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# Qatar University **Research** Magazine

Issue no 4 - December 2014

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## QU research gives Qatar **cool stadiums** **for 2022 World Cup**

LIEP leaps Qatari students on to engineering

Plastics for thermal comfort in buildings on the horizon

**QU's Biofuel Project:**

# From Algae to Energy



جامعة قطر  
QATAR UNIVERSITY

Qatar University Research Magazine December 2014

## Message from the VP

# Our vision: to be among the best



**Dr. Hassan Al-Derham**

Vice President for Research  
Qatar University

We started out this year in a grand style and on a positive note with the winning of the Best Research Office Award 2014, a beautiful testimony and reward for our hard work in the past year. Since then Qatar University has been making giant strides in fulfilling our mandate as a teaching and research university. It is our vision.

We launched 'Research for the Future', the road map of research at QU where we mapped out our priorities for 2014 to 2019. Qatar University's research laboratories were recently awarded ISO/IEC 17025-2005 accreditation by the American Association for Laboratory Accreditation (A2LA), a clear demonstration of our adherence to the highest ideals of quality and international best practice in all our research processes, lab systems and procedures.

We have also gone a step further with the establishment of the Qatar University Biomedical Research Center (QUBRC), an interdisciplinary outfit that will leverage on QU's internal human and infrastructural resources and the increasing network of organizations in Qatar with interest in biomedical research. The QUBRC is an addition to our existing specialized research centers.

Apart from signing different agreements with our partners, we have also been hosting collaborative events. Recently, in partnership with ExxonMobil Research Qatar and Texas A&M University at Galveston (TAMUG) we hosted a workshop on Qatar's dugong population. Research and innovation collaboration opportunities between the European Union and the Gulf Cooperation Council (GCC) states were discussed at a workshop which we also hosted.

Because of our dogged efforts and based on the outcome of reputation survey results, research publications and citations, QU is considered the fastest-growing university in research in the Middle East.

In this 4<sup>th</sup> issue of the Qatar University Research Magazine, we have an interesting line up of stories and articles that go further to showcase what our lecturers, researchers and students have been doing.

Our feature story is on efforts being made to ensure that Qatar gets air cooled stadiums for the 2022 FIFA World Cup. It is an eye opener to what our well-harnessed human resources can achieve given the right environment.

Beginning with this edition, a new section, "Our Partners", will showcase the fruitful relationships between Qatar University and its partners and the positive outcomes that have been generated from research collaborations, focusing on a distinct entity in each edition.

Then there is the piece on the benefits our youths have been deriving from participating in the "Life is Engineering Program" which has been nurtured by the College of Engineering. These and many more are packed into this edition for your reading delight.

We have also launched our social media platforms which will contribute significantly to communications with our stakeholders, partners and researchers in various fields. They will further assist in disseminating our news and the outcomes of research projects we are working on. In addition, they will open new horizons for cooperation with the local and international research community.

Have a pleasant reading experience as you explore the magazine.



# TIMES HIGHER EDUCATION MENA UNIVERSITIES SUMMIT

February 23 – 24, 2015  
Qatar University



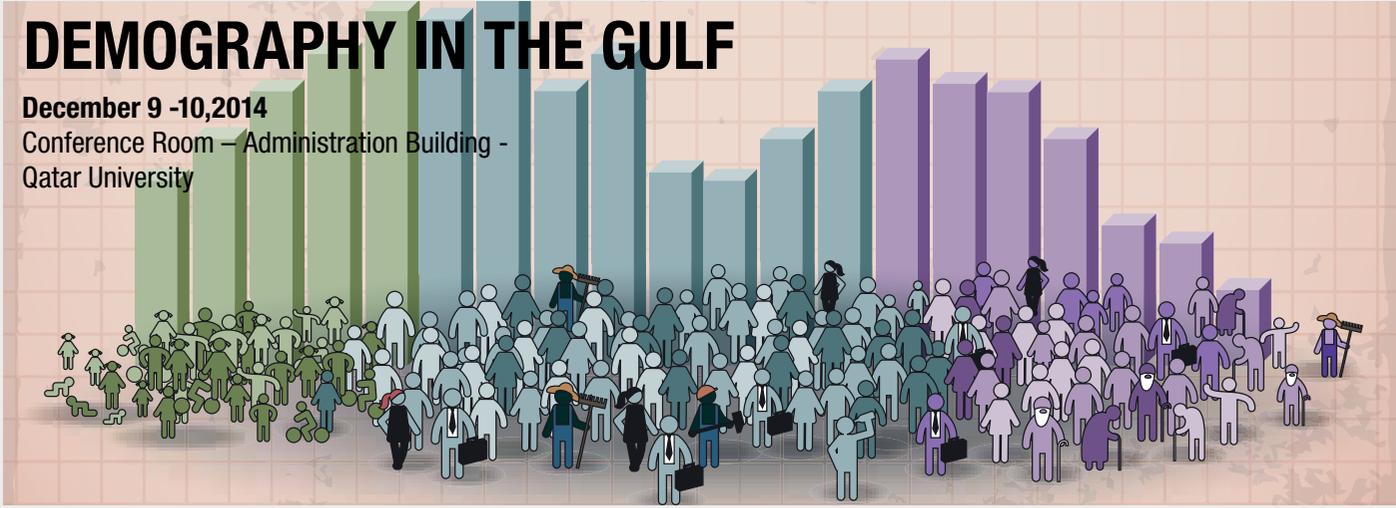
## SEHHA: SCIENCE EDUCATION AND HUMAN HEALTH ACTIVITY

December 23-24, 2014  
Qatar University, Department of Health Sciences  
- College of Arts and Sciences



## MEDICATION SAFETY OUTREACH

December 20, 2014 - Qatar University



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December 9 -10, 2014  
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Qatar University  
**Research**  
Magazine

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## News

# QU hosts experts at biomedical research symposium



Dr. Hassan Al-Derham with other QU officials and guests



Dr. Hilal A. Lashuel, QBRI Executive Director

Experts in biomedical research and related fields attended the research symposium organized jointly by Qatar University Biomedical Research Center (QUBRC) and Qatar Biomedical Research Institute (QBRI) in September.

The event was attended by QU Vice President for Research Dr. Hassan Al-Derham, QBRI Executive Director Dr. Hilal A. Lashuel, and scientists and researchers from Qatar Biobank, Qatar Cardiovascular Research Center (QCRC), Qatar National Research Fund (QNRF) and Qatar Foundation (QF).

Its purpose was to bring together experts, scientists and researchers to discuss developments in biomedical research in Qatar, and more specifically, for QU and QBRI scientists to meet and strengthen their scientific interactions. Discussions also focused on the aims, objectives and strategies of QUBRC and QBRI towards achieving a breakthrough in biomedical research.

In her remarks, QUBRC Director Dr. Asmaa

Al-Thani said that the new center would focus on research, training and services in applied and basic biomedical research. She added that, to achieve this objective, QUBRC would work closely with QBRI and other partners in Qatar such as Hamad Medical Corporation (HMC), Qatar Cardiovascular Research Center (QCRC), Sidra Medical and Research Center, Qatar Orthopaedic and Sports Medicine Hospital (Aspetar) and Qatar Biobank (QBB).

“Through its activities and functions, the Center will strive to reduce the transmission of infectious diseases in the community and hospitals and enhance public health in Qatar in collaboration with the Supreme Council of Health (SCH) and HMC”, Dr. Al-Thani said, adding, “Concerted efforts will be made to advance research on drug development and testing in the long run”.

Dr. Al-Thani highlighted QU’s competitive strength in biomedical sciences, noting its many college-based labs, a faculty body of over 50 in the field of biomedical sciences, and a host of graduate programs. “The Center itself has

ample facilities, equipment and resources and will provide state-of-the-art labs and support for interdisciplinary and translational research and complement the already existing or planned biomedical research capabilities in the country”, she said.

She stated further that, while attracting industry partnerships for research and development (R&D), the Center will leverage resources at other QU units such as the Center for Advanced Materials (CAM), Kindi Lab for Computing Research, Laboratory Animal Research Center (LARC), College of Pharmacy (CPH), and the Environmental and Biological Sciences department in the College of Arts & Sciences (CAS), and provide expanded capabilities to faculty and student researchers.

Dr. Lashuel remarked: “The QUBRC is a significant achievement for QU and the biomedical landscape for the State of Qatar. Also, this milestone is a great opportunity to build a bridge between QU and QBRI in areas of education, training and research”.

## News

# QU establishes Biomedical Research Center



Qatar University recently established a dedicated center of excellence for biomedical research – QU Biomedical Research Center (QURBC) - and announced the appointment of its director.

The work of the new center will be overseen by Dr. Asmaa Al Thani and will be aligned with the organization's research priorities on energy, environment and resource sustainability; social change and identity; population, health and wellness; and information, communication & technologies. Its establishment is in keeping with Qatar University's efforts towards the expansion of cutting-edge research in various areas of national priority with national, regional and international significance.

QURBC will leverage QU's interdisciplinary capacity, incorporating key players in the field of biomedical, health and medical research at QU -the Biomedical Sciences Program and Biological Sciences Program in the College of Arts and Sciences (CAS), and the College of Pharmacy.

The Center will also seek collaboration with national partners and stakeholders such as

Supreme Council of Health (SCH), Hamad Medical Corporation (HMC), Weill Cornell Medical College in Qatar (WCMC-Q), Sidra Medical and Research Center, Qatar Biomedical Research Institute (QBRI), Qatar Cardiovascular Research Center (QCRC) and Anti-Doping Lab Qatar (ADL-Q).

Dr. Al-Thani will lead the Center's focus on research, training, and services in applied and basic biomedical research in three major areas: metabolic diseases (chronic non-communicable diseases), namely cardiovascular diseases, type 2 diabetes, obesity and cancer; epidemiology and infectious diseases; and drug discovery, development and analysis.

QU VP for Research Dr. Hassan Al-Derham said: "The Center is evidence of Qatar University's alignment with the Qatar National Vision 2030 and Qatar's national research priorities which include public health and biomedical sciences-related research."

He noted that the Center will be hosted in QU's New Research Complex which is home to a number of the organization's specialized

research centers. "QU has invested in research infrastructure with a large biomedical wing comprising a Biosafety Level 3 facility and an animal facility", he said, adding, "Dr. Al-Thani's knowledge and experience will be an asset to leading the Center on strategies and initiatives that will serve the needs and expectations of the society and improve the human condition in Qatar and beyond".

Along with her position as QURBC Director, Dr. Al-Thani will continue as Head and Associate Professor of Virology at the Biomedical Sciences Program in the College of Arts and Sciences. "QURBC will serve to enhance and advance the work on biomedical research at QU started by the Program which celebrated 30 years of excellence in 2013", she said, adding, that expertise from the CAS programs and from CPH will be of immense value to the Center's work.

Dr. Al-Thani noted that in 2009, the undergraduate program was the first outside of the US to successfully fulfill all the standards required by the US-based National Accrediting Agency for Clinical Laboratory Science (NAACLS).

## News

# Qatar University, Sidra sign pact to foster research



As part of efforts to strengthen academic and research collaboration, Qatar University (QU) and Sidra Medical and Research Center (Sidra) signed a Memorandum of Understanding (MoU) yesterday to foster research, develop academic and scientific relationships, and facilitate academic and technical exchange.

The agreement was signed by QU Vice-President for Research Dr Hassan Rashid Al Derham, and member of the Office of Sidra Chief Executive Officer, Executive Vice Chief Medical Officer Dr Abdulla Mohammed Al-Kaabi.

The purpose of the MoU is to identify the areas of interest, and articulate a mutual strategic intent for further development and collaboration and facilitate the work of QU's Laboratory Animal Research Center (LARC) in those areas.

Dr Al Derham said: "This initiative between QU and Sidra is a demonstration of the two

organizations' commitment to the realization of the objectives of the Qatar National Vision 2030 as it aims to develop and empower our people to be able to sustain a prosperous society".

"The agreement will further empower Qatar University's Laboratory Animal Research Center (LARC) in its efforts to realize its mission of providing quality animal husbandry and veterinary care to support QU's leading role in education and research," he added.

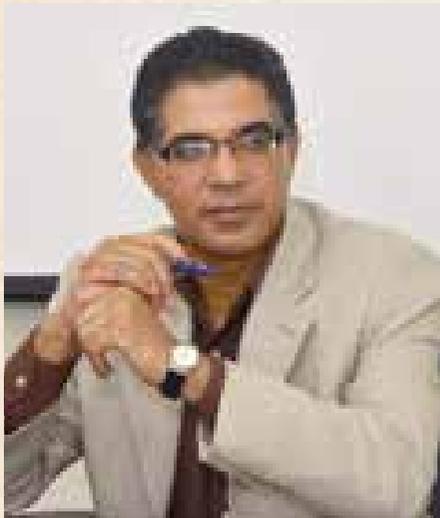
Dr Al-Kaabi said: "Sidra's partnership with Qatar University (QU) signifies the growing importance of developing talent, research and knowledge in Qatar. Our partnership can help build a thriving and sustainable future in the field of science and medicine. We hope that through shared areas of interest, such as joint research, training and educational initiatives, exchange programs and student sponsorships; we can create the landscape necessary for the delivery of globally relevant research

and ultimately contribute towards advanced healthcare services in the country".

LARC Director Dr Hamda Al-Naemi said: "The agreement between QU and Sidra opens opportunities for collaboration between the two parties. It serves as an umbrella to develop scientific relationship between LARC and Sidra in various areas of interest such as establishing joint research projects or programs, and developing training programs for professional staff".

"In addition, it will help in facilitating joint conferences, symposiums and workshops for the mutual benefit of both parties. The agreement is the start of a strong collaboration between LARC and Sidra that will result in considerable scientific and professional rewards for both institutions. It will also open up more opportunities for academics, researchers and students to explore other areas of cooperation," she added.

## Research Issues



**Dr. Nasser Ahmed Ibrahim Suleiman**

Associate Professor of Modern History, Department of Humanities, Qatar University

## Research and Studies Centers in the Arab World:

# Views on the current situation

Research and study centers in the last decades of the twentieth century attracted keen interest, which resulted in a stream of academic writings, which looked at them as a scientific phenomenon that emerged on the scene in several countries in the East and West with varying degrees of importance. They helped decision makers to deal with difficult or complex strategic issues and problems and gave vent to the realistic possibility of dealing with and confronting them using scientific and methodological methods that provided multiple solutions for decision makers and at the same time suggested possible alternatives.

Dr. Suleiman notes that research centers have had different names and definitions. Khalid Walid Mahmoud, a specialist in the study of research and study centers, mentions that some are named “Foundations”, “Institutes”, “Funds” or even “Endowments”, but they are all under the “research and study centers” category.

In respect of the role of research and study centers, there are those which are non-profit and civil research organizations that conduct research and studies on general problems and issues (in the fields of education, health, environment and economic development... etc) in order to analyze and submit proposals to address them. Their role is almost limited within the academic context, which aims to raise awareness about complicated issues and problems and reveal their dimensions and impact on current situations. There are also those which believe that they have gone beyond being scientific, investigative and cognitive to playing the role of advisory bodies.

They are considered vital centers working to provide scientific advice based on the opinions of academic experts and specialists, which help decision makers to form their opinions,

analysis and real visions in developing general policies and rationalize the decision making process.

Furthermore, there are a number of research centers that have assumed an important role in the field of future studies or what is known as forward-looking studies, which suggest their perceptions and expectations of important issues, helping those responsible for strategic planning in the development and construction of their reports in a scientific and accurate way.

In fact, the research and studies centers in the developed West evolved and achieved quantum leap in performance that made it possible to accurately determine the specializations, research fields, and objectives, one serving the other, working according to a strong network or system that shares results and cognitive expertise affecting in the end, the degree of the depth of the analysis.

The idea of accurate specialization became the dominant feature, and as a result, some centers were concerned with political research, others with security research, some with economic and few with historical research. There were those that determined their research and investigative scope according to geographical areas such as the Middle East region, which was granted by America, for example, in 1948 a major hub known as the Institute for Middle East Studies. There are centers that focused on specific issues like peace and ways to achieve it such as in Sweden, which in 1966 established the Stockholm International Peace Research Institute, in addition to other research centers interested in foreign policy and international affairs and others interested in local affairs, some of which are considered non-profit quasi-governmental centers that raised their funding from governmental, civil or non-formal sources.



The scientific center, Kuwait

Moreover, other centers are not linked to the state or the government and can be described as private independent centers, dominated by the free academic aspect of studies which provide solid studies and authentic cognitive result, aimed at spreading knowledge, enlightenment and development of the individual and society with vital and central issues that are of special priority or otherwise related to the fields of knowledge, heritage and culture in general. They derive their funding from their research projects in which they collaborate with donor organizations, businesses or bodies supporting scientific research or financial endowment. This latter type is significantly spreading in the Arab world.

Thus the phenomenon of the vertical specialty determining the research and knowledge fields increased, which explains the increase in the number of centers on a single state level: in the United States alone, according to 2011 statistics, –there were 1,815 research centers out of 6,480 specialized centers in multiple fields around the world. It is clear, especially in the developed world, that countries no longer rely on their universities and academic institutions alone, but there is a strong tendency to rely on the results of hundreds or even thousands of research centers that only work on research and investigation in the study of issues and problems related to their national and strategic fields.

The Arab world was not far from contributing to this phenomenon but with limited steps. It is well known that research and study centers have become widespread throughout



**In the United States alone, according to 2011 statistics, –there were 1,815 research centers out of 6,480 specialized centers in multiple fields around the world”**

the Arab world since the second half of the twentieth century, and clearly emerged on the Arab scene since the nineties. Egypt was in the forefront of the Arab countries, which became aware of the importance of benefiting from these institutions since the fifties and particularly in the wake of the Egyptian revolution in 1952, when the Institute of Arab Research and Studies was established in Cairo. Then came the wider move with the establishment of the National Research Institute in 1956 and the culture of establishing research centers reflected on other important institutions such as the Egyptian newspaper Al-Ahram which worked on the establishment of Al-Ahram Center for Political and Strategic Studies in 1968 (and included 35 experts and scholars) to intensify the academic and realistic interest in studying the Zionist enemy, analyze the

dimensions of the Arab-Israeli conflict, in addition to the study of international issues that have both relevance and impact on the Arab region, enrich the Arabic library with authentic and documented studies, publish sound and objective translations of the studies concerning the region and follow the different developments on its scene. Because of the expanded activity for this vital center (which released 148 books) during that period, it has become one of the most important specialized research centers in the affairs of the Middle East and the issues of the modern Arab world. This approach was supported few years later, specifically in 1975 with the establishment of the Center for Arab Unity Studies primarily concerned with the issues of the Arab nation and in its heart the central cause of Palestine.

Through the seventies and eighties, Arabic research and studies centers which worked on developing the culture of research and cognitive life in the general Arabic society spread quickly. They worked significantly in the publication of books, magazines and scientific journals which addressed issues of concern to the Arab public opinion as much as they interest the decision makers in various political sectors. Among the most important means of revealing the role of these research centers and their activity scope is their interest in workshops, seminars and scientific conferences, as well as special studies to address a certain problem, develop suggestions and recommendations and conduct polls that are of interest to decision makers or donors as much as they are to the Arab public opinion.

However, the outcome of the research and study centers' experience in the Arab world over more than half a century, reveals the weakness of their role and limitedness of their impact, and any comparison with their counterparts in the Western world (Europe, USA or even the advanced Far East (as in Japan, China, India and others), clearly indicates an ineffective and weak role, attributed to the limited expenditure on scientific research, the widening gap between decision makers and Arab studies centers, negligence of thinkers and creators and not offering them the adequate care in a way that helps exacerbate the phenomenon of «Arab brain drain» which reached - according to statistics issued by the Arab League, the International Labor Organization, UNESCO and Arab and international institutions - about



Children's Cancer Hospital Foundation 57357, Egypt

100,000 scientists, doctors and engineers who left their Arab countries in the Middle East and North Africa, with 70% of them not returning to their home countries! Moreover, the studies attribute other reasons to some Arab dominant regimes, which limit creativity, freedom of opinion and objective treatment outside the context of declared ideologies. Far from following the authority or justifying its actions and political and security decisions, the question has become how to make research centers free, independent and not subject to any form of censorship or intellectual custody.

Many Arabic research and studies centers work nowadays on preparing security and intelligence reports that are far from what really serves scientific and cognitive research as well as the development sector. This backwardness is also attributed to the despotism climate and the lack of an appropriate scientific environment. Many of them were subject to the centralized control by the security and intelligence authorities that are doing their utmost in closing in on those centers in case they failed to tame or rather “politicize” them, which makes them lose their scientific objectivity. They also work on sieging their funding sources and cutting back on donor sources, to suffer a lack of material resources, which in the end make them unable to provide qualified research competencies and personnel and cover the necessary expenses for research and study.

The available figures and statistics on the percentage of Arab funding for scientific

research reveal the depth of the problem faced by the Arabic research centers. The figures mentioned in the UNESCO statistics and Arab human development reports show a bad image of how the Arab world deals with research centers. The funding percentage for scientific research ranges between 0.1% and 0.3% for the entire Arab world including administrative expenses! In Sweden and France, for example, it reaches up to 3% of the general budget. In Israel, the expenses percentage on scientific research reaches the equivalent of 4.7% of the state's general budget and the equivalent of 30% of the government budget allocated to higher education. With regard to the yearly published production, the total research in the Arab world does not exceed 15,000, while the number of faculty members in colleges and universities is around 55,000 professors. The rate of productivity is around 0.3%, while the rate of productivity in the advanced countries is about 10%. All of this unveils – according to Professor Khaled Ghazal – the terrible situation in producing knowledge through the Arabic research centers.

We can only get out of this situation through spreading the freedom of expression and opinion, administrative and organizational disengagement with the authorities, granting the research centers a wide margin of freedom, independence and mobility and enabling them to receive information as much as facilitating the task of accessing them and providing sufficient and independent funding sources for research and study. On the other hand, the need for the research

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**The funding percentage for scientific research ranges between 0.1% and 0.3% for the entire Arab world including administrative expenses!”**

centers to assume their role in keeping up with the rapid changes, seek to follow the development of the research work's tools and its modern methodologies, attract the best human minds and take care of them and open a communication window among research institutions in the Arab world, as well as pursue a specialization that leads to excellence and competition and finally provides a network that sponsors the establishment of an Arab partnership for scientific research that will allow the exchange of knowledge and experience between research and studies centers in the Arab world.

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## News

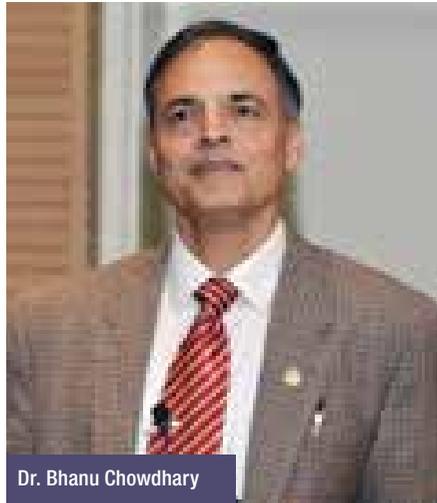
# Conservation of Qatar's dugongs discussed at QU workshop

Qatar University (QU) in collaboration with ExxonMobil Research Qatar (EMRQ) and Texas A&M University at Galveston (TAMUG) hosted a two-day workshop at Qatar University's New Research Complex recently to discuss Qatar's dugong population, their global status, and current and future strategies for their conservation in the State of Qatar.

The workshop followed the recent signing of an agreement in July by the three parties to further environmental research and marine mammal initiatives relevant to Qatar. Close to 40 regulators, researchers and academics, from environmental research, management, and conservation institutes, and other stakeholders including the Ministry of Environment and the Ministry of Municipality and Urban Planning, participated in the discussion.

Qatar is the home of the largest population of dugongs outside of Australia -- large, herbivorous marine mammals that consume sea grasses, can reach lengths of more than 3 meters, weigh more than 400 kilograms, and live up to 60 years. Historically, dugongs have a cultural and economic importance to Qataris, having been used as both an economic and food resource in the Arabian Gulf for more than 7,500 years.

Though long-living, dugongs have a low reproductive output. They are listed as Vulnerable to Extinction by the International Union for the Conservation of Nature. Currently, dugongs in Qatar face challenges including incidental fishing and habitat degradation. Limited research has been conducted on Qatari dugongs thus far and the tri-party initiative will aim to develop the scientific understanding needed to inform decisions for their protection and conservation.



Dr. Bhanu Chowdhary

In his welcoming remarks, QU Associate VP for Research and Strategic Initiatives Dr. Bhanu Chowdhary said that the workshop was a unique opportunity for Qatar University to lead research on dugong habitat and conservation in cooperation with EMRQ and TAMUG. "The expertise and excellent facilities and resources available at QU through the Environmental Studies Center, and other departments and research units in various colleges, along with various national and regional partners, will allow the research partners to successfully tackle key issues related to

conservation of this indigenous species" he said.

He also reaffirmed QU's commitment to knowledge-sharing and providing expertise for multidisciplinary research, education and learning in line with the organization's research priorities and in contribution to the objectives of Qatar National Vision 2030, National Research Strategy, and other national development strategies.

"We are pleased to collaborate with EMRQ and TAMUG on this important initiative and appreciate the lead taken by the Environmental Studies Center, and the support received from the Ministry of Environment, Ministry of Defense and Ministry of Municipality and Urban Planning to further environment sustainability efforts in Qatar", he added.

"We are extremely pleased to be working with Qatar University and Texas A&M University at Galveston to conduct research on Qatar's dugong population. The dugong species is a fascinating one, and we are committed to understanding more about it, while ensuring that it is protected and continues to thrive in its natural habitat," said EMRQ Research Director Dr. Jennifer Dupont.



Dugong



# QU research gives Qatar cool stadiums for 2022 World Cup



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**We are looking at 2022 not just as an event but as an opportunity for Qatar to say to the world we are no more a developing nation”**

**Dr. Saud Ghani**

The Brazil 2014 World Cup was watched in air cooled Fan Zones at Katara and Aspire in Doha, giving spectators and fans a taste of what to expect during the 2022 World Cup in Qatar. Already, the models of two of the new seven stadiums for the 2022 fiesta, that will be air cooled, have been revealed. Qatar University (QU) experts were teamed up with the consultants to deliver the design of the cooling system of the Al Bayt Stadium in Al Khor. Together with Aspire and the Supreme Committee for Delivery and Legacy, researchers at QU are driving this endeavor that will give Qatar the opportunity to host the world in environments that are conducive enough to meet the standards set by world football governing body, FIFA.



Al Bayt Stadium, Al Khor

Leading the team of researchers is Dr. Saud Ghani, Associate Dean of Development and Industrial Relations in the College of Engineering at QU, who has been devoting efforts to evolve an efficient sustainable and effective outdoor cooling system.

“We started two years ago with Aspire whose mission is to promote sports backed by research. Hilal Al-Kuwari, President of Aspire Zone Foundation, an enthusiast of outdoor cooling, was given the task of making it an air conditioned stadium. We decided to use Al Saad Stadium as an example and the task was to transfer Qatar Sports Club from a normal open air non-cooled stadium to a cooled stadium. The technical feasibility study was handed over to Qatar University and we started looking for a novel way of outdoor cooling,

to deliver cooling efficiently,” Dr. Ghani said in an interview.

Cooling in a small closed space is completely different from in an open space. In a closed space, there is a controlled volume of air which is pushed through the machines; cooled and push back to the desired space. Some fresh air can be made up from the outside, all calculated and precise.

“But in open outdoor cooling you are at the mercy of the conditions. As you pump a lot of cold air, special skills are needed because of the numerous tasks involved in delivering the air to the needed area only and not to the whole void, effectively and in a sustainable and efficient manner,” Dr. Ghani disclosed.

“We did the Qatar Sports Club cooling and they liked it. After that we have gone through different projects with Aspire like the renovation and cooling of Khalifa Stadium. We also looked at cooling the hills of Katara and how to cool the Corniche area. All these are about how to provide sustainable cooling for the community, especially through the summer months in order to promote and enhance the community health and promote sports.”

As a result of these efforts, the Al Saad Stadium in Doha has become the only cooled stadium in the globe. That is why Qatar is leading in the world in cooling for stadia and in stadium design, especially after it won the bid for the 2022 World Cup. Qatar University’s partnership with Aspire in projects no doubt has already led to the realization of one newly completed



stadium, the Al Bayt Stadium. Five other facilities are being worked on.

The Fan Zone for Brazil 2014 was effectively executed. Located in Aspire Park, it is an open outdoor space, stadium size. It is a completely cooled and comfortable environment for spectators.

“We wanted to give this to FIFA and people in the community; to tell them that it is possible with the most efficient technology to provide a cooled outdoor space for spectators and fans and players safely within the FIFA requirements,” Dr. Ghani said.

The biggest challenge is how to provide a safe environment for the players and spectators from the thermal comfort point of view. Before a match, a FIFA official will come at the kick off time to measure the

temperature and humidity and thermal stress factor. If the conditions are not met, there will be no play. Given the harsh conditions of the summer with temperature getting to 47 degrees Celsius, factoring in wind and dust, the temperature needs to be tempered to bring it down from 47 to 26. The challenge is how to do it efficiently.

Dr. Ghani and his team are addressing how to provide Qatar with the design that will meet the FIFA requirements. “We are looking at 2022 not just as an event but as an opportunity for Qatar to say to the world we are no more a developing nation. We are already developed with the capacity to host any other event or tournament. That is why the university as the national university is providing all the help and assistance from the scientific and design point of view to this effort and push,” he said.



**QU is one of the leading institutions globally to offer cooling to help an arid environment.”**



From the right Dr. Saud discussing the project with his team



**Aspire has invested in the university, showcasing the real value of having a government institution tasked with developing sports and research”**

### Relationship with Aspire

Qatar University's working relationship with Aspire has been on for close to three years. The organization is supporting a lab in the university with high performance computers that can do assessment and simulation by wind direction, temperature and distribution of cold air. The Aspire Lab at the College of Engineering in Qatar University was established to support research.

Talking further on the relationship with Aspire, Dr. Ghani said: “Aspire is also supporting us with the building of a wind tunnel where we put models and let the air flow around them and do the simulation. It is one of the biggest wind tunnels in any university in the Middle East. We have done the first prototype and the building is under construction. Aspire has invested in the university and this is the real value

of getting a government institution tasked with developing sports and research to work with the university to upgrade its facilities to world class standard.”

### Team members

The project is contributing to capacity building and utilization of expertise. About four people, one with a doctorate and three research assistants, are working with Dr. Ghani to support Aspire and its projects. One Qatari is also doing his post graduate studies in stadium cooling.

### Funding

The project is being funded by Aspire and the Qatar National Research Fund (QNRF) through the National Priorities Research Programme (NPRP). Qatar University is investing through the provision of land for Aspire to build the structure on campus.



Al Gharafa Stadium

“Aspire and QNRF are putting in \$1 million each in direct hard cash and the rest is university support,” according to Dr. Ghani.

### Benefits for the community

The last thing that FIFA wants is to see facilities for its tournaments abandoned after an event. That is what is called the legacy mode, how to utilize the facility for the benefit of the community and the world. So the facilities that are being designed for the 2022 World Cup will be of enormous benefit to the community after the tournament. So while designing

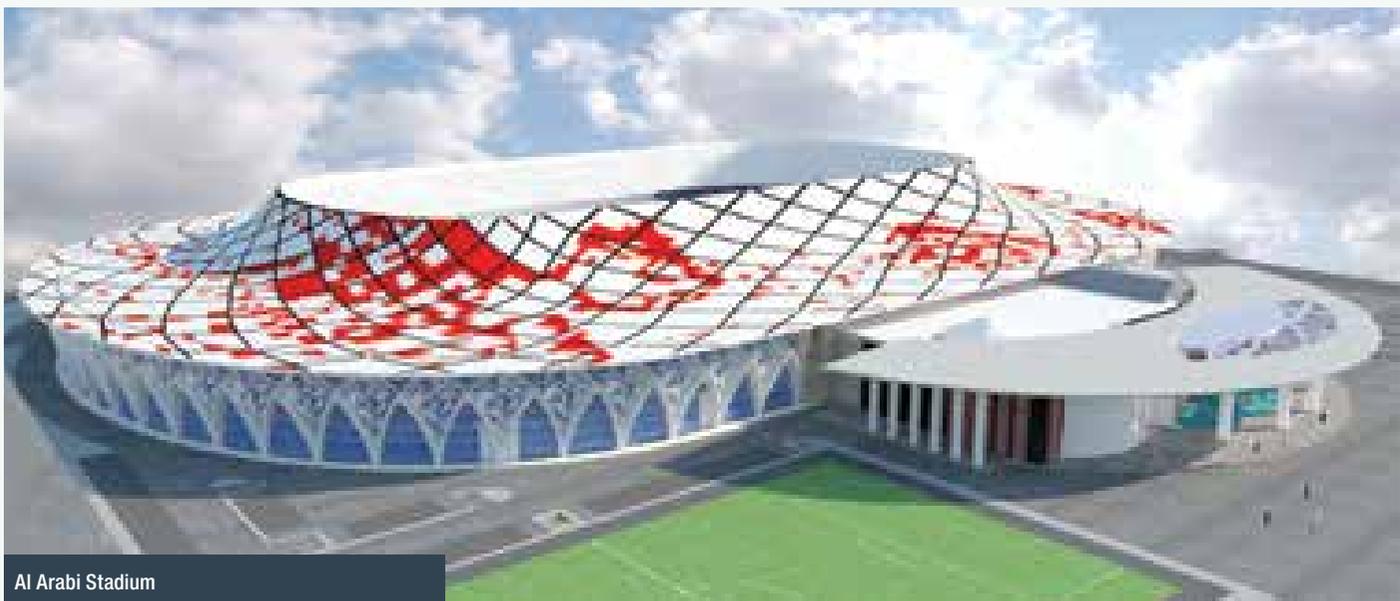
and building, the team is looking for multifunctional stadiums that will be useful afterwards and become recreational areas for the communities. They will house malls and multipurpose halls for cultural events, wedding parties, and gymnasiums. The stadiums will be a hub for local community activities in a brand new setting and act as meeting points for all the community while offering lots of jobs for the people.

### Qatar National Vision 2030

The first pillar of the Qatar National Development Strategy is to support the

2022 World Cup which the government has put at the heart of development. All ongoing developments in Qatar support that agenda. The World Cup is at the heart of the 2030 Vision, Dr. Ghani says.

“QU is one of the leading institutions globally to offer cooling to help an arid environment. We have another group offering cheap cooling for green houses in hot environment. It is also the only group in the world doing this. QU is claiming its place internationally in different fields, biofuel, corrosion, material science and cooling technologies,” he further said.



Al Arabi Stadium

## News

# QU launches five-year research road map



Dr. Hassan Al-Derham

In a move to demonstrate its growing role as the nation's research engine to drive the vision of a knowledge-based society, Qatar University (QU) recently launched its research roadmap for 2014-2019, identifying priority areas and outlining its goals for the coming five years.

As a national university of world-class education and high quality research that is aligned with national objectives and the needs of the community, the event was an opportunity for QU to detail its main areas of focus and the strategic plan for their achievement.

Entitled 'Advancing Research for Qatar's Future', the roadmap lists QU's four priority research areas -- Energy, Environment & Resource Sustainability; Social Change & Identity; Population, Health & Wellness; and Information, Communication & Technologies (ICT).

Each has a set of sub-themes respectively -- Liquefied Natural Gas and Alternative Energy, Materials and Nanotechnology,

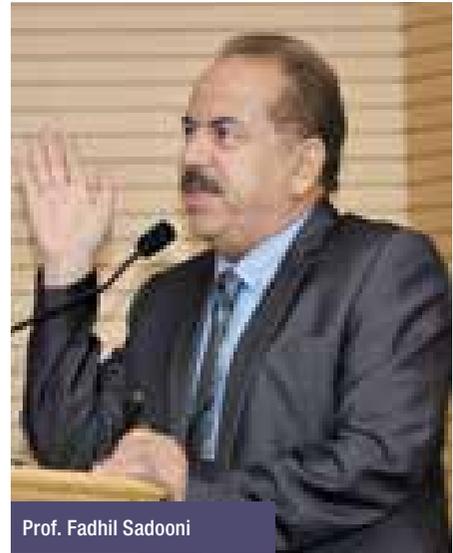


**The University is investing in developing its infrastructure as well as increasing the number of graduate programs”**

Marine Resources and Water, Air & Food Security; Modernization, National Identity and Society, Islam & Contemporary Issues, and Education and Capacity Building; Prevention & Treatment of Chronic Non Communicable Diseases, and Traffic Safety; and Intelligent and Secure Information Processing, Distributed Systems and E-Services, and Enabling Technologies.

Plans for implementation of the roadmap include the establishment of 12 interdisciplinary groups to address the sub-themes. The key impact is expected to be felt in the number and quality of PhD programs and post-doctoral training as well as stimulation of undergraduate research and creating mass in the priority areas within Qatar University and in Qatar.

In her opening remarks, QU President Prof. Sheikha Al-Misnad emphasized the university's commitment to supporting a research agenda that meets the current and future needs of the country and matching up with new developments in the field of research.



Prof. Fadhil Sadooni

She added: "I believe that the strategy and the implementation plan will contribute significantly in refocusing research efforts in the university and maximizing the return on investment in the field of research, thereby realizing the mission of the university which is based on 'Research Excellence', one of its fundamental pillars."

The event agenda included presentations by QU VP for Research Dr. Hassan Al-Derham, Social and Economic Survey Research Institute (SESRI) Director and Associate Vice-President for Research Operations Dr. Darwish Al-Emadi, Office of Research Adviser Prof Fadhil N Sadooni, Laboratory Animals Research Center (LARC) Director Dr. Hamda Al-Naemi, Associate Vice-President for Research and Strategic Initiative Dr. Bhanu Pratap Chowdhary, and Kindi Lab for Computing Research Director Dr. Qutaibah Malluhi.

Dr. Al-Derham said that while Qatar University is moving from being a teaching university to a teaching and research university, it is focusing on enhancing its



Dr. Darwish Al-Emadi



**Plans for implementation of the roadmap include the establishment of 12 interdisciplinary groups to address the sub-themes”**



Dr. Qutaibah Malluhi

research portfolio and advancing the needs of the community with the view to achieving a global footprint of research excellence.

He added: “The University is investing in developing its infrastructure as well as increasing the number of graduate programs to be able to achieve its goals in the identified priority areas of the roadmap”.

Dr. Al-Emadi said: “The roadmap is an excellent indicator of where QU is heading and shows where the organization will invest in the next five years which will give considerable impetus to its development and progress”.

Presenting on the Energy, Environment and Resource Sustainability theme, Prof Sadooni said, “The efforts of QU scholars will serve to optimize national processes and activities towards energy diversification, and environmental sustainability and conservation. Their work will contribute in no small measure to QU’s research capacity on this key priority area and to the objectives of Qatar National Vision”.

On Population, Health and Wellness, Dr. Al-Naemi said that the organization has a unique opportunity and is well-placed to bring together different disciplines to research health issues using an interdisciplinary

approach within QU and with input from our partners in the public and private sectors”.

Dr. Chowdhary noted that the road map will significantly strengthen QU’s research profile, and promote innovation, discovery and entrepreneurship, positioning it as a leading partner in the country’s stated development aspirations.

Dr. Malluhi emphasized that the roadmap is “an important milestone for Qatar University as it provides the needed vision and direction for becoming a well-recognized leader in ICT research and innovation in areas that are relevant to the society”.



Attendees

## Interview with Researcher

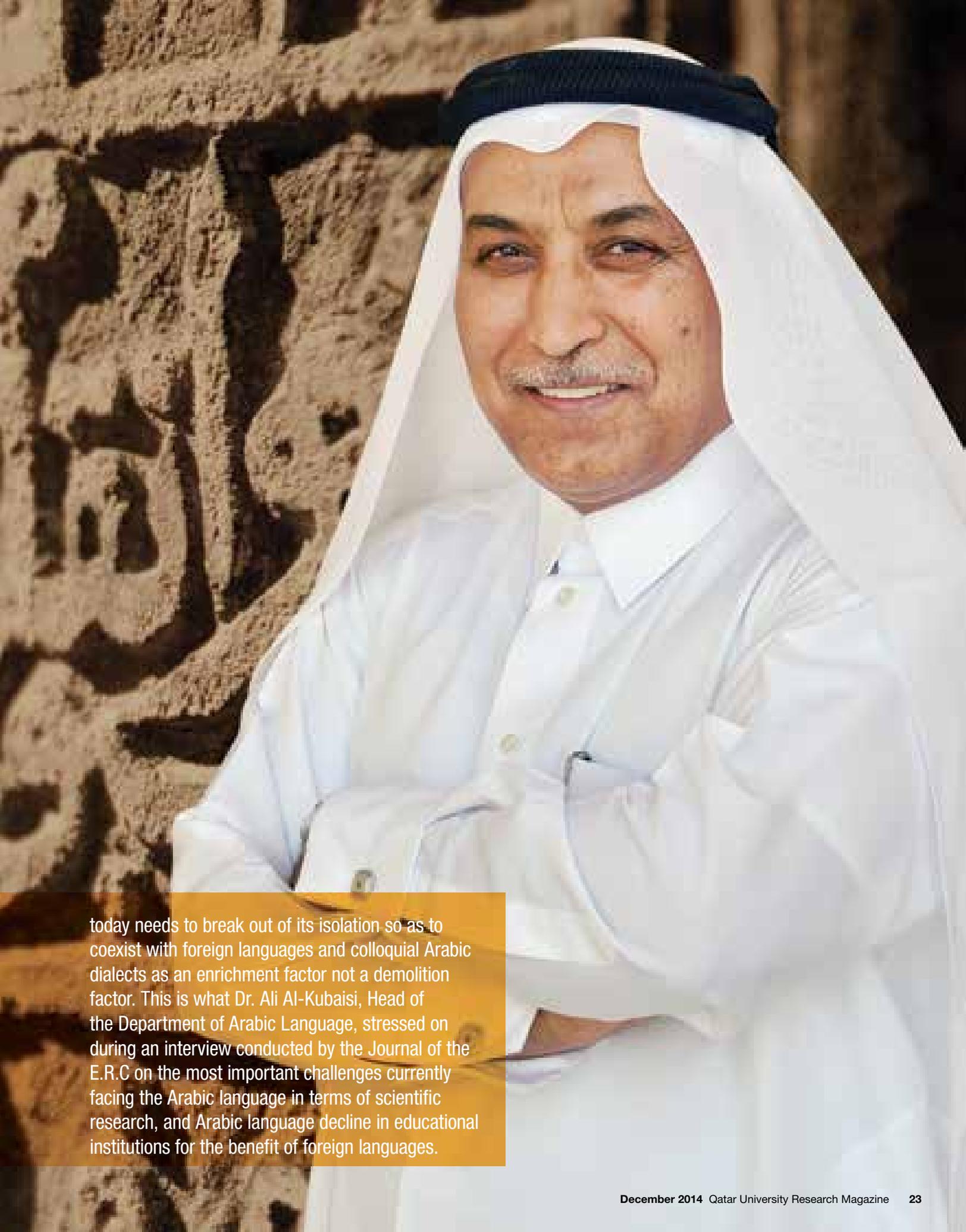
Dr. Kubaisi:

“**Standard Arabic (Al-Fushaa) today needs to break out of its isolation so as to coexist with foreign languages and colloquial Arabic dialects”**

Language is the medium of thought, the main means of mutual understanding and communication, the essence of cultural and social identity, and the keystone of patriotism and national loyalty for all nations. The Arabic language has a special place among languages of the world, due to its religious, national, and scientific importance for the peoples of the Arab and Islamic world which extends across Asia, Africa and parts of Europe. The importance of the Arabic language extended to include the

entire world, as it has played a leading role in the dissemination of knowledge and sciences, such as astronomy, mathematics, medicine, engineering, philosophy, and literature.

Based on this importance and the effective historical role of the Arabic language, the Department of Arabic Language at Qatar University always seeks to uphold Arabic at all levels, whether through scientific research or through the development of the students' language skills. The standard Arabic (Al-Fushaa)



today needs to break out of its isolation so as to coexist with foreign languages and colloquial Arabic dialects as an enrichment factor not a demolition factor. This is what Dr. Ali Al-Kubaisi, Head of the Department of Arabic Language, stressed on during an interview conducted by the Journal of the E.R.C on the most important challenges currently facing the Arabic language in terms of scientific research, and Arabic language decline in educational institutions for the benefit of foreign languages.

## Researcher Profile

Dr. Ali Ahmad Kubaisi is a researcher specialized in the Arabic language and literature. He has many valuable research contributions in the fields of Grammar and Morphology as well as several published specialized studies including: “Grammatical Functions: Introduction to Noun Functions within Sentences”, “Morphological Phenomena in Al-Faihani’s Poems: A Study of Tri-literal Non-affixal verbs with Nominative Clitics” and “Phenomenon of “Case-inversion”: The concept, Patterns and Impact on the Sentence Meaning”. These are in addition to a number of valuable articles and studies in the areas of language and academic education.

During his career, Dr. Al-Kubaisi occupied several academic positions. He started as a lecturer in the Department of Arabic Language, (College of Humanities at Qatar University). After that, he became an Associate Professor, and then the dean of the college before it came to be known as the College of Arts and Sciences (CAS). Afterwards, he became the Head of the Department of Arabic Language.

Dr. Al-Kubaisi earned a Bachelor’s degree in Arabic Language and Literature from the Faculty of Arts at Cairo University in 1976, a Master’s degree in Arabic language and a PhD in Grammar and Morphology from the Faculty of Arts at Cairo University. He has devoted a large part of his career to the study of the Arabic language and literature, either through research or educational contributions which have become a qualitative leap in Arabic language teaching techniques in the State of Qatar.



**First of all, Dr. Ali, what is linguistics and how can it be used in developing Arabic language teaching and learning?**

Linguistics is the scientific study of language. There are broadly three aspects to the study, which include language form (syntax, morphology...), language meaning (semantics, lexicon...) and language in context (pragmatics, discourse analysis...). Applied linguistics is one of the most important linguistics fields closely related to language teaching. This branch comprises many theories in the field of language teaching that we have not yet benefited from in teaching the Arabic Language. We wanted for this conference to provide a chance to introduce new teaching techniques through which we can develop the process of teaching the Arabic language, at the university level or earlier.

We, all, know that the Arabic language is usually taught in a traditional way, based on lectures without involving the students actively, but we want to change this concept for both faculty and students, so there will be new teaching techniques based on the employment of models, tools, and theories in applied linguistics – the interdisciplinary field of linguistics that identifies, and offers solutions to language-related real-life problems. All papers presented at the conference focused on this fundamental

issue. Actually, participants dealt with a wide range of aspects closely related to “language teaching and learning” problems. It should be noted that “teaching Arabic to non-native speakers” was one of the main themes of the conference. We also note that participants were from several countries.

**What are the most important recommendations made by the conference that will contribute to the development of the Arabic teaching process?**

The key recommendation is to emphasize the need to use the outcomes of modern linguistic theories in Arabic teaching, meaning that it is essential for us to develop Arabic teaching, at all levels of language (phonetics, lexicon, syntax...), as well as to employ such modern linguistic theories in academic research that serve the language, which will facilitate the students’ learning process and enable them to use the language efficiently, which may not be the case when using traditional methods for language teaching.

We also suggested that Qatar University establishes a center for applied linguistics studies, along with another recommendation on promoting coordination between universities and institutions concerned with early childhood education, such as coordination between Qatar University and the Supreme Education Council (SEC) in

order to develop Arabic language teaching techniques, especially at the elementary school which is the best time to establish a healthy and intact constituent relationship between student and language.

**How can we restore the role of standard Arabic (Al-Fushaa) in enhancing the sense of identity?**

The existence of the Arabic language is linked to the appreciation of its value and its status for us, Arabs and Muslims, which requires us to use every possible means to strengthen its presence where necessary. It is known that most of the Arab countries have regulations and decrees that encourage - even impose - the use of the Arabic language, especially in government departments, names of places and others. Associations were also established in some Arab countries for the protection of the Arabic language, including one in Sharjah and one in Morocco as well as in Egypt. In Qatar, Her Highness Sheikha Moza Bint Nasser established the International Organization for the Advancement of the Arabic Language, which shows a great interest in our Arabic language which must be put in its proper place in recognition of its religious and national importance.

**Some argue that the use of the Arabic language isolates researchers from scientific developments, as all modern sciences are in foreign languages... What's your opinion on this matter?**

We have to differentiate between our interest in the Arabic language and the need to learn another foreign language, as these two points are not contradictory. While we emphasize on the importance of the Arabic language and urge Arab researchers to be proficient in their mother tongue, we also emphasize the need to have students and Arab researchers who speak a foreign language that can help them advance their areas of study and research. Foreign languages serve the Arabic language in this aspect, thus scientific papers written in Arabic can be considered as modern researches that are commensurate with the

developments of the modern era. However, if research written in Arabic were based on old topics and traditional methodologies without benefiting from the outcomes of the scientific progress in other cultures, we would be committing a mistake detriment to the Arabic language that should keep pace with the requirements of the modern era.

Among the problems Arab researchers face is the non-publication of research written in Arabic in international journals which only accept works written in English. This problem may be solved once Arab universities launch internationally recognized peer-reviewed scientific journals, as Arab journals for most universities that have made great strides in the field of research, do not meet international standards. I discussed this subject with an official at the Association of Arab Universities during a conference in Dubai in 2013, and suggested that the Association of Arab Universities should play a role in launching a worldwide peer-reviewed scientific journal in Arabic, which Arabs and others who publish in Arabic can resort to.

I hope that an Arab association or organization like UNESCO can publish a worldwide journal in Arabic where researchers from universities all around the world can publish their work; a journal that attracts Arab speaking scientists from various countries.

“

**We should use modern methods in linguistic research and in teaching Arabic language”**





**The existence of the Arabic language is linked to the appreciation of its value and its status for us, Arabs and Muslims”**



**Will you communicate with the concerned authorities to put forward the idea and try to implement it?**

We grab any available opportunity to put forward this idea and Qatar University is currently in the process of preparing a list of journals that publish Arabic research. The Department of Arabic Language was asked to put together a list of journals deemed acceptable and suitable for the publication of research based on specific standards that live up to the level and status of Qatar University. But the problem of Arab universities is “Internationality” and “Globality” as these terms for Arabs are related to what is outside the Arab scope!

**Some allege or pretend that the Arabic language is poor in scientific terminology that meet the specialized scientist’s needs, what do you think?**

The formulation of the term is closely related to a producer’s general context. It is also intimately linked to scientific thought and progress. At the height of the Arab culture boom, all medical terms were in Arabic while the entire of Europe used to adopt Arabic medicine books and the terminology of Ibn Sina, Al-Razi, Ibn Al-Haytham and others ... But when Arab thought became unable to produce and create new things, it started borrowing terminology from foreign languages. However, the scientific entities involved in Arabic language in Egypt, Algeria, Damascus, and Baghdad made great efforts to find scientific terms in engineering,

medicine and astronomy, etc., and issued dictionaries and books specializing in scientific terms. Furthermore, the Bureau of Arabization Coordination continues to issue new scientific terms, but the problem lies in the multiplicity of words with the same meaning, for example, a scientific term may be translated using a certain word in the Maghreb but another word in the Levant. The use of the term may also be a problem in itself, as some adopt it while others don’t, making the Arabization or translation of terms a concern in the use of the Arabic language.

**Can the Arabic language be subject to research and development, and what can be added after its sciences have been completed?**

The Arabic language has its own specificity, but the old methods followed in the production of the linguistic thought in grammar, or morphology, or others need to be reviewed in the light of modern linguistics studies, that look at the language from a new point of view different from that of ancient Arab linguists who established language rules in order to preserve Arabic language from grammatical errors, and wrote linguistic books characterized by high levels of creativity and excellence. Nowadays, there are modern linguistic methodologies, in all branches, and disregarding such methodologies is considered as negligence on the part of Arab scholars. This is because the Arabic language requires the employment of these modern methodologies in language researches and in teaching the Arabic

language as studies in this field are very few, and those who conducted them are among the small number who interacted with modern linguistics, particularly in Morocco, Algeria, Egypt, Jordan, Saudi Arabia and Lebanon. They studied in foreign universities and returned to conduct research in the field of Arabic language and study it in the light of modern linguistic methodologies, which contribute to increase the understanding of the Arabic language and its distinctive aspects. There are also foreign scholars who specialized in the study of the Arabic language and published research and wrote books in English, German, and French about the history, sciences and issues of the Arabic language, and they emphasized the importance of studying the Arabic language to enrich modern linguistics.

**To what extent is the multiplicity and diversity of dialects an enrichment factor? And how can this diversity be seen as a positive factor for the development of linguistics research?**

Scholars disagree about the relationship between dialects and languages, as some consider dialects as shovels that demolish the classical language. However, this view is not necessarily the right one. Research in the field of dialects enriches the Arabic language. As for language use, we support the use of classical Arabic as how it should be used, but we consider conducting research on dialects as important as conducting research on classical Arabic, as the former increases our knowledge of the later and of



Research  
Success  
Story

# QU, QAPCO

work towards  
evolving more  
efficient use  
of plastics



**Dr. Mariam Al Maadeed:**  
**"CAM's partnership with QAPCO in these projects is a demonstration of Qatar University's commitment towards achieving the objectives of Qatar National Vision 2030 in building a knowledge-based economy and, especially, in preserving the environment for Qatar's future generations."**

Researchers from the Center for Advanced Materials (CAM) at Qatar University (QU) with the support of the Qatar National Research Fund (QNRF) and the collaboration of Qatar Petrochemical Company (QAPCO) as well as international partners are working to develop plastic and polyethylene materials from local products that are climate suitable to facilitate the achievement of thermal comfort in buildings. Apart from working on developing plastic heat absorbers for energy management in buildings, the team is also working on oxo-biodegradable plastics using QAPCO polyolefins, preparation of cellulose nanofibers and nanocrystals from date palm waste, and improving the performance of packaging materials based on QAPCO polymeric film.





From left Prof. Igor Krupa, Ahmad Mahmoud Nawarseh and Jaber Ali Kareeb

“

**Dr. Mabrouk Ouederni: “This collaboration is part of QAPCO’s responsibility to contribute to the realization of the objectives of Qatar National Vision 2030 and knowledge-based economy through research and innovation and a successful partnership with the University.”**

The project team is led by Prof. Igor Krupa, QAPCO Polymer Chair at Qatar University. His research interests include polymeric composites and nanocomposites, phase change materials, surface modifications of polymeric surfaces, sol-gel technologies and photoactuating materials. Two students of the Department of Chemistry and Earth Sciences, Ahmad Mahmoud Nawarseh and Jaber Ali Kareeb, are in the team, each working on a project. Their participation was facilitated by their advisor Dr. Yasser Hussain, and Head of Department Dr. Hala Sultan. Other members of the team are postdoctoral researcher Dr. Patrick Sobolciak, researcher Dr. Anton Popelka and research assistant Eng. Haneen W Abdelrazeq.

Dr. Mariam Al-Maadeed, Director of CAM and Dr. Mabrouk Ouederni, Head of R&D at QAPCO, are providing the general direction and strategic topic areas for these successful collaborative research programs.

### Plastic heat absorbers for effective energy management

The building and construction sector is developing at a fast rate in Qatar. There are lots of projects going on leading to high consumption of energy, particularly from fossil sources. That is why the development of plastic heat absorbers based on industrial plastics like polyolefins and paraffin waxes for effective energy

management in bioclimatic buildings has become necessary. It has been estimated that buildings account for up to 40 percent of global energy use resulting in significantly high carbon dioxide emissions that need to be reduced. Significant reduction of carbon dioxide emission could be achieved by improving building materials to reduce energy consumption.

The search for new building materials is a part of a new, general conception called bioclimatic architecture. This process connects architecture with nature. It is about building designs that take into account the climate and environmental conditions that make thermal comfort in buildings possible. Basic elements of bioclimatic design are passive solar systems which are incorporated into buildings and utilize environmental sources, like sun, air and wind, for heating, cooling and lighting. Prof. Krupa and his team are devoting their energy and available resources on this research project to ensure that its outcome has great positive impact on energy consumption in buildings not only in Qatar but in the region and beyond.

### Oxo-biodegradable plastics

Qatar produces approximately 2 million tons of polyethylene (PE) annually. The production is expected to increase soon with planned expansions. As majority of what is produced is used in packaging applications,



## Jaber Ali Kareeb: Research has revealed the physical property change of polyethylene and aluminum after plasma treatment to make them more compatible with each other”

a significant amount of plastic waste is generated. In addition to recycling, Prof. Krupa says the idea of oxo-biodegradable polyethylene seems to be the most relevant to the environmental problems associated with plastic products.

According to him, “Relatively inexpensive oil-based polyethylene can be produced using standard technologies; and transformed to oxo-biodegradable PE. It is based on the addition of very low amount of appropriate additives which may speed up natural degradation process resulting in micro-fragments of plastic with the presence of high amount of oxygen-based species. The resulting disintegrated PE with oxygen- containing moieties present in the PE molecule has much lower molecular weight and, thus the material is susceptible to microbial attack to be completely decomposed.”

He said this in turn, allows disposable products such as packaging to be transformed into gaseous species, i.e., mainly carbon dioxide and water, within a short period through a combination of UV irradiation, oxidation and biodegradation. Thus, degradable plastics represent a viable alternative to recycling and recovery as tools for waste management. The use of these materials is part of a multi-component solution to a complex problem. The project is being run in collaboration with QAPCO in the framework of European Union-GCC cooperation.

### Cellulose nanofibers and nanocrystals from date palm waste

Cellulose, an abundant biopolymer, was traditionally used for clothing, construction, furniture and paper making for thousands of years. The most complex form of cellulose in nature is in the cell walls of plants. In

Qatar, date palms are the largest source of cellulose. The waste from date palms (particularly the leaves) has low utilization and is usually incinerated. However, since it represents a valuable source of cellulose that can also be transformed into nanocellulose and nanocrystals, CAM recently initiated activities in this field.

The project is focused on the preparation of environmentally friendly cellulose micro and nano-structures (crystal as fibers) by a chemical/thermo/mechanical process from date palm wood waste. There are large nanocellulose applications in the area of paper and paperboard manufacture, polymeric nanocomposites preparation where nanofibers can replace common inorganic fibers for material reinforcement, in medical cosmetic and pharmaceutical industry, in oil recovery application etc.

Ahmad Nawarseh, one of the students, is participating in this project. He describes cellulose as a long chain of linked sugar molecules with a remarkable strength that is a major component of the date palm tree. It is also the main component of plant cell walls and the basic building block for textiles and paper.

“My project was focused on isolation and characterization of nanocellulose or microfibrillated cellulose (MFC) from the date palm leaves by using acid hydrolysis. Acid hydrolysis is a well-known method for the production of nano cellulose fibers. After isolation, the fibers were characterized by FTIR spectroscopy and scanning electron microscopy,” Ahmad said.

Nano and micro cellulose fibers were separated from the date palm trees after three main processes starting with blending the leaves to get them to micro size. Then bleaching was done to get rid of the

hemicellulose and the lignin in the date palm leaves. The hydrolysis process finalized the work with the use of a strong acid like sulfuric acid. Ahmad said the project dealt with the isolation and characterization of micro and nanocellulose from date palm leaves through acid hydrolysis. Characterization of prepared micro and nanocellulose was done using various techniques. According to the student, the study of the nanocrystalline cellulose fibers is very important for the enhancement of polymer as cellulose fibers are becoming more important since more applications are being discovered because of their renewable nature.

### High performance materials for food packaging applications

Polyolefins, particularly polyethylene, are among the most widely used polymers in many applications, such as in packaging, building, or transport industries. Qatar is one of the largest producers of polyethylene globally.

A combination of polyolefins with other materials including metals leads to improvement of various properties. A typical example is a laminate made from polyethylene and aluminum foil predominantly used in drinks and food (flexible packaging) industries. But the key problem is how to improve adhesion between both substrates.

“We introduced and tested a few methods for the materials’ surface treatment including chemical as well as physical approaches, like plasma treatment. The treated materials were characterized by various optical, spectroscopic, surface and mechanical methods,” Prof Krupa said. Packaging should not only be safe for food products but also ensure their complete protection



Prof Igor Krupa (left) with Dr. Mabrouk Ouederni

and monitoring. Among the most essential requirements, according to Prof. Krupa, are the antibacterial character of packaging, controlled water and oxygen permeability and thermal protection. Aesthetic qualities like transparency, coloring or antifogging are other requirements of customers.

The great challenge is that smart future package materials should also be able to interact with the users to give them as much information about the actual state of product quality as possible. The price of the packaging should be appropriate to make room for simple processing, utilization of common technological routes in plastic industry as well as the use of inexpensive and ecologically friendly compounds. The project is part of a planned long-term cooperation between CAM and QAPCO R&D Department that focuses on large scale complex modifications of QAPCO's products which are widely used in packaging and other applications.

QU student Jaber Ali Kareeb, who is taking part in the project, said that research has revealed the physical property change of polyethylene and aluminum after plasma treatment to make them more compatible with each other while designing some kinds of packaging.

Jaber focused his work on the application of low temperature plasma on polyethylene and aluminum foils as well as on the characterizations of resulting physical changes.

The surface roughness for aluminum and linear low-density polyethylene (LLDPE) after plasma treatment increased during the process, indicating that the roughness of the surface is proportional with treatment time. The contact angles decreased after plasma treatment because of the incorporation of characteristic polar functional groups to the LLDPE surface and ablation processes in aluminum foils. The treatment of LLDPE and aluminum foils increased the wettability and, therefore, adhesion increased between them.

### Benefits of Collaboration

Qatar University's Center for Advanced Materials and QAPCO Research & Development Department are working together on relevant topics that relate to the company's products. The idea is for the collaboration to lead to novel applications using QAPCO's products and materials and stimulate research activities that would enable students to be trained in research projects that are of industrial and economic value. The relationship will also lead to long

term benefits with students and researchers being trained to join the workforce in the petrochemical industry.

Dr. Mabrouk Ouederni, Head of Research and Development at QAPCO, stressed the importance of the collaboration as part of QAPCO's responsibility to contribute to the realization of the objectives of Qatar National Vision 2030 and knowledge-based economy.

He said that students worked on a project in collaboration with QAPCO R&D where they researched on surface modification of polyethylene to advance our technical understanding of adhesion between plastics and other substrates and improve material properties with great application value in the packaging industry.

QAPCO R&D is also collaborating with Prof. Mariam Al-Maadeed, Director of CAM, on a project funded by QNRF. It is in the area of nanotechnology where polymers produced in Qatar are compounded with graphene nano-platelets to significantly enhance the melt processing and performance of polyolefin nanocomposites. The potential application of this technology is in automotive and high performance packaging.

## News

# Project steps up study of arid mangroves and biodiversity



Dr. Ibrahim Al-Maslamani



Mangrove

Following a sterling performance in an earlier research project, Qatar University was awarded funding in the 7th Cycle of the National Priorities Research Program (NPRP) by the Qatar National Research Fund (QNRF) for a follow-on study of 'Essential Ecological Processes and Ecosystem Functions in Arid Mangrove Plants'. The first project has resulted in the publication of three papers so far and was led by Dr. Lewis Le Vay from Bangor University.

The new collaborative project with Bangor University in the UK is being led by Dr. Ibrahim Al-Maslamani of Qatar University's Environmental Studies Center.

The study's focus is on coastal zone management and biodiversity conservation in Qatar and regionally as mangroves and sea grass habitats are essential in supporting coastal biodiversity, productivity and fishery in coastal waters and are vulnerable to development and pollution.

Despite their uniqueness as a result of the arid environment and lack of rainfall-mediated nutrient input, Arabian mangroves still remain

the least studied. Basic questions regarding their ecological function remain unanswered and hamper their effective management.

The research work will build on previous results, developing an original and coherent body of work that will be a leading significant contribution to the understanding of mangroves in the environment and inform national and regional management of these important ecosystems.

"We will produce biological and oceanographic data and models to understand the processes underpinning the survival of Qatar mangroves and related biodiversity. This information is currently lacking, but essential for managing coastal development in the landscape surrounding mangroves. It is also of direct application to current mangrove replanting and transplanting efforts," Dr. Al-Maslamani said.

The project will contribute to the national strategic aims of understanding and protecting Qatar's marine resources and sustaining the environment for future generations.

It will use a mixture of observational measurements to inform the development of realistic oceanographic models based on the hypothesis that mangrove productivity in Qatar is facilitated by an interaction of landscape morphology with tidal asymmetry that drives organic matter input.

Interestingly, the productivity of mangroves in such arid settings has not been quantified and there is no data yet to compare productivity within different rainfall regimes, creating an information gap that needs to be addressed to further understand the sources of primary production in arid mangrove-sea grass systems.

The new study will continue the collaboration with Bangor University, with multidisciplinary team led by Dr. Le Vay and including biogeochemist Professor Hilary Kennedy, ecologists Dr. Mark Walton, Dr. Martin Skov and oceanographer Dr. Peter Robins. The project is part of a wider marine science collaboration between Qatar University and Bangor University under a Memorandum of Understanding promoting research cooperation and postgraduate training.



# Our Partners

This section will showcase the fruitful relationships between Qatar University and its partners and the positive outcomes that have been generated as a result. In essence, it will offer insight into research collaborations focusing on a distinct entity in each edition. It is an opportunity for companies and research-oriented establishments to showcase what they are doing to further enhance the achievement of the mandate of Qatar University as a teaching and research university.



Dr. Jennifer Dupont

# ExxonMobil Research Qatar and Qatar University: Partners in Collaboration

The EMRQ – QU partnership has yielded many important initiatives, particularly in the fields of science, technology, engineering, and math (STEM), including several research projects outlined below, but also others such as the Visiting Professors Initiative. ExxonMobil also supports key QU initiatives such as Life is Engineering, the Gas Processing Center and its annual Gasna competition, as well as providing guest lectures and on-going recruiting activities. QU's Research Magazine connected with Dr. Jennifer Dupont, Research Director of ExxonMobil Research Qatar.

The following are excerpts from that dialogue:

## Can you provide a brief background to the EMRQ – QU partnership?

Since ExxonMobil Research Qatar's (EMRQ) establishment at the Qatar Science and Technology Park in 2009, we have built a strong partnership with Qatar University (QU) through a variety of projects and programs. As a key goal for ExxonMobil is to help develop the next generation of scientists and engineers, it was clear very early on that QU was an ideal partner with whom we could pursue our commitment to promoting education and conducting research initiatives. The EMRQ – QU partnership has yielded many important initiatives, particularly in the fields of science, technology, engineering, and math

(STEM), including several research projects outlined below, but also others such as the Visiting Professors Initiative. ExxonMobil also supports key QU initiatives such as Life is Engineering, the Gas Processing Center and its annual Gasna competition, as well as providing guest lectures and on-going recruiting activities.

Another program that we are always keen to draw attention to is the Qatar University ExxonMobil Teachers Academy, which empowers teachers with knowledge and tools that make science and math exciting for their students. The program – the only edition of the original Mickelson ExxonMobil Teachers Academy held internationally – enables QU and ExxonMobil in cooperation

with the Supreme Education Council (SEC) to continue their support for initiatives that provoke an active interest in STEM education and research. The program has reached approximately 80 math and science teachers from primary grade classrooms in Qatar's independent schools, impacting 9,000 students and directly supporting the country's goal of building the capacity of its national workforce and realizing the objectives of its National Vision 2030.

As Qatar is channeling its resources into the advancement of culture, research and education in line with Qatar's National Vision 2030, the approach provides a roadmap by which to modernize Qatar economy, increase education and opportunity, and



**Water is a key resource for Qatar and finding more effective water management options has been an increasing area of focus for the National Research Strategy. ”**

protect the environment for generations to come. The EMRQ – QU partnership emphasizes our shared view that investments in these areas are essential to forging a knowledge-based economy. As such, we are proud to collaborate with Qatar University on a variety of research and educational initiatives that form the foundation for future advancements.

The partnership is multi-faceted, but ultimately returns to a strong emphasis on education and research as a mechanism to foster a strong fundamental foundation for the future of Qatar. We are proud to bring our decades of international experience to the table and work with QU to apply our collective knowledge to local challenges.

**Can you describe a few recent programs or projects that highlight the EMRQ – QU partnership?**

EMRQ is in the fortunate position of sharing a common area of research interest with QU in that a significant part of our research portfolio is focused on, or directly related to, environmental issues. This area is also a key focus area for the broader State of Qatar as exemplified by the designation of Energy and Environment as one of the four pillars of the Qatar National Research Strategy. This common focus on the environment has led to a number of joint research collaborations with the QU Environmental Studies Center (ESC). In 2009 EMRQ and the ESC entered into a memorandum of understanding to formalize our intentions to work together towards the advancement of science and technology through research and development collaborations. The initial project undertaken was a comprehensive ecological baseline study conducted for a 35 km stretch of the Qatar Marine Zone (QMZ) that extended 20 km offshore and onshore as far as 1 km inland. This intensive study included sampling and mapping of corals, seagrass and microalgal beds; fish population studies, mangrove forest study; seawater analysis; metocean data collection; and sediment sample analysis including biota characterization, as well as terrestrial characterization of the nearshore ecosystem. This comprehensive ecosystem analysis, which identified scores of species not previously documented as being present in the QMZ, provides a valuable baseline to assess natural variations and other changes

in the environment, and serves as a basis for scientific monitoring and future study.

More recently, EMRQ and QU have built on and are adding to the information developed in the baseline study through collaborative projects to characterize the microbial diversity of the QMZ through algal mapping, isolation, and eco-toxicity studies to better understand the base of the food chain in this environment, and potential environmental stressors.

Another new research program in which we are partners with QU (along with Texas A&M University in Galveston USA) is a study to increase understanding of the dugong population in Qatar coastal waters. Dugongs are large, long-living herbivorous marine mammals that historically have had a cultural and economic importance to Qataris - having been used as both an economic and food resource in the Arabian Gulf, for more than 7,500 years. Qatar is home to the largest population of dugongs outside of Australia with two of the three most important regions in the Arabian Gulf however, limited research has been conducted on Qatari dugongs thus far. This project aims to help develop the scientific understanding needed to inform environmental conservation decisions for dugongs in Qatar.

In addition to these and other research collaboration projects (see below), the EMRQ – QU partnership is exemplified by close association with and interaction with the various QU academic departments. EMRQ provides guest lectures to graduate seminar classes; participation on advisory boards; collaboration, advice and mentorship to graduate students in the research components of their degree requirements; and also provides a potential employment opportunity in that currently 2 EMRQ staff scientists are QU graduates.

In addition to research collaboration projects funded by EMRQ, ExxonMobil also provides contributions to other QU research efforts such as an unrestricted research grant to the ESC for QR 750,000 in 2010 and the contribution of QR 1 million to support the QU Qatar Road Safety Studies Center in 2014. This latest grant supports research including in-depth analysis of car crashes, safety assessment of school

buses, pedestrian traffic studies, traffic management and road safety of Doha's highways. From the research findings, the center will run road safety awareness campaigns throughout the country to ensure the learnings are shared with the people of Qatar.

**The Grand Research Challenges outlined by Qatar Foundation are particularly significant for members of the energy industry. Can you talk a little bit about what ExxonMobil is doing to further these research objectives?**

Water is a key resource for Qatar and finding more effective water management options has been an increasing area of focus for the National Research Strategy. This has led to Water Security being designated as one of the three initial research Grand Challenges identified by the Qatar Foundation Research Organization in 2013. A key component of Water Security is the ability to maximize water resources by implementing technologies to re-use industrial water as opposed to discharging as a waste stream. EMRQ initiated its Water Re-Use Research Program in 2010 and has been looking at technologies to apply to this challenge. As a part of this program, we have joined with QU ESC to collaboratively undertake several studies that will allow for the rigorous evaluation of engineered wetlands as a potential technology to help address this issue.

This work includes a multi-year phytoremediation study to assess the ability of native plant species to remove target contaminants from industrial waste water in an engineered wetland system. Work is also being done to characterize the ability of microbes in such a system to degrade hydrocarbons, as well as soil properties and pre-treatment filtration studies. All of this information will ultimately be used to help design and test an engineered wetland treatment system to fully understand the ability of this technology to help address wastewater treatment for beneficial re-use.

As members of the energy industry, we have a responsibility to work together to continually spur further advancements and breakthroughs that help us do our jobs in a way that maximizes the value and efficient use of resources, while increasing safety,

improving human health and protecting the environment.

As research is a long term endeavor, success depends on long-term investment, planning, and rigorous scientific investigation. We applaud the State of Qatar's approach in recognizing the role technology advancements play in a country's development. The work EMRQ is doing helps address Qatar Foundation's National Research Strategy and the R&D grand challenges related to energy and environment and water security, and ultimately demonstrates ExxonMobil's commitment to developing key technologies that will support Qatar's development while protecting the environment.

**Please conclude by sharing any closing remarks about the EMRQ – QU partnership or other initiatives in Qatar.**

Qatar provides a prime example of R&D, innovation and collaboration in action. The forward-thinking approach has created an environment robust with research and development initiatives, where innovation is cherished and encouraged as an indispensable value. I am proud to say ExxonMobil has been able to make full use of Qatar's collaborative environment as we progress research with the help of many of our stakeholders, like QU.

It is also gratifying, from both a personal and professional perspective, for myself and everyone at EMRQ to be able to work on research that is in large part targeted at helping to better understand and protect Qatar's ecological resources and environment. The collaborations and interactions we have established with QU administration, academic staff, and students working in this area have confirmed for us the importance of this area of science to the people of Qatar, and around the world. We are pleased to be in a position to contribute to these efforts through our numerous marine environmental research projects and water re-use program, as well as related work we do in areas such as Coastal Research and Remote Gas Detection technology development. EMRQ is engaged in a wide range of projects in support of the Qatari vision and the support and collaboration EMRQ enjoys with QU is truly impressive and deeply valued.

Essentially, we share Qatar's view that advancements in technology play a critical role in meeting the energy demands and challenges of the future. By working with QU to conduct innovative research in partnership, while opening young people to the world of research, chemistry and other STEM subject-matter, EMRQ and QU demonstrate our mutual commitment to developing the future of the industry.



Dugong

## News

# Senior Masters student from QU travels to UK for successful thesis experiments



From left Dr. Husam from QU, Youmna and Dr. Wael from University of Bristol

Masters student Ms. Youmna Hassouna recently returned from the United Kingdom where she continued her work on tissue cultures and cell viability under the supervision of Dr. Wael Kafienah, senior lecturer in Stem Cell Biology in one of the top universities in the UK, University of Bristol.

Her thesis project, under the supervision of Dr. Husam Younes, Qatar University College of Pharmacy Associate Professor of Bio-Pharmaceutics, is related to the synthesis of a novel family of Thermally

Cross-linked Elastomers that will be used in tissue engineering and other drug delivery applications. The elastomeric scaffolds were prepared successfully at Qatar University and all the viability assays and cytocompatibility studies have been conducted successfully at the School of Cellular and Molecular Medicine, University of Bristol under Dr. Wael's guidance. "This was an incredible experience and my research knowledge has expanded with this visit. I hope to work in a pharmaceutical company or as a research assistant in academia, as I have a great passion for

research", says Ms. Hassouna.

Previously Ms. Youmna travelled to San Antonio, USA as a poster presenter in the American Association of Pharmaceutical Scientists (AAPS) conference in November 2013 and recently in February to the 6th International Conference on Drug Discovery and Therapy (ICDDT) in Dubai as an oral presenter for 'Synthesis, Characterization and Cytocompatibility of Poly (diol-co-tricarballoylate) Biodegradable Matrices for use in Tissue Engineering & other Biomedical Applications'.

## News

# QU, HMC, Egyptian university collaborate on detection of high burden infections

Ongoing research collaboration between Qatar University, American University in Cairo, Egypt and Hamad Medical Corporation (HMC) is looking into the possibility of developing a cost effective, inexpensive and reliable means of detecting tuberculosis (TB) and hepatitis C virus (HCV) in clinical specimens.

The research project is being funded by the Qatar National Research Fund (QNRF's) National Priorities Research Program (NPRP).

The Lead Principal Investigator is Prof. Hassan M.E. Azzazy of School of Sciences and Engineering of the American University in Cairo, while Prof. Asmaa A. Althani of the College of Arts and Sciences, Health Sciences Department of Qatar University is the Co-Lead Principal Investigator.

According to Dr. Wedad Saleem, post-doctoral fellow on the project, "we are working on developing and optimizing advanced versions of nanogold diagnostic assays for detection of hepatitis C virus and tuberculosis, a project that has recently received significant funding from the Qatar National Research Fund (QNRF).

"The first developed assays are qualitative colorimetric assays where a change in the color of the assayed sample from red to blue signals the presence of the disease. In the second and third phases of the project, work will be on developing prototypes for colorimetric and fluorimetric quantitative assays. Gold nanoparticle-based assays are simple, accurate, inexpensive, and generate results much faster than comparable technologies."

Dr. Saleem said the project will eliminate the need for thermal-cycling and other detection instruments.

She said it was incubated by QSTP as a potential NPRP item for commercialization. QSTP has also selected it for presentation in



Dr. Wedad Saleem

the Technology Innovation and Entrepreneurship Program.

*Mycobacterium tuberculosis* and hepatitis C virus (HCV) are two major pathogens which cause global health problems. Both TB and HCV infections share the challenges of reliable affordable diagnosis. The current TB diagnostic strategies have a global detection rate of 62%, falling short of the 2005 goal of 70% set by the World Health Organization. Additionally, reliable HCV diagnosis requires detection using molecular techniques which are expensive and require specialized equipment with high setup cost. The diagnosis of both infections is time consuming and labor intensive.

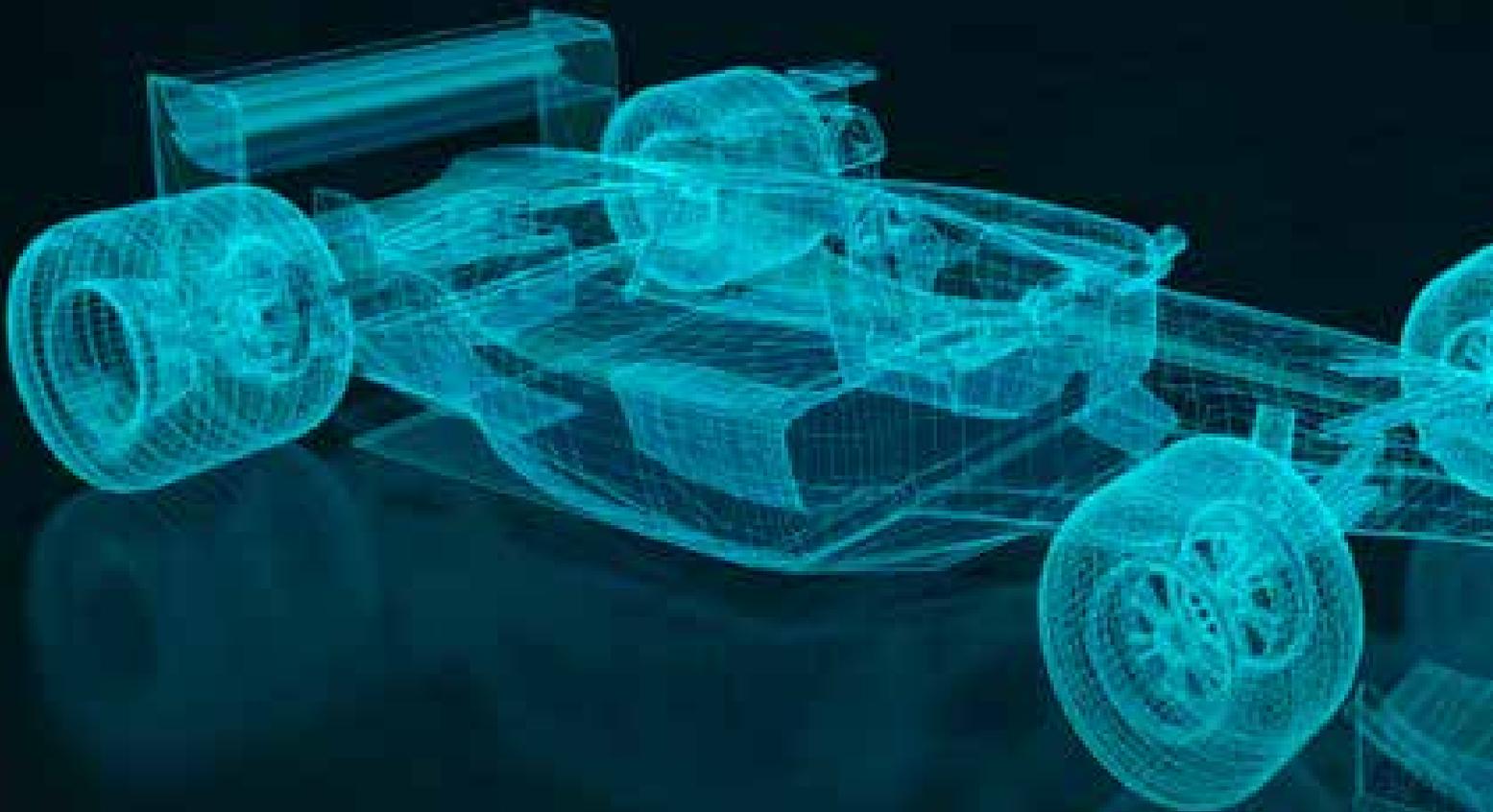
The project employed gold nanoparticles (AuNPs) to develop simple and rapid colorimetric assays for simpler, rapid, inexpensive and reliable detection of TB and HCV in clinical specimens. AuNPs-based colorimetric as well as fluorimetric assays will be developed for qualitative detection of nucleic acids of HCV and TB. Quantitative versions of the colorimetric

and fluorimetric AuNPs-based assays will also be developed. Hundreds of HCV serum samples and TB clinical specimens will be collected from Egypt and Qatar and tested using the new assays.

Initial results for HCV and TB detection using AuNPs-based assays have already been achieved and indicate the feasibility of the research. Preliminary data of the HCV AuNP assay was presented in two international conferences: the 3rd Hepatitis C International Conference, in Dublin, Ireland in 2009; and the annual meeting of the American Association for Clinical Chemistry, Anaheim, California in 2010. A paper on the project has also been published in the *Canadian Clinical Biochemistry Journal* (August 2010). Preliminary data on the developed TB nanogold assay was presented during the International Conference of Nanomaterials for Biomedical Technologies 2012 in Frankfurt, Germany and published in *Clinical Biochemistry* in May 2013. It was also a poster presentation at the 2013 Annual Research Conference organized by Qatar Foundation.

Student in  
the Limelight

# LIEP leaps Qatari students on to engineering





“

**To date,  
we have  
impacted the  
lives of 750  
students in  
this project  
and expect  
to continue  
to draw even  
more”**

**Dr. Rashid Al Ammari**

The Life Is Engineering Program (LIEP) is an ambitious project put in place to energize and prepare Qatari youths to play effective roles in the realization of the objectives of Qatar National Vision 2030. Its primary aim is to arouse the consciousness and interest of Qatari male high school students in engineering, science and math. LIEP is designed to introduce the engineering profession to students through exciting hands on experiences. Nurtured by Qatar University's College of Engineering (CENG), the project aims to simplify related science theories and their applications in engineering.

The program has been successfully held from 2010 to 2014 with the participating students embarking on a life changing experience each year. The sixth edition will be rounded up in 2015.



Students at a "Life is Engineering" Program training session



**The Qatar National Vision 2030 has opened many new opportunities for the country and its people, causing a historical breakthrough in all areas of the economy, industry, architecture, education, sports and health”**

In the finals of the 5th edition this year, Tarek bin Zeyad Independent Secondary School for Boys' team won the competition with a chance to visit the Nissan and Toyota car assembly lines in Japan.

The project offered the students and school administrators the opportunity to realize their long-held expectations and ambitions.

The students' team comprised of Abdulaziz Abdulhameed Al-Haddad, Ghanim Saleh Al-Ebrahim, Abdulla Mohammed Al-Sulaiti, Ahmad Khalid Abdulla, Mohammed Nasser Alhajri, Khaled Ibrahim Fakhroo, Essa Mohammed Al-Sulaiti and Khalifa Mohammed Al-Mansoori. They were led by Nabeel Hamed Al-Gburi, the students' team supervisor.

The students had various reasons and motivating factors for joining the Life is Engineering program but for Abdulla Mohammed Zaid Rashed Al-Sulaiti it was because of “the knowledge and practical skills that it offers which students need in their university life and future

careers.” He was particularly intrigued and captivated during the car assembly phase of the project as it included the practical application of engineering concepts.

“I now know more about scientific specializations in general and engineering in particular having learnt that engineering helps in building the society as engineers' finger prints are in every aspect of our lives,” said Abdulla who added that he now knows how important it is to work in a team.

He praised Qatar University for coming out with the ‘Life is Engineering’ concept which according to him has achieved its goals through its popularity among students who are joining scientific specializations in their studies.

For student Abdel-Aziz Abdel-Hamid Al Haddad, “the program is special on all levels as it provides us with multiple streams of expertise that will qualify us to join the labor market in the future.” The five-day camp which was held in the Ritz-



Carlton was the most interesting aspect for Abdel-Aziz as the period was used to go to the Losail city to make final preparations for the team's project. Abdel-Aziz agreed with Abdulla that group or team work gets tasks done faster and also generates new and innovative ideas from all the participants.

He encourages other Qatari youngsters to embrace "engineering as it touches upon many aspects of our lives. The profession is practical and is good for any person who pays attention to the littlest of details."

Mr Nabeel Hamed Al-Gburi, the students' team supervisor, was full of praise for the 'Life is Engineering' project which he said raises the awareness of students to the significance of engineering specializations through the enjoyable theoretical and practical knowledge it offers.

He disclosed that the students worked hard during all the phases of the project to achieve excellence and benefit from the offered theoretical and practical knowledge. He thanked all the people who worked to make the project possible for their efforts.

The prize was a morale booster for Hamad Mohd al-Mannai, operator and principal of Tarek bin Zeyad Independent Secondary School for Boys, who highlighted the significant role the Life is Engineering program plays in raising awareness about engineering among students. He said that it provides the students with important skills and knowledge which can help them in their university studies and future careers. According to him, because of his students' interest and excellence they have been able to achieve first place for three times.

While appreciating everyone's efforts, he particularly thanked the team supervisor, Nabeel Hamed Al-Gburi, for the team's success.

QU Vice-President and Chief Financial Officer Dr Homaid Abdulla al-Madfa in his speech during the finals of the 5th edition of the Life is Engineering Program, while praising the sponsors for their support, said that the university's investment in the project has been able to achieve the desired results.

"We are proud that the relationship between Qatar University and partner companies continues to grow daily, recording new bright and positive horizons in communication, cooperation and sharing," Dr. Madfa said. He also thanked all the participating schools, students and the organizing committee, which oversaw the project.

On his part, QU College of Engineering Dean Dr. Rashid Alammari said that the project was conceived as a national program with the aim of stimulating a large number of Qatari school students to choose engineering careers and participate actively in realizing the objectives of Qatar National Vision 2030.

"To date, we have impacted the lives of 750 students in this project and expect to continue to draw even more as Qatar's progress requires engineers in all sectors," he added.

Dr Saud Ghani, supervised LIEP since inception. Dr Saud stated that he is glad to see the LIEP becoming a sustainable program acting as a spring board for young energetic Qatari school students to explore their potentials to become the future leaders of the local industry.

For the project's sponsors - Qapco, Raytheon, ExxonMobil, Rasgas, Qatar Shell and Dolphin Energy it was also a moment of fulfilment as the fruits of their investments became manifest.

### Knowledge for the students

During each program session, each school team is exposed to comprehensive technical workshops and others in team



Dr. Homaïd Abdulla al-Madfa



Dr. Rashid Alamari



Mr. Hamad Mohd al-Mannai

building, time keeping, project management and leadership to mold and prepare them for the challenges ahead.

In the last week of the program, they are assembled for a camping exercise where they finish assembling their kit cars and attend several technical and managerial seminars which enable them to review their progress and plan new tasks. Interestingly, the students will be in a well supervised, safe and controlled environment.

### Number of schools participating

Although participation is open to all male independent secondary schools, only six schools are selected each. Selection will

be based on the schools' support, facilities and students' commitment. The six teams will be given all the needed training before they start to assemble their kit cars which will be driven on the Losail International Circuit.

### Venues for the training sessions

Qatar University hosts the training sessions but the kit car assembly is done in the participating schools. Qatar University's College of Engineering ensure supervision by undertaking several inspection visits to ascertain the integrity of the build and project time management. The college also provides the schools with a comprehensive plan and tool kits needed for the car build.

### The essence of LIEP

Qatar's National Vision 2030 is opening up a new vista of opportunities for the country and its people. This has resulted in a breakthrough in all facets of the economy, industry, architecture, education, sports and health. With engineering as a common factor in all these areas, qualified and specialized people are required to manage the development process. But there is shortage of Qatari engineers because of the wrong perception high school students have about engineering that it is a difficult subject. There has also been inadequate awareness about the importance of engineering. The vision of LIEP, therefore, is to create national leaders who are





**Qatar University's College of Engineering ensures supervision by undertaking several inspection visits to ascertain the integrity of the build and project time management"**



innovative and successful in the field of science and engineering.

### Scope of technical workshops

There will be five workshops covering health and safety, vehicle dynamics and powertrains, vehicle design and materials selection, and leadership and communication skills. The launch workshop will be used to introduce the program. The rules for participation and assessment will be unveiled on the occasion. Parents will have the opportunity to ask any questions and clear any doubts they might have about the program.

The workshop on health and safety will cover basic issues about health, safety and welfare and their application in an engineering shop floor. It will be an

opportunity to address personal safety, machinery operation, use of compressed air, general workshop cleanliness and housekeeping.

The vehicle dynamics and powertrains workshop will be used to look at vehicle dynamics from a vehicle system perspective. It will x-ray the interaction and performance balance between the powertrain, brakes, steering, suspensions and wheel and tire vehicle subsystems.

During the workshop on vehicle design and materials selection, the students will be taken through the regulation and legislative needs of modern vehicles. While protecting against global warming, the students will learn that vehicles must endeavor to provide comfort, safety and performance. The workshop will enhance the students' ability

to design a vehicle that is reliable, safe, economical and environmentally friendly.

For the leadership and communication skills workshop, the goal will be to explore ways to inspire and motivate the participating teams. It will be an opportunity to look at skills associated with good leadership like good communication skills, excellent team building capacity and the ability to get the best out of every team member. Students at the workshop will be provided with the skills, tools and insight to make a difference in the way they communicate and to improve on communication in their work environment.

All the workshops for the 6th edition will be held in February and March 2015 while the Race Day (Challenge) will take place in May.

## News

# Aluminum slags replacing cement in concrete?



From left Dr. Nesibe Gozde Ozerkan with Omar Al-Azzawi

A new research project being undertaken under the auspices of the Center for Advanced Materials (CAM) at Qatar University is looking into the possibility of using aluminum slags as partial replacement for cement in concrete structures.

Cement is notably expensive and contributes to environmental pollution while aluminum slags are discarded in landfills which are not environmentally friendly either.

The project team is led by Dr. Nesibe Gozde Ozerkan, assistant professor/assistant researcher at CAM.

According to Omar Al-Azzawi, a master's student in the project team, using the mix design specified in the research will reduce the concrete final setting time by 48 percent, which means a lot for the construction industry since time is money for them.

It will also, Omar said, reduce the corrosion

of the reinforcement steel by more than 50 percent, which will positively affect the durability of structures.

"Because of the expanding properties of aluminum slag, the mixture can be used in building subfloors, blocks and pre-molded panels. Applying this idea will contribute in reducing the cost of concrete, time needed for it to cured, pollution caused by cement production and the pollution that result from throwing the dross into the landfill," Omar said.

Dr. Ozerkan said that the biggest challenge for the project team during the testing process was the harsh weather condition "because we had to prepare our concrete samples outside." "Since we needed to decide the ideal concrete design including aluminum dross, we had to prepare a lot of mix designs and perform a lot of tests on a big number of samples," she added.

Dr. Ozerkan said the project is also highly

relevant to the realization of the objectives of Qatar National Vision 2030 since locally produced aluminum waste, which has very detrimental effect on the environment, was used in the project.

"As a result, it can be said that the usage of the dross in concrete decreases its detrimental environmental effect. Moreover, the dross has some beneficial effect on concrete properties. Therefore, the results of this investigation result into lots of benefits for local industry.

"The impact of our activities created a lot of interest and helped in creating a platform for discussion between students, their colleagues and their immediate environments, which inevitably helped to create a good awareness of material science and applied research," Dr. Ozerkan further said.

Portland cement-based products (primarily concretes) are the world's most commonly used building materials, and due to the huge production world-wide, especially in developing countries like Qatar, the cement industry is faced with economic, energy and environmental problems, such as 7 percent of total world-wide carbon dioxide (CO<sub>2</sub>) emissions. For sustainable development, major international concerns have been raised over how to reduce CO<sub>2</sub> emissions and given rise to a growing interest in the development of materials and technologies able to reduce the impact of Portland cement. One of the possible alternative ways of sustainable development in construction industry is to replace a large percentage of cement with other materials like industrial wastes, slag and fly ash which reduce the environmental impact of manufacturing an equivalent amount of cement and allow industry wastes to be safely recycled into a permanent structure rather than into a landfill site. That is the basis of the research project.

## News

# QF Selects QMIC's Hawa'ak Environment Monitoring System for Education City deployment

Qatar Foundation for Education, Science and Community Development (QF) has selected the Hawa'ak Environment Monitoring System from the Qatar Mobility Innovations Center (QMIC) as part of QF's vision to realize a smart environmentally friendly campus at Education City.

The agreement, following a successful two-year pilot programme, was finalized with a contract signing ceremony at QMIC's office at the Qatar Science & Technology Park (QSTP), attended by senior representatives from both parties.

Hawa'ak is an air quality monitoring system that utilises a rich Internet of Things (IoT) platform, fully developed by QMIC to support real-time monitoring of air quality and other environmental conditions, and also allows users to access the information via multiple channels including mobiles and web portals.

Hawa'ak utilises a new generation of mobile sensor stations, allowing the delivery of localised and personalised air quality information. This information contributes to building a rich bank of data and is driving the creation of new services and applications optimized for enterprises, government agencies, and consumers.

The monitoring stations will be located across main areas of Education City to provide a comprehensive overview of the environment and air quality conditions onsite. Information will be accessible for all Qatar Foundation staff and students through QF's internal Maktabi web portal.

Ms. Amal Al-Thani, Executive Director of QF's Health, Safety, Security & Environment (HSSE) Directorate which is responsible for the project, said: "Deploying the innovative Hawa'ak system and applications represents a critical element of our strategy to create



a smart environmentally friendly campus and culminates our joint effort in piloting the system in the last two years.

"This deployment will allow us to deliver necessary timely information to our users and stakeholders. In addition, the Hawa'ak system will allow us to create a rich data bank, which can be useful for conducting research and data analysis. We, at Qatar Foundation, are proud to be collaborating with a national entity like QMIC for deploying this system."

Dr. Adnan Abu-Dayya, Executive Director (CEO) of QMIC, said: "This agreement is a milestone for QMIC as it represents the first full deployment of our intelligent Hawa'ak system. We have enjoyed our working relationship with the HSSE team at Qatar Foundation throughout the pilot stage of this deployment and we look forward to the next stage of this partnership. Hawa'ak™ is yet another intelligent system resulting from QMIC's local R&D effort and clearly demonstrates our significant progress in transitioning locally engineered innovations from the lab to the market place".

This contract is the result of a successful two-year pilot with HSSE that was announced in April 2012 at Education City. The pilot proved to be technically and operational successful in meeting the emerging needs of the HSSE team. As part of the new agreement, a dedicated Hawa'ak network that consists of a number of air quality monitoring stations and particulate matters (PM2.5) monitoring stations will be fully deployed at Education City. The distributed monitoring stations will measure the levels of O3, NO2, NO, CO, PM 2.5, and some of metrological parameters (temperature, relative humidity, and wind speed & direction).

QMIC's Hawa'ak system is growing rapidly to deliver other needed services besides the air quality monitoring. For instance, Hawa'ak is currently capable of monitoring the electromagnetic field radiation caused by cellular wireless towers and indoor wifi access points, and soon Hawa'ak will support the deployment of advanced weather stations and collection of detailed weather-related data as well.

## News

# GCC-EU research & innovation opportunities discussed at H2020 event

Opportunities for cooperation on research and innovation between the European Union (EU) and Gulf Cooperation Council (GCC) states were discussed at the Information Day on Horizon 2020 (H2020) held at Qatar University recently.

The event was attended by close to 100 participants from academia, government and research. They were oriented on H2020 which is the EU's biggest research and innovation program that promotes taking great ideas of discoveries and breakthroughs from the lab to the market. They also learned about INCONET-GCC2, a three year (2014-2017) project designed to establish a science, technology and innovation cooperation network between the EU and the Arab Gulf countries to enable GCC countries to reap the benefits of H2020.

In his opening remarks, QU Vice President for Research Dr. Hassan Al-Derham expressed appreciation to the European Union for promoting the need for closer cooperation with Arab Gulf countries on research and innovation issues.

“At Qatar University, we welcome every opportunity to interact with international and multi-lateral bodies and industry partners to deepen research and enhance collaboration initiatives”, Dr. Al-Derham said, noting that QU participated actively in the first phase of INCONET-GCC.

He added: “It is worth mentioning that QU is collaborating with more than 175 different universities and research institutes in the EU. Now is the time to build on these existing relations to achieve a strategic collaboration of mutual benefit.”

EC Head of Unit EU/Neighborhood, Africa and the Gulf Dr. Elisabeth Lipiatou said that both regions share the same drive towards research and innovation and have been trying to break national boundaries in this aspect. “Horizon 2020 as a new framework will endeavor to

bridge the gap between research and innovation just as INCONET-GCC was formed to facilitate collaboration between Europe and the GCC and research among businesses in the two regions with a focus on diabetes and smart cities”, she said.

Director-General Research and Innovation at the European Commission Thierry Devars said that partnerships were essential for EU leadership in globally competitive technology sectors and that the new integrated program will couple research with innovation and simplify issues for companies, universities and research institutes.

In his presentation, QU Project Manager Abdalla Adlan in the Office of VP for Research and the national contact point for INCONET-GCC, said that the program will promote regional integration as well as identification and prioritization of common research areas of mutual interest and benefit. He added that it will also facilitate the uptake and use of common identified research areas and monitoring of performance and impact of cooperation agreements.

PRAXI Network Technology Transfer Consultant George Baroutas elaborated on the INCONET-GCC2 initiative, saying that the forum sought to support and strengthen institutional bi-regional policy dialogue in Science, Technology and



Dr. Elisabeth Lipiatou

Innovation (STI), and bi-regional cooperation between research and innovation actors.

He said further that the consortium consists of 20 key players from the two regions in research and innovation which include 10 EU partners, eight Arab Gulf countries, and two from south Mediterranean (Egypt and Morocco). A presentation on ‘Opportunities for EU-GCC Collaboration in Smart Cities’ was made by Stavroula Maglavera from the University of Thessaly, Greece in which she touched on the European Commission’s efforts in focusing on smart cities to optimize output and ensure coherence to public policy.



Attendees

## News

# Pictograms facilitate dispensing of drugs to migrant workers

Qatar has a diversity of workers, most of them low skilled and with little or no education. Communicating in English or Arabic is a big problem for them. When they have health issues that require medical attention in hospitals, the interface between them and health workers poses a serious challenge. Most times, the people at the receiving end are the pharmacists who have to dispense the prescriptions to the patients.

It was this scenario that motivated Dr. Nadir Kheir, Associate Professor of Pharmacy Practice and Coordinator of Continuing Professional Pharmacy Development at College of Pharmacy, Qatar University, and his team to embark on the pictograms for medication labels project.

After joining Qatar Petroleum (QP) in 2004 as a senior pharmacist from Auckland University, New Zealand where he was founding member of their School of Pharmacy and worked there since 2001, Dr. Kheir observed that QP had the largest number of oil and gas workers with low linguistic skills. Most of them could not speak Arabic or English.

“It was then that I saw the communication problem between the pharmacist and the workers as majority of them did not understand either of the languages used in healthcare delivery which is English or Arabic,” Dr. Kheir says.

Each medication has a label giving directions on how to use it. This is usually supplemented by verbal communication on how and when to take the medicine or indicating activities to avoid while on medication as cautionary measure.

“It is a challenge if you have somebody who does not understand either of the languages. I saw that upfront. Some of the pharmacists tried to solve the problem with illustrations like drawing lines to indicate the number of times the medicines are to be taken,” Dr. Kheir said

of the frustrating situation during an interview. QP’s Medical Director at the time, Dr. Dick Hooper, shared thoughts with Dr. Kheir on the best methods to resolve the problem, and the idea of pictograms emerged. However, Dr. Kheir left QP and joined Qatar University, among the foundation team of the then new Pharmacy Program in 2007.

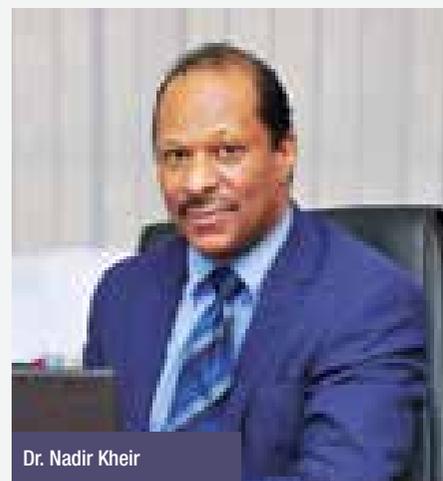
At Qatar University he found that the International Federation of Pharmacy (FIP) had a project about pictograms in pharmacy which assisted in developing pictorials or pictures in labels. He thought of trying it out in Qatar among the workers of Qatar Petroleum’s contracting companies and discussed it with his contacts there.

He applied for a Europe grant, developed a proposal which was approved and the funds were granted. He contacted a colleague in Qatar Petroleum, Linda Jean, a pharmacist who introduced him to an expert in pictograms, Dr. Ros Dowse in Rhodes University in South Africa, who had published works on the subject.

“We had somebody in South Africa, a Qatar Petroleum representative, Dr. Ahmed Awaisu, an assistant professor at QU, and my students, Amina Radoui and Aya El Badawi. We devised the study which was quite interesting, challenging and exciting. We spent more than a year on the project, in recruiting workers through Qatar Petroleum’s contracting companies”, Dr. Kheir said.

There were over 120 consenting workers. To explain the consent to them at least five translators were needed.

The workers were happy and willing to participate in the project. Their willingness indicated that it was a good project and that there was need for it as it would help to evaluate whether the approach would work.



Dr. Nadir Kheir

“We divided the participating workers into three groups to assess comprehension of labels on medication packs. In the first group we used the current system which is medicine in its box with the label written in English or Arabic and the pharmacist gives verbal instruction in a language which was either English or Arabic (both not comprehended by the workers); the second group was labels with pictorials only without any written or verbal instruction, and the third group was shown medicines with labels supported by written instructions, pictorials and verbal instructions in a language which was either English or Arabic,” Dr. Kheir explained

The three groups were tested and asked to explain what they understood in their own language. After analysis, it was found that the group that was given medicines with labels supported by written instructions, pictorials and verbal instructions was the best to comprehend.

The research team realized that some pictograms were difficult to interpret even when accompanied with verbal instructions, suggesting the need to thoroughly pilot them among users, taking into consideration cultural issues and other social aspects of the population of interest prior to implementation.

## News

# Project aims to put Qatar on global map of drug discovery



Dr. Feras Alali

Qatar might well be on the way of being spotted on the global drug discovery map, through a research project being led by Dr. Feras Q. Alali, Associate Dean, Research Affairs and Graduate Studies in the College of Pharmacy at Qatar University.

The project will be focusing on studying the biodiversity of Qatar's natural habitats as potential sources for drug discovery, with emphasis on plants, marine, and microorganisms, including bacteria and fungi.

"We will explore the potentials of these plants, fungi and bacteria in producing lead compounds, which could serve as new drugs," Dr. Feras said in an interview.

Health care is one of the largest business sectors in the world with huge expenditures per capita. There is always a necessity for discovering new, safer, and potent drugs.

"Sometimes drugs start showing failure due to resistance or side effects. So it becomes

necessary to always develop new drugs to meet the needs of patients," the associate dean said.

Nature has been a key player in drug discovery programs by providing novel drugs and drug leads for synthetic modifications. For example, of the 175 registered and approved anti-cancer drugs in the market since 1940, 75% were other than synthetic, and 49% were either natural products or directly derived therefrom.

"This is a significant percentage. If we apply this to anti-bacteria, 78% of all the antibiotics in the market fall into the same category. Of all the 1,037 drugs that entered the market from 1981 to 2010, 60% were related to natural products. There is a wealth of reservoir of lead chemistry that nature produces in plants, fungi or bacteria that save global health through the production of drugs," Dr. Feras said.

He contends, this is why there are global conventions/organizations that care much

about biodiversity as an untapped source of lead chemistry with novel mechanisms of action, which eventually translates into drugs.

"In Qatar, there are around 400 reported plant species in the wild. But, unfortunately, there are no estimates of the number of fungi or soil bacteria. Studies on Qatar's fungi and bacteria are scarce. We believe there are a plethora of species that represent an understudied source for drug discovery.

What makes Qatar unique is its environment, which reflects the organisms that are found in the country.

"Plants native to Qatar have different ecological properties and hence different chemical profiles than plants in the tropic or rain forests," Dr. Feras says. "The same is applicable to fungi and bacteria. They can survive harsh environments in summer by developing defense mechanisms that will be reflected in production of unique secondary metabolites, which potentially could be used as leads for drug discovery."

While Dr. Feras has applied for a grant to fund his project, he is at the moment establishing and setting up infrastructure. "We need to purchase chromatography and spectroscopy machines. These are the scientific equipment we use for separation and characterization of compounds. Acquiring these equipment will allow us to build infrastructure and increase awareness about drug discovery in Qatar," he emphasizes.

"People are yet to realize that Qatar, even as a small country, could have a huge potential for its unique environment. Hence, drug discovery research could stamp Qatar on the global market" he added.



LTQ Orbitrap XL mass spectrometer is used routinely for exact mass analysis

The public may have the misconception that drug discovery is a lengthy and costly process. According to Dr. Feras, “It usually takes 10 to 15 years to discover one drug, with a total cost of around \$1 billion. Yet, these numbers and time reflect the whole process from discovery until the drug reaches the market. But we will focus only on the drug discovery component called “chemistry lead”, which requires less time and cost.”

He said the support of a funding agency like the Qatar National Research Fund (QNRF) is definitely a key for the success of the project.

The drug industry in the Gulf and Arab region, even in the rest of the developing world, does not have research and development (R&D) facilities to pursue drug discovery. They focus mainly on generic products, making formulations of already known drugs.

But according to Dr. Feras, expertise is available in the region. There are experts in taxonomy; critically needed for genus and species identification of organisms. Biologists, chemists, medicinal chemists, natural product chemists, and pharmacologists that are needed for such projects are available.

“We have leading researchers working here in Qatar. We have a lot of good infrastructure. We need just to focus our efforts on drug discovery,” Dr. Feras alludes

He said it is an interesting development that one of the wings in the New Research Complex of Qatar University will be for biomedical research and drug discovery. This should be capitalized on to allocate resources and build capacity on drug discovery, he adds.

Dr. Feras is working on assembling a team and building connections with fellow researchers in the field. This semester, 10 plants that have been collected on campus were screened for cytotoxic activity by two undergraduate students. One of the plants showed potential activity that justifies further studies.

“We searched the literature and found that the plants have not been studied previously. The students presented the data as a poster at the 4th Annual Research Night on June 4th. We started making connections with specialists in the biology department; Dr. Ali Eid, Associate Professor, Department of Biological and Environmental Sciences, Qatar University, is now testing the anti-cancer potential of some of those plants,”

he says.

The project, he emphasized, will be concentrating on the coastal area of Qatar, which might be a rich environment for fungi. “The coastal area is projected to be rich in microorganisms. Plants are well distributed all over Qatar. They can be found in Al Khor, Al Wakra, Doha, Mesaieed, and almost in every city, even in the desert. The opportunity is for the plants of Qatar to be well documented, though they have not been tested for bioactivity. When it comes to fungi and microorganisms, there is almost no existing work yet on this exciting area of study.

If resources are allocated and drugs developed from Qatar, he adds, it will be a huge opportunity for Qatar and even the Gulf region to be on the global map in this aspect.

Regarding project funding, Dr. Feras said, a proposal was submitted to the Qatar National Research Fund (QNRF) last December. All the reviewers were positive and favored funding but unfortunately did not get QNRF approval for funding as it was classified as Class C “Competitive but not awarded”.

“We assembled an excellent team of scientists working in collaboration with the Anti-Doping Lab Qatar (ADLQ), Environmental Studies Center (ESC) and College of Arts and Sciences (CAS) at Qatar University, and the University of North Carolina –Greensboro, USA. The project was designed to study marine fungi for secondary metabolites. This is another reason why there should be awareness,” the associate dean said.

The project will accordingly be started with smaller grants probably from Qatar University to generate some preliminary data.

“The problem we are facing is that for such types of projects, specific instruments are needed that cannot be funded with small grants. We might still rely on our international collaborators. We have been having active collaboration with the University of North Carolina at Greensboro. We just published a paper in *Phytochemistry Letters*, where we isolated novel components of a plant from Jordan,” he explained.

## News

# QU laboratories awarded ISO 17025 accreditation by A2LA



Qatar University's research laboratories at Environmental Studies Center (ESC), Center for Advanced Materials (CAM), Central Laboratories Unit (CLU) and Gas Processing Center (GPC) have been awarded ISO/IEC 17025-2005 accreditation by the American Association for Laboratory Accreditation (A2LA).

This followed a series of audits over the past 4 years since the labs' initial accreditation by A2LA in April 2010. ISO/IEC 17025 is the most important standard for calibration and testing laboratories around the world and is used in developing the competence of testing and calibration laboratories.

In his remarks on the recent development, QU Vice-President for Research Dr. Hassan Al-Derham, said: "It is a clear demonstration of our adherence to the highest ideals of quality and international best practice in all our research processes and lab systems and procedures".

He stressed that Qatar University allocates ample resources to equip and staff its laboratories to ensure that its researchers, industry partners, and stakeholders have utmost confidence in the integrity of the labs' processes and procedures and in the results of the wide range of experiments and tests that are conducted on a daily basis.

QU Research Office Quality Manager Dr. Mohammed Maqbool Ahmed said that the ISO/IEC 17025-2005 standard is used by QU laboratories in developing their management and technical systems to ensure competence of the highest level. "During the accreditation renewal audits, all the laboratories' documents and records were thoroughly checked by the A2LA auditor who also observed a lab test being carried out", he said.

A2LA auditor Mr John Kinsella expressed satisfaction with the functioning of both management and technical systems used in the labs, saying: "The labs were well

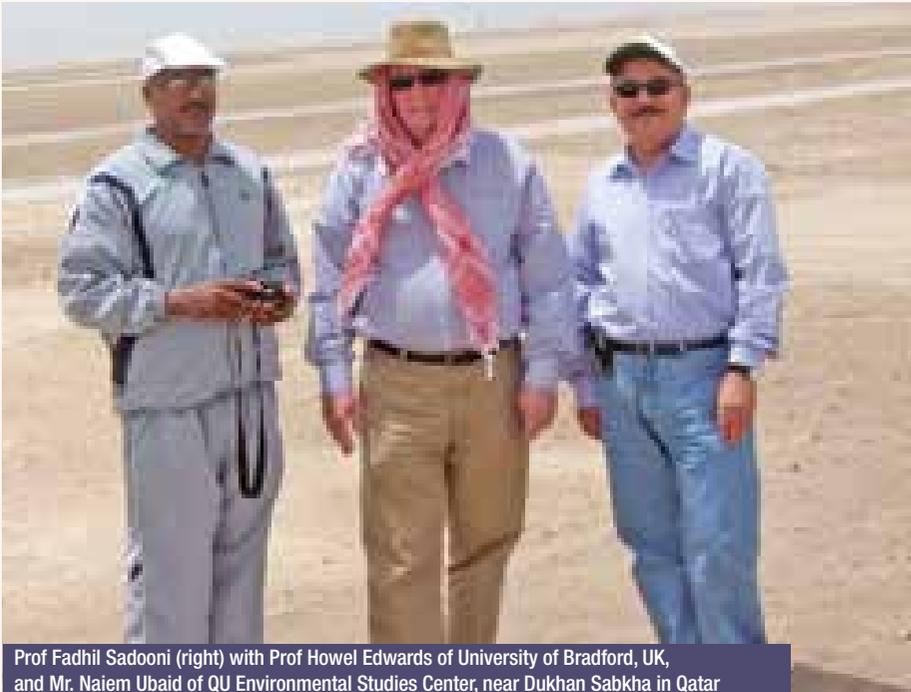


Dr. Mohammed Maqbool Ahmed

prepared for the audit. Test personnel are well trained and educated and were very cooperative. Testing equipment was well maintained and maintenance records were readily available at all locations".

## News

# QU staff and team members win honors at AAPG convention



Prof Fadhil Sadooni (right) with Prof Howel Edwards of University of Bradford, UK, and Mr. Naiem Ubaid of QU Environmental Studies Center, near Dukhan Sabkha in Qatar

A poster co-authored by Professor Fadhil Sadooni, adviser of the vice president for research at Qatar University, has recently won the Award of Excellence Top 10 Poster Presentation at the 2014 Annual Convention & Exhibition of the American Association of Petroleum Geologists (AAPG) in Houston, Texas. The presentation was on Microbial-Mediated Dolomite from Coastal Sabkha Environments of Abu Dhabi and Qatar: Analogues to Subsurface Arid Climate Dolomitized Reservoir Rocks.

The American Association of Petroleum Geologists is the world's largest organization dedicated to research related to hydrocarbon exploration with over 30,000 members and there were 9,000 participants at the event.

AAPG President Lee Krystinik in a letter to the winning authors said, "You are to be commended for your presentation of significant

content reflecting originality with outstanding organization and appearance".

Members of Prof. Sadooni's team include Dr. Christian J. Strohmenger, Qatar Center for Coastal Research Lead at ExxonMobil Research Qatar and, Judith A. McKenzie, Tomaso R. Bontognali and Crisogono Vasconcelos, from Geologisches Institut, ETH Zurich, Switzerland.

The presentation focused on a new mechanism for the formation of dolomite, the main component of the oil and gas reservoirs in the Middle East, including those of Qatar's North Field. It is based on detailed analyses of samples collected from the coastal sabkhas in both Qatar and the United Arab Emirates including the DNA of the microbial fraction and examination of samples from different parts of the world using Scanning Electron Microscope (SEM).

Prof. Sadooni said the study discovered that dolomite is more common in carbonate reservoirs of the Arabian Peninsula, deposited under arid climatic conditions like the Khuff and Arab formations, compared to those deposited under humid climatic conditions. Accordingly, microbial-mediated dolomite is seen to play an important role in the dolomitization process observed in arid climate carbonate reservoirs. Based on the research, dolomite is also found to form in small semi-closed pores or micro-niches, for example shell borings and micro-borings, within grain-dominated carbonate sediments.

The research abstract explains that arid climate carbonate reservoirs like the Permian Zechstein, the Permo-Triassic Khuff, the Triassic Kurra Chine, and the Jurassic Arab formations show early diagenetic dolomite clearly linked to facies successions. They are dominated by intertidal, microbial-laminated carbonates and often encased by salina- and sabkha-type evaporite layers.

Speaking on winning the award, Prof. Sadooni said, "I am very proud of our achievement as this study has been very challenging from a number of aspects and we have now received recognition from the largest organization dealing with oil and gas exploration in the world. Ultimately, this community has recognized the work we accomplished which is a great source of pride for me and the team."

Prof. Sadooni described it as an indication of the positive impact that Qatar University and Qatar in general are making on the global knowledge arena. Prof. Sadooni was at a recent meeting of the British Geological Society in which a large number of papers presented were based on research funded by the Qatar National Research Fund (QNRF), giving an indication that Qatar is a strong player in this important area of research.

# Profile

**Name:** Dr. Mohammad Diab

**Major:** Pharmacy

**Graduated in:** June 2004

**Occupation:** Assistant Dean Outreach and Engagement,  
QU College of Pharmacy.



Mohammad Diab

## What can you say about the evolving role of the pharmacy profession and pharmacists in the society?

The pharmacy profession emerged from its traditional dispensing and drug distribution roles into a more critical and clinical role. Safe and efficient use of drugs as well as patient education on the appropriate medication uses are some examples of the important roles the pharmacist plays during the delivery of pharmaceutical care.

Physicians had trouble keeping up with so many new drugs and with trying to learn how these drugs fit into the overall drug therapy process. As a result, it became obvious that pharmacists could help to improve therapeutics by providing unbiased and up-to-date drug information to physicians.

The demand for qualified pharmacists who are able to provide all these important care issues is increasing worldwide and together with expansion of pharmacists' involvement within the multidisciplinary teams that provide optimum patient care, there is emphasis on the important future that is waiting the profession.

## How were you motivated to become a pharmacist?

My decision to choose pharmacy as a profession was based on a personal experience. When I was young I visited the pharmacy to have one prescription filled. However, the time needed to fill the prescription was too long. When I asked the pharmacist about the reason behind the long waiting time, he explained that he needed to contact the physician to amend the medication as the current medication may hurt me. At that time, I asked myself what could have happened to me if the

Dr. Mohammad Diab:

## “My decision to choose pharmacy as profession was based on a personal experience”

pharmacist did not change the medication and what could be the circumstances. I then realized the important role the pharmacist plays in order to keep our health and decided to study pharmacy to help and provide care to patients.

### What work experiences did you have before joining QU?

I completed my PhD from the School of Pharmacy, University of Strathclyde, UK in 2009. I joined different pharmacy departments within Hamad General Hospital including: out-patient/in-patient pharmacies, total parenteral nutrition & chemotherapy department, Dr.ug Information Centre, and IV admixture and clinical pharmacy services. I have enjoyed playing the pharmacist's role in each department that involved identifying drug interactions, dosage adjustment in renal/hepatic failure, providing information about drugs to health care providers, providing optimum drug therapy to patients and many other drug intervention responsibilities.

As a pharmacist at HMC, I was also offered a lot of opportunities to join different training programs, international conferences as well as important committees and working groups. I led the continuous pharmacy education program for three years before joining QU College of Pharmacy in 2013.

### Do pharmacists have extensive career opportunities in Qatar?

As a pharmacist you have a wide range of career opportunities in Qatar. You can choose to practice your clinical knowledge

in governmental hospitals/clinics (more than eight hospitals and 5 clinics are available), private hospitals/clinics or in a community pharmacy. You may also like to join academia and research within the QU College of Pharmacy or you may like to join auditing and quality control within the Supreme Council of Health. Some labs that manufacture specific medications and dosage forms including parenteral products are also available for those interested in industrial pharmacy.

### Do you see pharmacy research making long lasting impact on disease control?

Pharmacists with enough education and training can conduct scientific basic, applied/translation and clinical studies on different disease states or drugs. Pharmaceutical researchers have the potential to improve the lives of people through insights and discoveries that relate directly and sometimes indirectly to medications and health. Examples of research areas in pharmacy include the development of new approaches to drug discovery, development or testing of a new procedure to manage the misuse of drugs in hospitals as well as factors affecting the patient outcomes of medication use.

Clinical pharmacy practice is my current research area that is focusing on type-2 diabetes management (DM) cardiovascular disease prevention and risk analysis as well as evidence-based medication use.

In 2009, it was estimated that the overall prevalence of DM among adult Qatari population was as high as 17%, and due

to the estimated high percentage of Qatari adults considered as pre-diabetics, this prevalence is expected to rise in the next few years. According to the International Diabetes Federation (IDF), Qatar was considered as one of the countries in the Middle East and North Africa (MENA) with the highest diabetes rates. It is the second highest ranked country for diabetes prevalence among the Gulf Cooperation Council (GCC) countries after Kuwait.

The IDF estimated that healthcare expenditure to manage diabetes and prevent its complications in Qatar was USD \$2,269 per person in 2010.

In Qatar I have completed three research projects around DM in which I developed and validated a medication assessment tool to measure the level of adherence to internationally recognized clinical guidelines in the management of type-2 DM and in the prevention of CVD. The tool was validated academically and clinically and was then applied in the diabetes clinic at Hamad Medical Corporation and used to identify areas that lacked the appropriate care. The risk of developing CVD among the study sample (a total of 305 patients) was also analyzed and used to identify and target patients at higher risk. The results of these studies led to four poster presentations and oral communications at the European Society of Clinical Pharmacy Symposium with four published abstracts and a peer reviewed paper in the International Journal of Clinical Pharmacy.



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انضم إلينا اليوم!