M. I.**, Umm Al-Qura University, Makkah, KSA, April 16-18, 2012.

#### Conferences outside KFUPM:

1. "Nonlinear Abstract Fractional Differential Equations," **Tatar, N-e.**, 4<sup>th</sup> International Interdisciplinary Chaos Symposium on Chaos and Complex Systems, Antalya, Turkey, April 29 to May 02, 2012.
2. "Role of Orthogonal Polynomials in Engineering, Computer, Physical & Social Sciences," **Bokhari, M. A.**, Namal College, Pakistan, March 28, 2012.
3. "On  $(1-t) - 1$  Weighted Orthogonal Polynomials: Applications and Computational Aspects," **Bokhari, M. A. and Al-Attas, H.**, Proceedings of ICM, 2012.

#### Workshop inside KFUPM:

1. "Generalizations of the Combinatorial Nullstellensatz," **Schauz, U.**, CARG One-Day Workshop, KFUPM, 29. April 2012

#### Physics Department

1. "Non-catalytic Deep Desulfurization of Model Fuel Oil, ACS meeting, Prep. Pap.-Am. Chem. Soc., Div. Fuel Chem," **Siddiqui, M. N., Hoshiani K. and Gondal, M. A.**, Proceedings Published by the American Chemical Society 2012, 57 (1), 765,
2. "Nano Scale Titania Thin Film Morphology and Optical Study on Patterns of elf-assembled Monolayers," **Rao, S. G., Gondal, M. A. and Dastageer, M. A.**, IEEE Proceeding, HONET-2011 (2012) 228-232 (DOI 10.1109/HONET.2011.6149822).
3. "Gas Sensing Properties of 1-D Nanostructures of ZnO," **Faiz, M., Tabet, N. and Maalej, N.**, Abst: 5<sup>th</sup> Saudi Science Conference, Makkah, Saudi Arabia (2012).
4. "Commissioning of a Total Skin Electron Therapy (TSET) Technique," **ulHassan, M., AlDahwai, I., Maalej, N. and Abdelrahman, W.**, International Conference on Radiation Medicine (ICRM2012) Clinical Applications and Innovative Approaches, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia 27 February , 2012.

5. "Commissioning a Monte Carlo Based Treatment Planning System," **Abdullah, L. A., Jalal, B., Maalej, N. and Abdel-Rahman, W.,** International Conference on Radiation Medicine (ICRM2012) Clinical Applications and Innovative Approaches, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia 27 February , 2012.
6. "Mammography Imaging Optimization," **Maalej, N.,** International Conference on Radiation Medicine (ICRM2012) Clinical Applications and Innovative Approaches, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia 27 February , 2012.
7. "Commissioning of a Total Skin Electron Therapy (TSET) Technique," **ulHassan, M. S. Z., AlDahlawi, I., Maalej, N. and Abdel-Rahman, W.,** World Congress of Medical Physics and Biomedical Engineering, Beijing, CHINA., IFMBE Proceedings, 2012.
8. "Raman Study of Localized Recrystallization of Amorphous Silicon Induced by Laser Beam," Tabet, N. , **Al-Sayoud, A., Said, S. , Syed, A. , Yang, X., Yang, Y., Diallo, E., Wang, Z., Wang, X., Johlin, E., Simmons, C. and Buonassisi, T.** 38th IEEE Photovoltaic Specialist Conference, USA , Austin, Texas, 3-8 June 2012
9. "Gas Sensing Properties of Nanostructured ZnO Thin Films," **Mekki, A., Maalej, N. and Tabet, N.,** 5<sup>th</sup> Saudi Science Conference SSC5'2012, Mekkah, 16-18 April 2012.
10. "Gas Sensing Properties of 1-D ZnO Nanostructures," **Faiz, M., Maalej, N. and Tabet, N.,** 5<sup>th</sup> Saudi Science Conference, SSC5'2012, Mekkah, 16-18 April 2012.
11. "Raman Study of Laser Induced Recrystallization of Amorphous Silicon Thin Films for Solar Cells," **Tabet, N., Johlin, E., Simmons, C., Wang, X., Yang, X., Said, S. and Buonassisi, T.,** Beam Injection Assessment of Microstructures in Semiconductors (BIAMS), Annaba, 25-28 June 2012, Algeria.
12. "Engineering the Properties of Amorphous Silicon to Enhance Solar Cells Efficiency," **Tabet, N., Johlin, E., Simmons, C., Wang, X., Said, S. and Buonassisi, T.,** 2nd Asia-Arab Sustainable Energy Forum and 4th International workshop on Sahara Solar Breeder, May 15 & 16, 2012, Oran, Algeria.
13. "Gas Sensing, Photocatalytic Properties and Selective Toxicity of Nanostructured ZnO," **Tabet, N.,** International Conference and Workshop on Nanostructured Ceramics and other Nanomaterials (ICWNCN), Delhi, India, 13-16 March 2012.
14. "Laser Processing for Crystalline Silicon Photovoltaics: An Enabler for Low-Cost, High-Efficiency Solar Cell Manufacturing," **Winkler, M. T., Simmons, C.B., Sullivan, J. T., Brandt, R., Recht, D., Ertekin, E., Tabet, N., Mazur, E., Mendes, M., Hegedus, S., Grossman, J. C., Aziz, M. J. and Buonassisi, T.,** SPIE Optics+Photonics conference, San Diego, USA, 12-16 August 2012.
15. "Materials Engineering for solar cells of Enhanced Performance," **Tabet, N.,** 2nd Asia-Arab Sustainable Energy Forum, jointly held with 4th International workshop on Sahara Solar Breeder, Oran, Algeria. Oran, 16-18 April 2012.

16. "Thickness Dependent Morphology and Optical Study of Metallic Thin Films on Patterns of Self-assembled Monolayers," **Rao, S. G., Gondal, M. A. and Dastageer, M. A.,** MRS (Materials Research Society) Spring Meeting-2012, San Francisco, USA (2012). (Poster presentation)
17. "Gas Sensing Properties of Nanostructured ZnO Thin Films," **Mekki, A., Maalej N. and Tabet, N.,** The 5<sup>th</sup> Saudi Science conference, 16-18 April 2012, Um AL Qura University, Makkah, Saudi Arabia.

### **College of Industrial Management**

#### **Department of Accounting & MIS**

1. "A Study on Impact of Stock Market Index and Interest Rate and GDP in Emerging Economies," **Talha, M. and Abdullah,** Paper presented in American Accounting Association (AAA), International Accounting Section 2012 Midyear Meeting and Doctoral Consortium, February 23 – February 25, 2012 Pointe Hilton Tapatio Cliffs Resort, Phoenix, Arizona, USA.

### **College of Environmental Design**

#### **Architectural Engineering Department**

1. "Self-Compacting Concrete Using Indigenous Materials," **Dehwah, H. A. F.,** Proceeding of the 11<sup>th</sup> International Conference on Concrete Engineering and Technology 2012, (CONCET 2012), Kuala Lumpur, Malaysia, June 12-13, 2012.

### **College of Applied & Supporting Studies**

#### **General Studies Department**

1. "Cross-culturally Exploring the Better-than-average Effect," **Garris, C. P.,** Paper presented at the annual meeting of the Society of Australasian Social Psychology, Adelaide, Australia. April, 2012.

### **College of Computer Science & Engineering**

#### **Systems Engineering Department**

1. "Robust Filter Design for Linear Systems with Parametric Uncertainties via Unreliable Transmission via Unreliable Transmission Channels," **Mahmoud, S. M.,** Proceedings of the 9<sup>th</sup> International Conference on Systems, Signals and Devices, Chemnitz, Germany, March 20-23, 2012.
2. "Modified Backstepping Control of Quadrotor," **Saif, A. A., Dhaifullah, M., Al-Malki, M. and El Shafie M.,** 9<sup>th</sup> International Multi-Conference on Systems, Signals and Devices 2012, March 20 - 23, 2012 - Chemnitz, Germany.

**Entries received from the Centers for Research Excellence****Center for Research Excellence in Nanotechnology**

1. "Field-Deployable Electrochemical Sensors for Heavy Metals in Potable Waters of Saudi Arabia," **Kawde, A.**, The 85<sup>th</sup> Petroleum Environmental Research Forum (PERF) Meeting, Saudi Aramco, Technical Exchange Center, Dhahran, Saudi Arabia, March 10 – 11, 2012.
2. "Analytical Determination of Trace Ciprofloxacin Antibiotic Concentrations in Pure and Drug Formulation Forms," **Kawde, A.**, The 243<sup>rd</sup> ACS National Meeting, San Diego, California, March 25-29, 2012.
3. "Development of Point-of-care Biosensor: A step Forward Toward Breast Cancer Diagnosis," **Kawde, A., Liu, G., Alhooshani, K. and Diab, A.**, The 243<sup>rd</sup> ACS National Meeting, San Diego, California, March 25-29, 2012.
4. "Organic/Inorganic Hybrid Nanocompositions of Pristine and Functionalized Boehmite with Amine-cured Tetraglycidyl Meta-xylenediamine Resin," **Basheer, R. A.**, The 243<sup>rd</sup> ACS National Meeting, Division of Industrial and Engineering Chemistry, 23-28 March, 2012.
5. "High-speed water sterilization using conducting polymer-metal nanoparticles composite," **Basheer, R. A. and AbuThabit, N. Y.**, The 243<sup>rd</sup> ACS National Meeting, Division of Environmental Chemistry Nanoscale: Enhanced Environmental Technologies, 23-28 March, 2012.
6. "Low CT E Organic/Inorganic Hybrid Nanocomposite Encapsulants for IC Applications," **Basheer, R. A.**, The MRS Spring 2012 meeting on Functional Inorganic Nanoparticle-Polymer Composites with Engineered Structures and Coupled Properties, 9-14<sup>th</sup> April, 2012.

## 10. BOOKS PUBLISHED AND CONTRIBUTIONS

### Electrical Engineering Department

1. “Generalized Asymptotic Regulation for LPV Systems with Additional Performance Objectives,” **Koroglu, H., Mohammadpour, J. and Scherer C. W., (eds.),** Control of Linear Parameter Varying Systems with Applications, Springer, pp.121-148, 2012.
2. “Use of Swarm Intelligence for the Identification of a Class of Nonlinear Dynamical Systems,” **Rizvi, S. Z. and Al-Duwaish, H. N.,** Computational Intelligence, part of series Studies in Computational Intelligence, Vol. 399, Chap. 22, 2012, pp. 331-344, Springer Verlag.
3. “Adaptive Blind Equalization,” **Abrar, S., Zerguine, A. and Nandi, A. K.,** INTECH Publishers, 2012.
4. “Assembly and Printed Circuit Board (PCB) Package,” **Sharawi, M. S.,** Assembly and Printed Circuit Board (PCB) Package in Circuits and Systems, [Eds.Paolo Bellavista and Bruno Ricco],in Encyclopedia of Life Support Systems (EOLSS), Developed under the Auspices of the UNESCO, Eolss Publishers, Oxford ,UK, [<http://www.eolss.net>], January, 2012.

### Systems Engineering Department

1. “Applied Control Systems Design: State-Space Methods,” **Mahmoud, M. S. and Xia, Y.,** Springer-Verlag, UK, May 2012. DOI 10.1007/978-1-4471-2879-3.

### Earth Sciences Department

1. “The Ninth International Workshop on Agglutinated Foraminifera,” **Alagret, L., Ortiz, S. and Kaminski M. A., (eds.),** Grzybowski Foundation Special Publication, 18.



## 11. TECHNICAL REPORTS, FUNDED PROJECTS AND PATENTS

### College of Engineering

#### Electrical Engineering

1. "Design and Implementation of Aperture Stacked Microstrip Power Splitter for Microwave Communication Systems," **Iqbal, S. S.**, (PI) with **Sharawi, M. S.**, (CI), Final report of the FT-Project (FT-100013), January 2011.
2. "Design of a Directive Ferrite Loaded Waveguide Antenna for Multi-directional Beam Steering," **Iqbal, S. S.** (PI) and **Ragheb H.** (CI), Proposal Accepted for SABIC Project (SB111014), April, 2012.
3. "Design of Superdirective Microstrip Patch Antenna Array for Wireless Communications Applications," **Iqbal S. S.** (CI-II), **Dawoud, M.** (PI), **Hassan, E.** (CO-I), **KACST Research Proposal (AT-29-104)**, Funded by King Abdulaziz City for Science and Technology, Saudi Arabia, Duration: October 2010 – October 2012.

#### Patents

1. OFDM inter-carrier Interference Cancel-ation Method, US patent 20110090975, **Al-Naffouri, T. Y., Al-Dhahir, N. and Sohail, M. S.**
2. Cyclic prefix-based Enhanced Data Recovery Method, Serial no. 12/385,076, **Al-Naffouri, T. Y. and Quadeer, A. A.**, US patent accepted.
3. Method of Estimating and Removing Noise in OFDM systems, Serial no. 12/457,848, **Caire, G., Al-Naffouri, T. Y. and Quadeer, A. A.**, US patent accepted.
4. "Method of Generating an Integrated Fuzzy-Based Guidance Law for Aerodynamic Missiles," **Omar, H. M. and Abido, M. A.**, Accepted, Patent Application (12/851498), Docket # 31500.66, Filed March 19, 2010, Accepted March 12, 2012.

#### Mechanical Engineering

#### Technical Report

1. "Investigating Dislocation Structures during Nano-Indentation," **Khan, S. M. A.**, Final Report, KFUPM SABIC/Fast Track Research Grant #100024, April 2012.

#### Patent

1. "Piezoelectric Damping Device," **Hawwa, M.A, Al-Nassar, Y.N. and Al-Qahtani, H.M.**, US Patent 8,134,279, Date of Patent: March 13, 2012.

**College of Sciences****Chemistry Department**

1. "Development of Electrochemical Sensors for the Investigation and Analytical Determination of Ciprofloxacin in Pure and Drug Formulation Forms and its Interaction with Nucleic Acids and Metals," **Kawde, A.**, (Principal Investigator) and **Hassan, N.**, (Co-Investigator) Project Number: SB100001, Final Report, submitted to DSR, May 2012.
2. "Final report on Chem 323 online Course Grant," **Kawde A. and Alhooshani, K.**, Submitted to DAD, Jan. 2012.

**Earth Sciences Department**

1. Quantitative Reservoir Characterization of Unconventional Tight Gas Sandstone (Sarah Formation) for Enhanced Oil Recovery," (Client: NSTIP): Annual Interim Report. (**Dogan, A.U.**), May 2012.
2. "A Pilot Project: Passive Seismic Experiment," Client: NSTIP, Final Report (**Kaka, S.**), 2012.
3. "Analysis of Passive Seismic Data for Reservoir Monitoring & Characterization," Client: Saudi Aramco, Progress Report (**Kaka, S.**), 2012.

**Department of Mathematics & Statistics****Technical Reports:**

1. "Algebraic Properties of PLRD Functions," **Laradji, A.**, Technical Report No. 425, (January 2012).
2. "Some Instructional Issues in Hypergeometric Distribution," **Joarder, A. H.**, Technical Report No. 426, (February 2012).

**Physics Department**

1. **NSTP Project # 08-NAN93-4**, Final report submitted, Oct 2011, "Applications of Nanoscale Materials (Metal Oxides) Using Laser Induced Photo-Catalytic Process," **Gondal, M. A. et al.**, (Sep 2009 – Jan 2012).
2. **KACST # DRP-4-25**, Annual report submitted, "Development of Technologies for Deep Desulfurization of Fuel Oils," **Gondal, M. A. et al.**, (May 2010, June 2012).
3. **Internal project # IN090025**, Semi-annual report, "Laser Approach to Metal Nanoalloys, Its Optimization & Search for Novel Alloy Nanostructures materials," **Gondal, M. A. et al.**, (April 2009-April 2012).
4. **Center of Corrosion Core project # 1**, Semi-annual report, "Development of Laser Induced Breakdown Spectrometer for the Determination of Chloride and Sulfate Concentration in Concrete Structures for Assessment of Reinforcement Corrosion," **Gondal, M.A. et al.**, 2012.



5. **Internal project # Rg1011-1 & Rg1011-2**, Semi-annual report, “Photo-catalytic Conversion of Carbon Dioxide into Methanol Using Nano-catalysts,” **Gondal, M. A., et al.**, (Oct 2010- March 2013).
6. **“Internal project # Rg 1103-1 & Rg 1103-2**, Semi-annual report, “Synthesis and Optical Characterizations of Hybrid Nano-Structures Using Advanced Laser based Techniques,” **Gondal M. A. et al.**, (March 2011-April 2014).
7. **MIT-1012-1** “Remediation of Water Produced in Resource Extraction,” **Gondal, M. A. et al.**, (january2012- January 2014).
8. **MIT-10109**, “PV water pumping-part IV III,” Semi-annual Report, **Gondal, M. A. et al.**, (Feb 2012-Feb. 2014).
9. **NSTIP Project # 08-NAN92-4**, Final report. “Synthesis of Nanostructured ZnO and Development of Sensing and Biomedical Applications,” **Tabet, N.** (PI), **Faiz, M., Mekki, A., Maalej, N., Al Sunaidi, A. and Yamani, Z.**, October 2011.

### College of Computer Science & Engineering

#### Computer Engineering Department

1. “Technical Reports (a) Software R&D Center and (b) Systems Integration for Operating Room in Saudi Royal Land Forces,” Submitted to the Ministry of Defense, **Al-Madani, B.**, May 2012.



## 12. INTERNAL LECTURES AND SEMINARS OFFERED BY KFUPM FACULTY

### Electrical Engineering Department

1. Speaker : Dr. Hakan Koroglu  
 Topic : Scheduled Control for Robust Attenuation of Non-stationary Sinusoidal Disturbances  
 Date : March 22, 2012

### Mechanical Engineering

1. Speaker : Mr. Asif Matin  
 Topic : Design And Development Of PV (Photovoltaic) Based Smart Energy Harvesting System  
 Date : January 01, 2012
2. Speaker : Mr. Bharat Bhushan  
 Topic : Mems/Nems and Biomems/Bionems Materials and Devices and Biomimetics  
 Date : April 15, 2012
3. Speaker : Rachid Boukhili  
 Topic : Impact and Compression Behaviour of Aafp Manufactured Carbon/Epoxy Composites Containing Gaps and Overlaps  
 Date : May 08, 2012
4. Speaker : Shaikh Pervaiz Ahmed  
 Topic : Modeling of a Combined ITM-Porous Oxygen Transport Reactor : Towards a Spatially Uniform Temperature ITM (MS Thesis Defence)  
 Date : May 09, 2012
5. Speaker : Jaffar Awni AbdulRahman Hajibrahim  
 Topic : Load and Energy Analysis of a Commercial Building (MS Thesis Defence)  
 Date : May 14, 2012
6. Speaker : Fadi Abdul Kareem Al-Badour  
 Topic : Numerical and Experimental Investigations of Friction Stir Welding of Tube-Tube Sheets Joints (Phd Thesis Defence)  
 Date : May 15, 2012
7. Speaker : Turki Nabieh Baraoud  
 Topic : Fabrication of MFI Zeolite Membrane for RO (Reverse Osmosis) Water Desalination Process (MS Thesis Defence)  
 Date : May 16, 2012

Computer Engineering Department

1. Speaker : Dr. Basem Al-Madani  
 Topic : Real Time Systems Industry at Platform  
 Venue : Command and Control Group, Ministry of Defense, Riyadh  
 Date : May 13, 2012.

Systems Engineering Department

1. Speaker : Ismail Ibrahim Al-Meraj  
 Topic : Constrained Binary Artificial Bee Colony to Minimize the Makespan for Single Machine Batch Processing with non Identical job sizes.  
 Date : February 14, 2012.
2. Speaker : Prof. Mustapha Nour El Fath  
 Topic : Production Planning in an Uncertain Manufacturing Environment.  
 Date : March 13, 2012.
3. Speaker : Abdullah Al-Shehri  
 Topic : Field Bus\_Enabled DCS Applications.  
 Date : May 8, 2012
4. Speaker : Ali Muhammad Abudari  
 Topic : Production Lot Sizing & Process Targeting under Process Deterioration & Machine Breakdown Conditions.  
 Date : May 15, 2012
5. Speaker : Abdulelah Saeed Algarni  
 Topic : Process Gas Chromatograph  
 Date : May 15, 2012
6. Speaker : Dawood Abu Rous  
 Topic : Advanced Process Control Implementation  
 Date : May 16, 2012

Chemistry Department

1. Speaker : Mr. Theo Goumas, from Bader International Group (BIG)  
 Title : New Technologies for Wastes Disposals  
 Date : 14 February 2012. (Room # 4-125– 11:00 p.m.)
2. Speaker : Prof. Martin Steinhart, Institute for Chemistry  
 Head of Physical Chemistry, Univ. of Osnabrueck Germany  
 Title : Hybrid Systems and Nanorod Arrays by Mesoscopic Structure Design in Nanopores.  
 Date : 4 April, 2012. (Room # 4-125– 11:00 a.m.)

3. Speaker : Dr. Victor Polo, University of Zaragoza, Spain  
 Title : Theoretical Studies on Chemical Systems: unconventional bonds, Organic Reactions and New Catalysts.  
 Date : 01 May, 2012 (Room # 4-125) - 11:00 a.m.
4. Speaker : Prof. Wan Ahmad Kamil Che Mahmood, School of Chemical Universiti Sains Malaysia:  
 Title : Chemical Research At Malaysian Research University  
 Date : 6 May, 2012 (Room # 4-125 - 11:00 a.m.)
5. Speaker : Prof. Bahrudin Saad, School of Chemical Science Universiti Sains Malaysia: Malaysian Research University  
 Title : Green Separation Techniques  
 Date : 8 May, 2012 (Room # 4-125 - 11:00 a.m.)

#### Earth Sciences Department

1. Speaker : Prof. Aldo Vesnaver (KFUPM, ESD Seminar)  
 Title : Polarization Analysis of Passive Seismic Data  
 Date : February 28, 2012
2. Speaker : Dr. Abdulwahab Abokhodair (KFUPM, ESD Seminar)  
 Title : Semiautomatic Differentiation Tools  
 Date : April 10, 2012
3. Speaker : Prof. Gabor Korvin (KFUPM, Maths. Seminar)  
 Title : A New Rock Physical Model and its Applications  
 Date : April 10, 2012
4. Speaker : Dr. Michael A. Kaminski (Masaryk University Brno, ESD Seminar; Warsaw University, ESD Seminar; AGH University of Science & Technology Krakow, ESD Seminar; University of Bratislava, ESD Seminar)  
 Title : Scientific Drilling in the Arctic Ocean: Results from IODP Expedition 302  
 Dates : April 13–20, 2012
5. Speaker : Dr. Bassam Tawabini (The Society of Petroleum Engineers-Saudi Arabia Section [SPE SAS] and the Saudi Environmental Society [SENS] Joint Workshop titled, “Environmentally Sustainable Technology & Management in the Upstream Oil & Gas Industry”)  
 Title : Oil Industry Effects and the Environment  
 Dates : May 27-28, 2012
6. Speaker : Dr. Bassam Tawabini (The 85th Meeting of the Petroleum Environmental Research Forum (PERF) titled, “Water Conservation & Waste Minimization and Management”)  
 Title : Investigating the Efficiency of Carbon Nanotubes (CNTs) in Removing Inorganic and Organic Pollutants from Contaminated Waters  
 Dates : March 10-11, 2012

7.      Speaker        :      Dr. Bassam Tawabini (Int'l Assoc. Drilling Contractors  
IADC).  
Title        :      Management of Drilling Wastes  
Dates        :      February 15, 2012

Department of Mathematics & Statistics

**Regular Seminars**

- 1      Speaker        :      Dr. Stefanos Orfanos  
Title        :      Quasidiagonality of Crossed Products  
Date        :      Tuesday, January 31, 2012
- 2      Speaker        :      Dr. Adel Khalfallah  
Title        :      Hyperbolic Embeddedness and Extension Converge Theorem of  
J-holomorphic Curves  
Date        :      Tuesday, March 20, 2012
- 3      Speaker        :      Dr. Gabor Korvin (E.S Dept., KFUPM)  
Title        :      A New Rock Physical Model and its Applications  
Date        :      Tuesday, April 10, 2012
- 4      Speaker        :      Dr. Khalid Furati  
Title        :      On a Differential Equation with a Sequential Fractional  
Derivative  
Date        :      Sunday, April 29, 2012
- 5      Speaker        :      Dr. Faisal Fairag  
Title        :      Preconditioning Techniques for Oil Reservoir Simulation  
Date        :      Tuesday, May 1, 2012

**Visitor's Seminars**

- 1      Speaker        :      Prof. Christian Lomp  
Title        :      Finiteness Conditions on the Injective Hulls of Simple Modules  
Date        :      Sunday, February 12, 2012
- 2      Speaker        :      Prof. Christian Lomp  
Title        :      Goldie's Dimension for Rings and Modules  
Date        :      Tuesday, February 14, 2012
- 3      Speaker        :      Dr. Said Houari  
Title        :      Decay Property of Timoshenko System in Thermoelasticity  
Date        :      Tuesday, February 21, 2012
- 4      Speaker        :      Prof. Marwan Saeed Abulrub  
Title        :      Vaccination in a Model of an Epidemic  
Date        :      Tuesday, March 6, 2012
- 5      Speaker        :      Prof. Asghar Qadir  
Title        :      Higher Dimensional Systems of Differential Equations  
Obtainable by Iterative Uof Complex M  
Date        :      Tuesday, March 13, 2012

- |   |         |   |  |
|---|---------|---|--|
| 6 | Speaker | : | Prof. Arjun K. Gupta (STAT)  |
|   | Title   | : | Modeling Skewness with Applications in Epidemiology and Finance        |
|   | Date    | : | Sunday, April 29, 2012   |
|   |         |   |  |
| 7 | Speaker | : | Dr. Mujahid Abbas  |
|   | Title   | : | Isotone Projections and Solution of Nonlinear Complementarity Problems |
|   | Date    | : | Sunday, May 13, 2012   |
|   |         |   |  |
| 8 | Speaker | : | Prof. Benedict Gross   |
|   | Title   | : | Recent Progress on the Arithmetic of Elliptic Curves                   |
|   | Date    | : | Tuesday, May 15, 2012  |
|   |         |   |  |
| 9 | Speaker | : | Prof. Qamrul Hasan Ansari (Adj. Prof.)                                 |
|   | Title   | : | Some Iterative Methods for Split Feasibility and Fixed Point Problems  |
|   | Date    | : | Tuesday, May 22, 2012  |

### **Thesis Defense**

- |   |         |   |  |
|---|---------|---|--|
| 1 | Speaker | : | Mr. Abdul-Khaleg Ali Hasan Al-Baiyat (PHD)                                     |
|   | Title   | : | Extended Bessel Functions with Application to Engineering Problems             |
|   | Date    | : | Sunday, March 18, 2012   |
|   |         |   |  |
| 2 | Speaker | : | Mr. Ali Saeed Al-Qahtani (PHD)   |
|   | Title   | : | Impulsive Boundary Value Problems and Impulsive Control Systems                |
|   | Date    | : | Saturday, April 28, 2012   |
|   |         |   |  |
| 3 | Speaker | : | Mr. Usamah Sadeg Muhammad Al-Ali (MS)  |
|   | Title   | : | Symmetry Analysis of the Wave Equation on Two Spherically Symmetric Spacetimes |
|   | Date    | : | Tuesday, May 8, 2012   |
|   |         |   |  |
| 4 | Speaker | : | Mr. Abdullah Faisal Shetaiwi (MATH 490)  |
|   | Title   | : | Constructing Plane Curves from Given Curvature                                 |
|   | Date    | : | Wednesday, May 9, 2012   |
|   |         |   |  |
| 5 | Speaker | : | Mr. Mohammed Jamal Maqatif (MS)  |
|   | Title   | : | Boundary Control of Nonlinear Parabolic Partial Differential Equations         |
|   | Date    | : | Wednesday, May 9, 2012   |
|   |         |   |  |
| 6 | Speaker | : | Mr. Kassimu Mpungu (MS)  |
|   | Title   | : | Symmetry Analysis of Heat and Wave Equations on Surfaces of Revolution         |
|   | Date    | : | Sunday, May 13, 2012   |

- 7 Speaker : Mr. Khalid Ali Alanezy (MS)  
Title : Group of Classification and Similarity Solutions of Klen Gordon  
Equations on a Sphere  
Date : Tuesday, May 15, 2012

### **Students Seminar**

- 1 Speaker : Mr. Saeed Mohammed Salman  
Title : Symmetry Solutions for non PDEs  
Date : Sunday, May 6, 2012
- 2 Speaker : Mr. Tijani Apalara  
Title : Energy Decay in Thermoelasticity Type III with Viscoelastic  
Damping and Delay Term  
Date : Tuesday, May 8, 2012
- 3 Speaker : Mr. Basheer Saleh Abdellah  
Title : On Fractional Diffusion Equation  
Date : Tuesday, May 8, 2012
- 4 Speaker : Mr. Abdullah Faisal Shetaiwi  
Title : Constructing Plane Curves from Given Curvature  
Date : Wednesday, May 9, 2012
- 5 Speaker : Mr. Radwan Al-Rubee  
Title : Stochastic Galerkin Mixed Approximations for Elliptic PDEs  
with Random Data  
Date : Tuesday, May 15, 2012
- 6 Speaker : Mr. Iftikhar Ali  
Title : A General Decay Result in a Quasilinear Parabolic System with a  
Viscoelastic Term  
Date : Saturdays, May 26, 2012
- 7 Speaker : Mr. Waled Ahmed Al-Khusaifi  
Title : The Probabilities Zeta Function  
Date : Tuesday, May 22, 2012
- 8 Speaker : Mr. Basim F. Mustafa  
Title : Matrix Representation of 7-dimensional Indecomposable  
Nilpotent Lie Algebras over R  
Date : Tuesday, May 22, 2012
- 9 Speaker : Mr. Mohammad A. Abushosha  
Title : Laplacian Operator for Non Orthogonal Coordinates  
Date : Saturday, May 26, 2012



**Mathematics Workshop Day-2012**

A “Mathematics Workshop Day-2012” was held on Tuesday, January 3, 2012. The Distinguished Chair Professors / Adjunct Professors and our faculty members also gave talks in their areas of specialization.

**2012 CARG One-Day Workshop**

A CARG one-day workshop was held on Sunday, April 29, 2012. The Distinguished Professors and our faculty members also gave talks in their areas of specialization.

**Workshop on Chairs of the Standing Committees**

A workshop was held on 30 May 2012 wherein chairs of the standing committees presented their charges and accomplishments during the current academic year.

**Lecture Series on Introduction to Stochastic Differential Equations (SDE)**

A lecture series on “Introduction to Stochastic Differential Equations” was given by Dr. Smii Boubaker from the Department of Mathematics and Statistics. Dr. Boubaker gave six lectures (once a week) starting from February 12, 2012 until March 25, 2012. The faculty members of our department and also from outside the department attended the lecture series.

**Commutative Algebra Weekly Seminar (Organizer: Dr. S. Kabbaj),**

(Seminars were given by the following faculty members)

- 1    Speaker : Prof. Christian Lomp (University of Porto, Portugal)  
       Title : Finiteness Conditions on the Injective Hulls of Simple Modules  
       Date : February 12, 2012
- 2    Speaker : Dr. J. Abuhlail  
       Title : Ultrafilters and Ultra-rings-I  
       Date : February 19, 2012
- 3    Speaker : Dr. J. Abuhlail  
       Title : Ultrafilters and Ultra-rings-II  
       Date : February 26, 2012
- 4    Speaker : Dr. A. Tatar  
       Title : The Baer Sum of Extensions of Complexes of Abelian Sheaves-I  
       Date : March 4, 2012
- 5    Speaker : Dr. A. Tatar  
       Title : The Baer Sum of Extensions of Complexes of Abelian Sheaves-II  
       Date : March 11, 2012
- 6    Speaker : Mr. A. Kadri  
       Title : Trivial Ring Extensions and the  $\mathcal{A}$ -dimension  
       Date : April 8, 2012
- 7    Speaker : Mr. A. Kadri  
       Title : Trivial Extensions Defined by Coherent-like Conditions  
       Date : April 29, 2012

- 8 Speaker : Mr. M. Halic  
Title : Some (more) Splitting Criteria for Vector Bundles  
Date : May 6, 2012
- 9 Speaker : Prof. B. Gross (Harvard University)  
Title : On the Internal Structure of Parabolic and Parabolic Subgroups  
Date : May 13, 2012
- 10 Speaker : Prof. B. Gross (Harvard University)  
Title : Recent Progress on the Arithmetic of Elliptic Curves  
Date : May 13, 2012

Invited Lectures / Seminars:

- “Sobolev Spaces and Evolution Equations,” **Messaoudi, S. A.**, University of Ouargla, Algeria, (January 22-25, 2012).
- “Investigating Flame-pressure Interactions and Stretched Flame Velocities Using Implicit Simulations with Realistic Chemistry,” **Malik, N. A.**, KACST, King Abdul-Aziz City of Science and Technology, Saudi Arabia, (March 2012).
- “Investigating Flame-pressure Interactions and Stretched Flame Velocities Using Implicit Simulations with Realistic Chemistry,” **Malik, N. A.**, Georgia Institute of Technology, (March 2012).
- “Fundamentals of Combustion Using Implicit Simulations with Realistic Chemistry,” **Malik, N. A.**, KAUST, King Abdullah University of Science and Technology, (April 2012).
- “Fundamental Issues in Premixed Combustion Using Implicit Simulation Method with Realistic Chemistry,” **Malik, N. A.**, KUSTAR, Khalifa University of Science, Technology and Research, (June 2012).

Physics Department

Speakers from KFUPM

1. Speaker : Dr. M.A. Gondal  
Title : Latest Developments in Cancer Treatment Using Photodynamic Therapy in Conjunction with Photocatalysis Process and Novel Nano Engineered Materials under Laser Irradiation  
Date : Sunday 19 February 2012
2. Speaker : Dr. Khalil Harrabi  
Title : Fabrication and Characterization of Al Nanomechanical Resonators for Coupling to Nanoelectronic Devices  
Date : Sunday 26 February 2012

3. Speaker : Prof. Fida Al-Adel  
 Title : A Fast Review of some Important Elements that Help Making KAIST and Georgia Tech Fit for Facing Today's Global Challenges  
 Date : Sunday 8 April 2012
4. Speaker : Dr. Shankar Kunwar  
 Title : Electron-spin ECoupling in an Electron-Doped Copper Oxide Superconductor  
 Date : Sunday 15 April 2012

#### Speakers from outside KFUPM

1. Speaker : Prof. Abdelmajid Taki,  
 Université des Sciences et Technologies de Lille, France  
 Title : Rogue Waves in Optics  
 Date : Sunday 12 February 2012
2. Speaker : Prof. George Stegeman, Professor Emeritus, College of Optics  
 and Photonics/CREOL, University of Central Florida, USA  
 Title : Extreme Nonlinear Optics  
 Date : Sunday 4 March 2012,
3. Speaker : Prof. Asghar Qadir, Center for Advanced Mathematics & Physics  
 (CAMP), Pakistan  
 Title : A Toy Model for Quantum Measurement, Entanglement and  
 Decoherence  
 Date : Sunday 18 March 2012,
4. Speaker : Prof. Eric Mazur, Department of Physics, Harvard University,  
 USA  
 Title : Confessions of a Converted Lecturer  
 Date : Monday 16 April 2012
5. Speaker : Mr. H. Chibani, Max Planck-Institut für Quantenoptik, Germany  
 Title : Quantum Dynamics of a Strongly Driven Atom-Cavity System  
 Date : Saturday 26 May 2012



### 13. SEMINARS OFFERED BY OUTSIDE SPEAKERS IN THE UNIVERSITY

#### Civil Engineering Department

1. Speaker : Prof. William C. Taylor, Michigan State University, USA  
Topic : Urban Congestion  
Date : March 3, 2012
2. Speaker : Prof. William C. Taylor, Michigan State University, USA  
Topic : Freeway and Expressway Management  
Date : March 4, 2012
3. Speaker : Prof. William C. Taylor, Michigan State University, USA  
Topic : Advanced Signal Control System  
Date : March 5, 2012
4. Speaker : Prof. Pieter van Gelder,  
Delft University, The Netherlands  
Topic : Probabilistic Design and Risk Assessment: Application to  
Hydraulic Structures and Water Related Issues.  
Date : April 23, 2012
5. Speaker : Prof. Pieter van Gelder  
Delft University, The Netherlands  
Topic : Probabilistic Design and Risk Assessment: Future Development  
Date : April 24, 2012

#### Petroleum Engineering Department

1. Speaker : Dr. Mustapha Abbad, Research Scientist, Schlumberger Dhahran  
Center for Carbonate Research (SDCR)  
Topic : The Micro Grain Image as In-Situ Rock-Property Tester  
Date : January 31, 2012

#### Systems Engineering Department

#### **Seminars Offered By Outside Speakers In the University:**

1. Speaker : Prof. Ali Allahverdi  
Department of Industrial & Management Systems  
Engineering, Kuwait University, Kuwait.  
Topic : Publishing Your Paper in a Reputable Journal  
Date : February 26, 2012.
2. Speaker : Prof. Ali Allahverdi  
Department of Industrial & Management Systems  
Engineering, Kuwait University, Kuwait.  
Topic : Assembly Flowshop Scheduling Problem to Minimize  
Total Tardiness.  
Date : February 27, 2012

3. Speaker : Prof. Alex J. Ruiz-Torres  
Associate Professor & Interim Director  
Graduate School of Business, University  
of Puerto Rico, Rio Piedras.  
Topic : Supplier Allocation with Contingency Planning  
Considering Capacity Flexibility & Transportation  
Date : March 4, 2012.
4. Speaker : Prof. Alex J. Ruiz-Torres  
Associate Professor & Interim Director  
Graduate School of Business, University  
of Puerto Rico, Rio Piedras.  
Topic : The Parallel Machine Scheduling Problem with Variable Demand  
and a Pre-Defined Lot Size.  
Date : March 5, 2012.
5. Speaker : Prof. Alex J. Ruiz-Torres  
Associate Professor & Interim Director  
Graduate School of Business, University  
of Puerto Rico, Rio Piedras.  
Topic : A Production Planning Model Considering Multiple  
Yield Levels.  
Date : March 6, 2012.
6. Speaker : Prof. Chris Charalambous  
Department of Public & Business Administration  
School of Economic & Management University of  
Cyprus, Nicosia, Syprus.  
Topic : Product Positioning Using a Self-Organizing Map  
and the Rings of Influence.
7. Speaker : Prof. Chris Charalambous  
Department of Public & Business Administration  
School of Economic & Management University of  
Cyprus, Nicosia, Cyprus.  
Topic : Application of Neural Networks and Support  
Vector Machines to Pricing European Options.  
Date : May 01, 2012.
8. Speaker : Prof. Tongwen Chen  
Department of Electrical & Computer Engineering  
University of Alberta, Canada.  
Topic : Towards an Advanced Technology for Industrial  
Alarm Monitoring.  
Date : May 06, 2012.
9. Speaker : Prof. Tongwen Chen,  
Department of Electrical & Computer Engineering  
University of Alberta, Canada.  
Topic : Event Triggered Consensus in Multi-Agent Systems  
Date : May 08, 2012.

General Studies Department

1. Speaker : Dr. Shafi Aldamer, Dr. Eid Alharby, Dr. Haydar Sadig,  
Dr. Hisham Khogali, Dr. Ahmed Bendania,  
Dr. Dhailfallah Almatrodi, Dr. Chris Garris, Dr. Guoping Jiang,  
Mr. Abdaltaif Almurgren  
Topic : Sharing teaching experiences  
Presented to : GS faculty  
Date : March 11, 2012
2. Speaker : Dr. Guoping Jiang  
Topic : Motivations of Volunteering and Volunteerism in Saudi Arabia  
Presented to : All KFUPM students and faculty  
Date : Feb 28, 2012
3. Speaker : Dr. Dhaifallah Almatrodi  
Topic : Teaching Critical Thinking As A Strategy For Higher Education  
Curriculum Improvement  
Presented to : All KFUPM faculty and students  
Date : April 29, 2012
4. Speaker : Dr. Hisham Khogali  
Topic : Your Way to the Right Job  
Presented to : KFUPM graduates  
Date : May 8, 2012

Earth Sciences Department

1. Speaker : Dr Leonard J. Srnka (EAGE Vice President)  
Title : From Oil-prone Source Rock to Gas Producing Shale Reservoir  
Geologic and petrophysical characterization of shale-Reservoirs  
Date : February 1, 2012
2. Speaker : Dr. Cvetan Sinadinovski (Saudi Aramco)  
Title : The Earthquake and Tsunami of March 2011 Revisited  
Date : February 21, 2012
3. Speaker : Prof. Mark D. Zoback (Stanford University)  
Title : Shale Gas Reservoirs from the Nano Scale to the Reservoir Scale:  
How Rock Properties, Natural Fractures and the State of Stress  
Affect Hydraulic Fracturing Stimulation  
Date : February 29, 2012
4. Speaker : Dr. Jose Carcione (OGS, Italy)  
Title : Physics and Simulation of Waves for Exploration and  
Environmental Geosciences  
Date : March 13, 2012

5.      Speaker        :      Dr Andrea Valori (Schlumberger Dhahran Carb. Res. Ctr.)  
          Title         :      Nuclear Magnetic Resonance Applications to Characterize  
                              Reservoir Fluids, Rocks and Their Interaction  
          Date          :      March 20, 2012
  
6.      Speaker        :      Dr. Weishu Zhao (Schlumberger Dhahran Ctr for Carb. Res.)  
          Title         :      Determination and Upscaling of Rock Properties in  
                              Heterogeneous Carbonates Using Digital Rock Models:  
                              From Pore Scale to Grid Block Scale  
          Date          :      April 17, 2012
  
7.      Speaker        :      Dr. Ok Salim (KFUPM Chem. Dept.)  
          Title         :      NMR Spectroscopy on Geological Clay Based Polymer  
                              Nanocomposites  
          Date          :      April 24, 2012
  
8.      Speaker        :      Dr. Steve Dyer (Schlumberger Dhahran Ctr for Carb. Res.)  
          Title         :      Intelligent Completions – a Method to Control the Sweep of  
                              Fluids within the Reservoir  
          Date          :      May 1, 2012
  
9.      Speaker        :      Dr. Reza Taherian (Schlumberger Dhahran Ctr for Carb. Res.)  
          Title         :      Dielectric Dispersion  
          Date          :      May 8, 2012
  
10.     Speaker        :      Dr. Emad M. Al-Saadawi (Director, Expl. Services, MAADEN)  
          Title         :      Exploration, Target Generation Steps, and Exploration Models –  
                              Practical Examples  
          Date          :      May 22, 2012 (KFUPM RI CPM & ESD Joint Seminar)



**List of Speakers who delivered seminars at the Centers of Research Excellence (NT)**

5th February 2012

**Mr. Bill** (Application Scientist Quantum Design)  
Quantum Design, Laser Optik Technologie  
Im Tiefen See 58, D-64293 Darmstadt, Germany

**Materials Characterization at Low Temperature and High Magnetic Fields Quantum Design**

18th and 20th March 2012

**Prof. Ishaque Khan**

Materials Chemistry Program, Department of Biological and Chemical Sciences  
Illinois Institute of Technology, Chicago, USA

**Series of three lectures**

**Title: Functional Materials: Molecular Nanoclusters to Nanocomposites and Zeolitic Materials with Relevance to Catalysis and Chemical Sensing**

10th April 2012

**Prof. Bhushan Bharat**

Nanoprobe Laboratory for Bio- & Nanotechnology and Biomimetics  
Ohio State University, 201 W. 19th Avenue, Columbus, Ohio 43210-1142 USA

**Nanotribology, Nanomechanics and Materials Characterization Studies and their Applications**

15th April 2012

**Prof. Bhushan Bharat**

Nanoprobe Laboratory for Bio- & Nanotechnology and Biomimetics  
Ohio State University, 201 W. 19th Avenue, Columbus, Ohio 43210-1142 USA

**Mems/Nems and Biomems/Bionems Materials and Devices and Biomimetics**

26th May 2012

**Dr. Irshad Hussain**

Department of Chemistry, LUMS School of Science & Engineering (SSE),  
Lahore, Pakistan.

**Nanostructured Materials Using Nanoparticles as Building Blocks Synthesis and Applications**





