الجامعة الأمريكية في دبي
AUD
AMERICAN UNIVERSITY IN DUBAI

المحور الهندسي
Engineering Axis

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Event Calendar:

May 6-7, 2007

"Solar Energy and Its Applications in the Gulf Region" workshop at AUD. For more information. please contact Dr. Lana Chaar at 04- 3183415

Recently at AUD

Under the supervision of Dr. Lana Chaar, junior electrical engineering students Ali S. Jamaleddine, Muhammad Fraz Ajmal, and Hasnain Ahmed Khan participated in the 1st IEEE AISPC'07 student contest competition at Aalborg University. Their paper got accepted for presentation and inclusion in the conference proceedings.

Dr. Shafiee Awarded European Grant

Dr. Hamid Shafiee, Associate Professor of Electrical Engineering, was awarded a research grant from a European agency for research and development, to work on wireless cooperative sensor networks. Engineering Axis asked Dr. Shafiee to describe the objectives of this study.

The objective of this research is to develop practical solutions to signal degradation in digital communication systems. The results of this research are far-reaching in terms of improving the quality of signal transmission and saving battery life in digital communication systems. One problem in wireless communication channels is that, due to reflection and diffraction of the transmitted signal off various objects in the environment, multiple copies of the signal each with a different amplitude, delay and phase shift, are received. This phenomenon, called multipath fading, results in severe degradation of the performance of a digital communication system. The use of diversity is an effective way to minimize fading. Diversity relies on sending the signal on independent communication paths. Of special interest are spatial diversity methods in which signals are transmitted and received by multiple antennas.

For the spatial diversity techniques to be effective, antennas have to be separated by at least a few wavelengths. This makes

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Dr. Tlili IEEE Women-in-Engineering Chair

Dr. Bouthaina Kzadri Tlili, Associate Professor of Electrical Engineering in AUD has been elected the IEEE Women in Engineering (WIE) chair of the UAE Section. The Engineering Axis caught up with her about it.

WIE, UAE section, was formed in 2003 and has over 300 members. Dr. Tlili said that WIE is dedicated to various important issues for women engineers, which primarily include recognizing outstanding women achievements, and participate at technical conferences to promote membership and enhance networking. WIE also oversees the IEEE Student-Teacher and Research Engineer/Scientist (STAR) program which is devoted to mentor young women in junior and high schools. Dr. Tlili highlighted that WIE, UAE section, has been active locally and internationally in WETEX and Power-Gen Middle East, as well as in school and non profit charity organization activities. IEEE President, Dr. Michael Lightener and WIE Chair, Mary Ellen Randall, were invited to the 2006 anniversary of WIE UAE Section and visited AUD which sponsored the WIE anniversary dinner.

My Name is Kate Gunberg

I am a geotechnical engineering graduate student at the University of Michigan in the United States. I stayed here at AUD for 4 months to conduct research funded by an International Research and Education in Engineering (IREE) grant from the US National Science Foundation. This grant was awarded to Professor Russell A. Green, my PhD advisor. The research I

Kate Gunberg with Dr. Russell A. Green

conducted focused on the time-dependant changes in the engineering properties of sands after deposition and densification. We explored several construction sites in Dubai for data collection for the project. The collaboration with AUD was desired because of its reputation for engineering excellence, and my stay here was facilitated by Dr. Alaa Ashmawy, Dean of the School of Engineering. In addition to the technical aspects of my stay, the IREE grant is intended to foster cultural exchanges among the participants. I have always been interested in the culture of this region and my stay here was a success. I look forward to returning soon and collaborating further with AUD.

First AUD Engineering and Technology Fair held on April 14th, 2007

The School of Engineering and the IT Department at the American University in Dubai (AUD) organized the "Engineering and Technology Fair 2007" on Saturday April 14th, 2007. High school students (grade 11 and 12) were invited to participate in this event which promotes Engineering, IT and technology in general among high school students. More than 60 students attended the successful event. Individual prizes were awarded to students and a grand prize was awarded to the school with the most winning teams. The fair also included some Engineering activities for those students who do not want to be included in any competitions.

Among the participating schools, winning teams included Al-Mawakeb school, Dubai American Scientific School, Our Own Indian High School, and Dubai Modern School. The Axis congratulates the winning schools on their achievement.

As part of the event organization, last semester, several high schools were invited at AUD for an informative meeting followed by a dinner to coordinate the event. The meeting was also attended by the Engineering Student Recruitment Committee and the IT Outreach Committee. Dr. Alaa Ashmawy and Dr Khalid Khawaja briefly presented the school of Engineering and the IT department respectively. AUD plans to hold this important event again in the fall semester and will continue the tradition on an annual basis.

IEEE Distinguished Lecturer Program
Heterogeneous Wireless Access Environment

Prof. Hamid Aghvami, Ph. D.
Director, Centre for Telecommunications Research, King's College, London

By Rashid Khan
Junior Comp. Engineer

The IEEE Distinguished lecturer vist was organized by IEEE UAE Section, Power Engineering Society Chapter UAE, and Signal Processing and Communications Chapter UAE, in cooperation with IEEE AUD Student Chapter. The talk took place at the American University in Dubai on December 14th, 2006. The target group consisted of students, academics and people from industry with an interest in telecommunications.

Due to variations in educational background within the target group, several general aspects of Wireless Access Environment were discussed first. Dr. Aghvami started his presentation with the discussion of concepts of convergence, integration and inter-working of multiple heterogeneous radio access networks. He explained the technical and application differences between these networks including the associated degrees of coupling between them. He then presented different approaches for the design of next generation broadband wireless networks. He also addressed how to ensure the establishment, maintenance, and termination of end-to-end Quality of Service (QoS) for these approaches. He followed this up with an example of the design of a wireless network in the context of end-to-end networking. Dr. Aghvami captured everybody's attention with his vivid way of presenting examples from everyday life, such as Peer-to-Peer (P2P) file sharing, and the relation of these to the context at hand.

The suitability of the IP layer model as a glue to interconnect multiple heterogeneous radio access networks was addressed next. Dr. Aghvami concluded his presentation by discussing the NSF initiative on Future Internet Design (FIND) as a means of re-inventing the Internet architecture.

AUD's School of Engineering Holds Advisory Board Meeting December 14th, 2006

Dr Jihad Nader, Provost and Chief Academic Officer of the American University in Dubai, and Dr Alaa Ashmawy, Dean of the School of Engineering, presided over the engineering advisory board meeting on December 14th, 2006. The Advisory Board plays a pivotal role in setting the school's strategic priorities. The success of the meetings relies heavily on the diverse professional backgrounds of the board members. In addition to the AUD's Engineering faculty members, the meeting was attended by the following board members: **Dr. J. David Frost**, Vice Provost, Georgia Institute of Technology, **Dr. Eesa Bastaki**, Director of Education, Training, and R&D, Dubai Silicon Oasis, **Ms. Nazek Al Sabbagh**, Head, Civil Engineering Department, Dubai World, **Mr. Armand Robitaille**, on behalf of **Mr. Abdulla J.M. Kalban**, CEO, Dubal, **Mr. Samir Khoury**, Area General Manager, Consolidated Contractors Company, **Mr. Simon Azzam**, CEO, Union Properties, **Mr. Hamed Zaghw**, Vice President, Parsons International, **Mr. Mustafa Kaddoura**, Executive Director, Fixed Network, du, **Mr. Abdullah Al Hajri**, Manager Corporate Communication, DEWA, **Dr. Denis Beaupré**, Operation Manager, Unibeton Readymix, **Mr. Tariq Abu-Gharbieh**, on behalf of **Ms. Maitha Bin Adi**, CEO, Traffic & Roads Agency, Roads and Transport Authority, **Mr. Abdulrahman Kalantar**, Director, The Design Group, Nakheel. The Advisory Board also includes four prominent members who could not attend the meeting: **Mr. Sultan Al Jaber**, CEO, Masdar – Abu Dhabi Future Energy Company, **Mr. Peter Fuchs**, CEO, Siemens LLC, **Mr. Ahmed Abdulkarim Julfar**, Executive Officer for Operations, Etisalat, **Ms. Maryam Al Thani**, IEEE WIE Chair, Program Manager, DIFC.

Dr Ashmawy gave insight into the school's goals, strategies and priorities. It was decided that industry partners and faculty members should work together on developing internship and training experiences for AUD students. Dr Ashmawy said that he will follow up on all the recommendations made by the Board to make sure they are properly addressed. It is to be noted that the School of Engineering was established in 2001 in collaboration with the Georgia Institute of Technology (ranked among the top 5 engineering schools in the US). Dr David Frost, Vice Provost of Georgia Tech. and member of the board, held several meetings with various members of AUD's administration and faculty members to discuss methods of closer collaboration between AUD and Georgia Tech.

Trip to DUBai ALuminium (DUBAL) Factory

By Ali Said Jamaleddine
Junior Elec. Engineer

After the successful trip to Ducab, the School of Engineering once again lived up to its standards in integrating the industry with classes. On December 24th, 2006, junior and senior electrical engineering students had the opportunity to visit one of the leading power companies in Dubai, and the region's leading aluminum manufacturing company, Dubal.

Students were first greeted by the operations manager Mr. S. W. Bustami. A presentation about Dubal and what it offers followed. The presentation discussed the history of Dubal and it gave detailed reports regarding the upgrades and the future plans for the company. The presentation served as an excellent overview of the company and it helped the students relate to theory in class even before touring the factory.

The tour that followed was mostly concentrated on control systems and fault-tolerance and analysis. The control included that of bus bars, transformers, circuit breakers, generators, and turbines. All sections of the control division were visited.

Because Dubal was operating in a maintenance period, most of the transformers and generators were disassembled. Students were able to relate more to the material covered in class about electric machinery. Students were able to see how real-life machines looked like; thus, were able to upgrade their view from standard photographs and pictures.

Lack of time did not permit touring through all the sections and factories at Dubal. For instance, the steam turbine section and water desalination section were not visited. Nevertheless, the tour was enough for students to help form the picture of what electrical engineering is really about when it comes to industry. Still, students have not seen the last of Dubal, and surely, the School of Engineering is looking forward for another visit to Dubal in order for students to see the sections that were not visited.

The School of Engineering would like to thank Dr. Lana Chaar who supervised this trip. Dr. Chaar especially wanted to thank Mr. S. W. Bustami and Mr. S. D. Salman for their efforts in making this field trip a success.

Dr. Wathiq Mansoor's Visit to Osaka, Japan

In January 2007, Dr. Wathiq Mansoor visited Osaka University in Japan. He was invited by Dr. Takahiro Hara from the Graduate School of Information Engineering. The main objective of the trip was to establish a long-term collaboration between AUD and Osaka University.

During the visit, Dr. Mansoor had the opportunity to meet with the graduate students, who demonstrated some of their research and projects that mainly focused on mobile applications and databases.

One of the interesting projects was about partitioning the content of websites according to the users' interest. This makes it easier for the user to choose the desired partition so that the mobile device can display it rather than displaying the whole content, which usually does not fit on the small mobile screen.

Another appealing project was based on recording the movements of a piano master's hands through a video camera. The videos are processed using image processing techniques and stored. This data is used as a guide to the learners. The system compares the movements of the learner with the recorded data, and points out the mistakes made.

Dr. Mansoor shared his recommendations and comments with the graduate students regarding these interesting and unique projects.

Wireless Networks (Cont. from p.1)

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the direct application of diversity in certain cases impractical. For example, it is not feasible to consider multiple antennas in mobile phones in a cellular network. In such cases, diversity can be achieved by utilizing various terminals to form a virtual antenna array. The use of relay terminals helps to transmit information from a source node to its destination over several routes. This strategy is especially important in sensor networks where the transmission power for each station has to be kept to a minimum to save battery life.

One of the important and challenging issues in the development of cooperative networks is a practical methodology for selecting the most suitable relay terminals. With the number of terminals and the transmit power fixed as in the case of static protocols, suitable configuration of the cooperative links results in improved error rate performance. In dynamic networks, the desired performance can be achieved with fewer relay stations. The purpose of this research work is to devise suit-

About this Newsletter

Engineering Axis is published by the school of Engineering at the American University in Dubai. All are welcome to send relevant information to be included in the upcoming editions.

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AUD @ ANARC Programming Competition

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Engineering Axis Team Reporter

The annual ACM International Collegiate Programming Contest (ICPC) is known to be the most prestigious, largest, and oldest programming contest worldwide with more than 6000 teams competing at over 200 regional sites worldwide and representing over 1700 universities. The regional site for the Arab and North African countries was held in Al-Akhawayn University in Ifrane (AUI), Morocco during the period November 30th — December 3rd 2006. It was referred to as the Arab and North Africa 9th Regional Contest (ANARC-06). Three students from the Computer Engineering Department: Bashar Al-Rawi, Rashid Khan, and Sina Poorkasmaei represented AUD in the event. Dr. Wael Bazzi, the coach of the team, has administered the team's training and strategies setup. This was the first time AUD participated in ANARC. Despite this, AUD was ranked first among the gulf countries, topping teams from AUS, University of Wollongong, Kuwait University, and ranked 10th overall out of the 44 participant teams. Bashar's comment regarding the performance of the team was: "During the 1st hour of the contest we were ranked 1st as we solved the first 2 problems the fastest. We made a few mistakes afterwards, but in the end it was good enough to be ranked among the top 10 teams in our first attempt in this competition".

AUD participated for the 1st time
1st among the Gulf Countries
10th overall out of 44 teams

From L to R: Sina Poorkasmaei, Dr. Wael Bazzi, Rashid Khan, and Bashar Al-Rawi.

Also for the third year in a row, AUD place in the top three at the UAE's National Programming Contest (NPC-07), which was held in March 2007.