جامعة قطر
QATAR UNIVERSITY

Qatar University Research Magazine

Issue 15, May 2021

“Drones”

Interview with the Graduate Student: Sara Al-Emadi

Prof. Abdul Hakeem Yousuf Al-Khelaifi

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Digital Research Platforms: **Further Enriching QU's Research Excellence**

Dear readers,

Qatar University continues to focus on excellence as a core value in achieving its basic goals. At a time of growing challenges, the University continues to develop while encouraging and facilitating innovation and creativity.

When it comes to innovation and creativity, this issue highlights a set of varied achievements. One of which is the launch of Qatar University Press's online platform, which came at a time when the university publishing arena - locally and internationally - needed digital platforms that are meant for effectively communicating with all researchers and their audiences. It is equally my pleasure to announce the registration of QU Young Scientists Center (QUYSC) to the International Federation of Inventors' Associations (IFIA) the global platform for invention and innovation. As well as the launch of the first QU research podcast on the SoundCloud platform.

In February 2021, we also launched the IRBNet platform that has had a significant impact on the timeline for processing ethical approvals and QU's research activity. As for the health sector, the College of Health Sciences participated in the launch of a joint platform for a nutritional database for the GCC countries. This is in addition to a research participation from the College of Medicine on the interaction between pathogens and the host and body defense mechanisms, and a research in pharmacogenomics from the College of Pharmacy.

This issue also features the Biomedical Research Center winning a National Priorities Research Program (NPRP) grant to develop an artificial intelligence system for cardiac surgery planning. In addition, a team from the Center has succeeded in registering a patent for new predictive vital indicators for the duration of the stay of Covid-19 patients in the intensive care unit. The Ibn Khaldon Center for Humanities and Social Sciences shares with us the summaries of some research papers that uncover the determinants and challenges of cultural employment in the soft power industry, and its implications for Qatar's hosting of the 2022 World Cup. The College of Law has also participated in cases received by the Mobile Legal Clinic, and the College of Business and Economics discussed in a research paper the role of supply-chain flexibility and reshaping it in the context of economic and political risks, while discussing evidences from the State of Qatar. This comes along with soild research from the College of Arts and Sciences, including the development of insecticides from bacteria isolated from Qatar's soil.

This issue also highlights a discussion with Prof. Siham Al-Qaradawi, Professor of Organic Chemistry, about the first patent registered at Qatar University, and Prof. Kaltham Al-Ghanim, Director of the Social and Economic Survey Research Institute.

The cover issue shows Drone Technology, the thesis topic of the Master's of Science in Computing Program at the College of Engineering by the graduate student Sarah Al-Emadi.

We also share with you our most prominent activities, including the first annual meeting of the Academic Network for Development Dialogue (ANDD), the tadTalks event to encourage learning in the Office of Graduate Studies, and QU's celebration of the International Day of Women and Girls in the Field of Sciences.

There are other achievements, research topics, and events that have been realized in a joint effort between QU's research centers and colleges.

I wish you a pleasant reading,

Prof. Mariam Al-Maadeed,
Vice President for Research and Graduate Studies,
Qatar University

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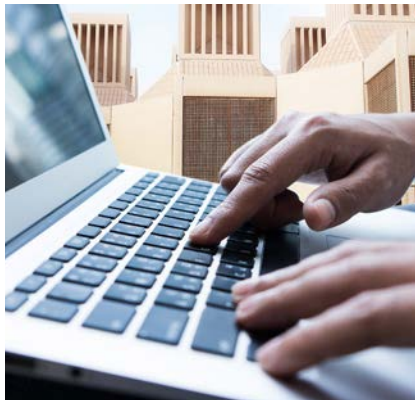

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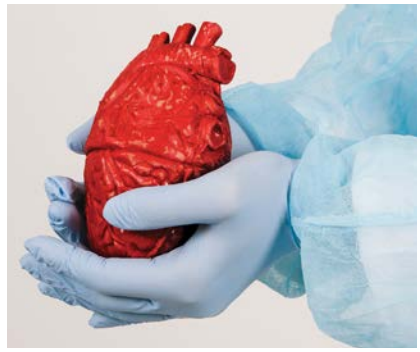

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The Research and Graduate Studies Office acknowledges the contributions made in support of publishing this issue. Editorial contributions are also welcomed on the following email: vprgs.eco@qu.edu.qa

Qatar University Launches its First Research Podcast

QU Research

Qatar University launched its first research podcast, which comes as an initiative from the Research & Graduate Studies Sector as part of the "Research Wednesdays" Series. The series aims to demonstrate excellence and diversity in scientific research, enhance active participation in keeping up with current research issues through the audio-visual media, and shed light on local and international issues. Thus, contributing to the achievement of the University's Vision and Mission with regard to research excellence and knowledge contribution.

Podcast is defined as an online broadcast medium or digital audio files with episodes that can be streamed at any time. One of the most important differences between podcast and radio/radio broadcasting is that podcast broadcasts recorded episodes at any time and not only during livestreaming. Thus, it is suitable for the pressures of work, especially in the university community, where anyone can listen to it round the clock and make good use of their time, whether during work or when practicing daily activities, and it is an inexpensive educational and cultural means.

Qatar University podcast is devoted to recording a series of varied seminars that discuss current, local and global issues such as the COVID-19 pandemic, scientific issues represented in research, advice, innovations and inventions, social and humanitarian issues of interest to the Qatari community and the world as a whole, in addition to health, psychological, medical, and other issues as well. In addition, contemporary issues such as information technology, cybersecurity and artificial intelligence. These issues are discussed through a platform in which researchers and specialists from Qatar University or from different government entities in the country meet to discuss a local or a global research issue from the point of view of different scientific or social research disciplines from various perspectives and aspects.

Qatar University Research Podcast is Qatar University's first, and it will be broadcasted on Soundcloud platform under the title "quresearch". Since the launch of the University's research podcast, the Research & Graduate Studies Sector has broadcast three seminars on Soundcloud: the first one is titled "Social, Psychological, and Neuro Scientific Impact of the COVID-19 Pandemic" on February 17, 2021. The second one is titled "Scientific and Literary Bases for Dialogue" on March 31, 2021. Lastly, the third one is titled "Artificial Intelligence and the Future of Humans" on April 28, 2021.

Launch of Qatar University Press Platform

Qatar University Press (QU Press) has launched its e-platform through a virtual launch event, attended by audience from within and outside QU, including His Excelency Dr. Hassan Al-Derham, QU President, Prof. Maryam Al-Maadeed, Vice President for Research and Graduate Studies, and Dr. Talal Abdulla Al-Emadi, Founding Director of QU Press. This launch comes at a time when the local and international university publishing arena is in an evident need for such cutting-edge digital platforms dedicated to the effective communication with authors, researchers, readers and all all audienc.

QU Press platform website is https://qup.qu.edu.qa and it comprises a number of other leading university presses. The platform can track visitors and downloads. Its security is in line with the General Data Protection Regulation (GDPR), and contributes to the development of the editing and production of books and journals, reflecting professionalism and effectiveness in the editorial process.

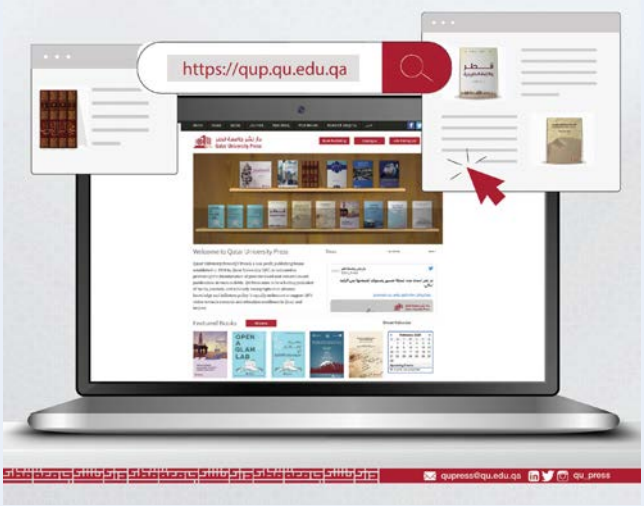
QU Press seeks to keep pace with the benchmarks of the industry's best practices for online academic publishing platforms, and will always focus on transparency amongst books, magazines, authors, peer-reviewers and the press. Additionally, QU Press e-platform will be used to expedite and facilitate communication with authors and peer-reviewers; by using automatic responses, follow-up, and reminders forms, organizing work with all partners remotely, and expanding authors and peer-reviewers' database.

Other features of intrinsic value are electronic indexing, increasing citation and improving impact factor. These can be achieved through electronic submitting of metadata, and journals and books content; in order to transfer data to global indexing platforms, digital academic repositories, e-libraries, global book distributors, as well as mobile research applications, such as: Researcher, and personal search file building platforms, such as: ORCID & Research Gate.

With regard to books, specifically, the platform acts as a register of publishing applications, allowing authors to easily track their submissions. It also facilitates the submission, evaluation and peer-review processes, as well as the provision of automated electronic archiving to preserve publications for long term. It also allows displaying books in Arabic and English, locating and selling them. In addition, books will be available online with their specific bibliographic data, which will enable indexing in international digital repositories, to add books in their databases for advanced search, thus improving citations.

In alignment with QU Press's aim to include their journals in recognized indexing bodies, the platform allows displaying journals issued under the umbrella of QU Press with their structure, content, and appropriate features that facilitate their indexing on a long-term basis. Therefore, authors will be required to submit their articles through individual accounts; so that all submissions and peer-review dates are kept under a sole account.

The platform incorporates production-specific features such as iThenticate plagiarism checker software to verify the originality of written work, the

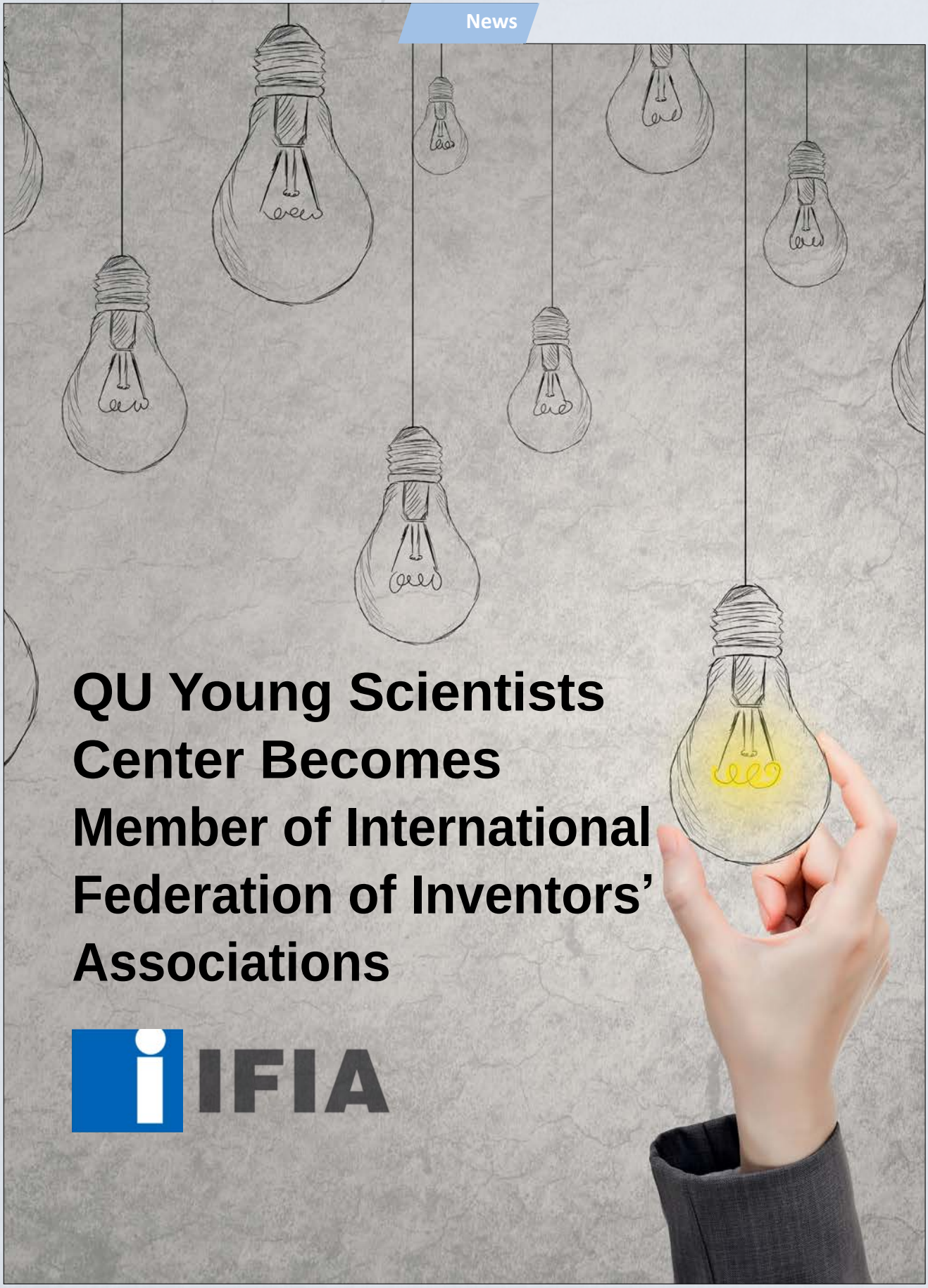


QU Press Platform

Digital Object Identifier (DOI) System, and automatic support for metadata export. These features allow QU Press journals to transfer metadata to external indexing and archiving repositories such as Pubmed and Medline for Biomedical Sciences, as well as the Directory of Open Access Journals (DOAJ), Google Scholar and other tools. Thus, journals and scholarly articles at Qatar University are accessible and easy to follow, track and download.

In terms of marketing and sales of digital books and journals, the platform contributes to circulating news and events through links on QU Press social media channels. It aims to expand opportunities to attract new local and international readers and peer-reviewers, and will also be able to display journals and books; with hypertext, metadata and research, display online introductory videos, and announce publishing invitations for those journals and books. The platform also facilitates automatic display and marketing on social media platforms, announcing QU Press news, and organizing virtual events. Moreover, the platform is a comprehensive e-commerce solution for bookselling, distribution, and print-on-demand (PoD) services both locally and internationally.

Commenting on the launch, Dr. Talal Abdullah Al-Emadi, founding director of the QU Press and professor of oil and gas law, said: "This newborn platform seeks to be among the leading platforms of university presses. It is set to provide ways to communicate professionally especially at a time when the world is still suffering from COVID-19 pandemic. The state-of-the-art platform will open up many global prospects for QU Press. It will exemplify global influence factor that develops digital publishing, marketing and sales as well as increasing citations of our unique and specialized references".



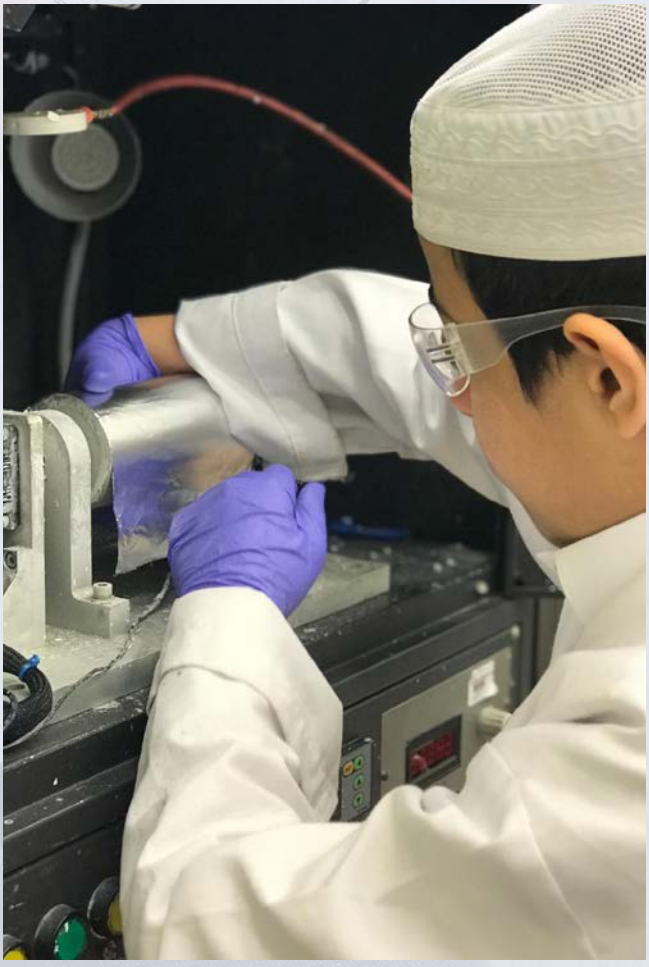
QU Young Scientists Center Becomes Member of International Federation of Inventors' Associations

Qatar has a national vision is to achieve a sustainable, diversified, and knowledge-based economy, with the aim of addressing challenges by advancing in knowledge and quality education. The Qatar National Vision for Human Development also stipulates the establishment of an infrastructure and an educational system that matches the most prestigious educational systems in the world, and contributes to preparing Qatari students to face global challenges. To become the most important innovators and entrepreneurs in the future, which will allow them to have a greater role in all sectors of the country's economy. Therefore, the Qatar University Center for Young Scientists seeks to focus its efforts and resources to support the social and economic development of the State of Qatar and work to establish links and partnerships with entities and institutions that would enrich its career. Accordingly, the Center has become a member of the International Federation of Inventors' Associations (IFIA), which was established in 1968 in the United Kingdom and includes more than 175 members from 100 countries and territories such as Denmark, Finland, Germany, Britain, Norway, Switzerland, South Korea and other countries.

The International Federation of Inventors' Associations (IFIA) is the global platform for invention, innovation. This non-profit organization aims to spread a culture of invention and innovation, support for inventors, transfer of technology, and cooperation with relevant organizations. Since its inception, the Federation has been working to educate the public about the importance of inventors in society and the protection of their rights. In addition, the Federation holds international invention exhibitions, scientific seminars and workshops in cooperation with other international organizations to provide an opportunity for its members to display their innovations, benefit from its wealth of knowledge, and exchange views regarding the promotion of creativity and entrepreneurship. Moreover, promoting the most recent achievements of its members allows for the expansion of relationships and the knowledge base required exploring the possibility of commercialization with various entities.

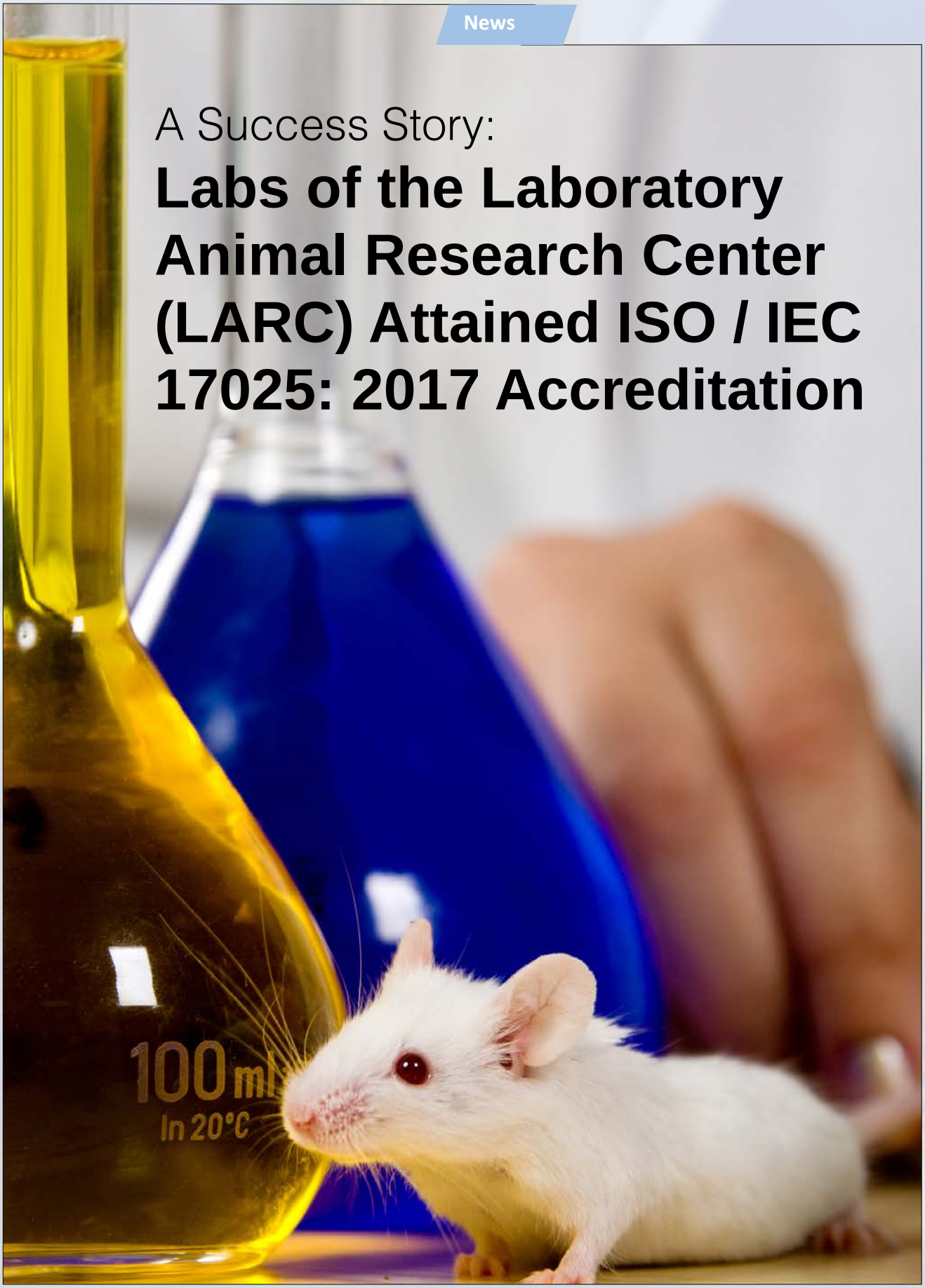
This membership will enable the Young Scientists Center at Qatar University to participate effectively and exchange knowledge and experiences in conferences, exhibitions and events that bring together universities, institutions and prestigious organizations from all over the world, such as Creativity and Innovation Week, Intellectual Property Day, and the International Inventors Day. In addition to increasing international outreach, recognition and interaction with IFIA's vast network, it provides an opportunity to participate in innovation and policymaking processes. The membership will also enable researchers and students of the Center to share ideas, innovations, discoveries and their success stories with the world, provide advisory services on intellectual property protection and inventors' assistance programs, contribute to the marketing of inventions and their publication in the journals of the scientific organization. They will also be eligible to apply for inventors' funding opportunities in various fields, including energy, environment and health, to contribute to the development of a better world.

The Director of the Young Scientists Center at Qatar University, Dr. Noora Al-Thani, has been keen on obtaining the Center's membership in the IFIA for the vast benefits of the youth and the Qatari society. Also, to achieve the vision of Qatar 2030, whose responsibility rests with all individuals and institutions, especially those interested in youth education. On this occasion, Dr. Noora said, "We are pleased with our acceptance to join the Federation after we went through several stages of applying for the membership, and that this membership will provide us with several fields of development, advancement and formation of relations with international bodies. Our young inventors will be able to take advantage of the global platform, and the various programs to present and develop their ideas and increase their expertise in several scientific and technological fields," she added.



A Success Story:

Labs of the Laboratory Animal Research Center (LARC) Attained ISO / IEC 17025: 2017 Accreditation



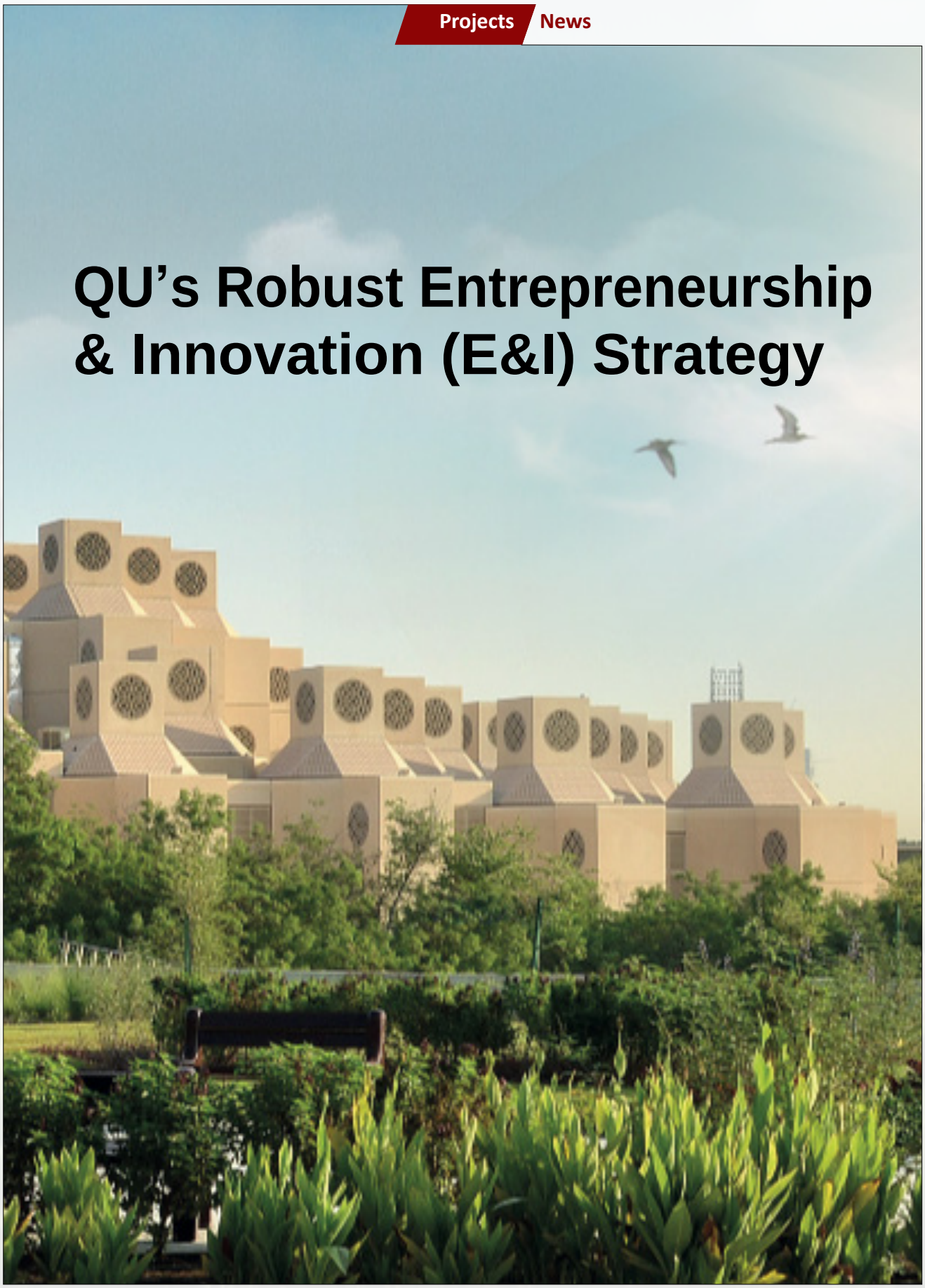
Qatar University's new Laboratory Animal Research Center (LARC) is the state of the art designed building with an excellently controlled environment to ensure humane care and welfare of research animals. LARC is the first of its kind in Qatar that offers a great opportunity for scientists, faculty and research students to utilize the laboratory animals in research. Humans and rodents such as rats and mice have similar body organs and organ systems that perform the same functions in a very similar way. Therefore, laboratory animals are valuable assets for scientists to study biological processes, to investigate the causes of diseases and to test new vaccines, treatments and therapies for the wellbeing of humans. LARC is committed to provide laboratory animals (Rats and Mice) husbandry care and training that harmonizes with the world's best practices, along with reviewing and updating existing policies and procedures for all administrative, veterinary and other operations related to animal care. This kind of practice is important to assure quality of research data.

The laboratory division of LARC is well equipped to carry out both the diagnostics and research activities. The main objective of the LARC laboratory is to monitor the health status of vivarium rodents through immunological, microbiological and molecular methods. In addition, the laboratory division is also responsible for environmental monitoring of vivarium husbandry and wash area to prevent entry of unwanted pathogens that might influence the health of existing research animals and alter their response to experimental conditions. The quality of animal drinking water is one of the main component to avoid infection in vivarium environment, maintaining a good quality drinking water is mandatory for welfare of the research animals as well as for scientific reliability to produce valuable scientific data. LARC in accordance with International specialized organizations such as American Association for Accreditation of Laboratory Animal Care (AAALAC) and International Council for Laboratory Animal Science (ICLAS) requirements established the diagnostic testing methods of ELISA and drinking water quality in the year 2015. Since then number of samples from the vivarium were tested and the results subjected to stringent quality control measures. The quality assurance of diagnostic methods in LARC such as detection of animal pathogens by ELISA and

Conducting diagnostic analysis at one of LARC laboratories

drinking water testing method are periodically validated by sending samples to external laboratory IDEXX (U.S.A) and ISO certified Qatar Industrial laboratories (Qatar) respectively. In the year 2017, LARC started the journey of ISO accreditation to accredit these two methods. This led to the preparation and compiling of documentation on testing protocol and administrative procedures as per ISO/IEC 17025:2005 recommendations. ISO/IEC 17025:2005 from American Association for Laboratory Accreditation (A2LA) plays an important role in supporting the provision of accurate and reliable results from laboratory testing. The ISO/IEC 17025 Accreditation process involves documentation, proficiency testing and laboratory visit of accredited quality control auditors from A2LA. The Quality control department of Qatar University supported our effort through reviewing documents and guiding us in presenting our test results in ISO/IEC 17025:2005 format. In April 2018, LARC successfully secured accreditation for the two methods that are critical for the vivarium. Laboratory staff from LARC, Dr. Kavitha Varadharajan, Mr. Imran Khan and Ms. Hamda Aboujassoum are the analysts for drinking water testing and ELISA method respectively. The testing results were approved by the laboratory manager and the LARC director for result submission. Again later in September 2020, LARC obtained ISO/IEC 17025:2017 Accreditation for the same methods virtually through online due to the pandemic situation. This successful achievement of securing ISO/IEC 17025:2017 Accreditation proves the quality and proficient testing competency of LARC laboratories that reflects on the quality of LARC animals used for scientific research at Qatar University.

QU's Robust Entrepreneurship & Innovation (E&I) Strategy



The Entrepreneurship & Innovation (E&I) Strategy is one of Qatar University's enabling strategies that, in fact, is part and parcel of its 2018-2022 transformational strategy. At its core, the (E&I) strategy is compatible with Qatar National Vision (QNV) 2030.

In implementation of the Entrepreneurship & Innovation (E&I) Strategy plan, Qatar University adopts creativity as one of the core values in order to achieve its basic goals. Thus, the University encourages its members into independent thinking by providing an atmosphere of freedom to use their research projects in finding innovative alternatives and solutions that help overcome existing obstacles and challenges. Further, the University supports research, development as well as creativity in research fields in line with the national research priorities in addition to the needs and aspirations of the whole community at both the economic and social levels. It also works on establishing a culture of research and innovation and on providing a supportive environment for it in the University. QU also focuses on diversifying and sustaining funding sources for research projects and programs as well as in the postgraduate programs that qualifies students and researchers to contribute to enriching the knowledge economy.

Innovations and inventions cover multiple fields, including industry, mechanical engineering, technology, healthcare, environment, agriculture, sports and other fields that respond to the national priorities and achieve the maximum local benefit, alongside their global impact.

Qatar University Board of Trustees-headed by His Highness Sheikh Abdullah bin Hamad Al Thani, the Deputy Emir, have expressed a great interest in innovations, which was shown in the formation of a higher committee at the university level in order to manage innovation, entrepreneurship and digital transformation led by the University President and Vice- presidents, an indication of the active interest in this field. This interest in innovation and technology transfer is a true translation of the strategic plan of Qatar University which includes six basic objectives, under which seven main strategies fall, including the digital transformation strategy as well as the entrepreneurship and innovation strategy. These main strategies go in line with the state's national vision to shift towards a knowledge-based economy.

In this context, the Office of Innovation and Intellectual Property (IIP Office) was established in 2017. It undertakes the basic tasks of creating a strong infrastructure and managing intellectual property in a manner consistent with the requirements of modern innovation, starting from the disclosure of the idea, to the study of its technical and economic feasibility, and the consideration of its patentability by the competent committee, ending with the filing process until obtaining the patent at both local and international levels.

The IIP office is mainly responsible for managing Intellectual Property (IP) and technology transfer files. It encourages not only QU's community, but the whole Qatari community to innovate and/or invent by holding tons of awareness sessions per year. It also supports and facilitates the protection of QU's community, the IP rights in cooperation with the concerned authorities such as the Ministry of Trade and Industry, Qatar Foundation and others. Most importantly, the office is in charge of building a strong database for all the records related to its IPs.

The IIP Office at Qatar University has several functions that include the following:

First: increasing awareness of intellectual property rights in the University community and the Qatari society as a whole, through lectures, seminars, electronic publishing and other means, in addition to including this subject within the academic curricula.

Second: providing legal services for filing IPs of various types in the international and local offices as well as supporting them in coordination with other stakeholders. It is worth noting that the office added temporary patent registration service so as to facilitate procedures for University members; this service enables researchers to publish and participate in conferences until studying the idea and the possibility of converting it into a patent worthy of investment and development, ending with converting it into a permanent patent.

Third: commercializing intellectual property inside and outside Qatar besides following up the development of the patents obtained as well as patent applications to ensure that they reach the commercial stage. The office works on that in a way that serves the country's economic diversity and achieves the national vision in creating a knowledge-based economy.

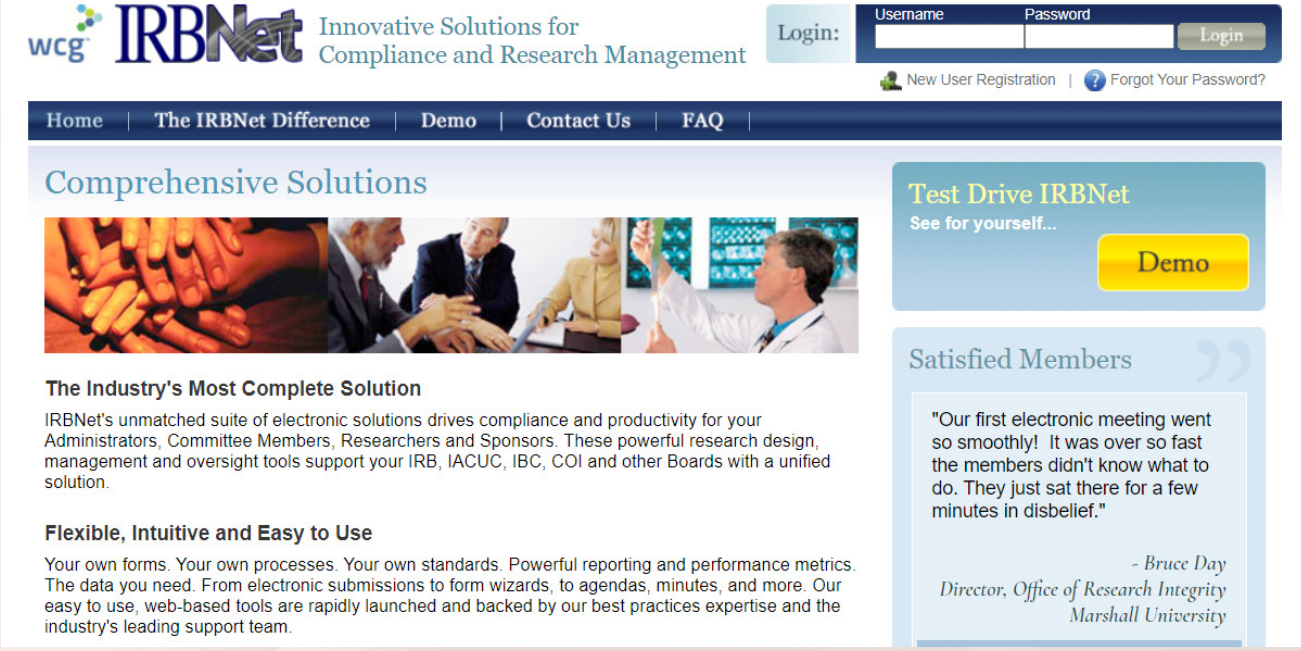
The Office of Innovation and Intellectual Property at Qatar University manages the filing processes of more than 152 files, and it succeeded in obtaining 47 international patents for number of University members. It is also studying 7 of the patent applications to convert them into emerging companies that serve the national economy.

Finally, innovation at Qatar University is closely related to its strategic planning, which combines the national goals with the vision and goals of the University; it is also related to the development of educational programs, curricula and the quality of higher education. Further, innovation covers applied research in various sectors such as industry, health, food, water desalination and renewable energy, software and others. Also, the Office strengthens relationships with a large number of institutions and organizations in order to enable access to the latest research results and technologies.

The Office of Innovation and Intellectual Property (IIP Office) through the link:

https://www.qu.edu.qa/research/research-resources/research-excellence/intellectual-property

IRBNet Platform Launched to Streamline Research Ethical Approval Submissions



IRBNet Platform

Research at Qatar University (QU) has gone through a tremendous increase due to the variety of internal and external funding made available for researchers, in addition to the expansion of graduate studies and programs which increase both human and animal utilization in research. As a result, the Tri-board Committees witnessed a surged in the number of applications received to attain ethical approvals. Furthermore, QU research sector has long recognized the need to reduce manual and paper-based procedures, streamline protocol submission and review processes and leverage today's best technologies throughout the research lifecycle. On February 2021, Research Ethics & Integrity Office announced the adoption of IRBNet set of tools that will be an expression of digitization of the future operations of Tri-board ethics committees (QU-IRB, QU-IACUC & QU-IBC). The digitization of Tri-board operations comes in alignment with the strategic initiatives of research to enhance performance and efficiency of Tri-Board management by exploiting digital tools for receiving and processing submission and applications to the committees. This indeed will have a significant impact on ethics approvals processing timeline and QU's research activity in general.

The submission and review procedure that was mainly based on email communication is now being replaced by electronic document submission. By creating a user account, the investigator can browse the most updated forms and templates, upload supporting documents then submit the application package that will be received as new submission by the supporting staff. One advancement in the application process is that IRB application form is available in a smart form option. This option will facilitate the building of the application form in a smooth and effective way as it allows more filling options and skipping sections inapplicable to the submitted protocol. IRBNet also allows the web-based protocol sharing with other research team members who may amend or sign a package depending on the type of access they are given. This also applies to collaborators from other institutions who only need to create an account on IRBNet to gain access to a collaborative research protocol. Administratively, the supporting staff will now spend less time in coordinating applicants and reviewers' communications. In addition, the tracking system of applications and audit capabilities will be improved.

IRBNet implementation stages required a huge dedication from the research ethics team and the Tri-board committee members, also a great support from the offices of the research sector. In addition to leading the implementation process, the research ethics & integrity section offered webinar sessions to all QU research community. Those sessions were a great opportunity to learn about the advantages of IRBNet platform and its expected impact on the efficiency of the ethical approvals' submission and review process. The research ethics team also conducted in-depth training sessions that demonstrated the complete submission process through the platform highlighting the most important notes researchers need to know before submitting through IRBNet. Leading this transition stage effectively and with the support of everyone in QU research community, the research ethics is hoping to reach a plateau of smooth work enjoying the many features of this new platform.

QU-IRB: Qatar University Institutional Review Board
QU-IBC: Qatar University Institutional Biohazard Committee
QU-IACUC: Qatar University Institutional Animal Care & Use Committee

QU Announces 2021 Internal and External Research Grant Awards

Group picture at the signing ceremony of an MoU between Qatar University and Qatar Fertiliser Company (QAFCO) in December 2019.

Qatar University continues to strive for excellence through its efforts in education and research, while serving the local and international community, in addition to working through its methods to contribute in achieving the Qatar National Vision 2030.

Besides the current challenges induced by the outbreak of COVID-19 worldwide, Qatar University is continuing to support its research community with a total of 74 newly awarded projects for the new cycle. In addition, Qatar University continues its efforts to support its students in their research work by funding about 250 students each year, through different student grants.

In this context, the Research Support (Grants and Contracts) at the Research and Graduate Studies Sector in Qatar University announced, the Cycle 4 Internal Grant Awards, on Wednesday 27th of January 2021,

Globally, most of the programs have seen a significant increase in the total number of submissions compared to the last cycle, with the total reaching 267 this year.

As an example, the High Impact Grant submissions had an increase from 7 to 27 submissions with 6 awarded projects, and the Collaborative Grant submissions had an increase of 70% with a total of 18 awarded projects. It was shown that the College of Engineering (CENG) and the College of Arts and Sciences (CAS) led the way by collectively claiming around 50% of the total submitted grants.

In terms of research fields, most of the submitted proposals were in the Health and Biomedical Sciences and Energy & Environment research pillars of the University (Figure 1).

Due to the exceptional circumstances of COVID-19, the Office of Research Support recently established two specific short lifecycle grants, as part of an international research effort to deal with the virus and support the speed of rapid scientific research initiatives:

- The Qatar University Emergency Response Grant (ERG): provides a bridge support to new and early stage investigations. It supported nine projects covering five research areas: basic molecular research, clinical research, social-behavioral research, infectious disease epidemiology and e-health.
- The Concept Development: Emergency Response grant (CD-ER): deals with the high demand for innovative solutions. CD-ER is intended to enable the development of innovative prototypes, processes and innovative platforms. It covered seven additional awarded projects.

Beyond studying the virus from different perspectives, Qatar University researchers contribute to enhance proper protection plans and awareness, in addition to highlighting the role of the University in addressing such emerging concerns.

The International Collaboration, through the International Research Collaboration Co-Fund (IRCC), remains highly attractive with new submissions from Canada, Malaysia, Turkey, China, Norway, Poland, France, Ukraine, Italy, Australia, UK and US totaling to 13 new co-funded projects. This year, Qatar University also strengthened its specific IRCC Strategic Track with Oman in four additional co-funded projects.

From the industry side, Qatar University has initiated the new "QAFCO Research and Development Grant" (QRDG) in collaboration with Qatar Fertilizer Company (QAFCO). The grant targets faculty and students from different fields of research, and supports QAFCO's strategy in disseminating knowledge, contributing to enable Qatar becoming self-sufficient and building a knowledge-based economy to achieve the Qatar National Vision 2030. The grant has dedicated solutions with high Technology Readiness Level in process enhancement, environmental studies, climate change adaptation and soil health management. QRDG supported eight early-stage projects in its first phase, from which two will be selected to continue as one-year projects by mid-2021.

In addition to internal grants, Qatar University offers external grants through the Qatar National Research Fund (QNRF). This year, researchers and students from Qatar University have been awarded several projects funded by the Qatar National Research Fund, as follows: 34 awards in the thirteenth cycle of the standard track of the National Priorities Research Program (NPRP13-S), one award in the twelfth cycle of the cluster track of the National Research Priorities Program (NPRP12-C), two awards in the sixth cycle of the Postdoctoral Research Grant Program (PDRA6), one award in the second cycle of the Early Career Researcher Award (ECRA2) and finally five Awards at the second cycle of the QNRF-MME Joint Funding (Food Security Call - MME2).

Finally, Qatar University has adopted an ambitious research roadmap aiming to achieve the main and transformative priorities in four areas of research: Information and Communication Technology, Energy and Environment, Health and Biomedical Sciences, Humanities and Social Sciences, and aims at keeping high standards in terms of support for its faculty, researchers and students.

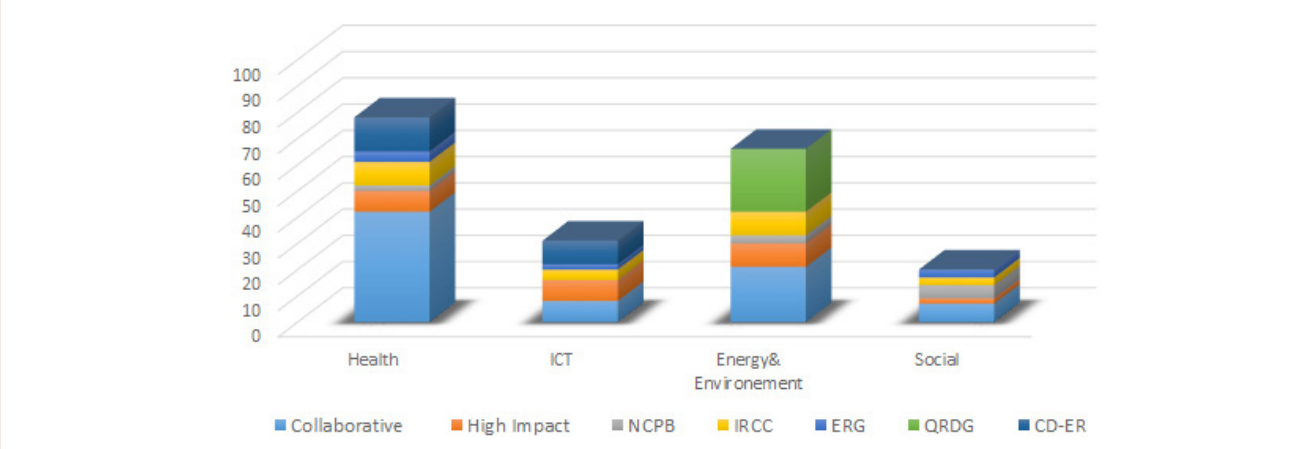
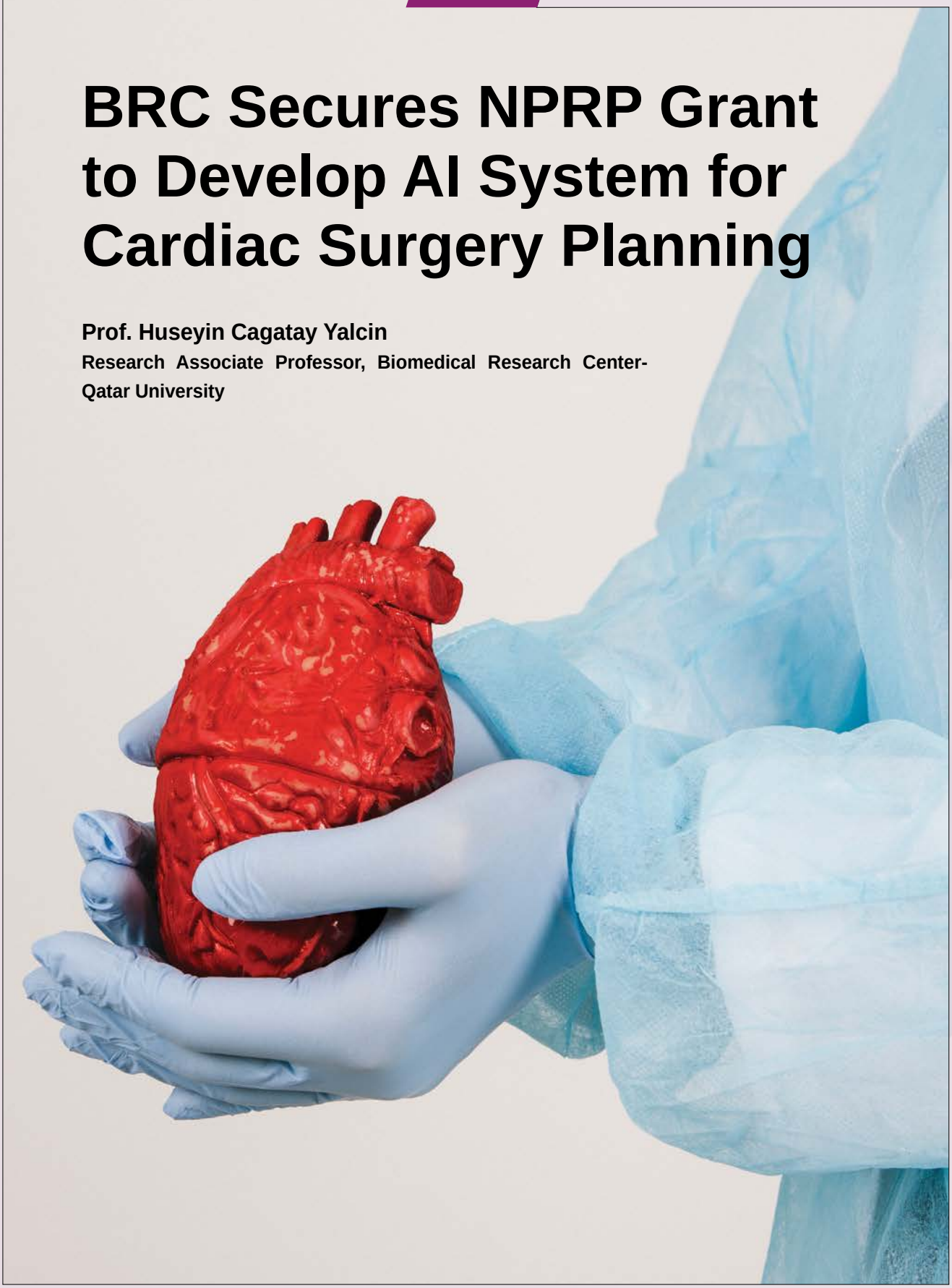


Figure 1. Research fields for grants offered.

BRC Secures NPRP Grant to Develop AI System for Cardiac Surgery Planning

Prof. Huseyin Cagatay Yalcin
Research Associate Professor, Biomedical Research Center-Qatar University



From left to right: Dr. A.Rahman Alnabti (HMC), Prof. Fayçal Bensaali (QU), Prof. Huseyin C. Yalcin (QU), Dr. Salem Abujalala (HMC), Dr. Khaled Othman (HMC)

In collaboration with Qatar University (QU) College of Engineering, Hamad Heart Hospital and Middle East Technical University (METU) from Turkey, the Biomedical Research Center (BRC) was recently awarded with a prestigious NPRP grant from QNRF for the development of an Artificial Intelligence System to guide cardiac clinicians for complicated heart surgeries. QU research team will be led by Associate Prof. Huseyin Yalcin from BRC as the lead principal investigator in the study. Prof. Fayçal Bensaali from the Department of Electrical Engineering is another principal investigator. Dr. A. Rahman Alnabti, will lead the clinical team of eight clinicians at Hamad Heart Hospital. The METU team will be led by Prof. M. Metin Yavuz from the Mechanical Engineering Department.

The project topic is about a commonly applied surgical procedure known as transcatheter aortic valve replacement (TAVR) therapy. Let's start with a brief description of cardiovascular diseases (CVDs) and this procedure before presenting the project. CVDs are the single largest cause of non-communicable deaths worldwide and prevalence of CVDs in Middle East, including Qatar is beyond the global average. Among CVDs, heart valve defects, in particular aortic valve (AV) defects are the most prevalent. AV regulates blood flow exiting the left ventricle, the major pumping chamber of the heart. For a severely damaged or non-functioning AV, although surgical valve repair is sometimes possible, using a prosthetic heart valve is a major treatment option for a vast majority of patients. While conventionally, aortic valve replacements are surgically implanted via invasive open-heart surgery, TAVR has been introduced about two decades ago as an alternative for minimally invasive implantation of new generation bioprosthetic AVs. For TAVR, a stented valve is inserted to the aortic root using a catheter through the femoral, subclavian or carotid artery. Unlike surgical replacement valves in which the valve is sutured to the root and native valve is removed, in TAVR, stented replacement valve is anchored to aortic root while native valve is still in place. Anchoring is managed by expansion of the stent towards aorta as shown in Figure 1. For this practice, selection of the proper valve as well as its implantation position are of utter importance for success. Clinicians usually do this selection based on their previous experience. Proper and precise assessment of valve performance before implantation is very important and would ensure limitation of post-operation complications.

Computational modeling is a powerful approach in biomedical research to realistically simulate tissue behavior where direct observations provide limited information. Relevant to TAVR, computational models potentially allow virtual implantation of multiple device sizes and types at different implantation depths for a specific patient, to provide useful insights facilitating decision making for the physicians. Even though computational simulations can effectively be used for assessing transcatheter AVs to identify an optimal design

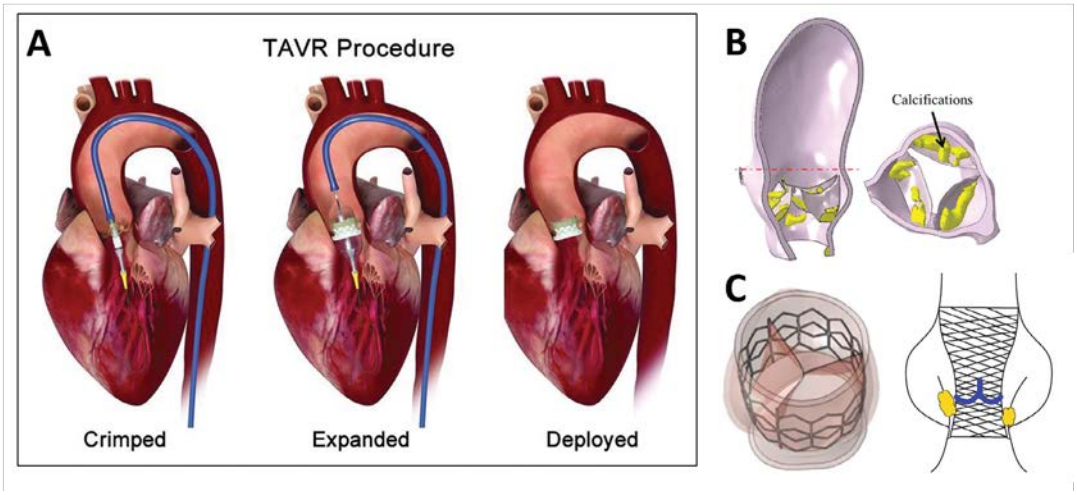


Figure 1. (A) TAVR procedure, (B) insertion of transcatheter bioprosthetic aortic valve, and (C) through native valve leaflets

for a patient, such patient-specific computational models usually require complex procedures to set up and long computing times to obtain final simulation results, preventing prompt feedback to clinicians in time-sensitive clinical applications such as TAVR. Therefore, such an approach is not practical and readily applicable in clinical TAVR therapy.

Here, Artificial Intelligence (AI) is coming into play. Multiple AI applications have already started to have a profound impact in our daily lives such as personalized advertisements and this technology is finding applications in the field of medicine as well. AI or in scientific terminology Machine Learning (ML), is defined as an application that provides systems the ability to automatically learn and improve from experience without being explicitly programmed.

Prof. Yalcin, has been working on computational models for native and replacement aortic valves for establishing this approach as a patient specific diagnostic tool for CVD patients and he came up with the idea of incorporating ML tools to advance assessment of TAVR cases. Prof. Bensaali on the other hand has been working on ML applications including medical applications such as development of ML algorithms for image-based diagnosis of aortic aneurysms. The two researchers started to draft the idea and shared it with Dr. A. Rahman Alnabti, head of TAVR program at Hamad Heart Hospital who welcomed the idea and gave full support. A team of experts and clinicians was quickly assembled to move forward with the NPRP application. Finally, Prof. Yavuz from one of the leading engineering universities of Turkey, METU, joined the consortium for experimental validation of the final system outcomes for virtual implantations using the aortic flow systems in his fluid mechanics laboratory.

The project aims to develop a smart ML system, for performance assessment of TAVR outcomes in a patient specific manner. The final system will be used by clinicians for selection of optimal transcatheter valve design during therapy planning. Working principle is presented in Figure 2. As shown in the figure, based on clinical assessment via medical imaging and desired TAVR outcomes, the system will automatically assess a variety of different valves and select an optimal design for specific patients.

For a successful ML system, the key point is training the system with as many input cases as possible. About 150 patients go under TAVR operation at Hamad Heart Hospital annually. For the project, medical data for the patients who have gone through TAVR will be collected for last few years as well as during the project. Project team will process these data with computational modeling techniques for a detailed assessment of valve performance and hemodynamic improvement following the surgery. The information will be fed to the ML algorithm to train the system for matching

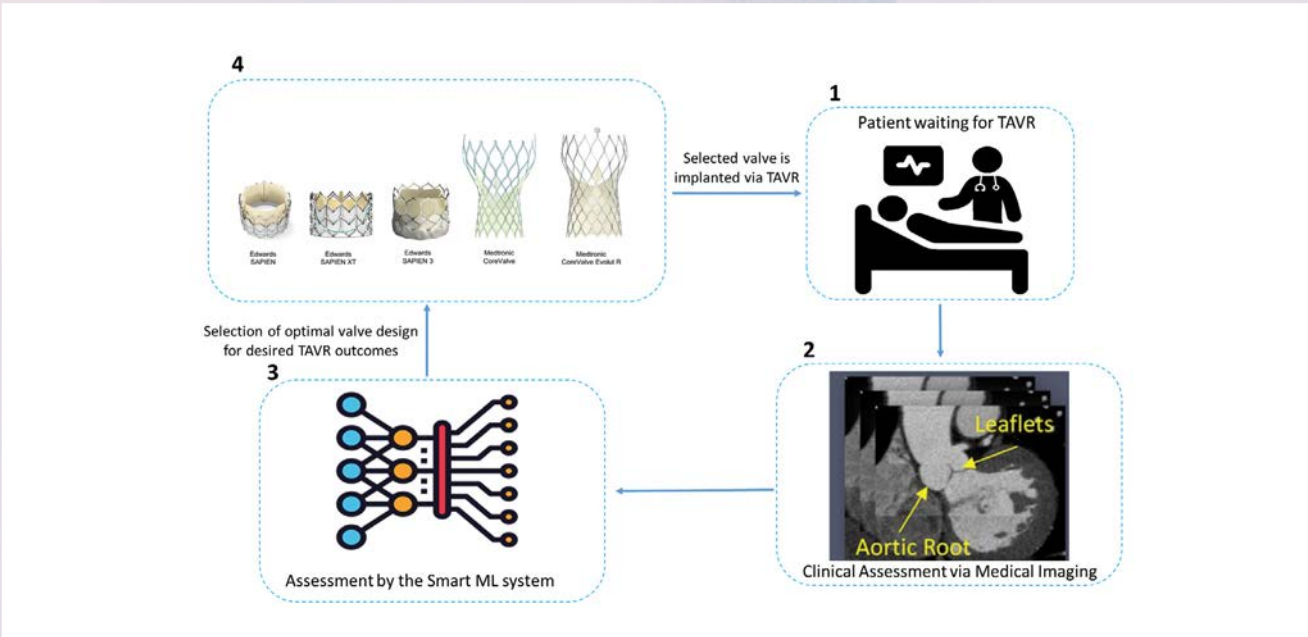


Figure 2. Proposed System Diagram. Smart ML system will automatically select an optimal valve design for specific patients based on medical image assessment and desired TAVR outcomes.

patient specific parameters, and selected valve features with TAVR outcome performance indicators. This way, the final smart ML system will be able to predict performance of multiple different transcatheter valves for a selected patient to predict TAVR outcomes for the examination of virtual implantation of these valves, and for identification of optimal valves for specific patients.

Associate Professor, Prof. Yalcin said: “Qatar has been producing cutting edge science in many fields and with this project, we are aiming to develop a novel system to improve and save lives of CVD patients in Qatar and in other nations.”

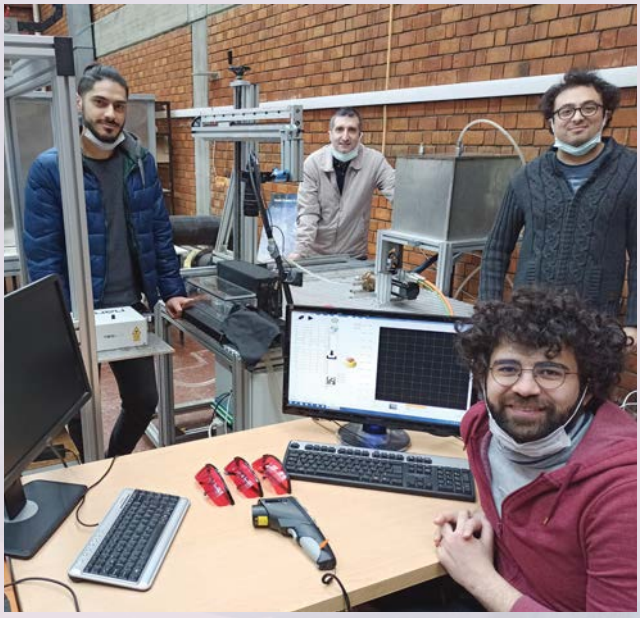


Photo of the Turkish team in front of Aortic flow set up. From right: Mr. Semih Türk, behind him Mr. Kerem Tuğ Gökçek, Prof. M. Metin Yavuz, and Mr. Amirhossein Fathipour

Biomedical Research Center Director Prof. Asma Al-Thani said: “BRC is a leading center in the nation conducting multiple important projects in the medical field. This new NPRP is a good example of multidisciplinary research combining engineering and medicine to improve human health locally and globally, aligning very well with our mission.”

, Prof. Bensaali said: “Very fortunate to be part of the team to work on this multidisciplinary project that brings together artificial intelligence and biomedical to solve a cutting-edge problem, which will significantly improve and save lives of CVD patients.”

Dr. A. Rahman Alnabti said: “The project is a novel example for outstanding cooperation between scientists and clinicians to improve patients care. We already have an established TAVR program at Hamad Heart Hospital and this study will definitely improve it even more.”

Prof. M. Metin Yavuz from Turkey said: “As nations, Turkey and Qatar have been collaborating in many fields including science and technology. We look forward to start the work with this great team and help in developing this AI system with our engineering expertise, which should lead to many other fruitful projects among our groups.”

Development of Bio-insecticides based on Local *Bacillus thuringiensis* Strains for the Biological Control of Harmful Dipteran Disease Vectors

Project grant Number: GSRA2-1-06040-14015

Prof. Samir Jaoua,

Professor of Microbiology and Molecular & Microbial Biotechnology and PhD Supervisor

PhD Student: Kavita Murleedharan Nair

Department of Biological & Environmental Sciences, College of Arts & Sciences - Qatar University

Prof. Samir Jaoua,

Kavita Murleedharan Nair

The objective of this defended PhD thesis in Biological and Environmental Sciences (Dept. of Biological and Env. Sc, College of arts and Sciences), is to set up a sustainable solution to two health issues faced worldwide today: the diseases caused by pathogens carrying vectors like mosquitoes and diseases caused by the use of chemical pesticides highly toxic and persistent in the environment by leaching through the soil and water after treatment. *Aedes aegypti* is one of the most dangerous species of mosquitos, found in temperate countries, capable of spreading human diseases like Dengue, Chikungunya, Yellow fever, etc.

The bacterium *Bacillus thuringiensis* (*Bt*) produces, during the sporulation phase, insecticidal crystal proteins (delta-endotoxins) that are considered worldwide as the best bioinsecticides that are not only biodegradable and harmless to humans and environment, but also very effective against mosquito larvae. A bank of *Bt* strains (about 700 strains) have been isolated from Qatar soil by Prof. Samir Jaoua at the research lab at CAS, QU. In Kavita Nair's PhD work, a part of this ongoing project, was revealed, that 440 *Bt* strains synthesize bioinsecticidal crystals of different shapes (Figure 1). The corresponding proteins content and coding genes have been explored.

The analysis of the protein content of these produced crystals showed different types of delta-endotoxins of different sizes (Figure 2) (Nair *et al*., 2018-1).

Based on the PCR amplification/sequencing and characterization of the delta-endotoxins coding genes, several genes have been identified (Figure 3) and synthesis of several insecticidal proteins has been revealed (Nair *et al*., 2018-1).

Using qualitative and quantitative bioassays against A. aegypti larvae, 19 *Bt* strains showed high insecticidal activities against 3rd instar larvae of Aedes aegypti mosquitoes (Nair *et al*., 2020).

In addition, it was found that several *Bt* cytolytic crystal proteins exhibited anticancer properties against lung cancer epithelial cells. These cytolytic proteins produced by Qatari *Bt* strains showed amino-acid sequence differences when compared with published ones (Figure 4) (Nair *et al*., 2018-2).

Conclusion and benefits of the research outcomes to Qatar

In the PhD thesis of Kavita Nair, Qatari *B. thuringiensis* strains were successfully isolated from soil, identified and their delta-endotoxins explored. Many strains showed insecticidal activities against the very dangerous disease vector Aedes aegypti. In addition, *Bt* strains having important cytolytic activities against lung cancer cell lines were evidenced and characterized. In an applied part, the crystal proteins of several *Bt* strains were produced in liquid cultures.

These findings demonstrate clearly that many of the locally isolated *B. thuringiensis* strains can be considered as potential candidates for local production of safe and environmentally friendly biopesticides useful in biological agriculture and for pharmaceutical applications.

Acknowledgments:

This publication was made possible by GSRA grant no. GSRA2-1-0604-14015 from the Qatar National Research Fund (a member of Qatar foundation). The findings achieved herein are solely the responsibility of the authors. This study was also partly supported by grant no. QUST-CAS-SPR-2017-31 from the College of Arts and Sciences, Qatar University.

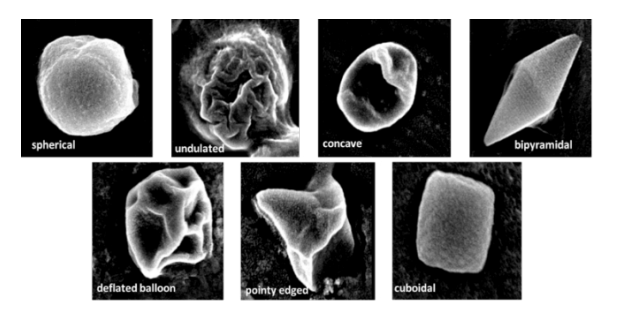


Figure 1. Scanning electron microscopic images of the different types of crystal morphologies produced by *Bt* strains of the collection (Nair *et al*., 2018-1).

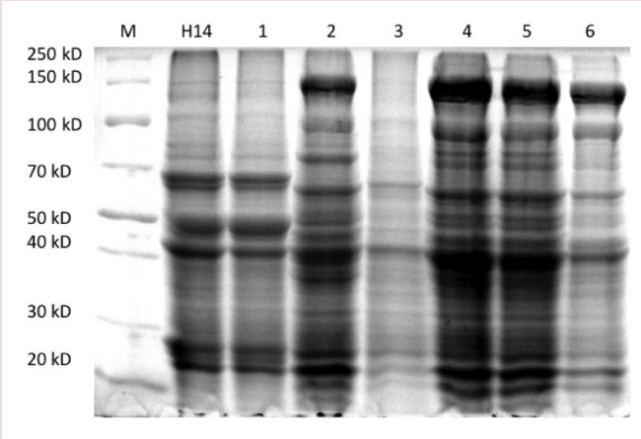


Figure 2. SDS-PAGE gels showing the different delta-endotoxins patterns among the local *Bt* strains (1 to 6). Marked as M is the broad range protein marker; H14 is a *Bt* reference strain (Nair *et al*., 2018-1).

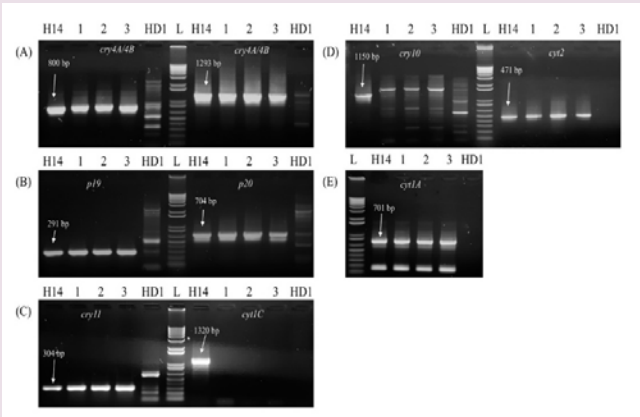


Figure 3. Electrophoresis of the amplified PCR products obtained for each delta-endotoxin genes explored. Lanes L represent 1 kb plus ladder (100 bp, 200 bp, 300 bp, 400 bp, 500 bp, 650 bp, 850 bp, 1 110 kb, 1.65 kb, 2 kb, 5 kb and 12 kb). Each panel represents genes amplification (Nair *et al*., 2018-2).

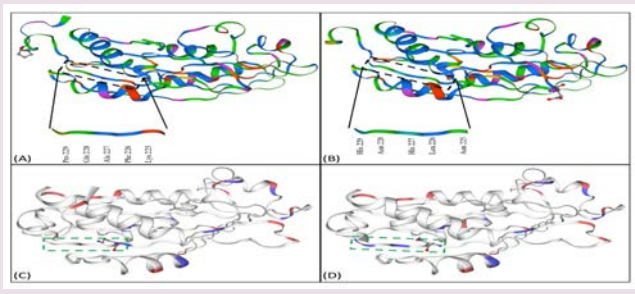


Figure 4. Protein modeling and structural and chemical homology comparisons between *Bt* Cyt proteins. (A) *Bt* H14 reference and (B) Qatari *Bt* subsp. QBT229, is showing the amino acid replacements and chemical differences in the region.

Novel Actuator Fault Diagnosis Framework for Multi-Zone HVAC Systems Using 2-Dimensional Convolutional Neural Networks*

Mariam Elnour, Research Assistant
Dr. Nader Meskin, Associate Professor of Electrical Engineering
College of Engineering- Qatar University

Heating, Ventilation, and Air Conditioning (HVAC) systems are used to condition the indoor environment in buildings. They can be subjected to malfunctioning since they are the most extensively operated building components that account alone for almost half of the total building energy usage. Therefore, fault diagnosis (FD) of the HVAC system is important to maintain the system's reliability and efficiency, and to provide preventive maintenance. This work presents a supervised fault diagnosis strategy for single actuator faults in HVAC systems given that actuators such as dampers and valves are mostly prone to faults resulting in thermal discomfort and energy inefficiency in buildings. The proposed approach is developed and validated using simulation data collected from a 3-zone HVAC system shown in Figure 1 and Figure 2 that was simulated using Transient System Simulation Tool (TRNSYS).

The proposed approach is based on 2D Convolutional Neural Networks (CNNs) using an efficient 1D to 2D data transformation shown in Figure 3 performed on the time-series signals acquired from the HVAC system in two configurations, which are the static and the dynamic. As shown in Figure 4, the proposed approach consists of an off-line stage in which the CNNs are trained using the historical building data, and an on-line stage such that the real-time measurements of the system variables are acquired by the building management system (BMS) and used to determine the diagnosis decision. It is investigated in its two schemes; the static and dynamic schemes, to analyze the correlation between the system's variables and to consider the temporal effects of the time-series signals without compromising the detection time. The proposed diagnosis approach is a multi-model framework that is composed of 5 two-class CNNs. CNN 1 performs fault detection by determining whether the system is fault-free or not. The remaining CNNs are trained to diagnose each type of the concerned actuator faults independently, which are 4 types. Each CNN was trained to perform binary classification of "belongs to the class or not" such that the network's outputs were labeled positive for the concerned class and negative otherwise. The HVAC system under this study has 4 actuators, which are the three zones' VAV box dampers and the water valve in the chiller-tank link. The system status can be denoted by 5 possible classes that are healthy, faulty in actuator 1, faulty in actuator 2, faulty in actuator 3, and faulty in actuator 4. The performance of the CNNs is ensured by an optimal tuning of its significant hyper-parameters using Bayesian optimization algorithm towards maximizing the classification accuracy.

Dr. Nader Meskin

The classification performance of both the static and dynamic 2D CNN-based diagnosis models was found relativity similar which can be attributed to the fact that the system is slow and broadly exhibits a steady behavior. Nevertheless, the static 2D CNN-based diagnosis scheme was more computationally efficient. The proposed fault diagnosis framework is a data-driven approach that is independent from the building technical details and does not utilize the knowledge of the system mathematical model. It can be applied to more complex buildings with more and different types of zones while obtaining the same performance in terms of accuracy and reliability, conditioned that sufficient amount and adequate quality of data are available for training. For large-scale buildings, it is suggested to use a multi-agent fault diagnosis solution to compensate for the increased computational requirement of the algorithm with respect to the building size. It assists in maintaining the system's reliability and efficiency in terms of operation and energy consumption, and providing preventive maintenance.

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* This research work has been published in the Institute of Electrical and Electronics Engineers (IEEE) Transactions on Automation Science and Engineering (doi:10.1109/TASE.2021.3067866.)

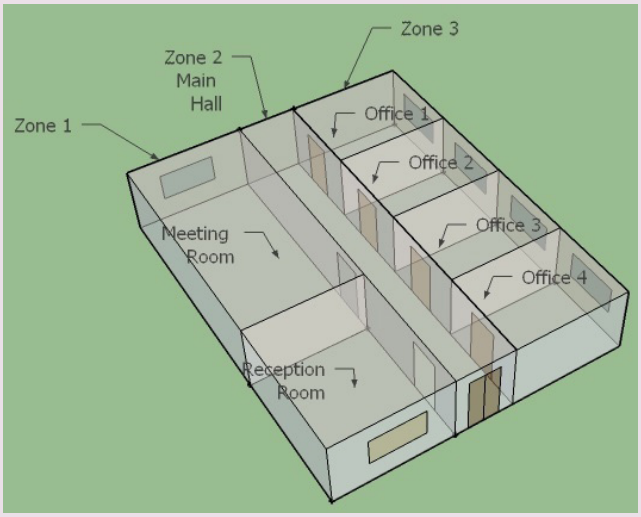


Figure 1. Sketch of the simulated 3-zone building.

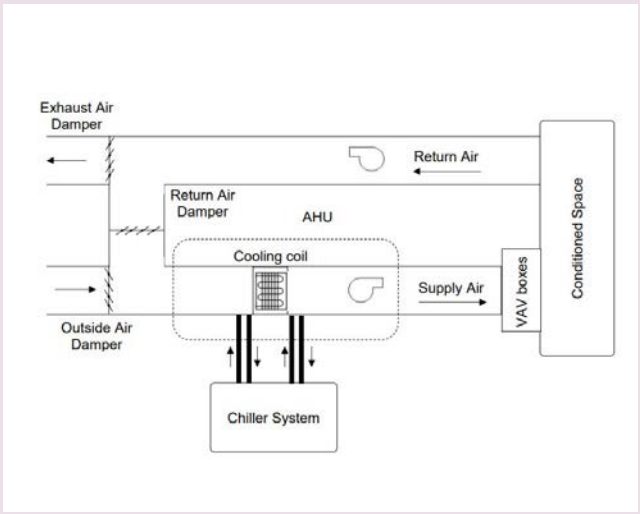


Figure 2. Diagram of a typical HVAC system for cooling.

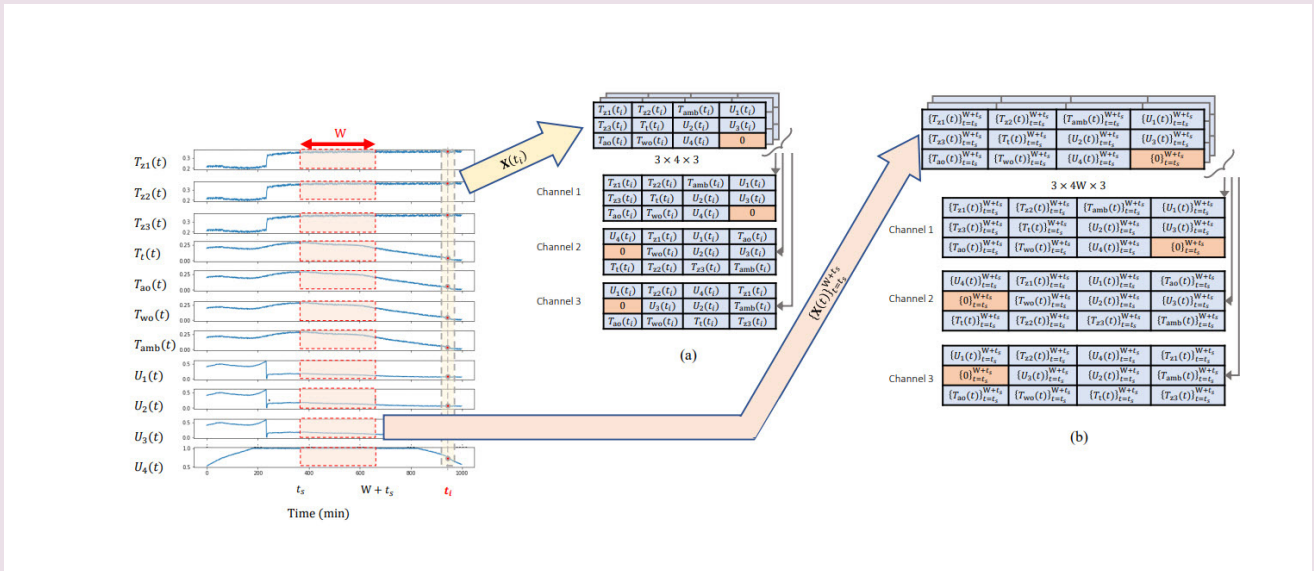


Figure 3. Demonstration of the proposed 1D to 2D data transformation approach based on reshaping the 11 system's 1-dimensional data samples into a 3D configuration in both static and dynamic forms. (a) Static 2D transformation. (b) Dynamic 2D transformation.

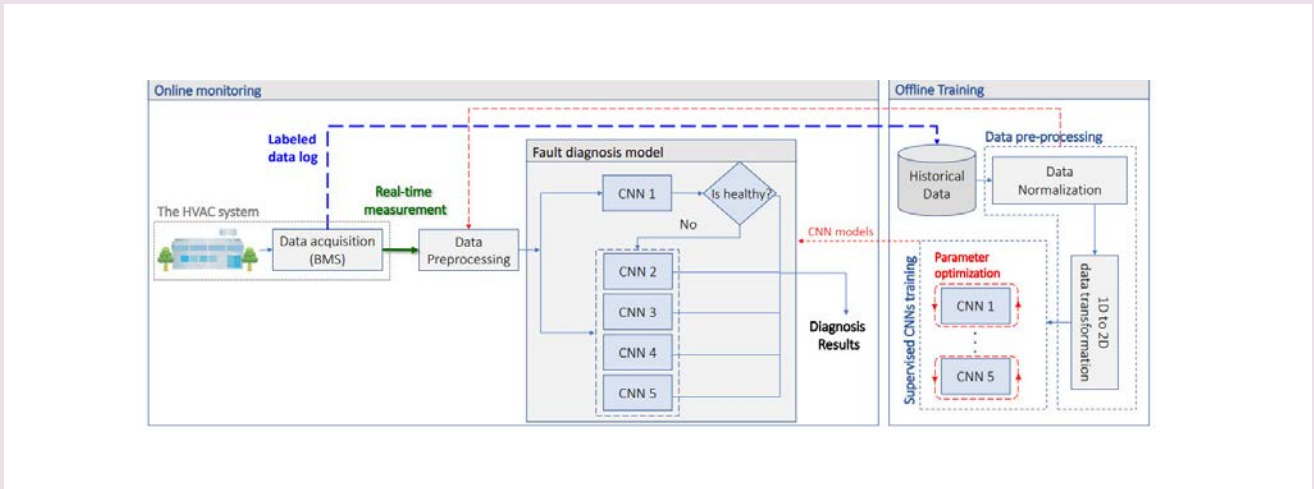
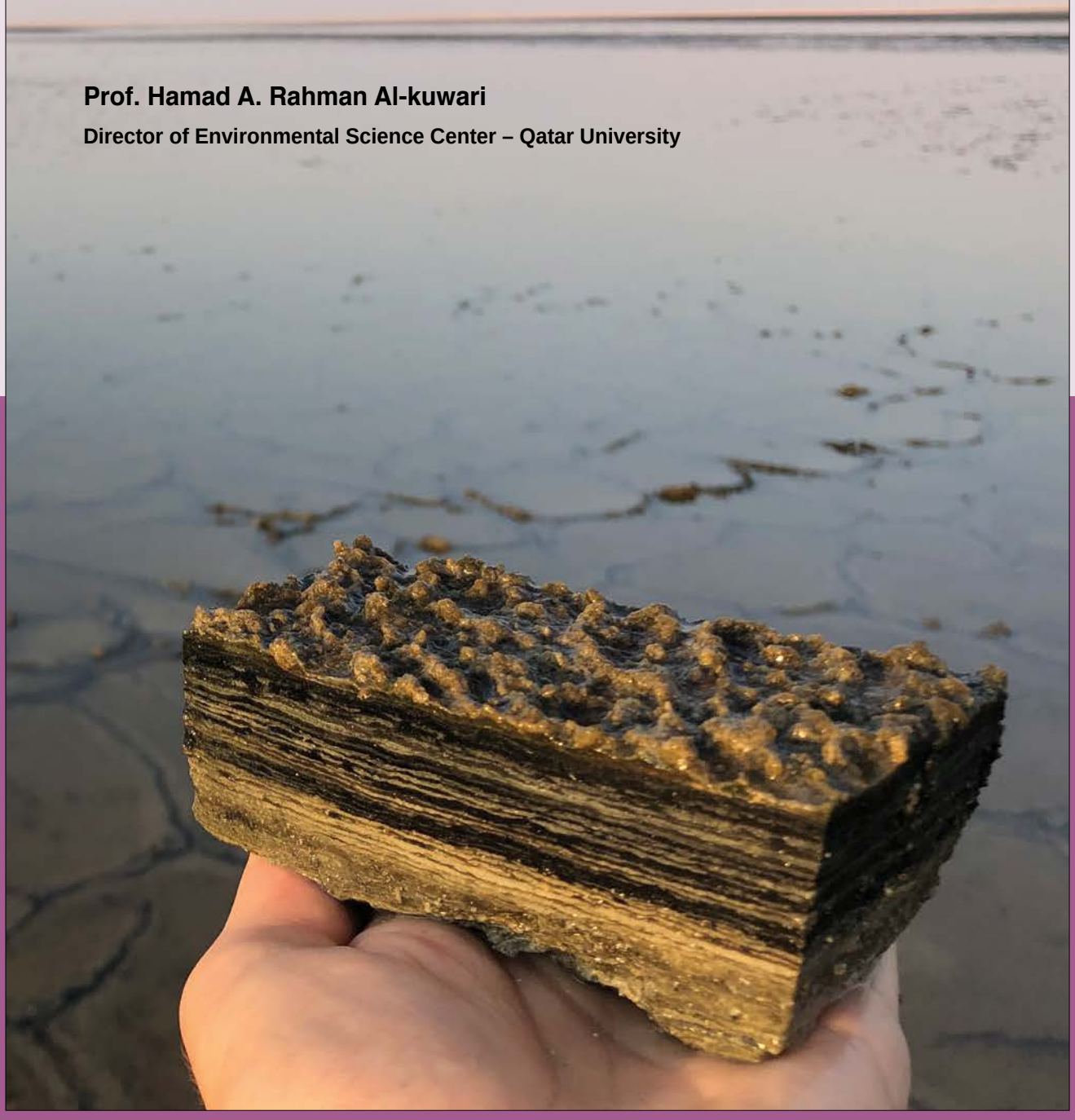


Figure 4. The proposed 2D CNN-based HVAC system actuator fault diagnosis method framework.

Microbes at Work in the Sabkhas of Qatar

Prof. Hamad A. Rahman Al-kuwari

Director of Environmental Science Center – Qatar University



Sabkhas (salt flats) are characteristic environments of the coastal landscape of Qatar. At first glance, a sabkha may look like a desolate, uninhabited and inhospitable place, where it is easy to get stuck even with the most performing 4x4 truck. A research project led by Prof. Hamad Al-Saad Al-Kuwari, Director of the Environmental Science Center of Qatar University, is revealing a completely different and unexpected picture. In these sabkhas, a multitude of microbes that are too small to be seen with the naked eye have found strategies to survive under the extreme conditions imposed by the hot temperature and arid climate. Even more surprisingly, such microbes are apparently playing a key and, as yet, highly underestimated role for the formation of minerals and sedimentary rocks that are of great importance not only for the field of sedimentology and microbiology, but also for oil geology, material sciences, and even for the search of life on Mars.

The project, titled “Geobiological Processes in the Sabkhas of Qatar” was started in 2015, funded by Qatar National Research Fund (QNRF) under the National Priority Research Program (NPRP), initiating a truly multidisciplinary and international collaboration among scientists affiliated with prestigious universities and research institutes, including: Qatar University and ExxonMobil Research Center in Qatar, the ETH Zurich and the Space Exploration Institute in Switzerland, the NASA Jet Propulsion Laboratory in the USA, and the University of Toronto in Canada. After a successful first phase, the same line of research will continue during the forthcoming years, thanks to a new grant awarded during the 13th NPRP cycle.

The modern sabkhas of Qatar are among the rare environments on Earth where it is possible to study the formation of carbonate and evaporite minerals, which is a commonly found mineral association in ancient sedimentary sequences and, furthermore, constitutes economically important gas and oil reservoir rocks. These reservoirs are often located at depth in the subsurface, making their characteristic and physical properties difficult to evaluate and predict. Thus, the study of the Qatari sabkhas, where the same sedimentary sequence is forming today close to the surface, is of great benefit for geologists and engineers engaged in the exploration and exploitation of similarly constituted hydrocarbon reservoirs. Moreover, the sedimentary rocks forming in the sabkhas may be an analogue to sediments that have been identified by various robotic rovers and orbiters on the surface of Mars, and whose origin is yet to be fully understood. For

Prof. Hamad A. Rahman Al-kuwari

these reasons, the sabkhas of Qatar represent unique “natural laboratories” or “modern terrestrial analogues” where it is possible to test hypotheses and implement new proxies useful both for the technical challenges of the energy industry and for answering fundamental scientific questions. In contrast to previous studies, the one orchestrated by Prof. Hamad Al-Saad Al-Kuwari was the first to investigate the sabkhas not only from a purely physicochemical perspective, but also focusing on the role that biology may have in these extremely inhospitable environments.

Numerous field campaigns have been conducted in various coastal areas of Qatar, leading to the identification of the Dohat Faishakh sabkha (Figure 1) and the Khor Al Adid sabkha (Figure 2) as the two places with the highest potential for conducting the planned research. Samples of sediments and microbial mats have been described and collected from these sites, which often required long days of work in the field, hampered by the sun and the challenging logistics. The collected samples have been subsequently analyzed in the laboratories of Qatar University, as well as those of the other collaborating research institutes, using techniques from the field of sedimentology, geochemistry, microbiology and molecular biology. This work allowed for discovering unexpected microbe-mineral interactions, demonstrating the importance

that these microscopic primitive microorganisms have in the formation of minerals like dolomite, a common Mg-rich carbonate that is often a major constituent of oil and gas reservoirs (Figure 3). The same research also provided new insight into the microbial diversity and survival strategies that microbes were able to adopt to survive in these extreme environments. Interestingly, microbes in the sabkhas also create unusual textures and sedimentary structures that may potentially be found in a "fossil form" on the surface of Mars (Figure 4). Several findings done in the past years suggest that billions of years ago the conditions on the surface of Mars may have been not so dissimilar to that characterizing today's Qatari sabkhas, which are therefore seen as ideal places to train for the forthcoming Mars exploration missions.

Besides the scientific importance, Prof. Hamad Al-Saad Al-Kuwari hopes that continuing to study the sabkhas of Qatar will contribute to drive the attention on this peculiar environment, increasing the general awareness about the importance of valorizing, and taking actions to preserve, such a delicate ecosystem. The sabkhas, so rare and unique worldwide, should be considered as a natural and valuable heritage of the country.

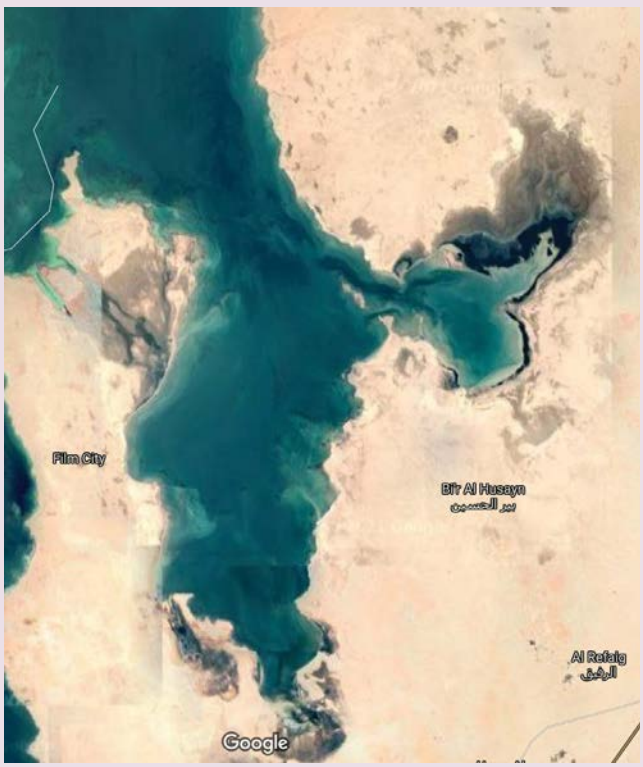


Figure 1. Location map of the Dohat Faishakh sabkha, NW Qatar. The dark area is the microbial mat zone.

Figure 2. Location map of Khor Al Adid estuary in southern Qatar. The dark area is the microbial mat zone. The photo shows also the Broccoli delta in the estuary.

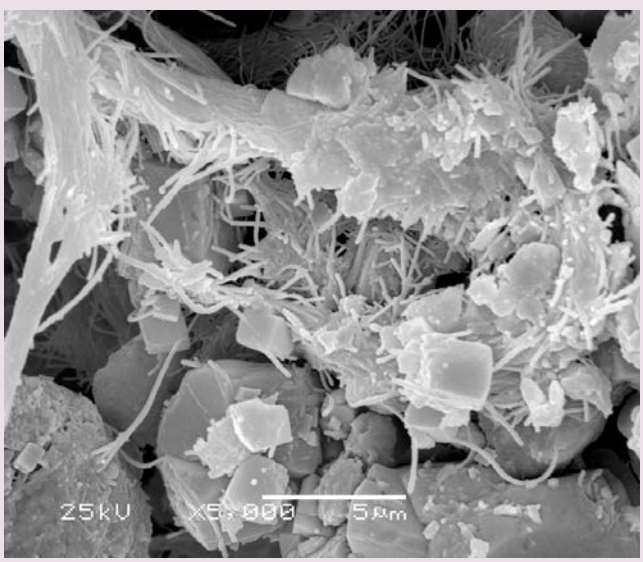


Figure 3. Combination of microbial mats, clay minerals and dolomite showing the importance of bacteria in the formation of some mineral assemblages.

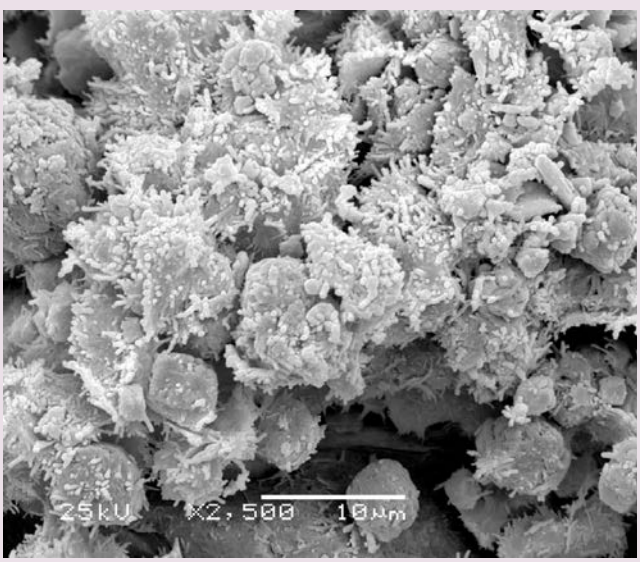


Figure 4. Scientists are looking for such bacteria produced textures in rocks from Mars to see if the planet hosted some microbial life at a certain stage in its history.

Discovery of a Novel Chalcone-based Chemotherapeutic Compound for Triple Negative Breast Cancer

Prof. Ashraf Khalil

Professor of Medicinal Chemistry and Acting Department Head of Pharmaceutical Sciences, College of Pharmacy –Qatar University

Breast cancer is the most commonly reported cancer in females and the leading cause of cancer death in women globally. It is a highly mixed disease with triple negative breast cancer (TNBC) being the most aggressive subtype. TNBCs do not have FDA approved targeted medications yet. Therefore, a group of researchers from Qatar University aimed at the identification and discovery of new alternatives to combat this deadly disease. Ms. Dana Elkhalifa (MSc Pharmacy Graduate) selected this interesting project as her MSc thesis under the direct supervision of Dr. Ashraf Khalil (Professor of Medicinal Chemistry and Acting Head of Pharmaceutical Sciences Department) and co-supervision of Dr. Ala-Eddin Al Moustafa (Professor of Cell Biology, College of Medicine) and Dr. Feras Alali (Professor and Director of Research and Graduate Studies, QU Health Cluster).

This research project (Figure 1) was funded by Qatar University and Qatar National Research Fund (QNRF). The research team was able to design, synthesize and characterize novel chalcone analogs and test them for the potential treatment of invasive breast cancers. Chalcone is a biochemical molecule that is found in a variety of plants including flowers, fruits and vegetables. In literature, it was reported to exert diverse biological activities in different disease conditions like infections, heart diseases, central nervous system disorders and cancer. Therefore, the team had designed and synthesized 14 novel chalcone analogs bearing different functional groups with potential anticancer activities. They proposed that these molecules could target difficult types of breast cancer like TNBC.

Consequently, the prepared compounds were

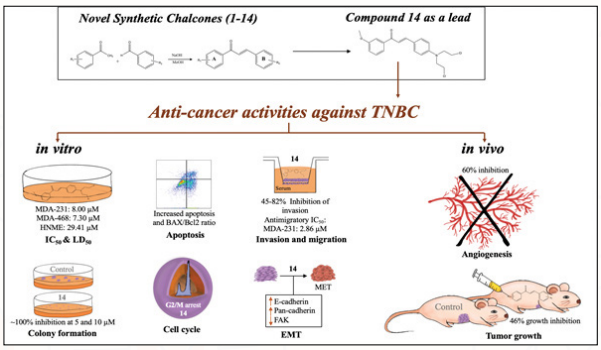


Figure 1. Summary of the main study findings.


From left: Prof. Ashraf Khalil (Professor of Medicinal Chemistry and Acting Head of Pharmaceutical Sciences Department), Ms. Dana Elkhalifa (MSc Pharmacy Graduate), Prof. Feras Alali (Professor and Director of Research and Graduate Studies, QU Health Cluster), Prof. Ala-Eddin Al Moustafa (Professor of Cell Biology, College of Medicine).

tested against a panel of TNBC cells in the lab (in vitro). One of these novel molecules was found to be highly effective. It had significantly inhibited cancer cells' growth, prevented their movement and migration, promoted their physiologic death and had completely inhibited them from forming colonies. It was compared to well established anticancer medications in the market and found to be superior to them. Further, the effect of this novel molecule was investigated in animals to test whether it can inhibit new blood vessels formation. Interestingly, there was a 60% inhibition by the novel compound, indicating it can prevent cancer progression. Because these results were very interesting, the research team tested this promising molecule on a mice cancer model (in vivo) injected with invasive breast cancer cells (TNBC). The new molecule was capable of inhibiting cancer cell growth by around 50% as compared to untreated mice.

A US patent was then filed and published (Publication No. US-2020-0392119-A1) on this novel molecule, which is believed to exert a great potential of being developed as an anticancer medication, not only for breast cancer; but hopefully, for other types of cancer. Currently, the research team is in the process of developing a drug delivery system for this molecule using nanoparticles. Additionally, they are investigating the anticancer activities of it on other types of breast cancer, namely HER2+, and on colorectal cancer in vitro and in vivo using the Drosophila (small fruit flies) colorectal cancer model.

Interview with an Inventor:

Prof. Siham Yousuf A Alqaradawi

Professor of Organic Chemistry

College of Arts and Sciences – Qatar University

In this issue, we are pleased to present the readers our interaction with Professor Siham Al-Qaradawi, Prof. of Organic Chemistry at Qatar University. She held many positions at the University and led many research achievements, and received many grants throughout her career. Prof. Siham participated in many international scientific societies, and played a prominent role in Qatar University students' academic and professional development. We meet her as a Qatari inventor who added a distinctive landmark to the list of innovations and patents.

Dr. Siham Al-Qaradawi, would you please introduce yourself to the University community?

I joined Qatar University in September 1977 as an undergraduate student. I graduated with an excellent grade in 1981 when I was ranked first at the College of Science and second at the level of Qatar University in the fifth batch of graduates. Then I continued my studies and obtained my PhD from the University of Reading in the United Kingdom in 1992. I was awarded the prestigious William Fulbright Scholarship as a Visiting Researcher at Temple University in Pennsylvania, USA in 2010/2011. I was also awarded the German Academic Exchange Prize in 2003. During my tenure as Dean of the College of Arts and Sciences (2005-

2010), I established the College of Pharmacy and introduced the International Affairs Program. The international accreditation for many programs such as the Chemistry Program from the Canadian Society of Chemistry and the Biomedical Sciences Program has been received.

I have taught several courses and hundreds of students since my appointment at Qatar University as an assistant professor, and I have participated in various committees at the department, college, and university levels. I received six research grants from the Qatar National Research Fund and happen to have published more than 75 scientific papers in international journals with a high impact factor.

How does a researcher acquire the title of the inventor?

A researcher attains the title of the inventor when his/her research leads to outstanding results that no one had reached before. The researcher can think outside the box and transform his research and ideas from theoretical knowledge and strategic initiatives into real technological and realistic solutions that provide additional value, and when the researcher registers his work as a patent to develop these ideas into initiatives, products and pilot projects that serve national priorities.

How does Qatar University create an environment conducive to invention and innovation?

Qatar University has allocated several internal research grants to assist faculty members in conducting their research. In addition, researchers can hire research assistants to form a research team that works on following up on practical and administrative details. The budget for these research grants also helps to purchase equipment, chemicals, and materials in support of scientific research, and the University generously supports attending scientific conferences, which helps to get acquainted with what is happening in the world of the latest experiences and technologies through meeting with distinguished scientists and networking.

Recently you have received a patent on the method for making a Nano-catalyst. Would you please elaborate on this invention in a simple way?

The current patent is explaining how to remove toxic carbon monoxide emitted into air through car exhaust by its catalytic conversion into less toxic carbon dioxide. The catalyst reported herein may have potential application as a component of the three-way catalytic converters. Indirect application may include purification of hydrogen gas in the methane reforming process for fuel cells systems or removal of CO poisoning in carbon dioxide laser systems.

Our tailored CuO/TiO_2 NT composition constitutes an active and stable catalyst to convert the highly toxic carbon monoxide in exhaust or flue gas to less toxic carbon dioxide without the need to utilize the high cost precious metals such as platinum, gold or palladium that are well-known for their superior catalytic activity. Our catalyst provides comparable activity and higher stability compared to plasmonic metals-based catalysts and suffers much less from the thermally-induced sintering, typically observed for gold or platinum-based conversion catalysts. Our catalysts can be produced at large scale in a scalable fashion through environmentally and economically-friendly approach.

How will it be utilized locally and internationally, and how will it be applied?

This catalyst can be used to remove the toxic carbon monoxide gas emitted into the air in flue gas, car exhaust, or factories to improve air quality by oxidizing it to less toxic carbon dioxide, in addition to the possibility of using the catalyst to purify hydrogen gas during the methane reforming process and for fuel cell systems.

What are the most important patents you have registered at Qatar University?

For me, this is the first patent that I have registered at Qatar University.

How do we build the minds of our young people to develop passion for innovation and inventions?

The first party responsible for building a child's mind in the first years is the family, through which creativity is preserved within the child, while working to give him full freedom of thought, and this helps him to be creative and to exploit free time in developing their skills and searching for everything new. The school also has a very

important role, although many people have the impression that the gifted student is the student who gets high marks in mathematics, science, or in the final diploma and they forget that there are talented students who may not get the highest scores in those subjects. So everyone should work to make the learning process easier, faster, better and more enjoyable for students in order to help students turn from ordinary to talented students.

What are the obstacles and difficulties that may be there in the face of any invention?

Funds and marketing are among the most important challenges and obstacles facing inventors. Although some young inventors won some prizes in scientific exhibitions and competitions, whether local or international, and some of them won many gold and silver medals in international forums, their innovations were not converted into products on the ground. The lack of confidence of major businessmen and investors in their ideas, in addition to the absence of scientific associations and official bodies to adopt these ideas and projects, which may frustrate innovators are also the issues.

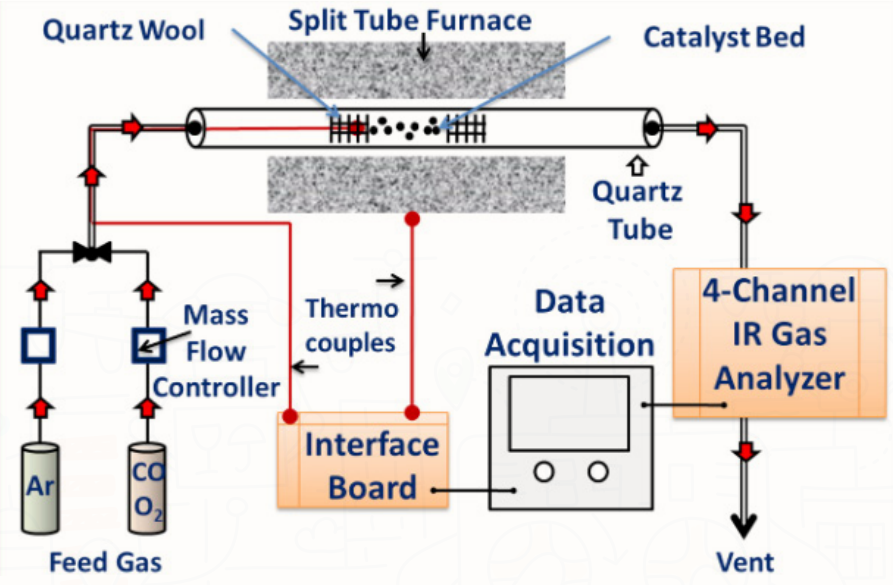
How does Qatar University support inventors and protect their IP rights?

For students and young researchers, Qatar University started the Al-Bairaq project in 2010 under the leadership of Dr. Noora Jaber Al-Thani with a vision to develop the scientific, experimental and research skills of high school students. The idea was to immerse K-12 students in scientific practice in order to advance their scientific educational interests through practical activities.

For faculty members and researchers, Qatar University established the Office of Innovation and Intellectual Property in 2017 to be the focal point within Qatar University to raise awareness of intellectual property rights within the University and in the Qatari community as a whole. The Office is also responsible for registering patents, protecting other types of intellectual property and marketing them, as well as disseminating the results of intellectual property to stakeholders inside and outside the University.

In your opinion, what is the importance of inventions for the development of communities?

Inventions have great importance in our lives. One of the most important benefits that inventions provide to humanity is that they save and facilitate us to carry out the difficult tasks that require very high physical efforts, including those inventions used in construction, drilling, and excavation operations. The inventions of medicines and medical devices are among the most important inventions that were able to protect humans from many diseases that threatened them in the past.

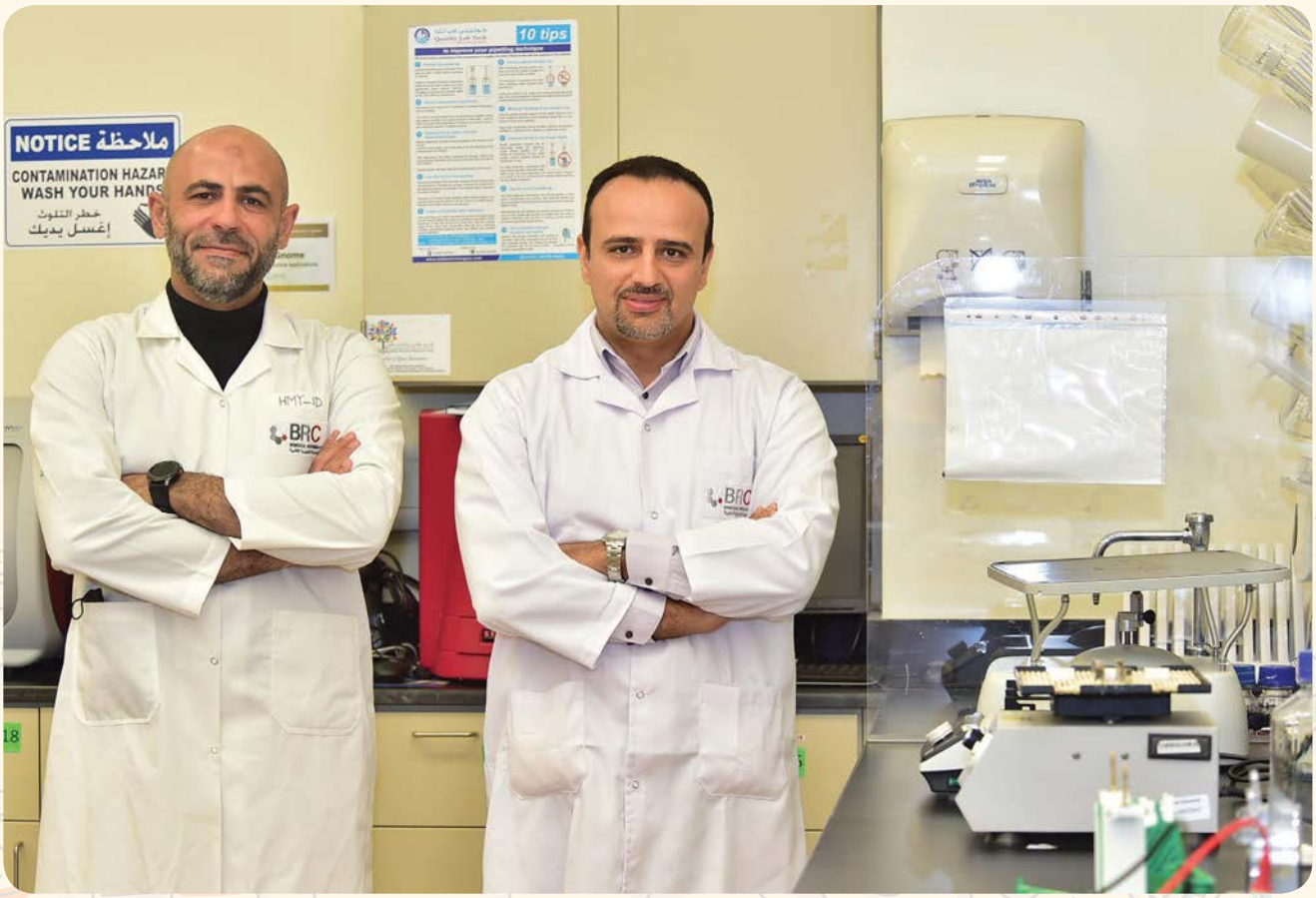


Schematic representation of the catalytic CO oxidation experimental set-up.

Helping Critically Ill COVID19 Patients:

New Predictive Biomarkers of Length of Stay at the ICU for Better Management and Risk Reduction

Dr. Mohamed Elrayess
Research Associate Professor, Biomedical Research Center - Qatar University



From Left: Prof. Hadi Yassin, Section Head of Research at the Biomedical Research Center; and Dr. Mohamed Elrayess

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), causing the Coronavirus disease 2019 (COVID-19) pandemic, has endangered the lives of millions around the globe. Around twenty percent of COVID-19 patients become critically ill as they exhibit respiratory distress that requires immediate oxygen supply, including invasive mechanical ventilation in severe cases. Out of the critically ill patients, 30% die. During the peak time, intensivists are required to predict the duration of invasive mechanical ventilation for a better utilization of ICU resources using a number of laboratory values and patient features, also known as Apache score, which considers both acute and chronic disease. However, the accuracy of early clinical prediction of duration of invasive mechanical ventilation remains limited, especially in patients who require longer stay and more care. Therefore, one of the most challenging aspects of COVID-19 pandemic is managing the critically-ill patients at ICU, especially during disease peak due to limited capacity and resources. Early detection of the metabolic changes in critically ill COVID-19 patients under invasive mechanical ventilation (IMV) at the intensive care unit (ICU) could help in their disease management and recovery. These patients constitute the real strain on the health system and are liable to some of the worst possible outcomes of the disease, which renders early prediction of their evolution at ICU of tremendous clinical value.

In this regard, it has become very important to identify COVID-19 patients who are likely to recover faster and predict their recovery duration for better management of resources at ICU.

Dr. Mohamed Elrayess and a research team from the Biomedical Research Center at Qatar University (Dr. Asmaa Al-Thani, Dr. Hadi Yassine, Dr. Fatiha Benslimane and Ms Maria Smatti), Hamad Medical Corporation (Dr. Ali Ait Hssain) and Hamad Bin Khalifa University (Ms Sara Taleb, Dr. Ilhame Diboun and Prof. Omar Albagha), have investigated novel predictive biomarkers of length of stay at the intensive care unit (ICU) for better management of ICU resources and risk reduction of COVID-19 outcomes. The emerging novel data has identified alterations in specific clinical features between ICU admission and one week at ICU. In addition, the data has also suggested that certain metabolic changes during the first week of admission can be utilized to predict COVID-19 ICU outcomes.

Previous reports comparing the metabolic profiling of COVID-19 infected samples and matching healthy controls have revealed specific metabolic signature of disease severity. However, most of these studies collected metabolites after patients have acquired the severe disease symptoms. Therefore, the utilization of these models for severity prediction remains limited. In this study, researchers have investigated whether COVID-19 can trigger specific metabolic changes detectable in the sera of patients under mechanical intubation as soon as they are admitted to ICU in order to use them as tools to differentiate those who are likely to recover from those who would sustain an extended stay at ICU. Therefore, targeted metabolic profiling has been conducted of the sera of critically ill COVID-19 patients in ICU at two time points. The schematic Figure 1 shows the study design.

The first analysis was for samples collected within the first 48 hours of intubation and the second was for samples collected a week later. Researches have also confirmed their findings in published data of metabolic markers of COVID-19 severity by other investigators. The results of the study identified a model based on two metabolites (hypoxanthine and betaine)

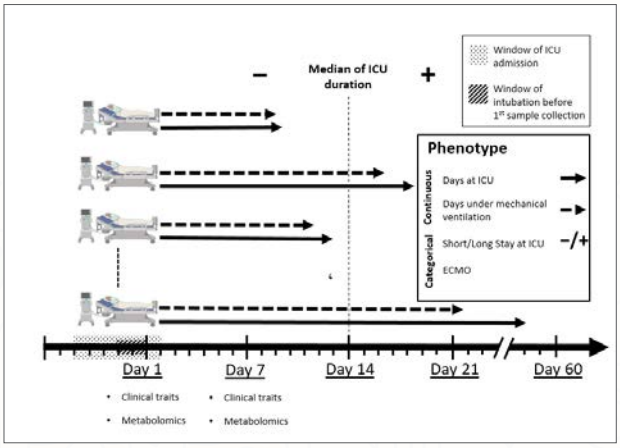


Figure 1. Study design scheme.

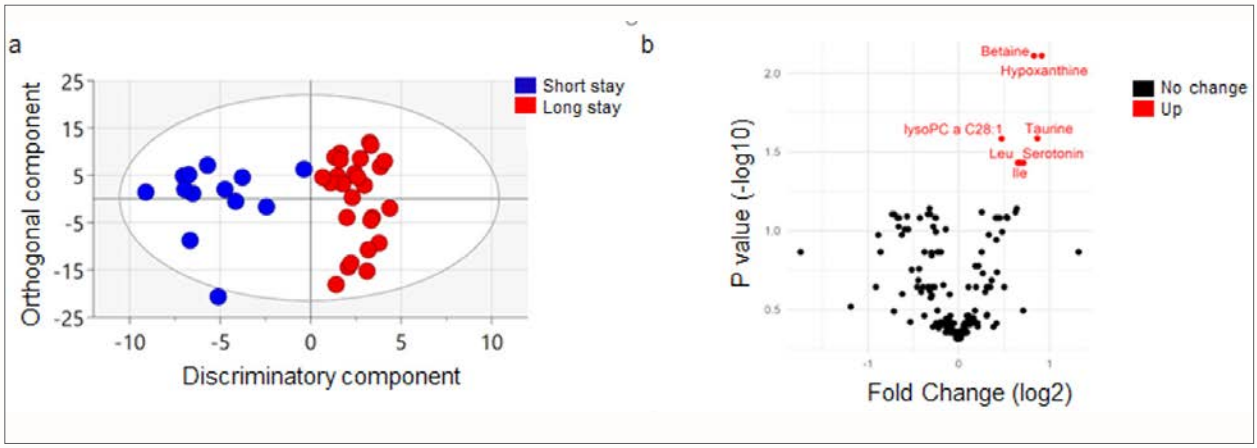


Figure 2. The model differentiating short and long stay groups based on measured metabolites (left) identifying the top metabolites distinguishing the two groups (right).

measured at ICU admission that was best at predicting whether a patient is likely to experience a short or long stay at ICU. Figure 2 shows the model differentiating short and long stay groups based on measured metabolites (left) and identifies the top metabolites distinguishing the two groups (right).

Another model based on 5 metabolites (kynurenine, 3-methylhistidine, Ornithine, p-Cresol sulfate and C24.0 sphingomyelin), measured a week after ICU admission, and was identified to accurately predict the invasive mechanical ventilation. Both predictive models outperformed the gold standard APACHE II score used at ICU all over the world and differentiated COVID-19 severity in published data. Figure 3 shows the model differentiation days under intensive mechanical ventilation (IMV) based on measured metabolites (left) and identifies the top metabolites distinguishing the two groups (right).

In summary, the findings of the study have shown that it is possible to discriminate on admission the critically ill COVID-19 patients who are likely to stay shorter from those who are likely to experience a long stay at ICU. The biomarkers that have been identified and patented are associated with various medical complications of COVID-19 infection such as inflammation, coagulation, kidney injuries, and immune response. The identified models outperformed the predictive ability of the gold standard APACHE II score, which is typically used for predicting fatality and disease severity. The identified predictive biomarkers may also be used as therapeutic targets for intervention to improve the patient clinical profile at ICU. Validation of the utility of our panel of biomarkers for predicting duration at ICU and IMV is currently underway in preparation for its wider use in Qatar and around the world.

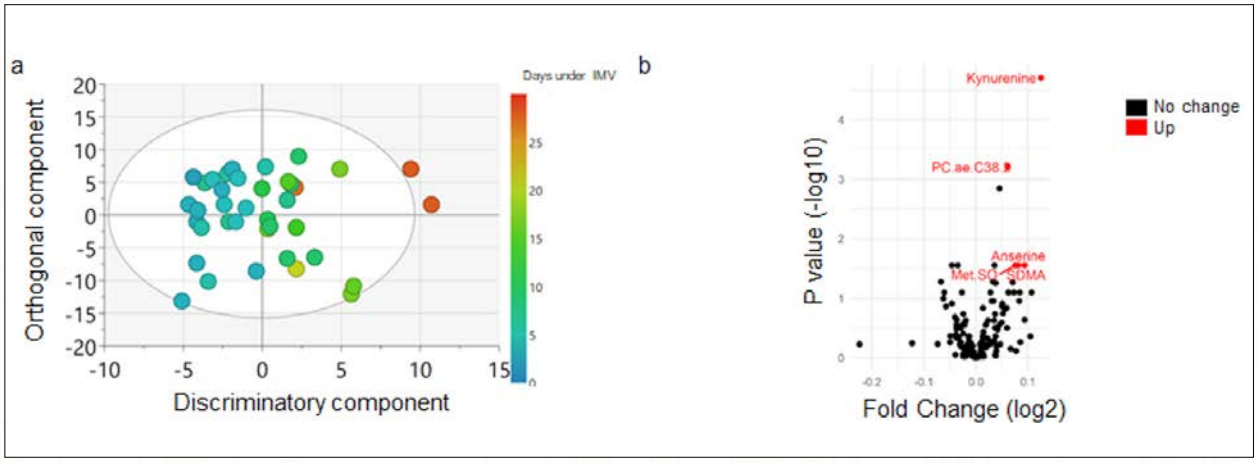


Figure 3. The model differentiation days under intensive mechanical ventilation (IMV) based on measured metabolites (left) identifying the top metabolites distinguishing the two groups (right).

Prof. Shaheen Al Muhtaseb

Professor of Chemical Engineering, Department of Chemical Engineering – Qatar University

جامعة قطر
QATAR UNIVERSITY

Inventor Business Card:

Q. How would you present yourself to the University community?

I am a professor of Chemical Engineering at Qatar University (QU). I Joined QU in the Fall semester of 2007. I pursued my university education in the Hashemite Kingdom of Jordan and the United States of America, and worked in the United States and the United Arab Emirates. My research interests are mainly in the area of advanced materials science and their applications in separation processes, environment protection, and enhancement of their performances for the energy transformation and alternative energy applications. For instance, my research focuses on the development of porous and nanoscale materials to extract specific components from mixtures (e.g. capture of carbon dioxide from exhaust gases and purification of water from pollutants) using adsorption or membranes processes. My research also addresses the development of methods of polymer crosslinking and micro-encapsulation of phase change materials (PCMs) for enhancing their usage in temporary storage of thermal energy. It also addresses the use of advanced materials used for energy transformation.

Q. What are your most important inventions patented in Qatar University?

All praise be to Allah, a number of international patents were completed during my tenure at Qatar University in the field of advanced materials science and their applications. Some patents have already been granted, and others are filed or under preparation. The devise of a method to produce carbon nano-rods and nano-wires is perhaps one of the most important granted patents, in view of its potential application in miniature industries and technologies. Other patents include the invention of more effective and environment-friendly alternative methods to crosslink and template polymers and methods for the micro-encapsulation of phase change materials (PCMs). These are significant inventions because of the potential impact of these methods on improving the production of these materials.

Q. How does Qatar University create a favorable environment for inventions and innovation?

Qatar University plays a major role in enabling a favorable environment for inventions and innovation. In this regard, I would like to acknowledge the active role of the Office of Innovation and Intellectual Property of Qatar University in the filtering and administration of patents registration. I would like also to commend the support provided by the Office of Research Support of Qatar University. Due credit should be given to the Central Laboratories Unit and the Department of Chemical Engineering at Qatar University for its role in obtaining high quality measurements, which contributed to the investigation and validation of the different inventions.

Q. How did you promote your research capabilities to earn the title of an inventor?

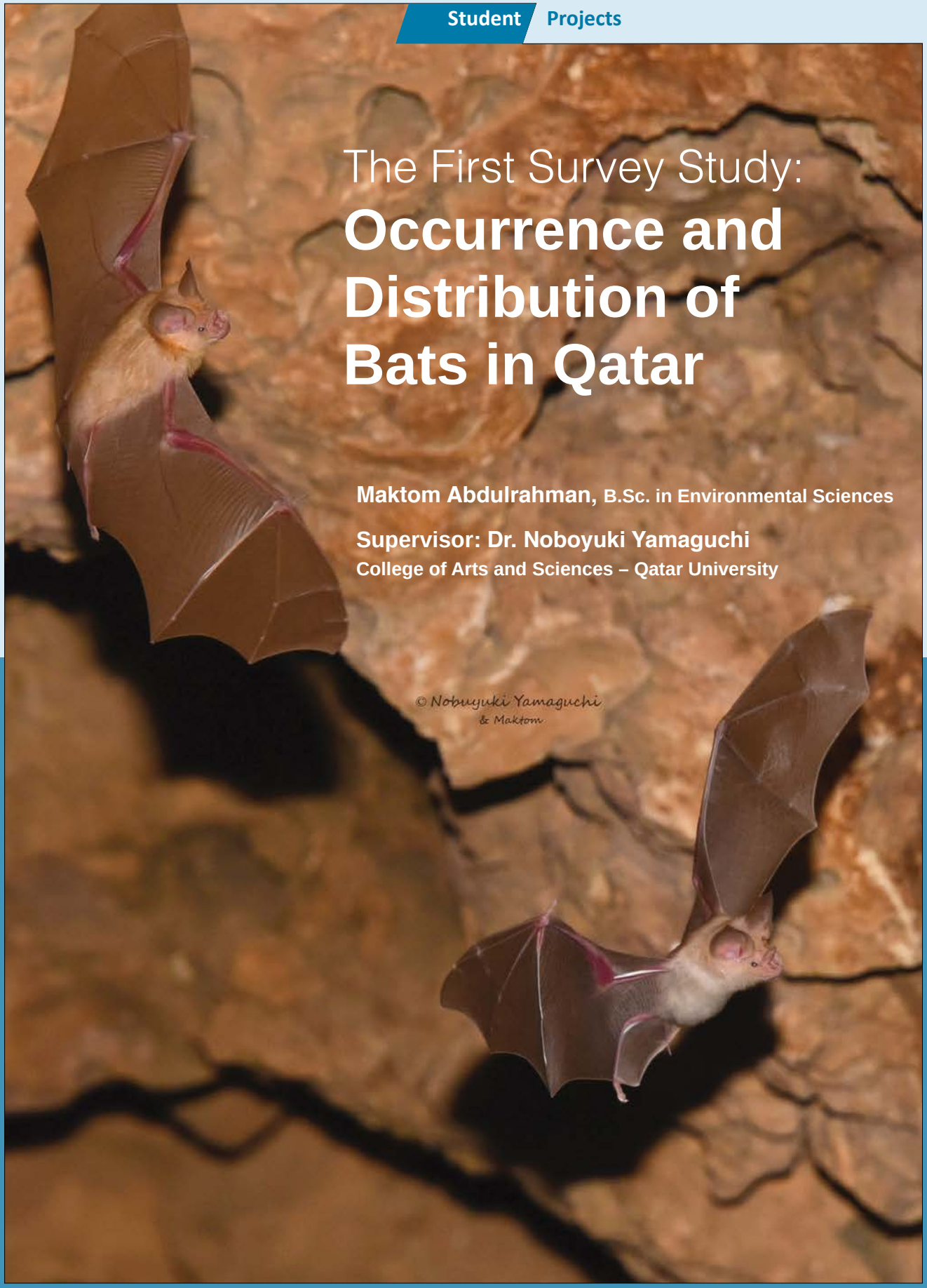
Obtaining the financial and qualitative support for long-term and medium-term projects is one of the most important factors in achieving inventions. Thanks are due to Qatar National Research Fund, as one of the most significant providers of this kind of support. Further, it is also important to engage a team of scientifically and professionally experienced team of researchers who have the passion for learning and exploring unusual ideas. Besides, a defined scientific strategy, to investigate areas of improvements in advanced materials science and applications needs to be adopted, with due consideration to consider the environment friendliness and avoiding complications without compromising their efficiency. Likewise, we need to keep pace with the scientific developments in relation to areas of concern.

Q. What are the research goals you plan to achieve?

Contributing to the dissemination and application of knowledge that benefits the society is one of my most important research goals. To reach this goal, different innovations need to be developed to increase their technology readiness levels (TRLs) and marketing potentials. Providing sufficient funding is also important for this goal.

Q. How would you describe the life of an inventor?

The life of inventors is loaded with a permanent passion for exploring the unknowns and searching for hidden details that may bear a “buried treasure” within them. This is why they are always extremely busy, which reminds me of a jest about an inventor who dreamed of creating an invention to expand time!



The First Survey Study: Occurrence and Distribution of Bats in Qatar

Maktom Abdulrahman, B.Sc. in Environmental Sciences

Supervisor: Dr. Noboyuki Yamaguchi
College of Arts and Sciences – Qatar University

The distribution of bat species in Qatar had never been recorded before. Evidently, Maktom has conducted the first nationwide bat survey in Qatar. Bats are considered a keystone species which makes them an essential component of many ecosystems and serve as bioindicators for many environmental stressors. Therefore, it is vital to study and keep track of them.

Based on sonogram analysis, 3 species were identified, *Asellia tridens*, *Otonycteris hemprichii*, and *Pipistrellus kuhlii*. The most recorded species was *Asellia tridens*, the only species recorded in the northern half of the country. The probability of recording bats was not higher in the northern half of the nation, where there are many irrigated fields, as it was previously predicted when the study began. The distribution of bat species may be affected by variations in human land use and disturbance, as well as distance from the Arabian Peninsula's main body. A key habitat feature for *Otonycteris hemprichii* and *Asellia tridens* may be the presence of roosting sites in less disturbed sinkholes/caves, which are therefore crucial for bat conservation.

The bat survey was conducted between September 2018 and April 2019. To begin, the research looked for potential roosting and activity areas such as sinkholes/caves, old water wells, bridges, and farms, with a particular focus on finding the sinkholes/caves mentioned by Sadiq and Nasir (2002). Maktom was able to find six sinkholes and caves. The study also attempted to cover as much of the country as uniformly possible under logistical constraints (56 sites in total). The bat detector was moved in and around the site by 4x4 vehicle and/or on foot. If it detected any bat call during that period, the bats were classified either "present", or "absent" at that site. The study classified a site as a roost when: 1) more than two bats were visibly detected emerging from the structure shortly after sunset, and 2) the site had a structure appropriate for bat roosting (e.g. abundant houses, cave, or sinkhole). The bat calls were recorded by Echo meter 2 device & analyzed using Kaleidoscope PRO software (Wildlife Acoustics) for species identification, based on call characteristics including frequencies (maximum frequency (Fmax), minimum frequency (Fmin), and the ending frequency of the flattest part of a call (Fc)) and structure, inter-pulse intervals and power density. For quantifying call characteristics, the study used call sequences during the normal flight where the sequence of calls has a relatively constant appearance and excluded sequences with increased call rate (e.g. feeding buzz). The study selected five call sequences per species, from each of which a sequence of six calls

The student Maktom while using ultrasonic recorder

were selected, for quantifying call characteristics. For identification of the particular bat species, call characteristics known from other parts of the Middle East were used (Benda et al., 2006, 2008, 2012 Benda and Uhrin, 2019; Hackett et al., 2017). The dominant habitat features of each site was also recorded which was then classified into one of the following four categories: cave/sinkhole, open desert, irrigated farm, and artificial structure. Differences in bat occurrence between northern and southern halves of Qatar, and habitat features, were tested using the likelihood ratio Chi square test, and the statistical analyses were performed using SPSS 25 (IBM, Armonk, USA).

A total of 287 acoustic ultrasound recordings were collected across Qatar, of which 169 were bat call sequences. Maktom & Dr. Yamaguchi identified three species *Asellia tridens*, *Pipistrellus kuhlii*, and *Otonycteris hemprichii*. *Asellia tridens* (Figure 1) was the most widely distributed bat species in Qatar (Figure 2) with 107 calls recorded. The occurrence of *A. tridens* in Qatar is considered uncertain in the latest version of the IUCN Red List of Threatened Species (Monadjem et al., 2017b). However, this research confirmed its presence in Qatar. In addition, this study reported the presence of *Pipistrellus kuhlii* in Qatar for the first time. The sonogram of *Asellia tridens* (Figure 3a) has a relatively long constant frequency (CF) component at around 118.0 kHz followed by a rapid downward frequency sweep to 90.0 kHz, with the total length of a call c. 7.90 ms. It has the average Fmax of 118.1 kHz, Fmin of 99.5 kHz, and Fc of 115.1 kHz, and is similar to that of *A. tridens* previously recorded in the Middle East (Benda et al., 2006, 2008; Hackett et al., 2017). *Otonycteris hemprichii* was the least common of the three species with 14 call sequences recorded, and its call is characterized by Fmax (36.5 kHz), Fmin (20.5 kHz), and Fc (21.0 kHz) (Figure 3b), and is similar to that of *O. hemprichii* previously recorded in the Middle East (Benda et al. 2008, 2012; Hackett et al., 2017). While *O. hemprichii* is the quietest of the recorded

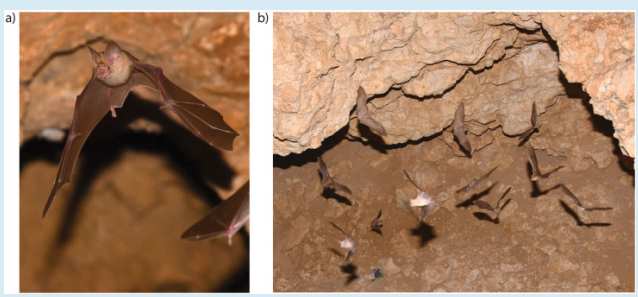


Figure 1. *Asellia tridens* in Qatar: a) single individual, and b) multiple individuals flying out of the roost.

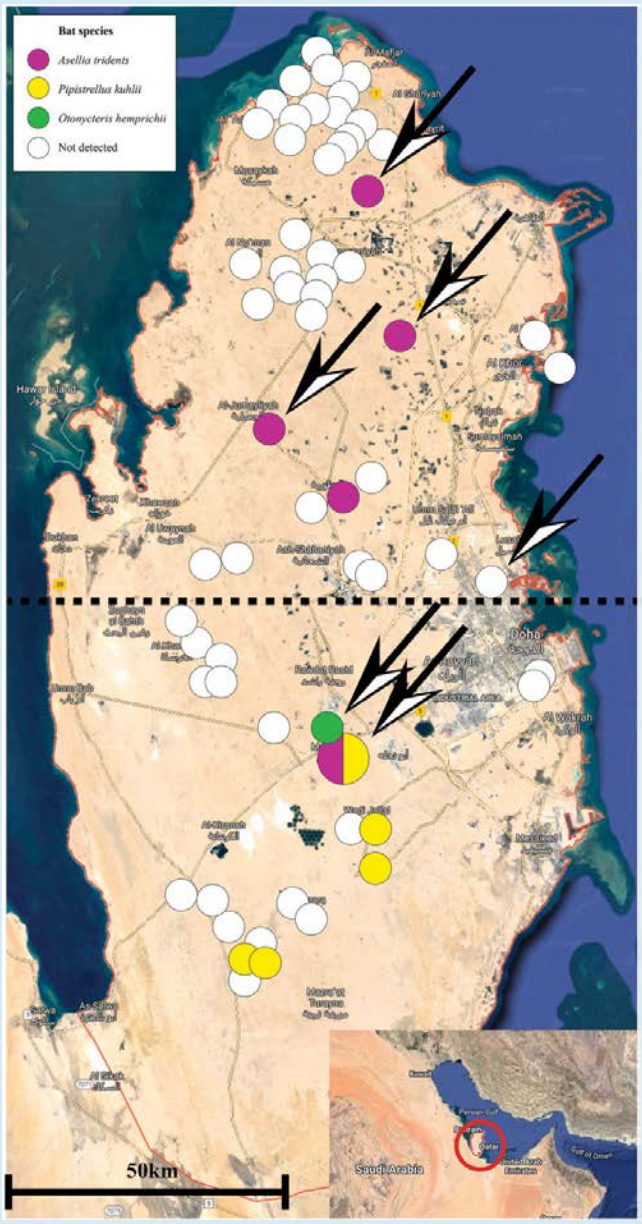


Figure 2. The distribution of the surveyed sites in Qatar. Arrows indicate sinkholes/caves. The dotted line divides the country into north and south.

Dr. Yamaguchi photographing *Asellia tridens*

The specie *Asellia tridens* , which is found throughout the State of Qatar

species and therefore perhaps more likely to have been missed, it also has the lowest frequency calls which attenuate more slowly. Pipistrellus kuhlii was recorded only in the south of Qatar (Figure 2). Pipistrellus kuhlii (48 calls recorded) has a FM-QCF call characterized by Fmax (48.8 kHz), Fmin (36.6 kHz), and Fc (37.5 kHz) (Figure 3c) and is similar to that of P. kuhlii previously recorded in the Middle East (Hackett et al., 2017; Benda et al., 2012; Benda and Uhrin, 2019).

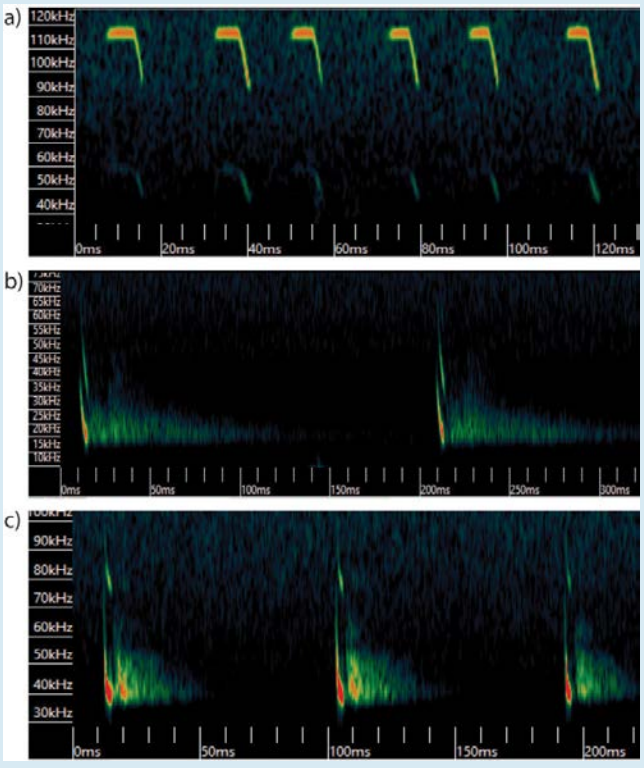


Figure 3. Sonograms of bats recorded in Qatar: a) Asellia tridens, b) Otonycteris hemprichii, and c) Pipistrellus kuhlii. Note that scales of both horizontal and vertical axes are different between species.

Although Asellia tridens was found throughout Qatar, both Otonycteris hemprichii and Pipistrellus kuhlii were found only in the south. The study speculates that these distributions may reflect the peninsula effect, first postulated by Simpson (1964), where distance from the main Arabian Peninsula is a factor affecting diversity. The main Arabian Peninsula has a higher bat diversity and greater abundance than found in Qatar (Harrison and Bates 1991). Due to the geographical proximity, bats may colonize southern Qatar from the main Arabian Peninsula more easily than the north of the country. Alternatively, in the north of Qatar, with a high concentration of irrigated farms, the bat populations may be affected by pesticide use. Bats may be more sensitive to pesticide use compared to other mammals (Stahlschmidt and Brühl, 2012).

Four of the five roost sites appeared to be occupied by a single bat species (either Asellia tridens or Otonycteris hemprichii, based on detection of calls. The single exception was the Mudhlem sinkhole site in the south (see Figure 2) where two call sequences of Pipistrellus kuhlii were recorded whilst call sequences of Asellia tridens dominated the site. However, it is not certain if the sinkhole is used as a roost site by Pipistrellus kuhlii. This may suggest the possibility of interspecific competition, where the more abundant Asellia tridens limits the range expansion of Otonycteris hemprichii and Pipistrellus kuhlii within Qatar.

The article is available via the following link: https://www.sciencedirect.com/science/article/pii/S0140196320302780

HDAC Inhibitors Modulate Inflammation and Autophagy Flux in Macrophages during Bacterial Infection

Tamader Sultan Alyaarabi, B.Sc. in Medicine
Supervisor: Prof. Susu Zughaier, Associate Professor of Microbiology and Immunology
College of Medicine – Qatar University

Student Research Project:

Macrophages play essential roles in innate immunity and host defense as well as homeostatic roles in tissue regeneration, wound healing and recycling senescent RBCs and apoptotic cells. In response to infection or inflammation, activated macrophages secrete large quantities of various immune modulators including pro-inflammatory cytokines, chemokines, antimicrobial peptides and eicosanoid lipid mediators. However, the release of excessive inflammatory mediators will increase levels of inflammation leading to dysregulated immune responses, which contribute to the pathophysiology of diseases. Inflammation is the hallmark of many chronic diseases such as diabetes, atherosclerosis, cardiovascular diseases, metabolic syndrome, arthritis, and autoimmune diseases. The release of inflammatory molecules is mediated by gene expression and epigenetic modifications in chromatin and DNA. These epigenetic modifications are controlled by a set of enzymes like histone acetylation and deacetylation, histone methylation and demethylation, and DNA methylation and demethylation. These enzymes are targets for several drugs used to treat cancer. In particular, histone deacetylases (HDAC) inhibitors are used as therapeutics to dampen the enzymatic activity of HDAC enzymes. Furthermore, HDAC inhibitors are reported to induce apoptosis and autophagy in cancer cells.

From Left: Prof. Susu Zughaier, Tamader Alyaarabi (student) during the microscopic examination in the laboratory.

Autophagy ("self-eating") is a physiological process important for cell survival and is required for normal cellular homeostasis, recycling macromolecules, and is activated upon starvation. Importantly, autophagy plays an important role in host defense by clearing invading pathogens. Additionally, bacteria-mediated dysregulation of autophagy has been associated with exacerbation of acute infections. In order to facilitate their survival and evade clearance by the host, some bacterial pathogens evolved systems to manipulate the autophagy process using different mechanisms. Thus, pathogens may impede autophagy at different steps including the inhibition of cellular signaling pathways required for initiating the autophagy process, direct interference with the activity of autophagy components, inhibition of autophagic flux by blocking autophagosome-lysosome fusion, utilizing autophagy vesicle resources for bacterial replication, escaping from the autophagosome to the cytosol, and evading autophagy recognition by masking bacterial surfaces. HDAC inhibitors are reported to induce autophagy, however, the effect of HDAC inhibitors on modulating autophagy flux in macrophages during bacterial infection is not known.

The aim of this study is to investigate the effect of HDAC inhibitors on reducing inflammation and enhancing autophagy flux in macrophages during bacterial infection. To address this aim, tissue culture approach was implemented in which human and murine macrophages were grown to confluence and then subjected to bacterial infection in presence and absence of HDAC inhibitors such as Trichostatin (TSA) and Apcidin. To assess inflammation, human monocytic cells (THP-1) and murine RAW264 macrophages were infected with a Gram-positive bacteria Staphylococcus aureus (SA) or a Gram-negative bacteria Klebsiella pneumoniae (KPS) in presence or absence of HDAC inhibitor TSA (10 μg/million cells) then incubated overnight at 37°C. Secreted cytokines such as TNFα and IL-1β were measured in the supernatants from infected macrophages using ELISA method. Immune modulation in infected macrophages was also assessed by measuring nitric oxide release in the supernatants using the Griess reaction method. To observe autophagy, murine RAW264 macrophages stably transfected with the marker of autophagy GFP-tagged LC3 protein were used and autophagy formation was visualized using fluorescence microscopic imaging. In

order to eliminate the risk of bacterial virulence factors, bacteria were inactivated using 10% formalin fixation overnight followed by extensive washings to remove any traces of formalin then resuspended in PBS.

The data showed that HDAC inhibitor TSA reduced inflammation response measured as IL-1β (Figure 1A) and TNFα (Figure 1B) release from infected human THP-1 macrophages. Similar experiments were performed using murine RAW264 macrophages and data showed that TSA also inhibited nitric oxide release from infected macrophages (data not shown). Other HDAC inhibitors like Apicidin also showed similar results suggesting the immune modulatory and anti-inflammatory effect of HDAC inhibitors on macrophages during bacterial infection.

Autophagy process is a host defense mechanism that helps in bacterial clearance in infected macrophages. HDAC inhibitor TSA, in contrast to its effect on cytokines release, enhanced autophagy induction in infected murine RAW264 macrophages. The murine RAW264 macrophage cell line is stably transfected with the marker of autophagy LC3 protein with GFP-tag. Therefore, upon autophagy flux activation, the accumulated GFP-LC3 protein form the green fluorescent autophagic vacuoles or puncta as shown in Figure 2. These autophagic vacuoles facilitate bacterial clearance by fusing the phagolysosomes that degrades pathogens.

In conclusion, this study demonstrated that HDAC inhibitors reduced inflammatory responses but enhanced autophagy flux in macrophages suggesting its role in modulating macrophage responses to facilitate bacterial clearance during infection.

This student research project was focused on pathogen-host interaction and the body's defense mechanisms. It was the first wet laboratory research experience for Tamader Alyaarabi and her colleagues, Jawaher Baraka and Khalid Abougalala from College of Medicine supervised by Dr Susu Zughaier. During this project, Tamader had the opportunity to learn important biomedical techniques, such as cell culture, enzyme-linked immunoassay (ELISA), and confocal microscopy imaging. Although at the beginning the research was very challenging to learn and perform all these techniques but with practice for many hours and close supervision, skills and confidence in experimental research was gained. Furthermore, Tamader was able to learn how to work within a scientific environment, collect and analyze research data, as well as how to interpret and present them. She believes that this experience helped her develop essential skills and techniques necessary for professional development at this early stage and leaves a great positive impact on her current studies and future career as a doctor.

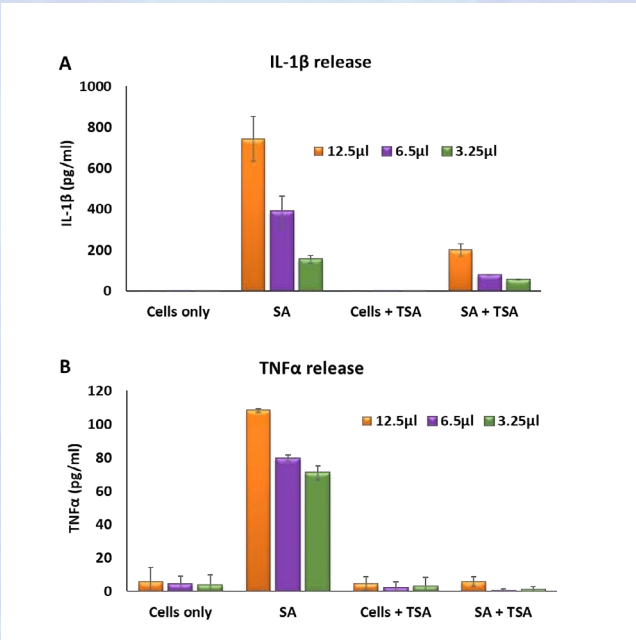


Figure 1. Cytokines release IL-1β (A) and TNFα (B) from human macrophage like monocytic (THP-1) cells during bacterial infection in presence or absence of HDAC inhibitor TSA. Macrophages were infected with Staphylococcus aureus bacteria in different doses and cytokines were measured in the supernatants of macrophages using ELISA method.

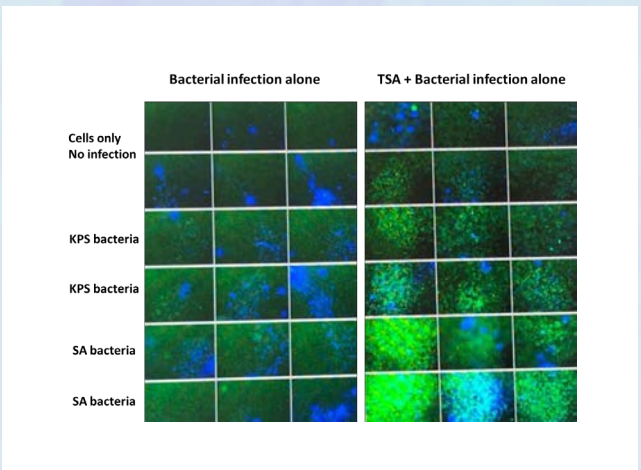


Figure 2. Autophagy flux in murine RAW264 macrophages infected with bacteria in presence and absence of HDAC inhibitor TSA. KPS: Klebsiella pneumoniae; SA: Staphylococcus aureus; TSA: Trichostatin A HDAC inhibitor; Green puncta: Autophagic vacuoles in RAW264 macrophages stably transfected with LC3-GFP tagged autophagy marker; Blue: DAPI stained nucleus.

The Role of Supply Chain Resilience in Supply Chain Reconfiguration: **Evidence from Qatar**

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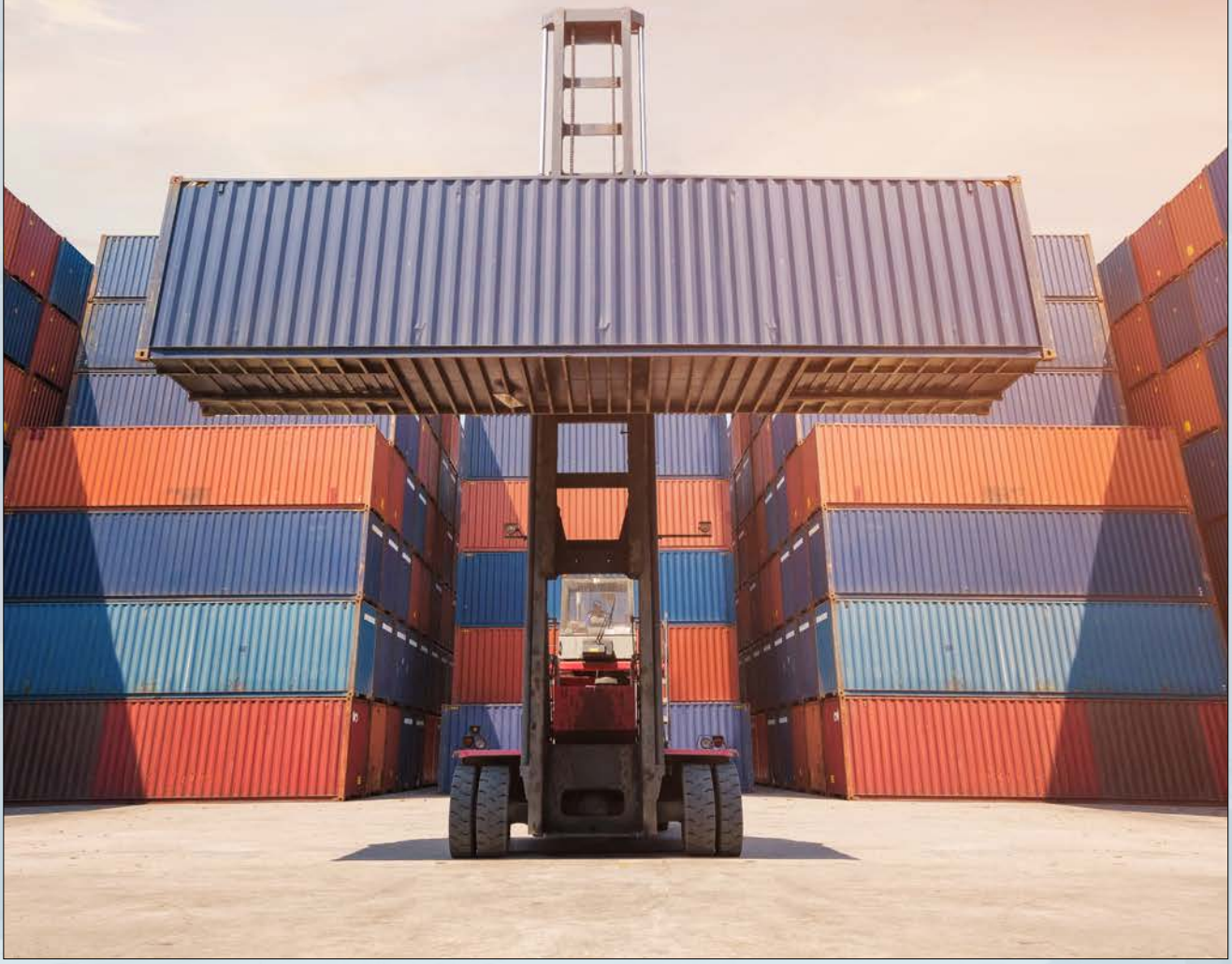
Co-Supervisor: Prof. Rana Sobh, Director of Core Curriculum Program and Professor of Management
College of Business and Economics – Qatar University



Supply chain resilience has emerged as a key attribute in wake of increased risk susceptibilities due to globalized operations. In June 2017, Qatar experienced a disruption of supply chains after the imposition of a blockade by four other countries. The blockade had a huge impact on supply chains, because the majority of products at that time in Qatar were imported, and imports were mainly routed through the blockading countries. The disruption of supply chains during the blockade led to delays and material shortages in these projects, including many in the final delivery stage. Qatari companies were forced to change their suppliers and redesign their supply chains to meet the needs of residents.

The major aim of the PhD thesis was to understand the role of supply chain resilience and reconfiguration in the context of economic-political risk. Resilient supply chains can adapt to both positive and negative environmental influences. They can also anticipate and minimize the negative effects of disruptions. Resilient supply chains have the ability to survive, adapt and grow in changed business environments. Organizations should therefore prioritize supply chain resilience because it has a significant direct effect on financial performance. Resilience can even be a source of sustainable competitive advantage and have a positive effect on customer satisfaction. Further, dynamics of supply chain reconfiguration help organizations to return to equilibrium. Supply chain reconfiguration has been examined at both strategic and operational levels, as it enables supply chains to survive, return to normality or move to a new status from which they can operate. This thesis therefore attempts to examine the impact of supply chain resilience on reconfiguration. The context of the study is Qatar because this provides an opportunity to understand the relationship under a particular type of risk, the blockade.

The study started with a systematic mapping review that was conducted to identify the gaps in contemporary literature on supply chain resilience and reconfiguration. The systematic mapping review identified enablers for economic-political risk. This allowed investigation of the role of these enablers in mitigating risk and in reconfiguring the supply chain. Based on literature review, a model utilizing Interpretive Structural Modeling (ISM) is proposed to understand the relationships among the enablers of supply chain resilience to effectively mitigate the economic-political risk. ISM model shows that risk management culture, information sharing, trust, and collaboration among the supply chain partners have a high driving power and are therefore key variables to improve supply chain resilience (Figure 1). The model provides a useful framework for decision-making on developing resilience in supply chains. Managers can use the model to ensure that they focus scarce organizational resources on the most important factors.

The results of the ISM model were utilized to propose a theoretical model, which empirically investigated the impact of supply chain resilience on supply chain reconfiguration considering the impact of key antecedents of supply chain resilience. Descriptive statistics, hypothesis testing and partial least squares (PLS) based structural equation modeling using data from the selected organizations in Qatar provided useful information about the recovery of supply chains following an economic-political risk event (Figure 2). The survey results established that there is a strong

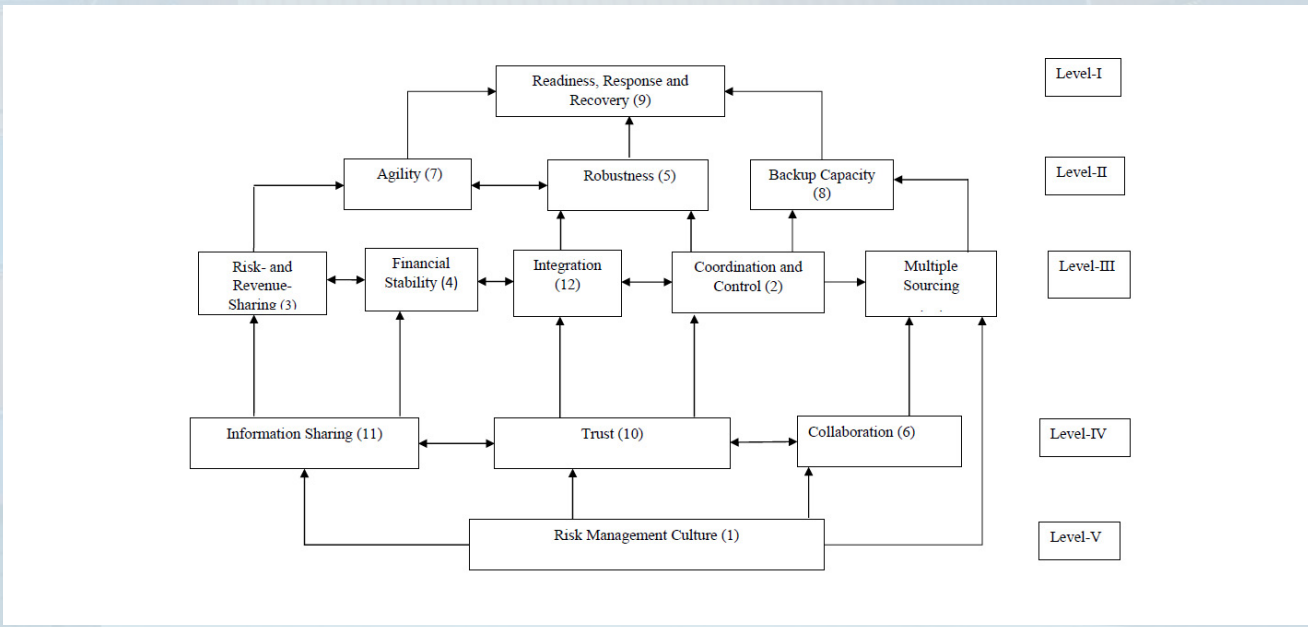


Figure 1. ISM Model for the enablers of supply chain resilience to economic-political risk.

Co-Supervisor: Prof. Rana Sobh

Supervisor: Prof. Mohd Nishat Faisal

positive relationship between supply chain resilience and reconfiguration. Supply chain reconfiguration emerged as a key variable determining the ability of supply chains to adjust in the wake of risk events or in a dynamic business environment. To focus resources towards building supply chain reconfiguration capabilities a multi-criteria decision framework integrating Analytic Network Process (ANP) and Balanced Scorecard (BSC) to prioritize the variables associated with supply chain reconfiguration was proposed in the research. An integrated framework of ANP-BSC found that for the case supply chain, responsiveness, revenue sharing, and visibility were the top three variables that would affect supply chain reconfiguration.

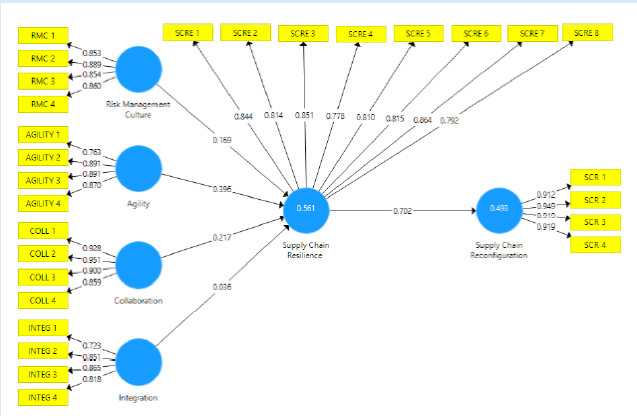


Figure 2. PLS path modeling results.

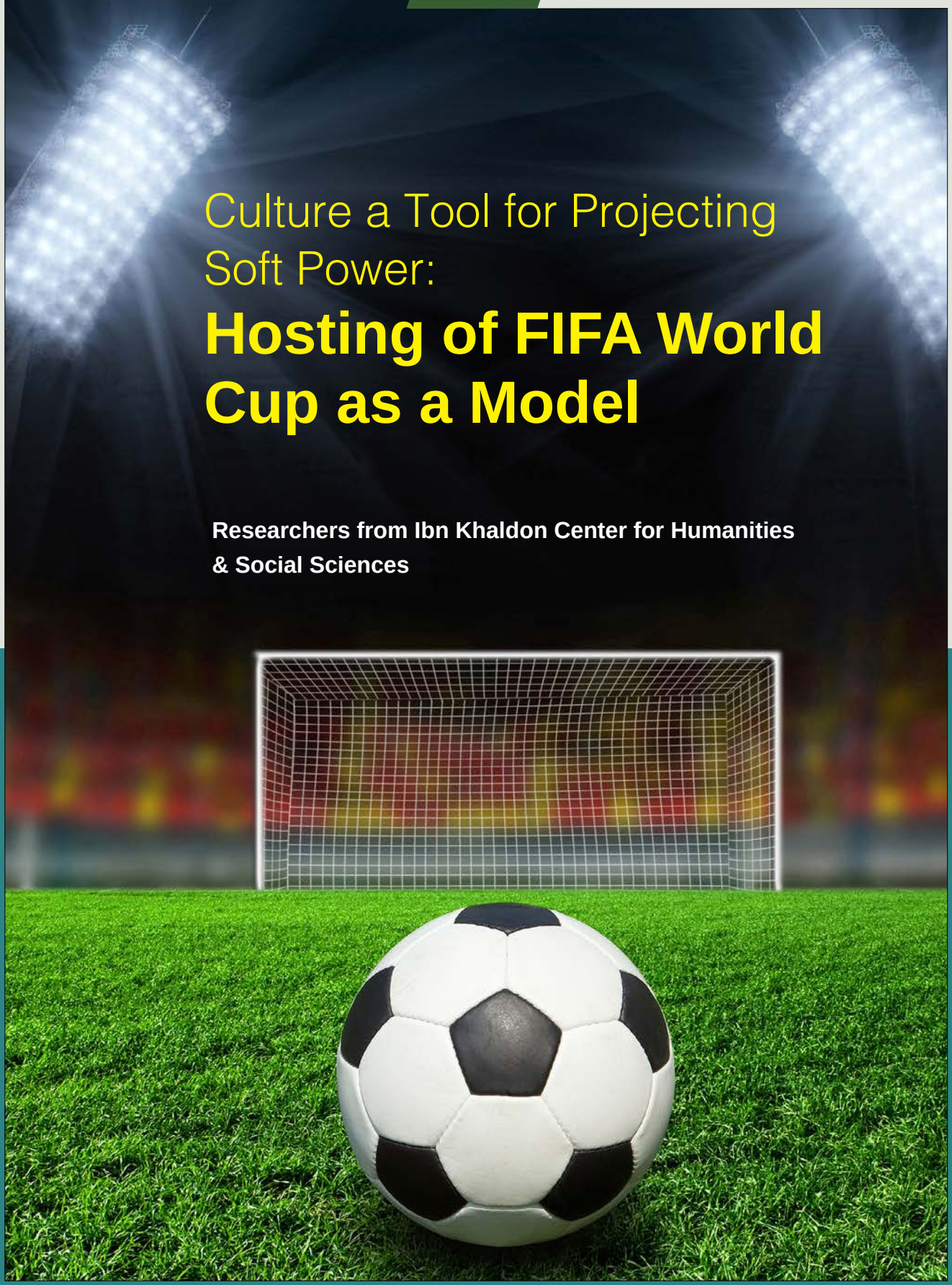
The findings reported in the thesis improves the understanding of supply chain resilience and reconfiguration in a developing economy. It proposes models and framework to understand resilience and reconfiguration variables that would enable businesses to develop resilient supply chains to effectively mitigate risks and improve continuity of operations. Findings revealed in the current thesis contribute to the supply chain resilience and reconfiguration literature. From a practical perspective, the analysis showed that organizations have to look beyond their boundaries. There is an urgent need to build resilience among organizations to mitigate risk in their supply chains. The result of the systematic mapping review, questionnaire survey, ISM model, and integrated ANP-BSC models provide new insights on the management of risk. They establish that resilience in supply chains needs to be a part of any organization's overall supply chain strategy.

The present findings can enhance our understanding of how resilience enablers influence and guide the firms to recover their supply chain after disruptions. By conceptualizing the impacts of supply chain resilience in recovering the supply chain disruption, this research takes another step towards the role of resilience in reconfiguration of the supply chain when a disruptive risk occurs. It emphasizes the role of risk management culture, agility, collaboration, and integration in enhancing the supply chain resilience, which in turn help the firms to reconfigure their supply chain after disruptions. The thesis developed an integrated supply chain resilience and reconfiguration framework by investigating the interdependence between the theoretical framework of supply chain resilience and reconfiguration and the operational practices. The findings have several important managerial implications. The significant relationship between supply chain resilience and reconfiguration will enable managers to make changes to their supply chain, including major adjustments. This study explored issues related to resilience and reconfiguration in supply chains in Qatari organizations and opens new avenues in this area for researchers to explore further.

Culture a Tool for Projecting Soft Power:

Hosting of FIFA World Cup as a Model

Researchers from Ibn Khaldon Center for Humanities & Social Sciences



A word cloud used to express "good traits of Qatari personality"

The World Cup is a global event that is awaited for by millions of competitive sports fans. The host country brings together huge numbers of individuals from the six continents of the world with their different religions, customs and culture.

In this context, researchers and specialists in the State of Qatar, in general, and Qatar University, in particular, are preparing to host the International Federation of Association Football (FIFA) World Cup 2022. To that end, they are studying this event and its impact on the Qatari society.

Among the research centers at Qatar University, Ibn Khaldoon Centre carried out a project aimed at uncovering the determinants and challenges of the use of culture as a soft power as well as the implications of this on hosting the FIFA World Cup 2022.

The aim of the project is also to discuss the parameters of the image of the Qatari society and the challenges it faces by studying Qatari residents' perceptions toward citizens and addressing the religious, social and cultural limitations for the standard society image of Qatar. The project involved four applied researches. The first and largest research is titled "Standard image of Qatari Society: Study of Residents' Perception." Its goal is to recognize the residents' social perceptions toward the State of Qatar, its culture and people. The importance of this study lies in addressing an issue about which the scientific references and reliable knowledge that the State of Qatar needs are scarce in the context of its readiness to organize the World Cup 2022.

The residents' perceptions about the Qatari society can be useful in identifying the distinctive elements of Qatar from a different perspective, which can be employed, highlighted or avoided during this event.

To achieve the objective of this study, inductive qualitative approach, which allows for building scientific knowledge based on the knowledge of individuals themselves, has been adopted.

Data were collected from a purposive sample of 111 residents of different nationalities, using the technique of "asynchronous online interviewing". The thematic analysis was applied using the MAXQDA Program.

The study has reached a range of conclusions, on the top of which are: residents came to Qatar with personal motives, the foremost of which are work and highly attractive standards of Qatar, such as living standards, security and safety.

The residents' perceptions are dynamic, changing and subject to several conditions, the most important of which are: direct personal experience and diverse cultural frameworks. Qatar's culture has special advantages in its tangible and intangible elements, which must be highlighted and maintained, and others that must be reviewed and recognized. Qatari personality is generally highly respected for its high ethical qualities, which may sometimes be deviated from by some.

Therefore, the State of Qatar, in its quest to maintain a distinct local character and congruence with modernity and universality at the same time, faces several challenges, the most important of which is to resolve the controversy over entitlements that are incompatible with local culture or religious beliefs, and others of human rights nature.

The other research papers addressed the religious, social and cultural determinants for making the standard image of Qatari society during hosting the FIFA World Cup 2022. The first paper, titled "Social Determinant and its Role in Forming Real Image of Qatari society during Hosting the World Cup 2022", aims to explore the social challenges that Qatar may face during hosting the World Cup 2022. The inquiries of the study focused on the social features that characterize the Qatari society and the most important social features that the Qatari society should have during the World Cup 2022. The study

also addressed how to deal with the social challenges that Qatar will face, when defining these elements. A sample of Qatari society's intellectuals was selected to express their views on these inquiries. The study adopted the qualitative approach. In-depth interviews were conducted with six Qatari intellectuals. In addition, a panel discussion was held with six graduate degree holders and those interested in community issues. The study reached several conclusions, the most important of which are: the sample focused on the necessity of showing the customs and culture of society without any falsification, preparing the Qatari society from now for things that may happen during hosting the World Cup 2022, and which may conflict with their beliefs and justify it. Certain preparations must be arranged, including explaining the controls to the audience coming to attend the World Cup in order to avoid any attitudes that are contrary to the public order.

The second paper was titled "Religion as a Soft Power for the State of Qatar in Organizing the FIFA World Cup 2022". This paper aims to shed light on the role of the Islamic religion in forming a positive image of the State of Qatar by studying the relationship between Islam as the official religion of the State, the Qatari people's religion and soft power. This is in addition to the areas in which Islam can play a role and Islamic means to overcome the challenges that the State of Qatar may face during hosting the World Cup 2022. In addition to interviews that were conducted with Qatari scientific elites, the paper relied on Islamic sources and official Qatari documents. The paper used the approach of discourse analysis and intentional indirect observation. This paper reached important scientific results, including the emergence of a strong relationship between Islam and soft power and Islam's role in forming a positive image of the State of Qatar in organizing the FIFA World Cup 2022. This is through the interest Islam evokes in sports related activities, determining its controls and indicating ways to overcome various challenges.

The third paper was titled "The Institutional Determinant and its role in Forming the Cultural Image of the State of Qatar during the Organization of the FIFA World Cup 2022." This study aims to examine and analyze the importance of the institutional role in building an exemplary cultural image for the State of Qatar and for the Qatari personality during the organization of the FIFA World Cup 2022. The study focused on several questions around the mechanisms of highlighting the Qatari personality by shedding light on the cultural aspects that express it. This study further tried to identify some aspects related to the Qatari personality. It touched on several themes such as current cultural activities, ways to develop them and the role of the human element in creating and promoting culture.

The study adopted qualitative tools, such as the lengthy interviews that were held with six Qatari intellectuals. An expanded panel discussion was also held with four specialists in the Qatari cultural scene.

The study concluded the necessity to rehabilitate citizens, especially youth, by enabling them to participate and contribute in activities in comparison to the large number of activities to be organized throughout the event as well as the necessity to highlight the identity of the State, which represent the interface of its soft power.

Additionally, the study emphasized the importance of concerted institutional efforts in the State at all levels in order to contribute to forming the positive cultural image equivalent to the huge event.

Finally, the research paper on the constitutional determinant addresses an analytical reading of the provisions of Qatari permanent constitution 2004 and its implications on hosting the FIFA World Cup 2022. The research paper defines the parameters of the constitutional image of the State of Qatar in accordance with provisions of articles of the constitution. Further, the implications of the constitutional image on the FIFA World Cup 2022 event through a practical framework are indicated.

In order to interpret the constitutional provisions, the analytical approach was adopted to determine the image approved by the constitution for the State. For this purpose, the paper focused on addressing, analyzing and interpreting the constitutional provisions to highlight the cultural, social, legal, political and economic elements based on the foundations of legal analysis in the first place.

With regard to the implications of the provisions on the event, the paper relies on the qualitative approach to detect the interactions between the reality and the constitutional provisions and to measure the gap between them by conducting in-depth interviews with a number of Qatari society's intellectuals, especially specialists in the field of law.

The study reached several results, the most important of which are: access to clearly defined elements of the constitutional image that should constitute reference and evidence for the reality of the State and the method of performance of its institutions as well as the need to bridge the gap between some legislative provisions and practical practices in the State. This is in addition to creating a harmonization between the legislative provisions in force and the exceptional requirements imposed by the nature of the event.

This project included several research papers with multiple titles, including theoretical papers and other field research. The three theoretical papers will be published. The first is titled "The Soft Power Making: The Introduction to Owning and Using Soft Power in International Relations." The second paper is titled "Sport and International Relations: Qatari Soft Power and Foreign Policy Making." The third paper is titled "Experiences of Past Hosts of the World Cup and Olympic Games."

Cultural Variations in a Job Burnout Social Work Setting:

A Cross-Cultural Comparison of Six Arab Cultures

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This investigation aims to examine the differences between social workers from Arab nations and their potential triggers for job burnout. Job burnout is a form of job stress involving physical, emotional, or mental fatigue and usually including beliefs of inadequate job competence. This form of stress can affect mental wellbeing and cause health complications for social workers. Therefore, it is important to prevent burnout to promote employees' health and wellbeing. Thus, this research aims to identify the differences between social workers' burnout levels in Qatar, Egypt, Jordon, Saudi Arabia, UAE, and Oman, using self-reported questionnaires.

Study Population and Selection Process:

The study population constituted social workers from six Arab countries aged between 23 and 45 years with 46% participants being female and 54% males. The inclusion criteria for the social workers were that they must be currently practicing full-time social workers with at least three years of experience in the field of social work.

Measures:

A demographic questionnaire was distributed to gather general information. Furthermore, a scale was formulated to measure job burnout inspired by the MBI. This was the primary method to measure key burnout factors (e.g. emotional stress, personal achievement, work powers, social relations, work pressure, conflict of values, negative reinforcement, and inhumanity).

Procedure:

The participants were invited to fill out an online survey available on Qualtrics through Twitter. They were provided information regarding the purpose of this investigation and that by participating, they are consenting to completing the survey. All participants were informed that they had the right to withdraw from the study at any point and that the entire experiment could take between 15–25 minutes.

Descriptive statistics were used to describe the participants' basic features, providing quantitative descriptions regarding gender, age, and nationality. A factor analysis was conducted for the eight key constructs in this investigation to identify the questions and key factors most closely associated with each other. A multivariate analysis was also conducted for the differences and interactions between the contextual factors across the key constructs and variables including experience, nationality, age group, and marital status. Pearson's correlation was performed to determine any positive or negative associations between the constructs. A partial correlation was also used to measure the relationship between the constructs while controlling nationality, marital status, and experience

Result and discussion:

Regarding how this investigation is similar to other studies, the results (Figure 1) from this investigation are

Prof. Ibrahim Mohamed Alkaabi

consistent with literature that has shown job burnout to cause emotional difficulties (Morse et al., 2012). Furthermore, this study's findings show similarities with other researches that has shown that work stress and low support at work are key constructs governing job burnout (Schaufeli & Taris, 2014). Furthermore, time pressure and workload/work pressure are also found in previous studies (Teng et al., 2010). The significance of management and organizational roles were also found in this study similar to researches related to job burnout; specifically, social relations/ social support can increase the likelihood of job burnout (Galek et al., 2011).

The correlation coefficients shown in table (1) indicate negative associations between emotional stress, personal achievement, work powers, social relations, work pressure, and negative reinforcement, while the rest of the variables were positively corelated to each other.

Furthermore, the study also supports literature that has shown individual characteristics being critical in determining job burnout. In this study, marital status, experience, and nationality showed variations in job burnout constructs similar to other researches (Malach, Schaufeli, & Leiter, 2001).However, this study did not control the effects of gender and age. Gender is particularly important as previous researches have found a greater risk of job burnout in women than in men (Guthrie & Jones, 2012).

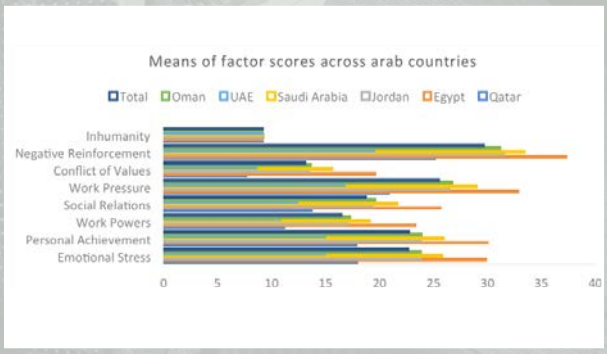
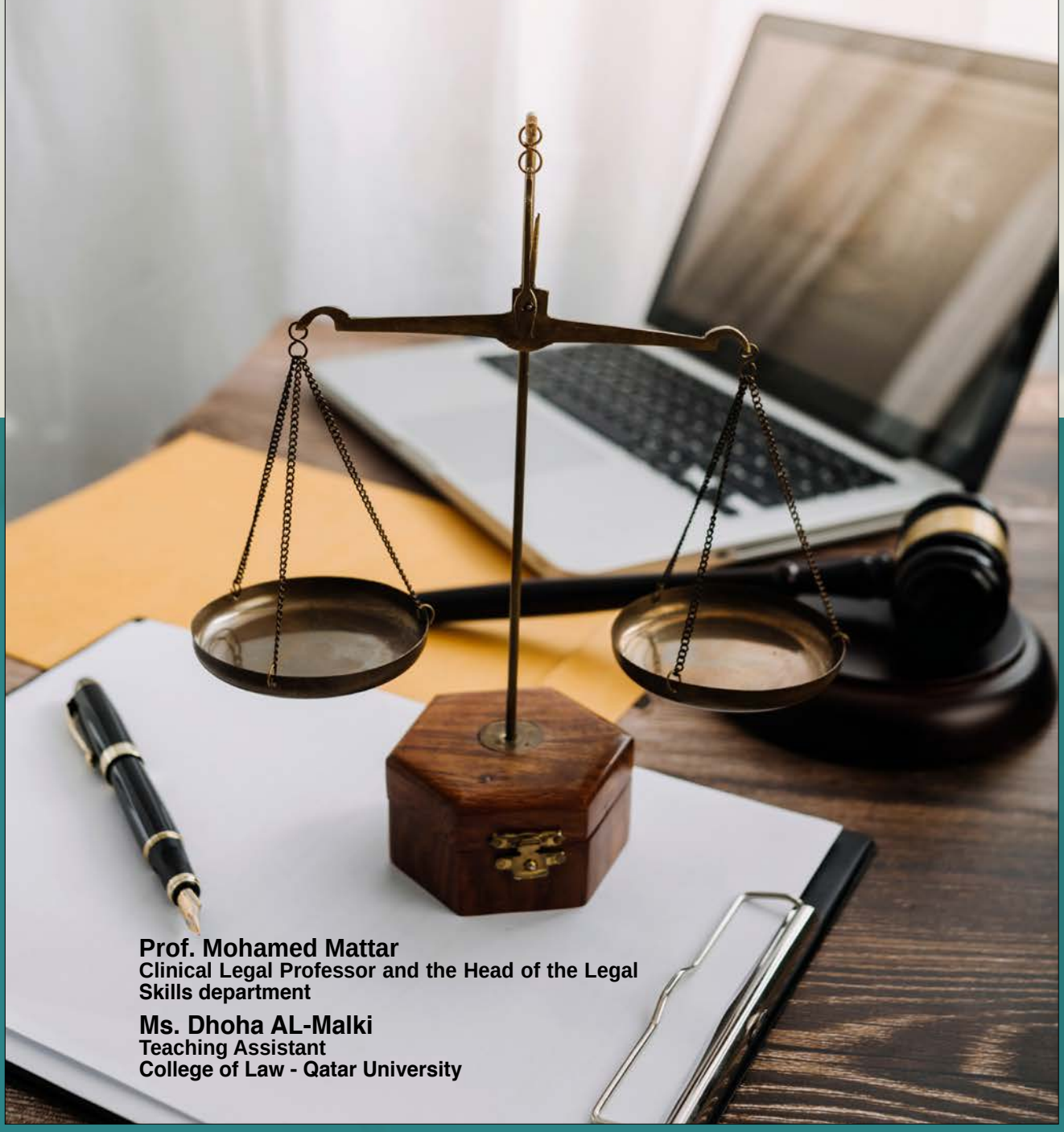


Figure 1. Means of factor scores across Arab countries

	1	2	3	4	5	6	6
Emotional Stress	0.422	-0.318	0.627	0.7	0.562	0.269	0.384
Personal Achievement		0.822	0.477	0.451	0.619	0.658	-0.108
Work Powers			0.409	-0.309	0.626	0.633	-0.047
Social Relations				0.76	0.735	0.191	-0.341
Work Pressure					0.725	0.275	0.467
Conflict of Values						0.438	0.334
Negative Reinforcement							-0.128

Table 1: Pearson correlation coefficients among the job burnout factors

The Law Clinic:
A Model of Education for Community Service



Prof. Mohamed Mattar
Clinical Legal Professor and the Head of the Legal Skills department

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Prof. Mohamed Mattar

Ms. Dhoha AL-Malki

The Law clinic:

The term law clinic is driven from the idea of the medical clinic, whereby a medical school student does not graduate until he/she receives training during the residency in treating patients, so the same idea was transferred to law schools so that the student is acquainted with practical cases and acquires legal skills before practicing the various legal professions.

Right to Legal Aid in the Qatari Constitution:

Law clinics play a major role in providing legal aid, as legal aid is a constitutional right, and the Qatari constitution implicitly guarantees it, under Article (135), which stipulates that "litigation is a safeguarded and guaranteed right for all people." Article (46) affirms that "each individual has the right to address public authorities." Article 39 states that "the accused is innocent until proven guilty before the judiciary in a trial in which the necessary guarantees are provided including the right to defense." These constitutional guarantees and rights cannot be achieved without providing legal aid to vulnerable groups. This is to enable them to exercise their right to litigate and address the authorities, and to guarantee their right to defense in criminal cases.

Establishing Law Clinics in Compliance with the United Nations guidelines:

Directive (16) of the United Nations Principles and Guidelines on Access to Legal Aid in Criminal Justice Systems stipulated that states "encourage and support the establishment of legal training and services centers in law departments within universities to enhance training programs in practical law."

Cases received by the Law Clinic-Legal Representation Model:

The Law Clinic is a general clinic that receives cases filed by migrant workers, related to various work issues, including failure of the employer to pay the worker's wages or to pay the end of employment compensation or other contractual violations. The Law Clinic also receives family cases, especially those related to marriage, divorce and domestic violence.

The Law Clinic moving to Qatar National Library:

The law clinic has moved from the College of Law at Qatar University to the Qatar National Library, and this is akin to the law clinics in South Africa, where the clinic moves from its location in the College of Law to public libraries to make it easier for the public to present their legal problems, and we, on our part, have moved more than once to the Qatar National Library, in order to open the way for all communities of Qatari society to make legal inquiries. At the same time invitation is given to representatives of the Ministry of Administrative Development, Labor and Social Affairs in charge of resolving labor disputes through mediation and reconciliation between the worker and the employer, and the Law Clinic is also honored to have volunteer lawyers who do not receive a fee if referred to for one of the cases presented during this event.

The First Case Examined by the Law Clinic:

On February 22, 2016, the law clinic received the first case and it was related to a worker whose contract was terminated by the employer after 14 years of work, and when the worker asked him to transfer his sponsorship to a new employer, he was required to waive the end of employment compensation in violation of Article (4) of the Qatari Labor Law No. (14) for the year 2004, which considers every waiver of a worker's right stipulated in the law as null and without effect. The Law Clinic helped the worker obtain the full amount of his end of employment compensation. The Law Clinic welcomes the new legislative developments, especially those that ended the sponsorship system and established for the first time a minimum wage.

The Most Recent Case Considered by the Law Clinic:

An expatriate posted a picture on his account on the "Facebook" platform, which included empty shelves in a supermarket, and was found guilty of violating the Anti-Cyber Crime Law. He resorted to the Law Clinic, and a lawyer was appointed to defend him, and in the appeal session on November 3, he was released and was declared innocent, due to the absence of criminal intent.

Qatar Judicial Appreciation of the Law Clinic's Efforts:

The Qatari judiciary has recognized what the Law Clinic is doing, appreciating "the female students of Qatar University for their effort, in exercising their societal duty and for the love of country, as long as you are a treasure for the homeland and may God bless you and protect you from all evil." Primary Case No. (001761 / mdk / 2017 m) third.

The Law Clinic Activities in carrying out Various Legal Projects: The Project Model

In the meantime, the law clinic carries out legal projects of interest for the Qatari community. The Clinic devoted an entire semester to discussing the impact of the blockade of June 5, 2017 on human rights, especially the right to marry, the right to work, the right to education, the right to movement, the right to practice religious rites, the right to litigation, and other rights that have been violated, as a result of the blockade.

In the academic year 2020-2021, the Law Clinic focused on the legal implications of the Coronavirus in various topics, such as the impact of the Coronavirus on contractual obligations, especially employment contracts and their economic implications, criminal responsibility for spreading epidemics and infectious diseases, and the role of the private sector and charities, conducting employment, education and conducting court sessions remotely, and performing medical experiments on the vulnerable.

The Law Clinic carried out this academic activity in cooperation with 30 law clinics in 20 countries, with the participation of nearly 500 students, and concluded with a virtual conference on November 30, 2020.

The Role of the Law Clinic in Raising Awareness and Education:

The Clinic raises awareness about the rule of law through educational convoys in the so-called Street Law, including the distribution of brochures dealing with the various legal implications of Coronavirus (Covid-19). This also includes raising awareness of the Student Integrity Conduct, with the academic and non-academic violations and the disciplinary sanctions resulting therefrom.

Enhancing Legal Skills needed to Practice Different Legal Professions:

In order for the students to perform these functions together, the Law Clinic trains students in drafting legal documents, legislation and contracts, and how to file lawsuits and meet clients. It also aims to introduce students to the ethical rules that govern the practice of the legal profession.

In implementing the different methods of law, the Clinic takes a four-phased approach based on different models. The first is the practical training model, as the Clinic provides legal aid in the cases presented to it, and the second is a preemptive model in which the Clinic tries to solve the problems presented to it, without the need to go to courts, and the third is a cooperative model as the Clinic participates in the legal projects that it is carrying out with other law clinics, and the fourth is a model of International legal education. As the Clinic cooperates with other law clinics in foreign universities of different countries in observing these models, it takes into account the modern standards set by the American Bar Association, which requires that the student completes six hours of experiential courses in order to complete the graduation requirements. A new track was created in the legal profession in addition to the criminal law and commercial law tracks, to prepare students for the job market.

The Impact of the Law Clinic on Academic Accreditation:

From the evidence relied upon by academic accreditation bodies, including the French Agency for the Evaluation of Research and Higher Education and the British Accreditation Council, to grant the College of Law international academic accreditation was the extent of offering of applied legal education and the effective role that the Law Clinic played in this regard.

International Recognition of the Different Roles of the Law Clinic:

The annual report issued by the US State Department on the status of human trafficking in different countries for the year 2020 referred to the efforts made by the Law Clinic at Qatar University College of Law in contributing to the development of the national plan to combat human trafficking in the State of Qatar and to the training of its employees. The US Embassy in the State of Qatar has donated a set of Restatements of the Law in various legal disciplines to the Law Clinic, in a special shelf, The American Shelf, at the University's library.

Most recently the Law Clinic participated in the Fourteenth United Nations Congress on Crime Prevention and Criminal Justice, which was held virtually in Kyoto - Japan on March 7-12, 2021.

Implications of Private Tutoring in Qatar

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Dr. Abdellatif Sellami

Introduction

Private tutoring – also referred to as shadow education – has of late grown in popularity across the globe, with clear prominence in East Asia. The nature, scope and complexity of private tutoring vary from one country to another. Fueled by myriad factors, private tutoring has profound implications for students and their families, the education system, and society as a whole. The recent surge of interest in this phenomenon points to a complex mix of triggers, including cultural, economic, and educational factors.

Qatar exhibits a context where private tutoring is burgeoning, with service providers muscling their way into the shadow education market in the country. The private tutoring industry is widespread in the country and anecdotal evidence indicates that large numbers of students enrolled in mainstream education concurrently attend private tutoring classes. This phenomenon continues to undermine the country's efforts to modernize and improve its system of education.

Results derived from a large-scale school survey conducted by Qatar University's Social and Economic Survey Research Institute (SESRI) in 2015 revealed that around a third of high-school students in Qatar use private tutoring in order to deal with schooling matters, such as completing homework and preparing for tests and exams.[1]

1 The full policy brief "Shadow Education: Private Tutoring and Education Reform" (June 2020), can be accessed in both Arabic and English at: https://sesri.qu.edu.qa/static_file/qu/research/SESRI/documents/Publications/16/Shadow%20Education%20Private%20Tutoring%20and%20Education%20Reform%20AR.pdf.

Another incentive for students is the desire to outperform and score higher than peers.

In 2018, SESRI carried out the Qatar Education Study, looking at private tutoring usage in Qatar. The schools covered in this study represent a cross-section of the major school types in the country: government, international and "other" schools. In total, 1142 parents participated in the study. Of these, 47% (n=532) had a child enrolled in government schools; 34% (n=390) in international schools and the remaining 19% (n=220) in other schools.

The results reported here demonstrate some of the study's key findings pertaining to four areas: (a) the use of private tutoring, (b) the school subject(s) private tutors are hired for, (c) the reasons for using private tutoring, and (d) the estimated cost of private tutoring.

Private Tutoring Usage in Qatar

Put together, results from the survey indicate that participation in private tutoring is more common among Qatari parents than it is among non-Qatari parents. Interestingly, a third of those parents (34%) reported using a private tutor for their child in Qatar. Half of these (51%) are Qatari and just over a third (28%) are non-Qatari.

Much like in other neighboring countries, private tutoring is a flourishing enterprise in Qatar. Various learning centers, private institutes and even individuals provide private instruction. Additionally, different forms of private tutoring are on offer, including one-to-one, small group, or large-class tutoring. Private tutorials are often provided in the tutor's or tutee's home.

School subjects children are privately tutored for

As Figure 1 demonstrates, mathematics was reported by parents as the subject their children are privately tutored for the most (68%) while

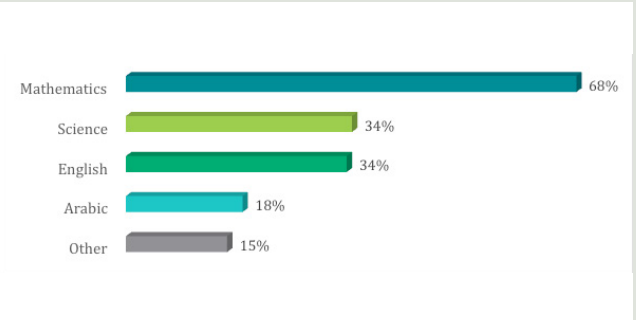

Figure 1. School subject(s) private tutoring is used for

34% indicated their child is tutored equally for both science and English. 18 % stated they hire a private tutor for Arabic and the remaining 15 % other subjects.

Breaking down parental data results by nationality, the results reveal that mathematics is the subject both Qatari (75%) and non-Qatari (72%) parents hire private tutors for the most. Interestingly, clear discrepancies are evident in the responses of both groups with regard to English and Arabic: 47% and 35% of Qatari parents respectively reported hiring a private tutor for the two subjects compared to 29% and 8% of their non-Qatari counterparts. Comparably similar percentages were reported for both Qatari and non-Qatari parents' usage of private tutoring concerning science.

Drivers behind the usage of private tutoring

Different influences shape parents' decisions to hire a private tutor for their child, as is shown in Figure 2 below. Results from the survey point to students' need of academic support (39%) and parental aspirations for their child's academic achievement in particular school subjects (30%) as major drivers of private tutoring. Parents' decisions to use private tutoring are also attributed to parental dissatisfaction with the education

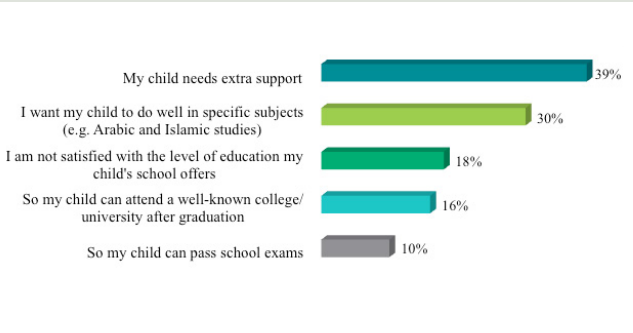

Figure 2. Reasons for using private tutoring

their child receives at school (18%). An additional 16% ascribed their use of private tutoring to the future educational aspirations they hold for their child to attend an elite college or university after graduation from high school. For the remaining 10%, the reason for using private tutoring is related to preparations for exams.

The cost of private tutoring

As Figure 3 shows, around half of parents (47%) spend from 2,000 to less than 8,000 Qatari Riyals (QAR) a month on their child's private tuition. While

Figure 3. The cost (in Qatari Riyals) parents pay for their child's private tutoring a month

around a fifth (21%) indicated private tutoring costs them less than 2,000 QRs, an additional 19% spend from 8,000 to less than 15,000 QAR on it. Combined, these results may entail a financial burden, especially for low- and middle-income families and this will undermine Qatar's endeavors to ensure education for all and undermine its pledge to meet the ideal of providing equitable educational opportunities for children irrespective of their social and economic backgrounds.

Lack of awareness of private tutoring legislation

Regarding parents' awareness of any laws regulating private tutoring in Qatar, the results revealed only 20% of the parents who use private tutoring were aware of such legislation, compared to 25% who are not. Interestingly, around half (48%) reported they did not know.

Conclusion

Private tutoring in Qatar has turned into a lucrative business that is still unregulated. Despite the ban imposed by law on the practice of private tutoring, it is still widespread and remains largely unregulated.[2] Unless it is stringently regulated, this phenomenon will continue to beset Qatar's education system with far-reaching implications. It will have serious effects on standardized instruction and curriculum delivery at different levels of schooling. More importantly, it will undermine the country's endeavor to ensure the provision of equitable education for all and its commitment to securing equal educational opportunities for all children, regardless of their gender, nationality and socio-economic status.

2 According to Law No.18/2015 and Ministerial Resolution No.10/2017, teachers in schools are banned from providing tutoring to students outside schools. See (https://al-sharq.com/article/03/12/2019/).

GCC Countries Collaborate to Work on Food Composition Tables and Database

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Dr. Tahra El-Obeid

The development of many diseases has a direct association with the nutritional and food habits of individuals. Many studies have proven that there is a direct relationship between the human diet and the physical activity with health and diseases. Research has emphasized on the importance of reliable nutrient data and that this data should be updated and reviewed on a periodic basis. Based on the WHO report, "*Diets of human populations are extremely complex ... Maximal insight into the relation between diet and disease will usually be obtained by examining diets both as constituents and as foods. Calculations of intakes of nutrients and other constituents require a food composition database that is complete and current*." The key principle for food composition table is the description of foods and their components. Food composition data is vital for several purposes; which includes the determination of the dietary requirement of individuals, dietary and nutritional counseling, meal planning, obesity management, policy making, food labeling, research and product development. The accuracy of the food composition data is very important as it shows the association between food and nutritional status, assists in the formulation of nutrition interventions to meet regulatory standards, for accurate food labeling and to assist in product formulation. As per Qatar National Nutrition Strategy and Plan of Action on Nutrition (2009) it was stated that the "State of Qatar is being classified among the countries passed through advanced nutritional transition stage, with high level of overweight and obesity, and micronutrient deficiencies in some population sub-groups. Keeping in mind, unhealthy diet and physical inactivity are among the leading causes of the major non-communicable diseases (NCD) such as cardiovascular disease, type 2 diabetes and certain types of cancer, and contribute substantially to the global burden of disease. The major health problems that Qatar has in common with the GCC is obesity, cardiovascular diseases, diabetes, micronutrient deficiencies, inadequate technical capacities and inadequate monitoring of food supply chain. All of these different attributes fall under the unavailability of proper mechanisms provided to health care workers, nutritionists and dietitians to assist them in addressing the major nutritional problems that are all associated with the diet of the community. Analysis of foods in the Gulf region is not well established. Although the area is rich in its different foods, however there are a few publications on the composition of the different dishes. Extensive research on the food components has been achieved in many regions of the world however, research and analysis of the nutrient content of foods in the Gulf region is

still virgin. Some of the GCC dishes are similar all over the Gulf region however there are variations in the recipes that should be accounted for. Over the last 10 years, the composition of very limited foods has been analyzed in Qatar, Oman, Bahrain and the UAE however; it has not covered all foods and did not provide a basis for the development of a comprehensive food composition table. The only available resource for foods in the Gulf is from the FAO and the information available dates back to 10 years.

One of the major challenges is that the data of the nutrient composition of foods in the GCC is that the results compiled are based on calculations and not from direct analysis of foods. This has added a quasi-regulatory role to food composition databases and thus, strengthens the need for maintenance of data quality in terms of both the representativeness of the samples and the quality of the analytical data. Qatar and the GCC have a diversified diet, in-terms of indigenous foods or the new foods introduced due to its cosmopolitan structure. In the field of nutrition and health, it is important to have reliable food composition data, which is imperative as it is used as a guideline for nutrition education, dietetics and for the development of community strategies. To date, Qatar and the GCC do not have a comprehensive National Food Composition Table. The only Food Composition Table that is available is the "Food Composition Tables for Arab Gulf Countries", which lists only 17 general composite Qatari/Gulf dishes. Reliable food composition data is critical in calculating the nutrient intake of a population based upon its consumption statistics and there is a lack of reliable analytical data for foods consumed.

Due to the lack of the consolidated food composition tables for the GCC, meetings were held with the member states to work on the analysis of GCC composite dishes and to have it on a shared platform. This platform will provide all the information required for health professionals, dietitians and nutritionists in devising diets for individuals with specific dietary requirements such as diabetes, obesity, high blood pressure, cholesterol etc. The primary objective is to analyze most of the foods consumed in Qatar and in the GCC and to prepare a database for them.

Pilot results of the GCC food composition tables

Proximate composition and mineral analysis of the traditional Qatari and GCC foods showed that the analyzed composite meals had a high protein content depending on the whether the food is animal or plant based (Figure 1). Figure 2 presents the fat content, which shows that fat content was high in the sweet foods due to the addition of ghee. In Qatar University, College of Health Sciences, the mineral content of the foods and several dishes was analyzed and it was found that they contained high levels of sodium ranging from 1276 to 1989 mg/100g while iron and zinc content varied from 0.3 to 7.4 and 0.03 to 4.5 mg/100g respectively. The level of potassium and calcium (in Figure 3) was found to be highest in Aseeda (sweet dish) with 375.7 and 403.6 mg/100g respectively. There is considerable similarity in the nutrient composition of the Qatari dishes to that of the dishes from the Gulf States. Data from these studies will be helpful in providing the nutrient content of traditional dishes of GCC for planning diet charts and for developing a GCC Food Database in the future.

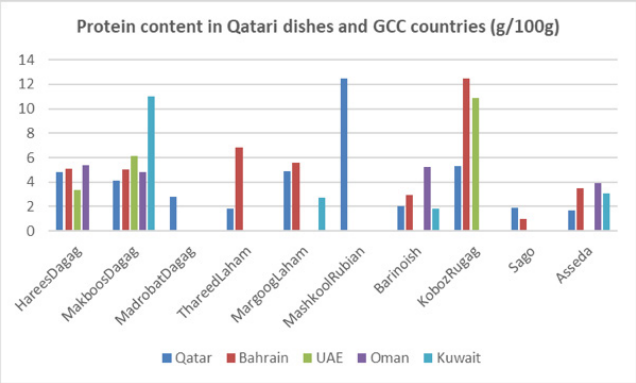


Figure 1. Protein content in Qatari dishes and GCC countries (g/100g).

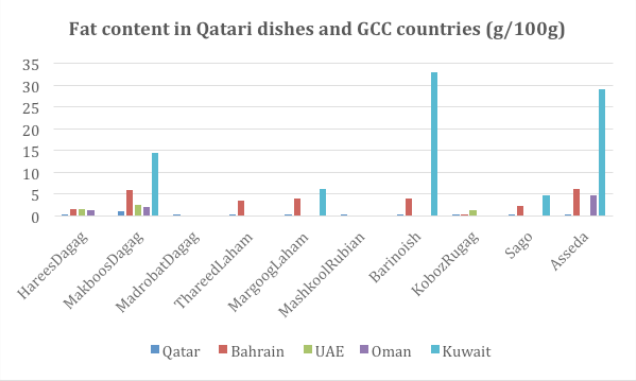


Figure 2. Fat content in Qatari dishes and GCC countries (g/100g).

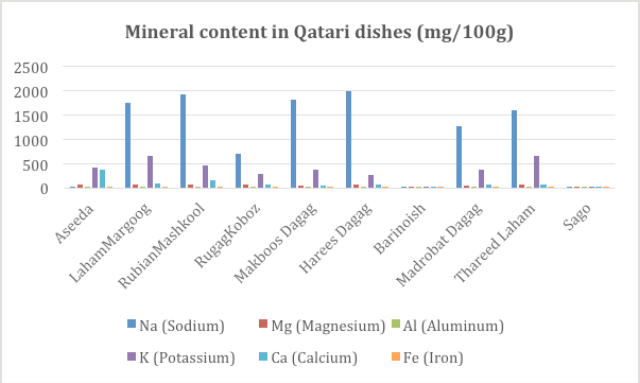
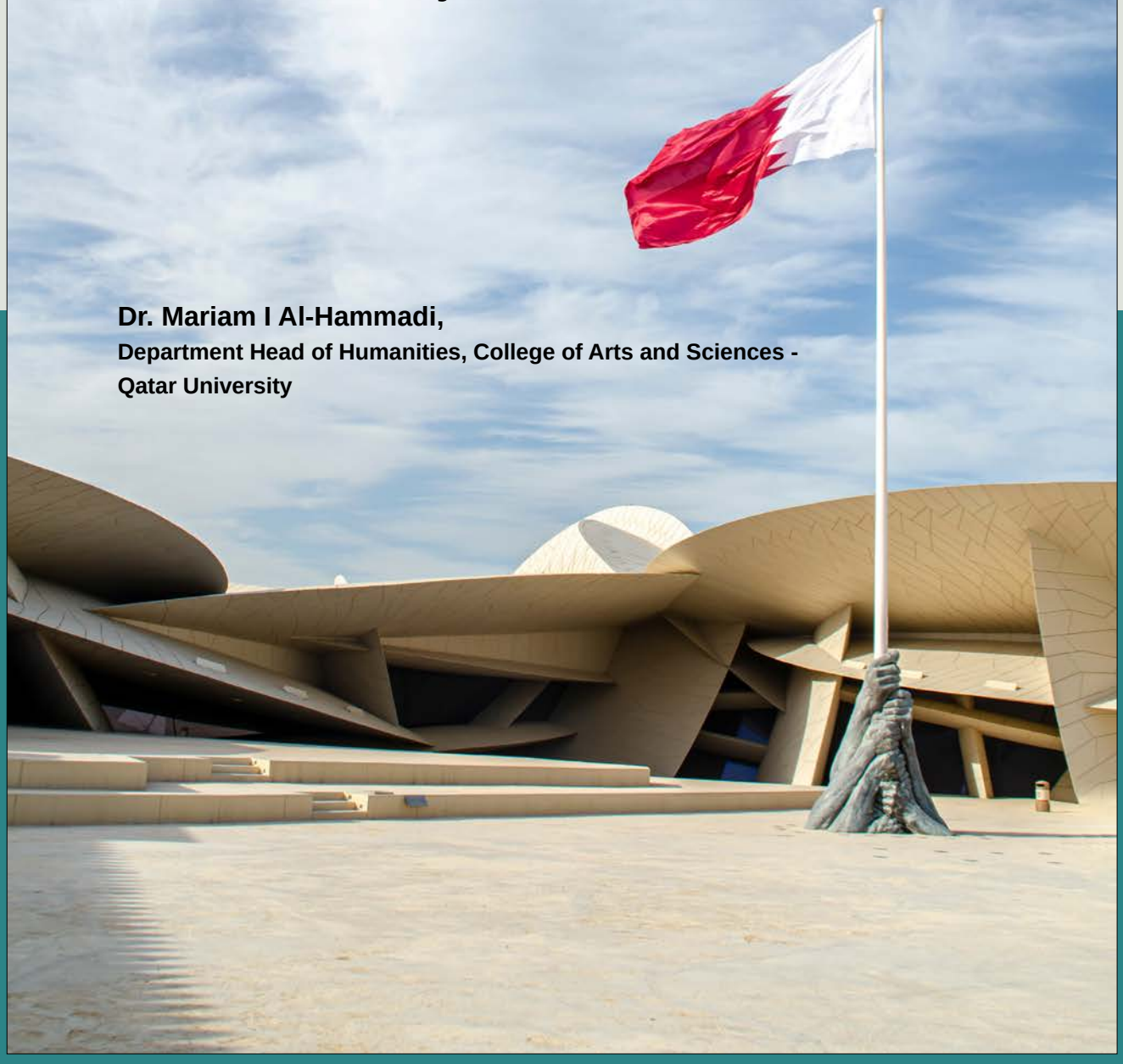


Figure 3. Mineral content in Qatari dishes (mg/100g).

Presentation of Qatari Identity at National Museum of Qatar: Between Imagination and Reality



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Dr. Mariam I Al-Hammadi

Introduction

In recent years, national museums have mushroomed in the Arabian Peninsula to become a regional phenomenon. This has been particularly evident in the intention of the Gulf Cooperation Council (GCC) countries to exhibit their national identity, a practice that has become increasingly focus of the national museums in the region. It is a challenging process in terms of representing the diverse communities. Such focus reflects the important roles that museums play in the politics of culture. In Arabia, museums are principally founded and financed by the states, which makes states the main architects and policy makers of the ideological trajectories museums project and follow.

This article discusses the proposal of the presentation of a unified identity at the new National Museum of Qatar (NMoQ). It focuses on the discussion of Qatari identity, drawing insight into the historical factors that create such an identity. The article raises a series of enthralling questions for the theoretical and methodological approaches to the study of presentation of the Qatari identity, such as: Which identity is worth presenting at NMoQ, the unified or ethnic identity? If the museum's presentation focused on a unified identity, how far would such a presentation be accepted and perceived by the public? This is not without mentioning the political crisis that Qatar faces at present, which has resulted in the siege by neighboring countries and severing of their relationship with the state, due to which Qatari citizens have become bound together.

Taking into account the Qatari community's reaction, further questions are investigated, such as: Does the country really need a presentation of Qatari identity that ignores historical facts? Does the country need a presentation that could correct misperceptions of Qatari identity, through which it can stop prejudices against certain Qatari groups? These questions are vital, particularly if we consider the endless arguments today in the Arabian Peninsula states regarding the effects of globalization, modernization and rapid change on the creation or presentation of identity and Islamic modernity.

What is Identity?

Identity is understood as historically contingent, complicated and socially constructed. Presuming our current concept of identity is transhistorical and transcultural; people's historical question of identity remains similar to today (Fearon, 1999, p.10). This makes it quite difficult to give an adequate statement that can introduce what identity means today. There is broad-ranging interest in the concept of identity.

Components of Qatari Identity: A Reflection on History

For all those differences in the definition of identity, we should focus on the several factors that construct Qatari identity. We cannot assume that a community has only one identity, as a community's identity can include more than one component. Qatar is no exception in terms of its identity as a homogeneous society. We start by highlighting two classes of identities: type and role.

Fearon (1999) argues there are ideal forms of identity and many social groupings are based on role and type. Role identities refer to labels applied to society that is expected to practice certain performance, actions, routines and behaviors. The type of identity refers to labels that are applied to a person who shares the same features in values, appearances, interactive and behavioral traits, attitudes, skills, language, beliefs, knowledge, historical commonalities, traditions, experiences, etc. Both role and type identities are well defined with regard to membership rules and social content.

National identity in Qatar is one example of the type identity. Almost all social categories are type identities, including ethnic identity. In contrast to role identity, which is formal, the type identity becomes less formal. If we will take the homogeneous society in Qatar and concentrate on ethnic identity, for example, we will find that membership in an ethnic group is claimed through hierarchy and historical factors. In terms of historical factors, the movement of groups back and forth in the Gulf region and far beyond plays a large part in their recognition of identity. Such hierarchy and historical factors creates in Qatar different components of national identity: Bedouin, Semi Bedouin and Urban, which includes Huwila (Arab Alhuwila).

Presentation of Qatari Identity at NMoQ: Between National and Ethnic Identity

Which identity is worth presenting at the NMoQ: national or ethnic?

Ever since the 1970s, museums have been concerned with social responsibilities and identity presentation. Consequently, museums transformed their presentations from traditional grand narratives to larger acknowledgement of local and community histories (Grincheve, 2015). Museums became social forums, where different perspectives and voices were shared and highlighted (Grincheve, 2015).

Identity is an essential constituent of state building, and Qatar is trying to verbalize a national identity that can unite its citizens around political leadership. Like identity, tribes have always been important constituents in state building in the Arabian Peninsula. These states were created by a strong tribal system, which legitimized the ruling tribes; hence, tribes are the base and an important part of the fabric of the Gulf social structure, not a separate entity. When we look at the social and political history of these countries, we find that they are a group of different tribes that were at times conflicted and allied at other stages. These tribes also differ in terms of strength, size and number. As a result, no tribe could politically control any of these countries unless they allied and collaborated with other tribes (Al-Shawi, 2014).

The main role that is noticeably assigned to museums is the presentation and interpretation of the new Qatar, which includes culture, politics, economy and identity. By virtue of their nature, museums are too elitist and confidential, which makes their role too effective and persuasive. The construction of Qatari identity in the context of pre-conceived ideas of a unified national identity is a proposal that predominates the intention of the museum's organizers. This reflects an intention to construct a recognition of belonging to one political entity and simultaneously a recognition of a distinctive history, culture and heritage.

Conclusion

This study of Qatari identity and the proposal of its presentation in the new NMoQ shows how complicated the relationship between the museum narrative and ostensible historical factors could be. Researching the historical factors shows that the presentation of a unified identity could be a brave step forward and a key to contemporary future; however, a clear display of historical factors is necessary to correct misconceptions of the Qatari identity. They also are necessary for the changing conceptions of community and its relations to possible and desirable future for Qatar, particularly as the past is so evident and alive in today's Qatar—and it will stay alive in our future, as there is no line between past and present. The past instead is very much relevant to today, as evidenced by the Qatari people's reaction against the blockade. Such siege led to a unification of the community with their sense of nationalism as a response to the outside threat. The bond that links the Qatari community proved to be strong as the community with its variation does not struggle culturally or traditionally. Rather, it proves that the Qatari community identity is a creation of social attributions. Thus, denying ostensibly historical factors would not be necessary in the museum presentation to prove the unification of the community.

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Muslim Philosophers and Theologians on Mathematics(1)

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This research focuses on the debate that arose between philosophers and theologians about some theoretical concepts of mathematics. Muslim philosophers generally accepted the Greek conception of mathematics, in particular, concept, in terms of its division into the geometry, which is related to the continuum quantum and arithmetic, which is related to the discrete quantum. This is in addition to the need of geometry to the hypothesis of magnitude, and the need of arithmetic to consider number as a mental faculty. However, we note that theologians rejected both of them, saying that geometry and arithmetic could be established without the basis of the two hypotheses of magnitude and number. This will result in a distinction between geometry and arithmetic. Recent studies of the development of Islamic mathematics revealed that Muslim mathematicians, who did not accept the Greek concept of mathematics, were able to make important achievements in mathematics. In addition, their conception of mathematics was closer to the modern science than the Greek philosophers. This is because Muslim mathematicians did not make a sharp distinction between continuum quantum and discrete quantum, and how such perceptions appeared only in the West in the sixteenth and seventeenth centuries. These studies, however, have not heeded that the theoretical principles of these developments in mathematics are due to the influence of the Islamic theology.

(1) This research was published in the Journal of **Islamic Studies**, Islamic Research Academy, World Islamic University, Pakistan, Issue 1. Volume 46, pp. 47-60, January-March 2011/Muharram-Rabi-ul-Awwal 1432 A.H.

Following Aristotle, Ibn Sina divides mathematics into both geometry and arithmetic; Ibn Sina distinguishes between them that the subject of the first is the continuum quantum, for example, the line, in which any part imposed is the end of one part of the line, which is also the beginning of another. It is common between the two parts of the line. The subject of the second is the discrete quantum, which has no common factor for its parts, for example, seven, if divided into three and four, there is no common factor between the two numbers. As a result, of this division, each of these two sciences has an existential and cognitive position. In the existential sense of geometry, the subject of this science is magnitude. In cognitive terms, a mental power has been assigned to understand the subject matter of this science, which is the factious force that takes it away from external concrete. As for the existential position of the arithmetic, the number is outside as an overstate of the external number. As for cognitive position, the mind is aware of the number after it is taken away of external accounts.

It should be noted that the Greek philosophers' division of mathematics into geometry and arithmetic, which was introduced by the Muslim philosophers, was due to the inability of Greek mathematics to deal with the irrational numbers. Thus, this forced them to distinguish between geometry as a science pertaining to continuous quantum, and arithmetic as a science related to discrete quantum. It made geometry handle this type of numbers. Thus, Greek mathematics was described as essentially an engineering mathematics. Also, for geometry, when saying that quantity is the subject of this science, it will be related to the external existence. In other words, the shapes they look at are those that are external. Thus, geometry was limited to the straight line, circle and forms from which it could be derived. As for arithmetic, the definition of a number as an object composed of units will limit calculations including addition, subtraction and so on to integers only, so that these operations do not include irrational numbers.

Theologians did not accept Muslim philosophers' perception of both magnitude and number, arguing that geometry does not need the hypothesis of magnitude. Additionally, the concept of number is not necessary for arithmetic. It should be noted that the view of the theologians is that geometric forms are made up of individual substances. The magnitude, as argued by the philosophers, did not exist. This leads to a final conclusion that there is no difference between the subject of geometry and the subject of arithmetic. That was because subjects of each of them will be the discrete quantum. In fact, this is what Ibn Rushd noted, in criticizing the fact that theologians adopted the theory of individual substance. Ibn Rushd believes that the fact that theologians adopted this theory in the interpretation of quantum and geometric substances will lead to the dropping of the distinction between geometry and arithmetic.

Indeed, this is shown by the rise of algebra of Al-Khwarzmi and the subsequent developments by Muslim mathematicians. By algebra, all these things which were previously dealt with by two different science, can be combined within one science. As noted by a scholar of Islamic mathematics, algebra of Al-Khwarzmi was a revolutionary shift away from the Greek concept of mathematics, which was essentially geometric. Algebra was a comprehensive theory that made it possible to deal with rational numbers, irrational numbers, geometric magnitude, etc. It is all algebraic objects. Dr. Rushdie Rashid says that, "even if the radicals of algebra belonged to Babylon mathematics, Euclid's Elements and the Arithmetic of Diophantus, what distinguishes Al-Kharzmi's theory, which was never imagined by his predecessors, was his creation of a theory of equations that can be resolved by radicals. This theory can be the basis of scientific problems of geometry and arithmetic alike."(1) Therefore, algebra is beyond ancient Greek mathematics in terms of its sharp separation of geometry and arithmetic by combining them into one science, algebra.

The importance of algebra of Al-Khwarzmi lies in paving the way for Muslim mathematicians to work beyond that distinction in mathematics between geometry as a science of continuum quantum and arithmetic as a science of discrete quantum. This is what is found, for example, in Mahani's sayings. In his explanation of Article X of Euclid's Elements Book, Al Mahani provides a definition of irrational quantum and rational quantum that is different from Euclid' s definitions. Al-Mahani treats the quantum as irrational numbers. While Euclid considers that quantum is only lines, Al-Mahani deems both integers and decimals as integers. Radicals and cube radicals are perceived as irrational numbers. Finally, the attempt to transcend Greek mathematics in distinguishing between quantum and number also shows in Al-Khayyam algebraic project. Al-Khayyam wanted to build a geometric theory of algebraic equations that was the first of its kind. Thus, he developed the concept of standard unity, which allowed him to apply geometry to algebra. The thing that made it possible for Al-Khayyam was to combine the concept of standard unit with the concept of magnitude.

These and other examples show how Islamic mathematics, with the influence of Islamic theology, did not succumb to the philosophical concept of Greek principles of mathematics in relation to the distinction between the subject of geometry and arithmetic.

(1) Rashid, Rushdie. "Al-Jabr", in the *Encyclopedia of the History of Arab Science*, supervised by Rushdie Rashid, pp. 463-489 (Beirut: Center for Arab Unity Studies, 1997), p. 464.

QU Researchers Lead Development of Sustainable Electrochemical Oxidation Processes to Degrade Water-polluting Pharmaceutical Compounds

Dr. Mohammad Ibrahim

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Qatar University researchers lead an international research team to publish a research article in the high impact factor reputable scientific journal, named Chemical Engineering Journal, published by Elsevier. This research work presented as an efficient sustainable degradation process of the hydroxychloroquine (HCQ) in aqueous solutions by electrochemical advanced oxidation processes including electrochemical oxidation (EO) using boron doped diamond (BDD) and its combination with UV irradiation (photo-assisted electrochemical oxidation, PEO) and sonication (sono-assisted electrochemical oxidation, SEO). The research team was headed by Prof. Nasr Bensalah, Professor of Chemistry, Department of Chemistry and Earth Sciences, College of Arts and Sciences at Qatar University. The research team included Dr. Mohammad Ibrahim, Research Associate, Central Laboratories Unit, Research and Graduate Studies Sector (VPRGS), Qatar University, Prof. Ahmed Bedoui, Department of Chemistry, Faculty of Sciences, University of Gabes, Tunisia, and Sondos Midassi (PhD student), Department of Chemistry, Faculty of Sciences, University of Gabes, Tunisia.

Prof. Bensalah mentioned that the past studies indicated that the Hydroxychloroquine (HCQ) is widely used as a drug for the treatment of rheumatologically, dermatological diseases and prescribed as an antimalarial drug. Recently, national and international medical organizations globally, allowed using of chloroquine and hydroxychloroquine in the treatment protocols of COVID-19 for certain hospitalized patients. Dr. Mohammad Ibrahim announced that a huge amount of HCQ is needed for the treatment of different diseases over the world, which certainly results in the discharge of large quantities of wastewaters contaminated with HCQ into the environment.

Due to its chemical and biological properties, HCQ has high potential to persist, bioaccumulate, and transfer to living organisms in intensified toxic forms. The literature -as mentioned in the study- indicated that, HCQ can also contaminate air (ozone depleting substance), soil (bioaccumation in vegetation), and groundwater (persistent substance). The high risks of natural water contamination due to the large production and utilization of HCQ, necessitates more attention to limit its hazardous effects on human health and environment.

The research team pointed out in the article that the results offer significant information needed in the future to depollute large quantities of wastewaters contaminated with HCQ drug and its metabolites as it was especially adopted as the first treatment of COVID-19 by many health organizations. HCQ degradation was monitored by UV/VIS spectrophotometry and total organic carbon (TOC) analysis. The analysis of organic and inorganic intermediates was conducted using high performance liquid chromatography (HPLC) and ion chromatography (IC). The experimental setup used in all electrochemical experiments comprises a single compartment electrochemical flow cell working in

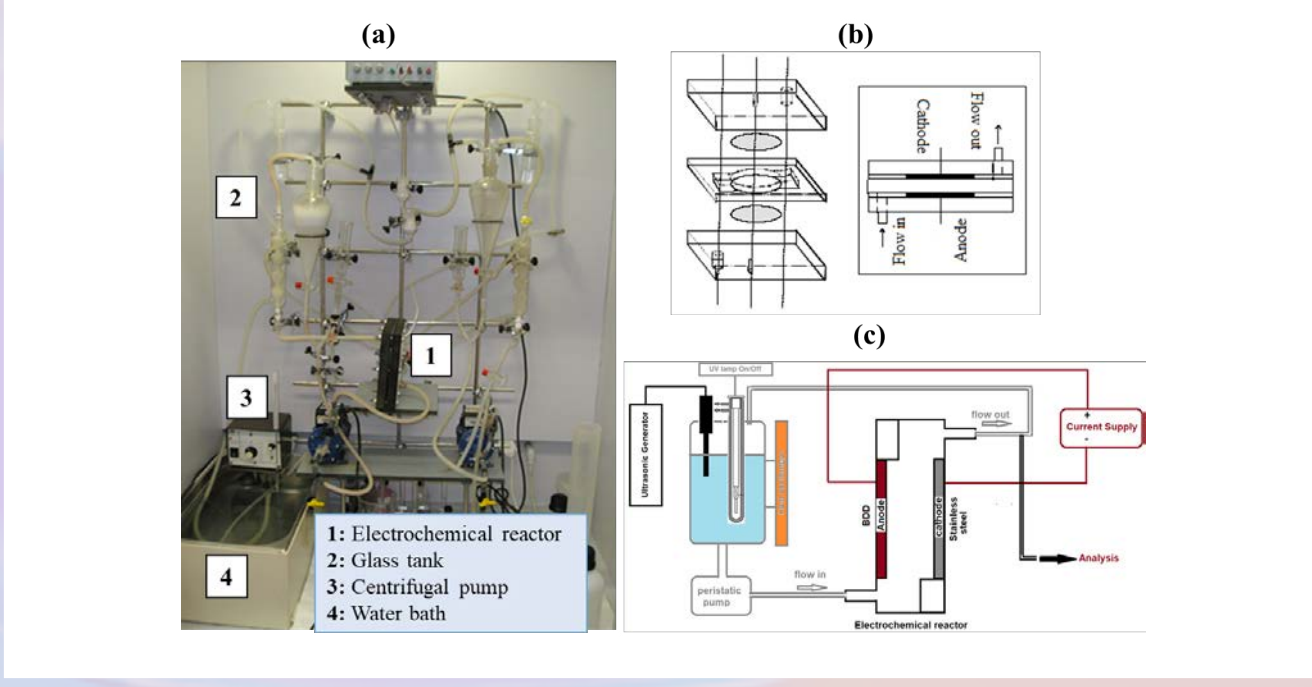

Figure 1. (a) Electrochemical setup, (b) Electrochemical reactor, and (c) Combined processes setup.

batch-operation mode (Figure 1.a). The electrolyte stored in a glass tank was circulated through the electrolytic cell by a centrifugal pump at a constant flow rate. A thermostatic bath/heat exchanger was used to maintain the temperature at 25°C during all the experiments. The same electrochemical flow cell was used in SEO and PEO experiments. In SEO experiments, an ultrasonic generator equipped with a sonication probe that is immersed in the glass tank was used. In PEO experiments, a UV lamp mercury medium pressure located in an axial position submerged in a vertical immersion tube contained in a vertical quartz cooling tube and immersed in glass tank was used. (Figure 1.b).

EO using BDD anode achieved complete depletion of HCQ from aqueous solutions regardless of the HCQ concentration, current density, and initial pH value. The decay of HCQ was more rapid than total organic carbon (TOC) indicating that the degradation of HCQ by EO using BDD anode involves successive steps leading to the formation of organic intermediates that end to mineralize (Figure 2.a). Furthermore, the results demonstrated the release of chloride (Cl–) ions at the first stages of HCQ degradation. In addition, the organic nitrogen was converted mainly into NO^{3-} and NH^{4+} and small amounts of volatile nitrogen species (NH_3 and NO_x). The chromatographic analysis confirmed the formation of 7-chloro-4-quinolinamine (CQLA), oxamic and oxalic acids as intermediates of HCQ degradation by EO, using BDD anode (Figure 2.b).

The research report revealed that the combination of EO with UV irradiation or sonication enhances the kinetics and the e□cacy of HCQ oxidation. PEO

From left: Prof. Nasr Bensalah from Department of Chemistry and Earth Sciences – College of Arts and Sciences and Dr. Mohammad Ibrahim from Central Laboratories Unit – Research and Graduate Studies Sector.

requires the lowest energy consumption (EC) of 63 kWh/m3 demonstrating its cost-e□ectiveness compared to the other EAOPs. PEO has the potential to be an excellent alternative method for the treatment of wastewaters contaminated with HCQ drug and its derivatives. Dr. Mohammad Ibrahim stated that PEO method utilizes only electrons and photons as reagents without the addition of other hazardous chemicals confirming its sustainability. This method is easy to be scaled in large water treatment plants and can be integrated with renewable resources (i.e. solar energy).

The article is available via the following link: https://www.sciencedirect.com/science/article/pii/S1385894720324074.

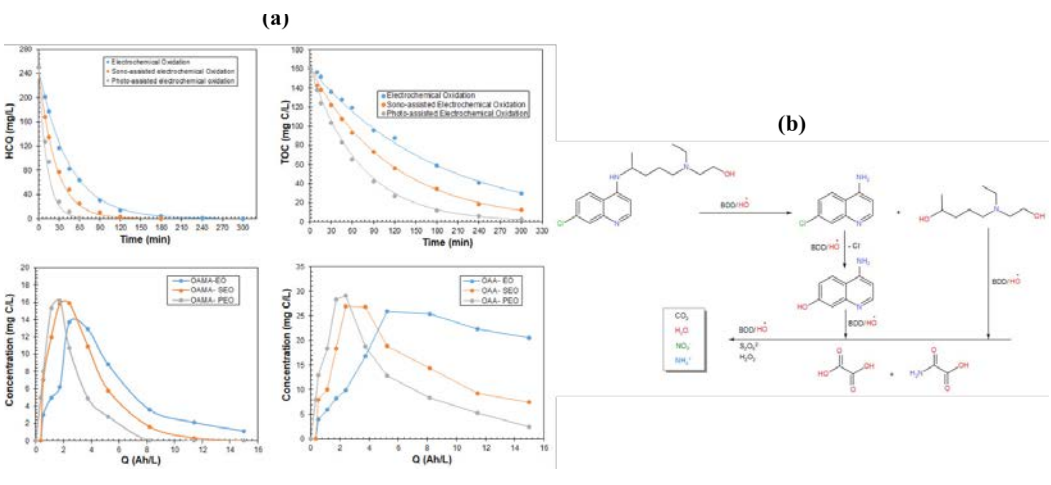

Figure 2. (a) Changes in HCQ, TOC with time and intermediates with the specific electrical charge during EO, SEO and PEO of HCQ in aqueous solution using BDD anode. Operating conditions: 0.05 M Na_2SO_4, [HCQ] = 250 mg/L; j = 20 mA/cm^2; initial pH = 7.1; T = 25°C, (b) Simple mechanism of HCQ degradation by electro-generated oxidants using BDD anodes.

Fish Consumption in Qatar

Dr. Sana Abusin

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Introduction

Qatar National Vision calls for responsible consumption and sustainable management of natural resources, simultaneously with the achievement of self-sufficiency in food production. As a result, Qatar has undergone an important development of shifting from full dependency on food imports to self-sufficiency in perishable foods in its National Food Security Strategy 2018-2023, aiming at managing the fish stock, currently under pressure of high consumption due to population increase.

Dr. Sana Abusin

Therefore, research studies on fish consumption became very important. Studying fish consumption is vital to estimate local demand and hence identify the gap between production and imports. Managers will also be able to manage fish stock by using the insights acquired from these studies. In particular, they will be able to identify fish species that are in high demand. Hence, they could formulate the necessary policies pertaining to fishery sustainability.

Despite the importance of fish consumption, socioeconomic aspects in understanding local production, consumption, import, and export of fish, there is lack of statistics and very few and outdated publications on fish consumptions exist. Therefore, the Social and Economic Survey Research Institute (SESRI) at Qatar University conducted its fourteenth Qatar Semi-Annual Survey (QSAS) in May 2019 to provide valuable information to decision-makers, politicians, scholars, and students about the general opinion of the three main groups of residents in Qatar (Qataris "citizens", white-collar "expatriates" and blue-collar "labourers"). The survey consisted of 2335 completed telephone interviews conducted across the three segments of the Qatar population (Qataris (677), white-collar (821) and blue-collar workers (837)).

Socio-economic aspects of fish consumption

To understand respondents socio-economic aspects of fish consumption in Qatar, consumption rates were determined by asking respondents about the number of times they consumed fish per month. Based on their responses, three categories are created: low (1–3), moderate (4–8) and high (more than 8) times per month.

Results showed that, among all respondents, blue-collar workers reported the highest fish consumption compared to Qataris and white-collar workers. Moreover, the frequency of consuming fish increased with education and preference to consume local species for moderate consumers. White-collar workers and Qataris prefer local fish, while blue-collar workers prefer imported fish. This may be because of lower prices and willingness to consume freshwater fish species found in their home countries.

Consumers were asked about reasons for not consuming fish. Result showed that, the religious reason of not consuming fish registered higher records. This might be affected by the fact that the data were collected during Ramadan, when most people prefer not to eat fish. Other factors negatively influencing fish consumption in Qatar are the existence of bones and the strong smell of the fish, in addition to people being vegetarians or allergic to fish.

Commercial fish species and their preference in Qatar community

Qatar community has different rate of consumption based on species that they prefer. Figure (1) shows the different rate at which commercial fish species are consumed in Qatar. It is quite clear that there is consumption pressure on only four species compared to others, which may affect the fish diversity and threat their sustainability.

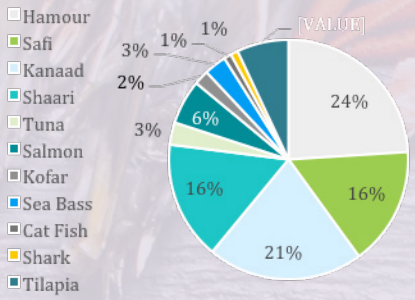


Figure 1. Most preferred fish species in Qatar.

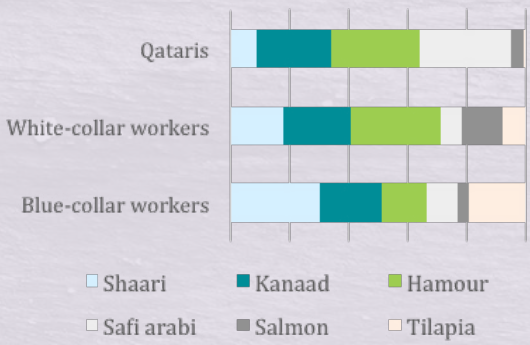


Figure 2. Most preferred fish species by respondents.

Fish consumption preferences were studied in more details based on respondents' type. Results in Figure (2) revealed that, among a total number of ten commercial species, Qataris mainly prefer to consume four: Humour, Safi, Kanaad and Shaari. Other respondents prefer these fish species too, but with different preference rate. In addition to the most preferred four species, white-and blue-collared workers prefer Tilapia and Salmon, the reason behind this might likely be because they consumed them in their home countries.

Fish consummation as part of food security strategy

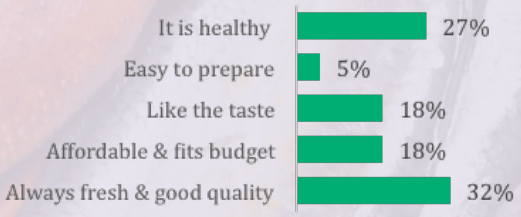


Figure 3. Factors that affected the purchase of fish or other fishery products.

The fisheries sector in Qatar is generally artisanal in nature, but has grown remarkably in the last decade. According to food security strategy 2018-2023, Self-sufficiency in fish products in Qatar was estimated at 74% in 2020 and the average annual consumption was about 22.3 kg per capita, roughly the same as the world average. Respondents were asked about factors that affected the purchase of fish or other fisheries products. The results showed that fish products are affordable, fresh, healthy and tasty (Figure 3). Commercial fish species are available at various prices to ensure that all members of Qatar's diverse community can access and consume fresh fish according to their budgets. Moreover, most respondents reported buying fish from supermarkets and as part of its food security strategy, Qatar has established new local markets for fish, such as the Um Salal market. Um Salal market replaced the old Abu Hamour market because of its proximity to fresh fish sources, such as Al-Khor and Al-Shamal.

Tilapia consumption in Qatar

Tilapia is one of the fresh water fish species that is introduced to Qatar fisheries, to be produced as an aquaculture product, so to fill the fish consumption gap and ensure that a shift to 90% fish self-sufficiency is achieved. The following graphs present social acceptance of this emerging species.

Respondents were asked a hypothetical question," Would they eat Tilapia if it were produced locally". The results showed that 65% of people in Qatar would

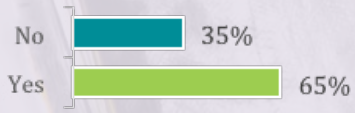


Figure 4. Acceptance of Tilapia consumption if it would be produced locally.

probably eat it, which gives a good indication that producing Tilapia would be a step toward to fulfilling the food security strategy's goal (Figure 4).

In order to know more details about Tilapia consumption in Qatar, the data was analyzed based on the respondent type. It seemed that both white-collar and blue-collar workers had enough knowledge about the emerging Tilapia fish and are willing to consume it that likely reflects their diverse origins from countries with fresh water fish species. In addition, half of Qataris are willing to consume Tilapia, revealing unexpected but positive findings as reflected by Figure 5.

Figure 5. Tilapia consumption by respondents.

Policy Recommendations

- Conducting a health awareness campaign to increase the consumption rate of fish species that are not under pressure, especially to safeguard fish biodiversity.
- Using species that are not highly demanded, as "byproducts" such as, animal feed and/or feeding aquaculture species by converting these fish to small cubes.
- Studying the Qatari community's willingness to consume processed fish of species in low demand in the form of canned fish, snacks and dry fish protein.
- Opening foreign investment opportunities in some areas, including efficient aquaculture and land-based systems to produce fish species that supports the fish stock under pressure.
- Rationalizing the management of the fisheries in Qatar to meet increasing demand and to change the fish industry from its artisanal nature to a more commercialized sector.

Clinical Implementation of Precision Medicine and Pharmacogenomics in Qatar

Dr. Hazem Fathy Ahmed Mahmoud Elewa

Section Head of Clinical Education, College of Pharmacy - Qatar University

Precision medicine refers to the use of genetic, environmental, lifestyle, and other unique patient or disease characteristics to guide drug selection and dosage. It is also highlighted as personalized medicine or precision health. Pharmacogenetics/ pharmacogenomics (PGX) as a discipline is part of precision medicine and personalized healthcare. PGX uses genetic information to predict subject's response to a medication (i.e. responders vs. non-responders to a medication), and to determine patients likely to experience adverse events of the medication, and the optimal drug dose. The knowledge and skills of clinical pharmacists in pharmacokinetics and pharmacodynamics of drugs gives them an advantage to take the lead and provide clinical services in the evolving area of PGX. In a statement draft on the pharmacist's role in clinical PGX, the American Society of Health-System Pharmacists (ASHP) highlighted the ability of clinical pharmacists to lead interprofessional efforts to develop guidelines and protocols and to initiate PGX services

Dr. Hazem Elewa, Associate Professor and the Head of Clinical Education and Training at the College of Pharmacy at Qatar University has been leading multiple funded projects on the implementation of PGX in Qatar from Qatar National Research Fund (QNRF) and Hamad Medical Corporation (Close to 1 Million QAR). These projects have been the MSc and PhD projects of five post-graduate students, in addition to three undergraduate students (UREP). The projects have yielded so far seven publications and more than ten abstracts in peer-reviewed journals. The projects focused on two drugs: (warfarin and clopidogrel), which are very important cardiovascular drugs used in the prevention and treatment of ischemic heart disease (heart attacks), stroke (brain attack) and other blood clotting disorders. Dr. Elewa stated "Cardiovascular disease is one of the top priorities according to the National Health Strategy in Qatar (2018-2022). Pharmacogenetics can be a very useful tool to enhance the efficacy and reduce the adverse events of two of the most widely used medications in this area- clopidogrel and warfarin."

A wide variety of Cytochrome P- 450 enzymes contribute to the 2-step bioactivation process of the clopidogrel, however, genetic studies showed that CYP2C19 mutations have the most pronounced effect on clopidogrel inter-individual variability. Ms. Zainab Ali, MSc graduate under the supervision of Dr. Elewa aimed to determine the prevalence of CYP2C19 genetic polymorphism in Arabs and to examine the association between the genetic and non-genetic factors and clopidogrel responsiveness

Dr. Hazem Elewa (middle) with members of his lab (Mrs. Loulia Bader and Mr. Islam Eljilany) during one of the genotyping experiments

in terms of clinical outcomes. The project included 254 patients from Heart Hospital who had acute coronary syndrome and underwent percutaneous coronary intervention. Those patients were followed-up for 12 months via phone calls and the medical electronic chart (Cerner®). Both bleeding and major adverse cardiovascular outcomes were reported in the study. It was noted that a common gene variation in the CYP2C19 contributes to the interindividual variability in response and safety to the commonly prescribed antiplatelet- clopidogrel (Plavix®). About 50 percent of the studied Arab population had variations in the studied gene, which made a high proportion of the population at risk of either increased risk of bleeding or increased risk of recurrent cardiovascular events (heart attacks) (Figure 1). Dr. Hazem comments that "people with the variation might need to take more tailored doses according to their genotype or they might be prescribed one of the newly approved antiplatelets - ticagrelor (Brilinta®) or prasugrel (Effient®) for those who respond poorly to clopidogrel. This is the first study in the Middle East and North Africa region to assess the association between genetic variations in CYP2C19 and the bleeding outcomes. Additionally, it is the first study to report the prevalence of CYP2C19 genetic variants and their associated clinical outcomes in Qatar. The results of this study will add to the literature of clopidogrel genetics generally and especially in Qatar. These results may trigger further studies on clinical implementation of clopidogrel genetics when choosing antiplatelets in the management of acute coronary syndrome." In a subsequent study to assess the pharmacoeconomic impact of applying a genetic-guided strategy when choosing these antiplatelets, it was found that the use of genotype-guided therapy would be more cost-effective than using one standard treatment. This study was in

collaboration with pharmacoeconomic expert, Dr. Daoud Al-Badriyeh, Associate Professor, College of Pharmacy and the work was performed by MSc graduate, Ms. Sawsan Almukdad.

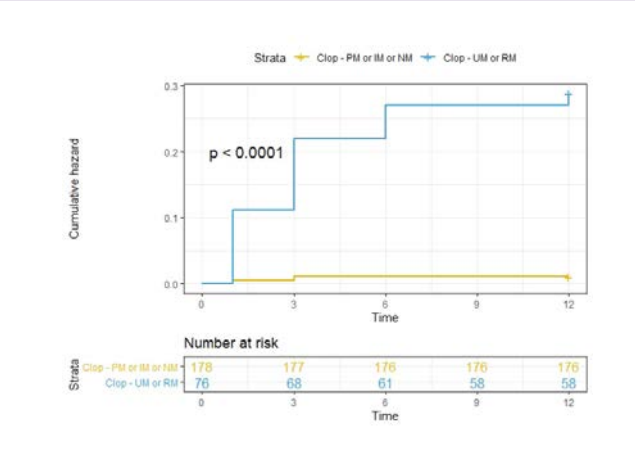


Figure 1. Kaplan-Meier survival curve indicating increased risk of bleeding for clopidogrel rapid or ultra-metabolizers compared to the carriers of other genotypes.

Dr. Hazem Elewa says, that "based on the current cost of genotyping and the continuous progress in genotyping techniques and its world-wide availability, we think that genetic testing will be an important determining factor for healthcare providers to choose between clopidogrel and the more costly branded drugs Brilinta® or Effient®."

For more than half a century, warfarin has been the cornerstone oral anticoagulant medication. Among the most important drawbacks of warfarin is its narrow therapeutic index, which can mediate serious bleeding adverse events that can even lead to hospitalization and death. Another disadvantage is the inter - and intra - patient variability in the dose required to achieve the optimal anticoagulation response. Dose requirements can vary from 0.5 mg to 20 mg per day. Various studies showed that genetic and non-genetic factors contributes to warfarin dose variability. The most important genes affecting warfarin dose among different populations are the CYP2C9 - a gene that codes for CYP2C9 enzyme which metabolizes and eliminates the more potent S enantiomer of warfarin, and VKORC1 - a gene that codes for the VKOR which is the enzyme inhibited by warfarin. In a clinical study performed on 150 Qatari patients using warfarin, Dr. Hazem along with his collaborators from Hamad Medical Corporation were able to show for the first time in a Qatari population the impact of VKORC1 (-1639G>A) , CYP2C9*2 & *3 on the warfarin dose variability (Figure 2A and 2B). Along with other clinical factors, these genetic factors explained almost 40% of warfarin dose variability. This study was the MSc project of Mrs. Loulia Bader and was published in The Pharmacogenomics Journal, which is part of Nature Publishing Group and has an impact factor of 4.2.

In alignment with the increasing importance of precision medicine and PGX, Dr. Elewa along with his colleague, Dr. Fatima Mraiche, Associate Professor, College of Pharmacy are launching a new pharmacogenomics elective course at the College of Pharmacy, Qatar University, starting next semester (Spring 2021). "PGX and precision medicine will shape the future of medical field. With the advancement in the DNA sequencing technology and its reduced cost, genetic information will be an integral part of patients' medical records. We believe that this course will prepare our students to make the best treatment choices in their practice, which will in turn further enhance patient care in Qatar," Dr. Elewa ended.

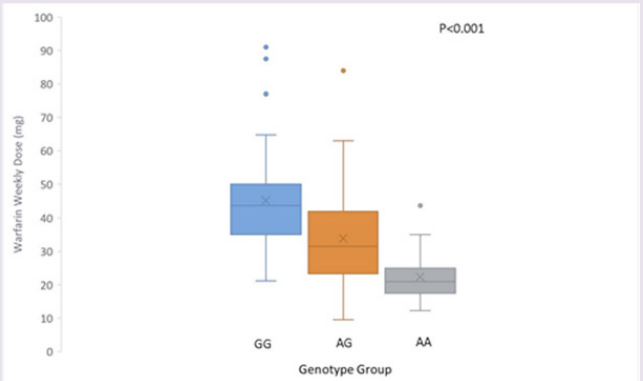


Figure 2A. Effect of VKORC1 (-1639G>A) (rs9934438) alleles on warfarin dose in the Qatari cohort.

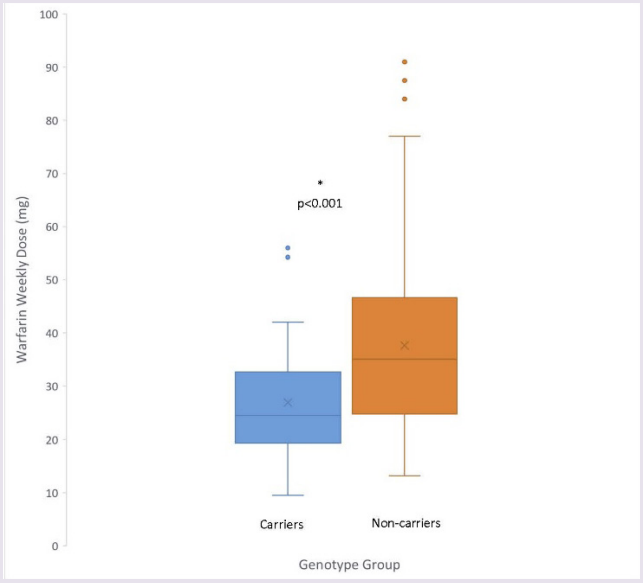
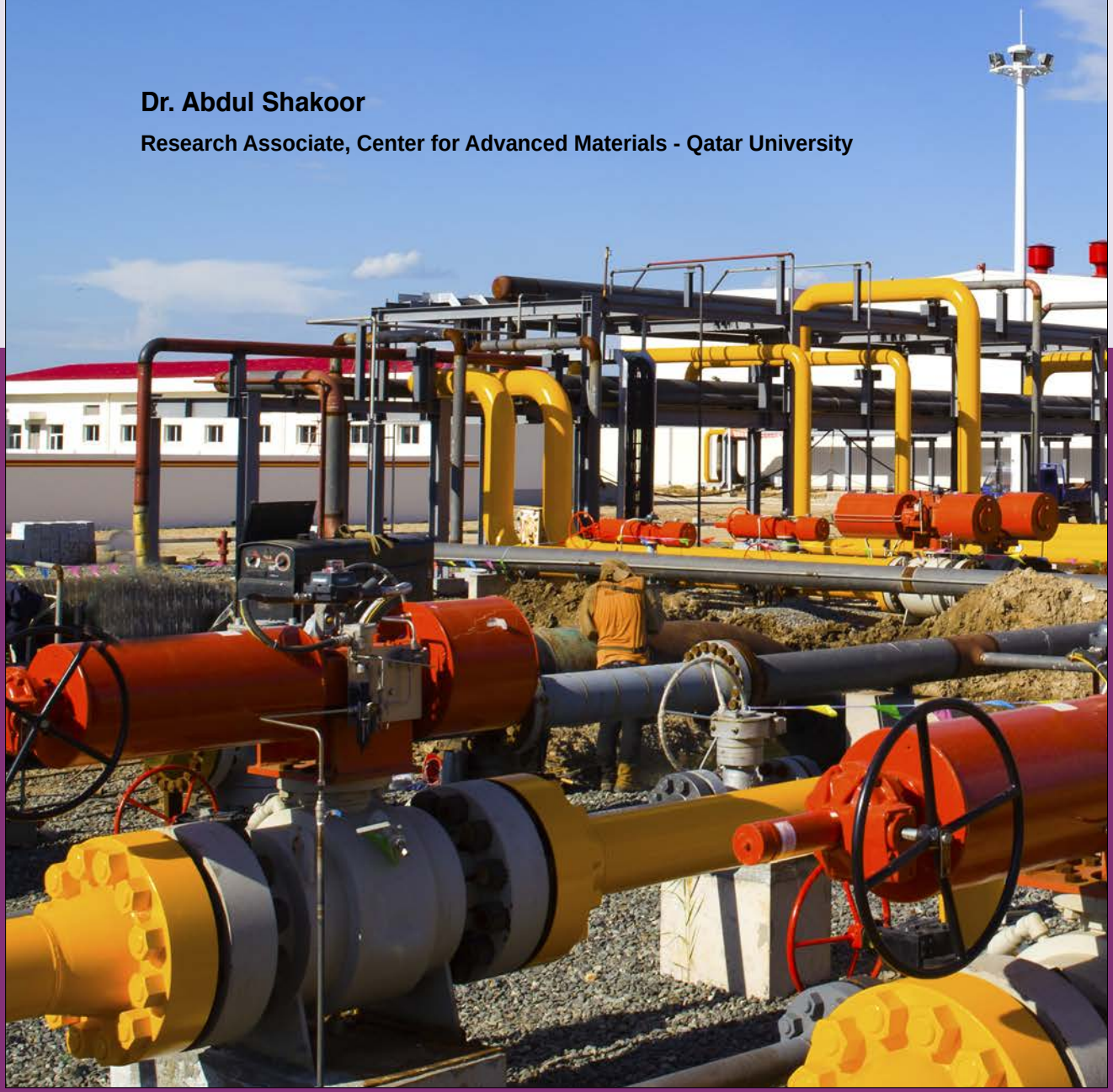


Figure 2B. Effect of CYP2C9 decreased function alleles (CYP2C9 *2 & *3) (rs1799853 and rs1057910) on warfarin dose in the Qatari cohort.

Smart Strategies for Corrosion Protection in the Oil and Gas Industry

Dr. Abdul Shakoor

Research Associate, Center for Advanced Materials - Qatar University



The global problem of corrosion is very challenging, and it is bothering the humankind for many centuries1. Organic coatings are often used to overcome corrosion challenges by limiting the contact of the metallic surfaces with an aggressive environment. During the operation, the protective coatings may get damaged, and initiate the corrosion. Smart strategies for corrosion protection have led to developing self-healing polymeric coatings in which polymeric matrices are commonly reinforced with nano/micro containers loaded with active species of different functionalities. These active species are sensitive to various stimuli and can be triggered by variation in temperature, pH, light, pressure or mechanical damage, etc[2]. Once released, these active species can hinder the attack of corrosive media and hence minimize the rate of corrosion. However, one of the significant limitations is that these carriers hold individual active species while the coating matrix requires simultaneously multiple active species to self-heal the damaged matrix efficiently.

To overcome the above-stated challenge and to enhance the corrosion inhibition efficiency, we have designed hybrid halloysite nanotubes (HHNTs) as a multiple active species carrier in the polymeric matrix (Figure 1 (a, b). HHNTs were developed by loading the primary corrosion inhibitor, imidazole (IM), in the lumen of HNTs by vacuum encapsulation. In the next step, layer by layer (LbL) method was employed to intercalate dodecylamine (DDA), secondary inhibitor, into the polyelectrolyte multilayers of polyethylenimine (PEI) and sulfonated polyether ether ketone (SPEEK) on the surface of HNTs. The synthesized HHNTs (3 wt. %) were uniformly dispersed into the epoxy matrix and coated on the cleaned steel substrates using the doctor blade technique to form hybrid smart coatings. For an exact comparison, the reference coatings (epoxy coatings composed of HNTs without any loading) and modified coatings (epoxy coatings containing HNTs loaded with IM) were formed by reinforcing epoxy matrix with HNTs.

The FE-SEM analysis of as-received HNTs and loaded HNTs (Figure 1 (c, d)) reveals a tubular structure without any clusters. The dark inner space of HHNTs in TEM images (Figure 1 (e, f)) confirms the efficient loading of IM. At the same time, the smooth deposited surfaces indicate the adsorption of polyelectrolytes on the surface of HNTs. Further, EDX analysis shown in Figure 1 (g-k) validates the adsorption of multilayers on the surface of HNTS.

Dr. Abdul Shakoor

Figure 2 (a-c) presents the XPS spectrum of aluminum, silicon, and oxygen, which are detected as major elements on the surface of loaded HNTs. On the contrary, carbon and nitrogen are the elements seen in the surface HHNTs (Figure 2 (d, e)). The carbon and nitrogen bonding energies reflect the structure of PEI and SPEEK, which were used as outer layers in HHNTs. The XPS analysis confirms the successful loading of IM into HNTs and adsorption of the polyelectrolyte multilayers on the surface of HNTs without any impurities. Furthermore, the substantial decrease in specific surface area (SSA) and pore volume (PV), as shown in Figure 2 (f) confirms the efficient loading of IM within the lumen of HNTs. The SSA and PV were further decreased by ~ 54% and ~ 32% respectively in HHNTs, which verify the adsorption of compact and pore-free polyelectrolyte layers on the surface of HNTs.

EIS results of the developed polymeric coatings after immersion in 3.5 wt % solution are shown in Figure 3 (a-d). Over the immersion time, the

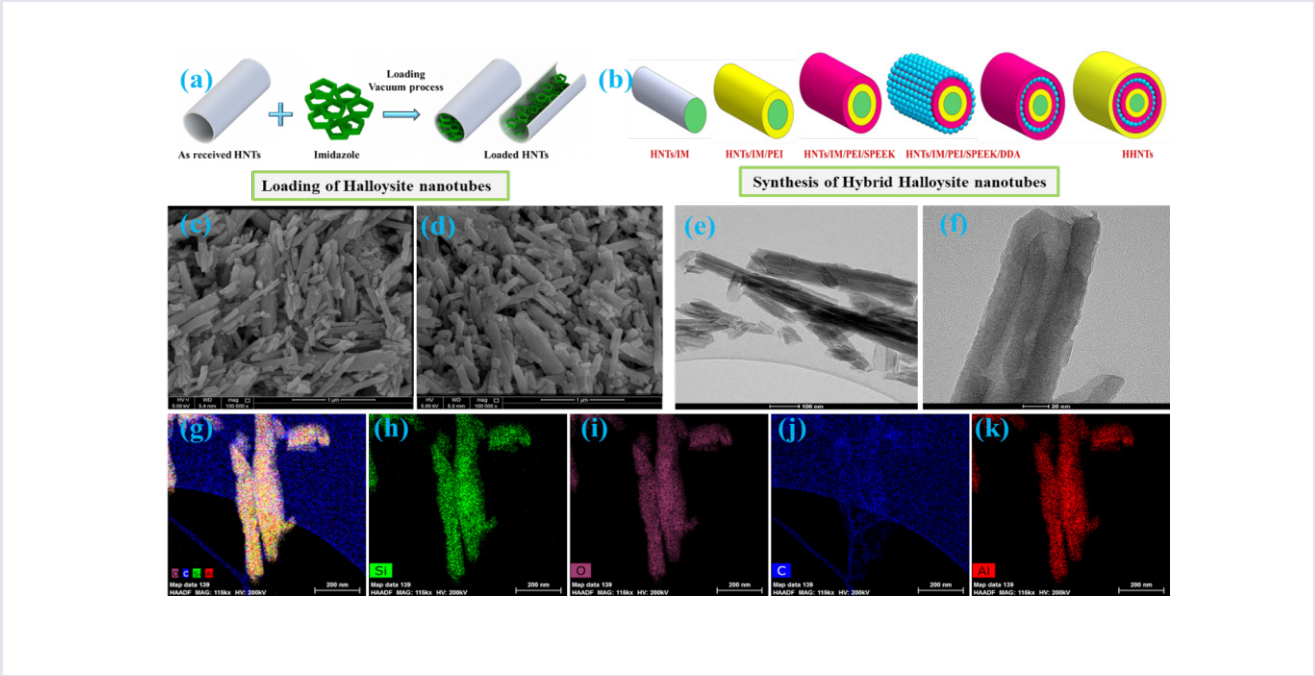


Figure 1. (a, b) Schematic illustration of loading HNTs and LBL deposition (c, d) SEM images of loaded HNTs (e, f) TEM images of HHNTs and (g-k) elemental mapping of HHNTs.

hybrid smart coatings show a gradual increase in the impedance value with increasing immersion time reflecting the synergetic barrier properties of two loaded corrosion inhibitors (IM and DDA). The maximum impedance value after the seventh day of the immersion time is ~2.01 x109 Ohm. The charge transfer resistance (Rct) of the reference coatings shows a slight decrease over the immersion period. On the contrary, the modified and hybrid smart coatings show an increase of Rct value. After the seventh day of immersion, the Rct value of modified and hybrid smart coatings increased by two and three orders, respectively. This increase in the magnitude of Rct in modified and hybrid smart coatings confirms the negligible corrosion activity on the steel surface. The highest calculated inhibition efficiency of modified coatings and hybrid smart coatings was ~ 92% and 99.8%, respectively, after the seventh day of immersion when compared to the reference coatings.

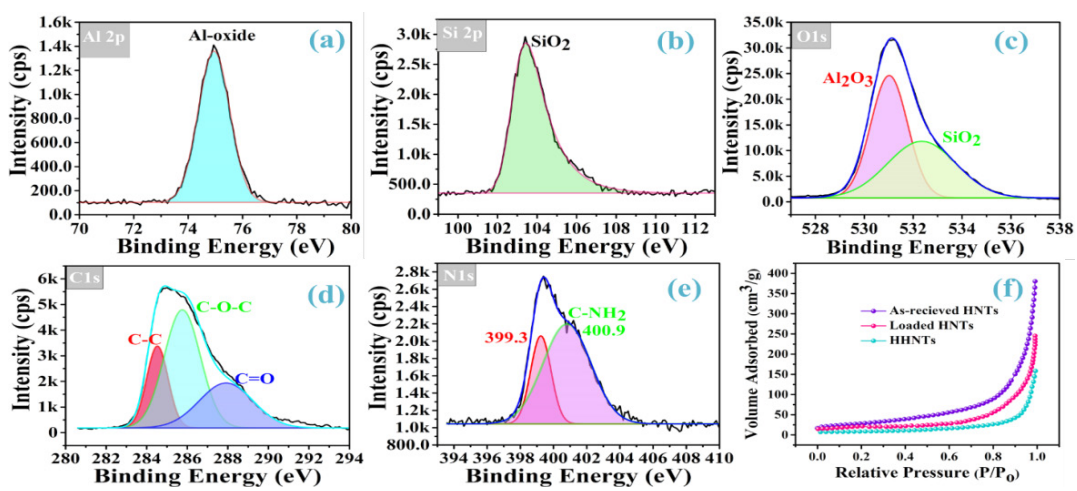


Figure 2. XPS spectra presenting the surface elemental composition (a-c) loaded HNTs (d, e) HHNTs and (f) nitrogen adsorption-desorption isotherms of the as-received HNTs, loaded HNTs, and HHNTs samples.

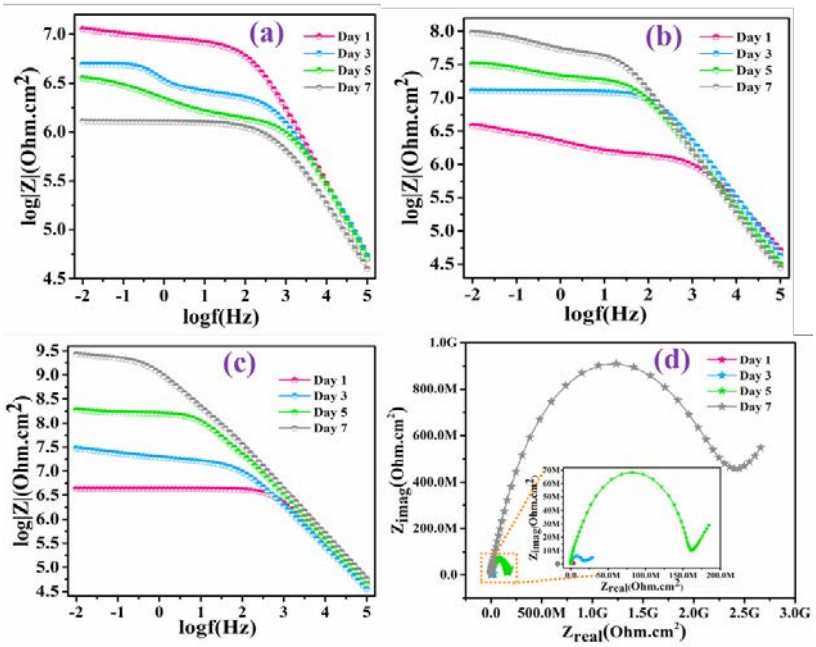


Figure 3. EIS results of the developed polymeric coatings after immersion in 3.5 wt % solution; (a) reference coating, (b) modified coating, and (c, d) hybrid smart coatings.

The corrosion inhibition of the steel substrate by IM is attributed to the adsorption of IM molecules on the negatively charged substrate. The IM molecules have three adsorption sites, including the nitrogen atom with sp2 lone pair of electrons, the hydrogen atom attached to the nitrogen, and the p bond of the aromatic ring. In addition, at the initial stages of immersion, the hybrid smart coatings uptake the electrolyte slowly, which enables the localized pH to be more acidic and triggers the intercalated DDA to be released from the multilayers of HHNTs. To summarize, both the IM and DDA in the hybrid smart coatings provide a significant barrier against corrosion species to penetrate the coating and hence prevent the corrosion process (Figure 4). To conclude, the tempting corrosion protection properties of hybrid smart coatings make them attractive in the oil and gas industry.

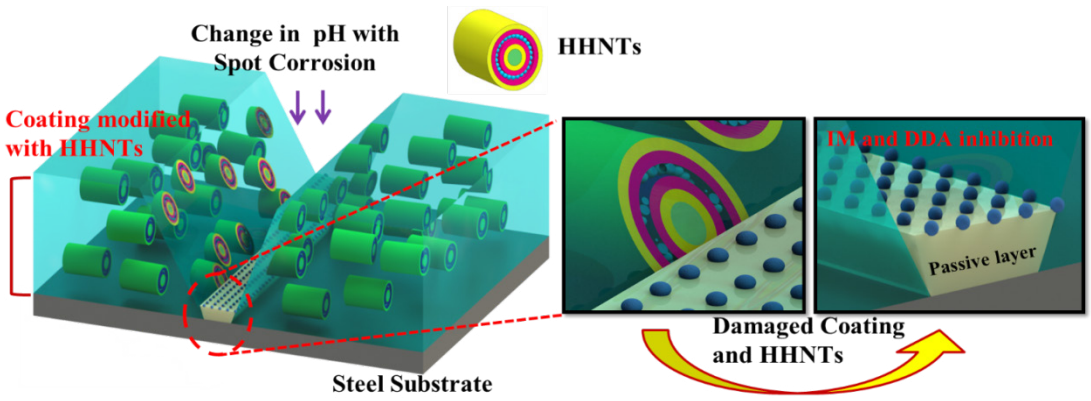


Figure 4. Protective self-healing mechanism of the hybrid smart coatings.

Development of Highly Sensitive Polymer Nanocomposite-based Moisture Sensor

Shoaib Mallick
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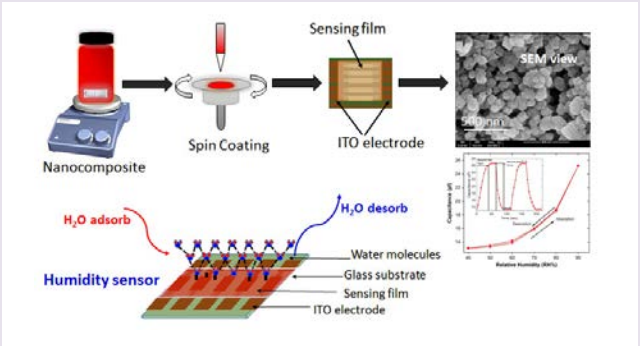
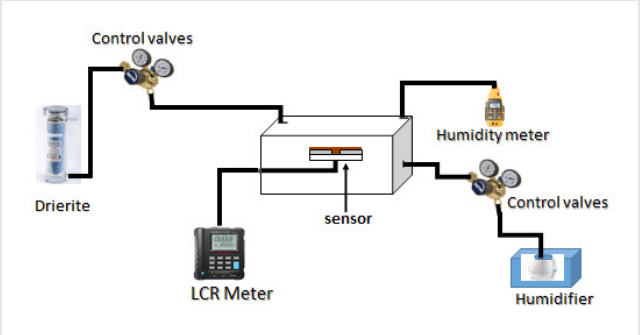
Prof. Farid Touati
Professor of Electrical Engineering, Department of Electrical Engineering, College of Engineering - Qatar University

A research team from Center for Advanced Materials (CAM), and Department of Electrical Engineering at Qatar University investigated the polymer nanocomposite-based moisture sensor under the Qatar National Research Fund GSRA3-1-1116-14016 grant on "Integrated Acoustoelectronic sensors for the salinity of water in natural gas flow." Moisture sensors are applied extensively in industrial manufacturing, packing process, and quality control to monitor and detect the moisture level. The sensing properties of thin-film polymer nanocomposites and their application in moisture sensing was investigated. The impact of TiO_2 ceramic nanoparticles on the thermal stability, morphology, structure, and electrical properties of the Polylactic Acid (PLA) were studied. The PLA-TiO_2 nanocomposite sensing films, having modified surface by acetone etching, exhibited superior morphological and electrical performance when compared to PLA-TiO_2 pristine samples. The study was reported in the journal of Ceramics International. To develop polymeric moisture sensors with a shorter response and recovery time, the team investigated Polyvinylidene Fluoride (PVDF) piezoelectric polymer, which had a high dielectric constant, thermally stable, and chemically resistive. The humidity sensing properties of the sensors were tested in the Relative Humidity (RH) range of 30-90% RH. This research work was published in the Journal of Sensors and Actuator B. Nevertheless, to achieve a smaller hysteresis response, they investigated the effect of Barium Titanate ($BaTiO_3$) microparticles on the moisture sensing properties, dielectric response, and thermal stability of the Polyvinylidene Fluoride (PVDF)-$BaTiO_3$ composite films. This systematic study was published in the Journal of Ceramics International. Moreover, to enhance the sensitivity of the polymeric moisture sensor at a lower humidity level below 20% RH, the team fabricated a resistive moisture sensor. In addition, Polyvinylidene Fluoride (PVDF) with different concentrations of Sulfonated Polyether Ether Ketone (SPEEK) to improve the sensitivity of the resistive moisture sensor at a lower humidity level were blended. The investigation was reported in the Journal of Materials Today Communications. This Project work was conducted in the Center for Advanced Materials (CAM) under the guidance of Dr. Zubair Ahmad and supervision of Prof. Farid Touati (Electrical Engineering Department).



Graphical Illustration of Moisture Sensor Fabrication and Characterization



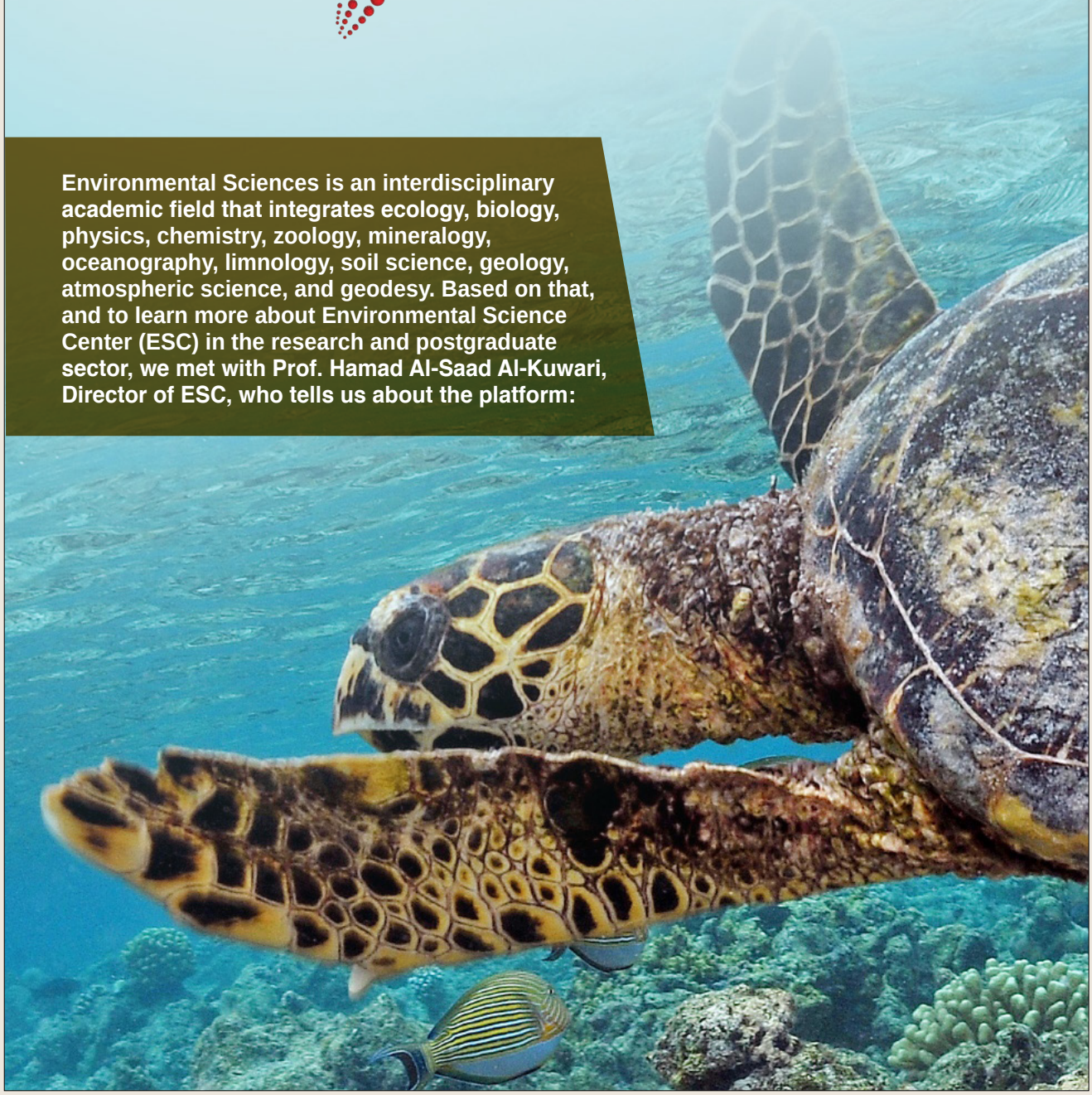
Graphical Presentation of Experimental Setup used to Measure Moisture Sensor Response

From right: Dr. Zubair Ahmad, and Shoaib Mallick.

Story of a Knowledge Platform:

ESC
مركز العلوم البيئية
Environmental Science Center

Environmental Sciences is an interdisciplinary academic field that integrates ecology, biology, physics, chemistry, zoology, mineralogy, oceanography, limnology, soil science, geology, atmospheric science, and geodesy. Based on that, and to learn more about Environmental Science Center (ESC) in the research and postgraduate sector, we met with Prof. Hamad Al-Saad Al-Kuwari, Director of ESC, who tells us about the platform:



First of all, would you please give us an overview of the research milestones that the ESC has achieved ever since its inception in 1980?

The ESC is the oldest research entity in the country, with a long series of important achievements, among them was the research vessel (Mukhtabir Albehar) that has completed pioneering marine studies in the Qatari national waters in particular and the Arabian Gulf waters in general. The research vessel (Janan) is continuing this endeavor and enriching the previous work. Furthermore, the ESC has deployed the first artificial reefs in Qatari waters to conserve its ecosystem. ESC has published more than seventy books documenting all aspects of Qatar's wildlife. The first unit for measuring air quality was established in the ESC since the nineties. The ESC has also started a project on the conservation and monitoring of the sea turtles. Moreover, the Center has concluded many environmental assessment studies for many of the giant projects in the country. Finally, the ESC has been awarded recently the UNESCO Chair in Marine Sciences.

Today, how do you define the ESC through its vision, mission, and main task?

The vision of the ESC is to be a leading research center in its field of specialization, which is Environmental Sciences in the Arabian Gulf region, and to have a strong global role that increases with the passage of time. The ESC is an entity that works through scientific research and initiatives, whether service or awareness, to conserve and protect the Qatari natural heritage. Moreover, the ESC researchers with the support of its cutting-edge equipment embark on documenting and conserving the components of the natural system and reducing the damage that it may endure by anthropogenic activities.

Would you please shed some light on the Center's sections and its existing research disciplines?

The ESC consists of a group of research teams, including the Oceanography Chemistry and Physics Team, the Land and Marine Ecology Team, the Earth and Atmosphere Sciences Team, and the Janan Research Vessel Team. These teams work as one research group. Each team consists of senior researchers at different disciplines related to the environment such as biology, chemistry, earth sciences, air quality, and plant technologies, etc. These teams are assisted by a group of research assistants and make use of advanced specialized laboratories run by trained and highly experienced lab technicians.

What are the most prominent research projects of the academic year 2020-2021?

The ESC is currently implementing a wide range of research projects, which are funded by the Qatar National Research Fund (QNRF) at Qatar Foundation (QF). Other projects are related to the use of some living organisms as biomarkers of environmental pollution in the marine environment, projects on the biological and geological processes in Qatar's Sabkhas (salt-encrusted flat) and the carbon cycle in the coastal areas, and research on gas reservoirs. There are also some research and services supported by the private sector, such as the project to protect, conserve, and monitor the sea turtles implemented in collaboration with the Ministry of Municipality and Environment (MME) and funded by Qatar Petroleum (QP), the project of artificial mushroom- shaped reefs implemented in collaboration with Qatar Gas (QG), as well as some research projects undertaken with (Total S.A.). The ESC is also studying the indoor air quality in some residential complexes of some companies.

Organic Chemistry laboratory

Scientific Photography Laboratory

How does the ESC support Qatar University students and researchers?

The ESC always welcomes Qatar University undergraduate students for training during the summer, as well as graduate students who need to conduct their experiments in the ESC's laboratories, or use the research vessel (Janan) to carry out surveys and collect samples. The ESC also collaborates with most of the research centers and other university units and provides the services and analyses they need.

What research services does the ESC provide to support teaching and research programs, especially those services provided by the research vessel "Janan"?

The ESC dedicates its entire research capabilities, including its researchers and laboratories, to serve the teaching process on demand. Furthermore, we are keen to keep in touch with colleagues at the Department of Biological and Environmental Sciences in the College of Arts and Sciences and other Departments. In addition, the research vessel (Janan) is often used for teaching and sample collection purposes.

What are the aspects of collaboration between the ESC and institutions, both academic and industrial in the State of Qatar?

Since the establishment of the ESC, it has collaborated with government authorities such as MME; there is also a professional relation with the Ministry of Public Health (MOPH) in the research field of air quality. Moreover, as previously mentioned above, we have joint ventures with major companies in the country such as Qatar Petroleum (QP), Qatar Gas (QG), ExxonMobil Research Qatar (EMRQ), (Total S.A.), and other companies.

Is there a collaboration between the ESC and research institutions outside the State of Qatar?

The ESC works with various international research centers and institutions. This collaboration is achieved either through direct communication between its researchers with fellow scientists at other institutions outside the country, or through agreements and memoranda of understanding (MOUs). Now, we are working with the Swiss Federal Institute of Technology in Zurich (ETH Zürich), as well as with the University of Houston in the United States.

What are the research objectives achieved by the ESC? And what are the goals that the ESC plans to achieve in the future?

The research objectives achieved by the ESC can be summarized in the publication of more than 70 researches in refereed scientific journals, receiving new funding of QAR10 million, which raises the total current research budget that received external funding to more than QAR30 million. The ESC has also registered two patents in the field of marine science.

As for the future goals, the ESC moves towards the future with firm steps. It works on two levels. A horizontal level that aims to add new specializations and establish new laboratories, such as the establishment of a water research unit that will start functioning next September. A vertical level that works to develop its current specializations, improve the services it provides, and encourage its researchers to publish in refereed high impact scientific journals in order to contribute to raising the University's position in the university ranking agencies globally.

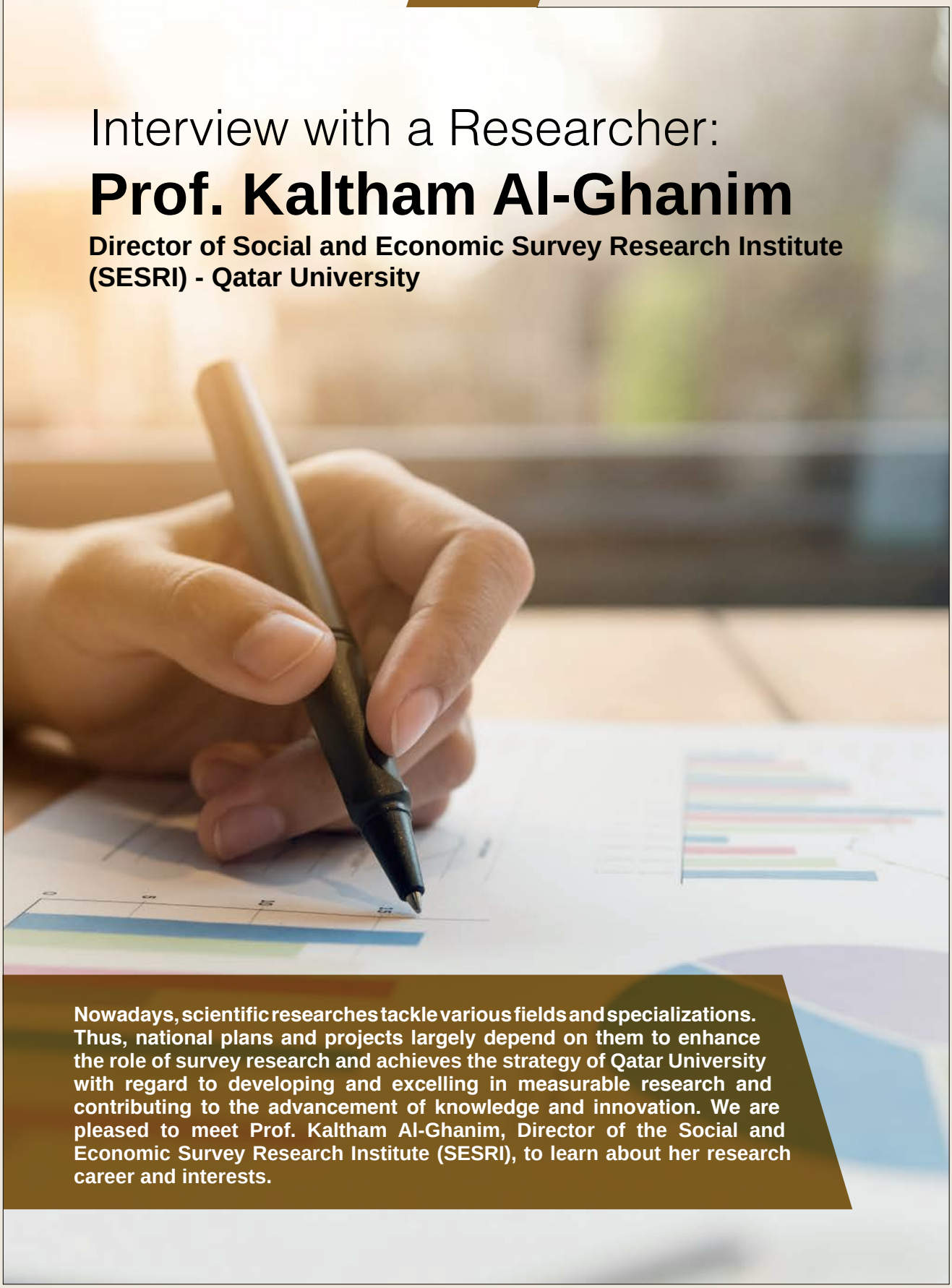
Plant Biotechnology Laboratory

Janan Research Vessel

Interview with a Researcher:

Prof. Kaltham Al-Ghanim

Director of Social and Economic Survey Research Institute (SESRI) - Qatar University



Nowadays, scientific researches tackle various fields and specializations. Thus, national plans and projects largely depend on them to enhance the role of survey research and achieves the strategy of Qatar University with regard to developing and excelling in measurable research and contributing to the advancement of knowledge and innovation. We are pleased to meet Prof. Kaltham Al-Ghanim, Director of the Social and Economic Survey Research Institute (SESRI), to learn about her research career and interests.

First, please introduce yourself and tell us about your major?

I am Kaltham Ali Al-Ghanim. I graduated from Qatar University, the fifth batch, where i majored in Sociology. I started my scientific career as a trainee researcher at the Center of Documentation and Humanities in Qatar University. After i obtained my PhD in Sociology, specializing in development, i worked as an Assistant Professor in the Social Sciences Department, the College of Arts and Sciences. Then, i headed the Economic and Social Research Unit at the Documentation Center for four years. Afterwards, i Chaired the Sociology Department for a year, and then worked as Director of Humanities and Social Science Center at the College of Arts and Sciences for 4 years. In August 2020, i assumed my job as Director of the Social and Economic Survey Research Institute. During this period, i published many studies and books in the fields of development, family, women, urbanization, and behavioral deviations. I also co-authored 3 academic books. Qatar University honored me with the Excellence Award in Scientific Research as well as Community Service. Moreover, i am highly interested in community issues, and, thus, i won the National Award for Voluntary Work and the Abdul Hameed Shoman Award for all scientific production. Further, i participated in establishing a voluntary association concerned with environmental issues and contributed to preparing many national strategies in the fields of family, women, youth and behavioral health. Currently, i am chairing the Supervisory Committee of the Behavioral Health Support Center, and am a Board member of the Qatar Foundation for Social Work.

Being a Sociology Professor, what are the social phenomena with which this science is concerned? What are the scientific steps of studying them?

Sociology is concerned with many scientific issues related to social formations and phenomena, such as social structure, social classes, social groups, social conflict, social deviations, social interaction, civil society and democracy issues as well as work structures and organizations. Sociology also devotes considerable attention to issues like social action, the social self, behavior, family, rights, freedom and equality, population, migration, development, urbanization, culture, arts, social communication, social change and identity issues. Some may see that these are diverse and various issues; however, Sociology covers them all. Sociology has sub-disciplines around which many studies have been conducted, the thing that allowed forming a theoretical structure for each phenomena.

In your opinion, what is the importance of social and economic researches? What have they added to the Qatari community?

This type of research is very important for all societies that go after building a real development on the basis of accurate knowledge of the socio-economic content, its mechanisms, the challenges facing this society, and the ways to solve them through making accurate and deep research on the nature of these challenges. There is no doubt that many researches' results have been used in formulating policies and strategies and in developing some legislations. Furthermore, social knowledge is very important in rationalizing political, development and reform decisions.

How does social and economic research contribute to achieving the strategy of Qatar University and QNV 2030?

Social and economic researches are part and parcel of knowledge, and they contribute to building and attaining sustainable development in Qatar as well as achieving the 2030 Vision of not just the University of Qatar, but also the State of Qatar. There are so-called exploratory studies or surveys that provide decision-makers with initial knowledge related to the gaps and challenges. Another type of research focuses on collecting data on a specific topic, such as population, family, workers, migration, behaviors, economic trends, etc. Evaluative research is another type that assesses what has been achieved and identifies the chances of success and failure. All of these survey and non-survey researches contribute to providing accurate data, guiding policies, and improving socio-economic and human development projects. These are cornerstones of the development strategy, the vision of Qatar and the strategy of Qatar University with regard to scientific research. The University has identified some priorities that focus on: social change and identity, economic diversification and sustainable development, women and family, national security, education and capacity building. Based on these priorities, the Institute of Social and Economic Survey Research is currently focusing on adopting a set of projects that aim to meet the community's developmental needs. The following projects are part of these researches:

Continuous survey projects on semi-annual and annual basis, every two years or every ten years with the aim of providing continuous evaluation:

- Guest Worker Welfare Index (GWWI) Project.
- Qatar Semi-Annual Survey (QSAS).
- The World Mental Health Project (WMH) (currently ongoing).
- Qatar Education Survey (QES) - conducted every 3 years.
- Agricultural Census - every ten years (currently ongoing).
- Qatar E-government (currently underway).

- Omnibus Survey.

Research projects underway:

- Survey on the Satisfaction with Municipal Services.
- Qatar Employee Productivity Survey.
- Sleep Problems Project.
- The Global Index of Vulnerability to Violent Extremism (GIVVE) Project (a major collaborative research project).

Projects expected to start by the next academic year:

- Qatar Vaccine Coverage Survey (Ministry of Public Health and Qatar University).
- Family Cohesion Project.
- Child Wellbeing Project.
- Paternity Study Project.
- Project to Evaluate the Effectiveness of the Counseling before Marriage Program.
- Project to Assess the Role and Services of Social Development Centers in Qatar (The Ministry of Administrative Development, Labor and Social Affairs (MADLSA)).
- Scholarship Project (Ministry of Education and Higher Education).
- Household Food Waste Project (Ministry of Municipality and Environment: Food Security Administration).
- The Shura Council project.

Being the Executive Director of the Social and Economic Survey Research Institute, tell us about research areas that the Institute focuses on?

Currently, the institute focuses on projects that meet the state's needs with regard to acquiring accurate scientific knowledge. Another research group fulfills the needs and strategy of research at the University and the institute. Moreover, the institute adopts internal research projects based on the interests of its researchers. The institute is considered the cooperation link between the researchers from inside and outside the University. It provides them with consultations and applies some studies, which are funded by research grants, on their researches.

What are your research projects for 2020-2021?

If the question is about my own projects, I am currently focusing on writing some research articles. I also lead a research on the productivity of the Qatari employees. Nowadays, we are signing an agreement to implement the family cohesion research, in which I am the principal researcher.

Based on your long experience in Sociology, how was your experience with Qatar University students?

It was an exciting and fruitful experience on both the teaching and research levels. I do not remember exactly the number of graduation projects that I supervised, but they may reach 100 projects. This is besides the group projects carried out within the courses. Indeed, the enthusiasm of the female researchers was interesting and heralds a new generation of distinguished researchers.

Through managing the Social and Economic Survey Research Institute, what are the future aspirations and goals you seek to achieve?

I feel lucky to work with such an integrated team in terms of skills, orientation, activity and productivity. However, being the director of the institute, I am looking forward to achieving many things; including expanding the institute's scope of research such as economic research, future studies as well as preparing influential reports that contribute to building development policies. I also work on enhancing the institute's role in influencing policy-making. In addition, the institute provides training and counseling services to the local community besides its current role in providing training programs for researchers, graduate students and students working on graduation projects. I also look forward to publishing the results of the institute's important researches so as to reach the largest segment of society through multiple means; this actually requires developing our capabilities in publishing through various means. We also support young researchers at the institute to develop their skills and refine their research personalities; I have developed several programs in this regard. I also seek to increase the ability of the institute's researchers in order to obtain research grants and increase their publications in internationally reputable scientific journals.

As a woman and a researcher, give an advice to women in general and to Qatari women in particular?

As a woman, wife, mother, and university professor, I faced many challenges such as saving time, organizing it, and making balance between family duties and work requirements. I advise women to strive in order to achieve self-fulfillment through doing things they love. That does not mean she should have a certain job, a housewife can work from inside her house through participating in economic projects, agriculture, or volunteer work. They should do their best to achieve life balance, especially since women of this era have multiple and various roles. Thus, they should know how to be successful in all of them.

Prof. Nelson Ndubisi

Professor of Management, College of Business and Economics
Qatar University

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QATAR UNIVERSITY

Researcher Business Card

What are the specialist tasks of your employment at Qatar University (QU)?

Research and thought leadership in the fields of entrepreneurship and innovation, marketing, sustainability and internationalization of SMEs and family businesses, and their interfaces. I supervise Higher Degree Research (HDR) in these areas and provide research leadership to enthused QU's early career researchers with similar interest. Because my research mostly stands at the interface of two or more fields, it often involves multidisciplinary and cross-cultural collaborations. I am an unrelenting advocate of research-led teaching, a philosophy I have upheld and honed the skill over the years, and continue to apply in my pedagogical and research activities at QU and the professional community.

Would you please brief us on your most important research achievements?

I am thankful for having had a successful academic career; it is difficult to put a finger on my most important work. I have published extensively, with over 70 publications in Q1 journals alone. I am the College's most cited, and one of MENA's most cited business professors. I have been recognized as Australia and New Zealand's 3rd most downloaded marketing scholar, and author of 2nd most downloaded marketing article by Emerald, UK. I have won Emerald Litrati Club's outstanding and most commendable research awards multiple times, Monash University's research excellence award, and several millions in research grants from international, regional and national grant bodies and organizations. I have been listed in Who's Who in the World since 2009 by Marquis Who's Who, USA, among many other achievements. If I must choose one that I am most proud of, I would say that being able to supervise and mentor Higher Degree Research (HDR) students and guide them from 'green' or 'rookie' experience to independent researchers, and watch some become accomplished researchers and (full) professors in their own right and standing, is the one. This is indeed a legacy I am most proud of.

What are your research goals for 2020-2021?

My goals are to continue to provide research leadership to QU HDR students and early-career researchers, and collaborate with peers across disciplines in the ensuing period. Through these collaborations, I hope to continue to deliver high impact research outputs that push back the frontier of knowledge in my fields of interest, as well as inform best practice by industry captains and government policy makers in Qatar and beyond.

Q. What is the importance of the "Management" major in professional life?

Management is an overarching discipline that stretches far and wide. It is helpful for top, middle and lower managers, and supervisors, who make strategic or tactical decisions in their organizations, regardless of their industry/sector. It is essential for entrepreneurs, from novice to serial and portfolio entrepreneurs. Also, not-for-profits, public administrators, and political establishments can avail management knowledge.

What research strengths and skills does the College of Business equip its graduates with?

CBE boasts of a number of world-class business researchers and thought leaders. We bring onboard considerable experience, dedication and excellence, by which we impart the highest quality of business education to our students, prepare them for successful work life, and place them on the right pedestal to compete on the global stage. For many outsiders, it is an enigma how a young college like ours has taken the Arab business school world by storm, and even then, the very best of CBE is yet to come.

Interview with a Student:
Eng. Sara Abdulrazaq Al-Emadi

Sara Abdulrazaq Al-Emadi

In Qatar University, there is a number of outstanding students who are expected to occupy important positions in all the state sectors. In order to know more about the productive minds and promising competencies, as well as the distinguished academic and research environment in Qatar University, we are meeting Eng. Sara Abdulrazaq Al-Emadi. She is a graduate of the Master's Program (Science in Computing) at the College of Engineering in Qatar University.

Introduce yourself, Sara? And tell us about your college career?

My name is Sara Abdulrazaq Al-Emadi, I have recently obtained a MSc in Computing and previously a BSc degree in Computer Engineering from Qatar University. I have worked in Oil and Gas industry as a network infrastructure engineer, a Senior Engineer in IT Strategy and also as a researcher in Qatar University. I am currently pursuing a PhD in Computer Engineering degree and my research work concentrates on drone technology, anti-drone systems, network infrastructure, computer networks, network security, artificial intelligence and machine learning.

What motivated you to study Masters in Science Program in Computing at the College of Engineering?

My decision in joining the MSc in Computing Program at Qatar University was influenced by a number of factors, starting with the fact that Qatar University is one of the best universities locally and it's consistently raising in international ranking. This is reflected on the quality of teaching and research that is carried throughout the program. Also, since I was working in the industry, being able to stay in Qatar throughout my studies was one of my top priorities. Hence, this program was the best option.

What is the idea of your research project? What will it offer to the Qatari community?

Drones are popular not only for recreational purposes but in day-to-day applications in engineering, medicine, logistics, security and others. With that, an alarming concern arose regarding the physical premises' security, safety and privacy due to their potential use in malicious activities. The idea of my MSc thesis, supervised by Dr.Abdulla Khalid Al-Ali, Head of Computer Science and Engineering Department, was born from the observation of such incidents that occurred worldwide recently where unauthorized drones would fly over a No-Drone zone to perform other malicious activities.

Drone's malicious activities do not only invade

privacy but also put people's life in danger and contributes to a great financial loss on a global scale. To address this problem, in my thesis, we proposed a novel and intelligent solution that automates drone detection and identification using machine learning and unique drone features. Our findings proved the effectiveness of this solution with remarkable precision.

This problem is very important to tackle on an international level and specifically in Qatar as it supports Qatar's National Vision (QNV) 2030 and will heavily aid, if implemented, in securing premises during the FIFA World Cup events hosted in Qatar in 2022.

"Drones" is a word that grabs the reader's attention. What does it mean? Give us a simple explanation for it please?

Drones are aerial robots that fly with the aim of achieving a certain mission, for example, collecting images, filming videos or even delivering items. They can be preprogramed such that you would give them the location and they fly to it and come back, or you control them using a remote controller.

What are the fields on which the idea of protection systems against drones infiltration will be applied and which segment of society will benefit from it?

Securing areas from malicious drone attacks is a very important task and it affects the community as a whole, whether they are individuals enjoying a vacation on their private property and seek privacy, parents concerned about the safety of their children in a playground, attendees of public events with large crowds or restricted areas such as airports. All of these places could be a target for malicious drone attacks and hence would require the implementation of a system, such as the one proposed in our work, to ensure that the safety, security and privacy measures are being met.

As a student and researcher at Qatar University, how would you describe the University's research achievements? What will Sara add to the research achievements in her scientific specialization?

In my opinion, Qatar University has been rapidly advancing in the research outcomes and achievements recently. Following the vision of Qatar University and QNV 2030, I aimed, through my research work, to contribute towards this advancement not only by publishing the work on top conferences and journals but also releasing the data collected and other resources as an open source in order to help other colleagues in the research community. We have also applied for a patent and are looking forward to transferring this work from research to a product that can be used in the near future by the community locally and internationally.

You must have gone through distinguished experiences as well as daunting challenges. What did you learn from them and what do you advise students at Qatar University?

Throughout my studies, I have faced some challenges and a lot of amazing moments, they helped me grow and learn. I believe that to achieve your goal, you have to be persistent and work hard even if things are not moving in the right direction, because, eventually, they will, and your hard work will pay off. Therefore, my advice to fellow colleagues is to never give up and work hard to earn what you aim for.

What are Sara Al Emadi's future goals and ambitions? And where do you see yourself among the women of Qatari society in the short and long terms?

The next step of my journey as a researcher is to work on exciting research projects that contribute towards QNV 2030 and to develop smart and novel solutions that would help the community. One of my goals is to share my knowledge which I have acquired through the years during my studies in Qatar University and my work as an engineer in the industry by teaching such that this knowledge is accessible to everyone.

Through your experience, how can Qatar University attract more students?

From my experience, Qatar University provides an excellent environment for graduate students who are aiming to pursue a career in both the academia and the industry. One way to attract more students could be through providing more courses that bridge the gap, through research, between the industry and the academia. Furthermore, providing scholarships to MSc and PhD students could contribute in attracting more students.

What does Qatar University offer to prepare its graduate students as future leaders and scholars?

In my personal opinion, Qatar University provides a healthy environment that supports the growth of young researchers in their respective fields by providing many different resources such as the diversity in courses and seminars, in addition to the opportunity of working and interacting with highly experienced faculty members.

Alaa Sami El-Rahmani

College of Sharia and Islamic Studies-Qatar University

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Graduate Student Business Card:

Q. Kindly introduce yourself to the University community?

I am Alaa Sami El-Rahmani, B.A. in Arabic language with a Minor in Linguistics, 2016 and an M.A. student in Interpretation and Qur'anic Sciences.

Q. Why did you opt for an M.A. in Interpretation and Qur'anic Sciences?

The glory of this science, my passion for it, and its close association with the sciences of the Arabic language fueled my desire to employ the knowledge I have in the field of Qur'an hoping that Allah makes me of benefit to others.

Q. Tell us about your research that was accepted for publication and the M.A. thesis in the Program?

The research that was accepted for publication in the Islamic University of Gaza Journal is titled "Linguistics and its Applications in the Holy Qur'an: A Critical Study" in collaboration with Prof. Mohammad Al-Majali, Associate Dean for Research & Graduate Studies at College of Sharia and Islamic Studies. It examines the possibility of applying linguistics approaches to the Qur'an by comparing the characteristics and principles of both the Shari'a Sciences and Humanities as linguistics stands as part of them. The study also extrapolates some models that apply linguistics approaches and theories to the Qur'an. The research concludes that linguistics can be used if it is reformulated in a way that suits the nature of the Qur'an, relying on the words of the interpreters, the saying that the Qur'an is sacred and that it is the word of Allah. This is in addition to applying the mechanisms of linguistics within the limits of what is suitable to the Qur'an, while eliminating the parts of the theory that contradicts the Qur'an.

The M.A. thesis is tilted "The Impact of Neglecting the Significance of Qur'anic Context by Modern Interpreters: A Critical Study" which is still in its beginning stage. The thesis attempts to employ the data of Theology of Jurisprudence, the Fundamentals of Interpretation, the Sciences of Arabic language, and Linguistics as all rely on the context and consider it a basis in stating the meanings of the texts. It aims to respond to the false modern interpretations of the Noble Qur'an that are currently being promoted as a kind of development in the field of Qur'anic studies, and openness in understanding the Qur'an. All these issues do not have a sound approach to eliciting meaning, such as Muhammad Arkoun, Muhammad Shahrour, Nasr Abu Zayd, Mansour Al-Kayyali, and others who post on the social media personal, incorrect and whimsical thoughts in interpreting the Qur'an, without being based on any scientific foundation. Unfortunately, these people influenced many people. They do not in fact follow a correct scientific methodology in eliciting the meanings of the Qur'an. May Allah guide me, and make my work purely dedicated for the sake of Allah.

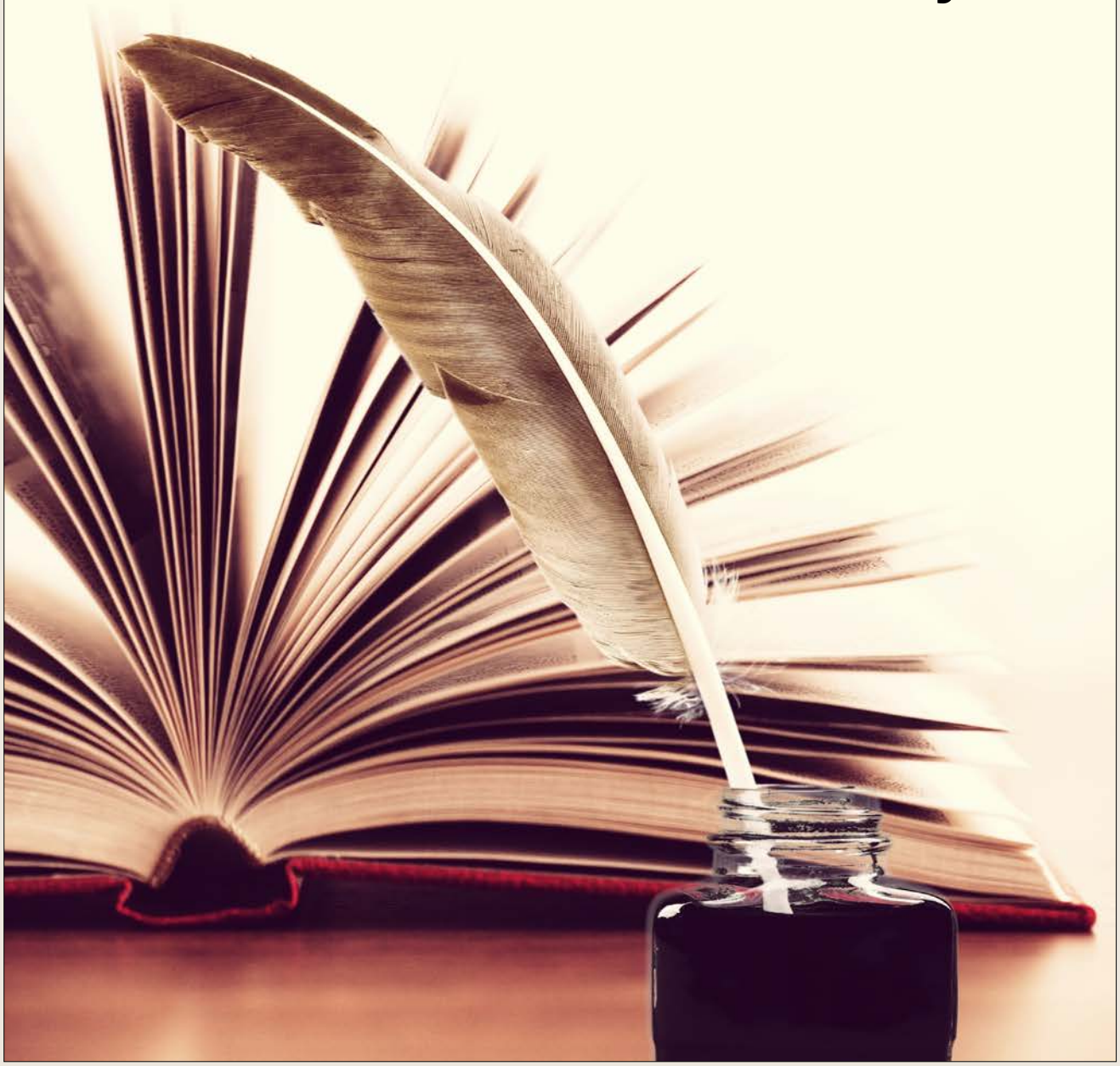
Q. From your research experience, what message would you give to the students of Qatar University?

They should make science as their goal, then all paths will open and passion for research is kindled. They should trust their ability to add something new to their field of specialization, and to keep reading so that more of their areas of research are uncovered to them. They should also benefit from the experiences of their teachers.

Q. What are the future objectives of Alaa El-Rahmani?

Completing my scientific career and contributing to the completion of research projects that serve the Noble Qur'an, and apply its teachings on people's daily lives and reality.

An Interview with Prof. Mohammed Harb Farzat, Author of "Qatar on the Arabian Gulf: A Search for Lost Times in Ancient History"



"Qatar on the Arabian Gulf" is a book in which the author takes us to the ancient history of Qatar. The author concludes that the Peninsula of Qatar, extending from the Arab land and overlooking the Sea of Qatar of the Arabian Gulf, is considered a part of the civilized world of the Gulf region in all ages. The research in the book is devoted to observing certain lost time in eras of ancient history. It also aims to chart a course for Qatar's history within the civilization of the Arab Gulf region.

For more information, we meet the author of the book, Prof. Mohammed Harb Farzat, a former Professor of Ancient History at Qatar University.

Prof. Mohammed Harb, you left QU in 2005, however, younger generations of university students would like to know more about you, so would you please introduce yourself to them?

Convergence among university generations is undoubtedly of great use, as scientific research becomes productive through continuity, communication, synergy, follow-up and integration. Additionally, scientific research methods develop, and mentalities develop through diversified education and cultures as well. I am also pleased that there are people, among the university family and the new generation of university students, who would like to get to know the founding generation.

I am proud to be a member of this generation who was the first to work in the Department of History when it was established nearly half a century ago. I chose to study history and work in historical research through studying, teaching and writing, seventy years ago when I joined the Department of History at the Faculty of Arts and the Higher Institute for Teachers/ Faculty of Education in 1950 at Damascus University in Syria. Then, I joined the Free University of Berlin and Goethe Institute in 1959 and 1962 to study German language and culture. I returned to Damascus as a German teacher, besides being a history teacher. Then I was invited to give lecture in ancient history at Damascus University in 1964, and was sent to Paris from 1965 to 1972, where I continued to study ancient history and ancient oriental languages. I received a PhD from the University of Paris / Sorbonne-Pantheon after presenting a thesis in French about a book on (the Aramaic Kingdom of Arvad) that dated back to the first millennium BC.

In Qatar, I worked at the university from 1975 to 1981, and then from 1993 to 2005. Nowadays, I work on research, writing and historical studies.

What does the title of the book imply?

Content of the book can be understood from its title. It indicates that the work of the researcher and the author was to observe lost time in the ancient history of Qatar. The purpose was to collect evidence and

Prof. Mohammed Harb Farzat

explain discovered monuments, facts, as well as frequent movement to place the name of Qatar on trade exchange routes and ancient Arab linguistic and cultural interaction that shaped Qatar's civilizational identity in addition to the rest of the Gulf.

What are your most notable published works?

I have more than seventy published works, ranging from books, studies and researches. The main ones are as follows:

- Party Life in Syria 1908-1955 1st edition, 1955, 2019 2nd edition.
- Dr. Decroly 's Method of Education and Applicability - unpublished. It was a university thesis at the end of the study of education and eligibility for education.
- History of the Aramaic Kingdom of Arpad - from the history of Syria in the first millennium BC. It was prepared in French at the University of Paris / Sorbonne and at Collège de France - limited edition 1972.
- Research in the history of Aram Syria - in the first millennium BC. It included publishing Aramaic documents in Arabic and was translated for the first time. It was published in the Journal of Historical Studies at the University of Damascus and the Journal of Arab Heritage in Damascus 1982-1986-1994.
- History and Future of Languages by Harald Haarmann. Review and Comments on the German Translation. Qatar Ministry of Culture, 2006.
- Civilized System in Eastern Ancient History - Ministry of Culture, Qatar, 2010.
- Qatar on the Arabian Gulf: A search for lost times in Ancient History 2020.

Currently, I have some works that are under progress, and they mainly discuss the history of Qatar and the Gulf, as well as the history of civilization and cultural identity. I hope to finish one of them in the middle of this year.

We have noticed that you stopped at certain situations through which you stir searching in the history of Qatar and the Arabian gulf. What are these situations and what are the most notable points that could be observed and recorded from the ancient history of Qatar?

The main point that could be observed and recorded from the ancient history of Qatar in my book was the result of an investigation of the history of commercial and cultural relations between the land of Babylon and ancient Gulf region. Here, in this research, we were able to narrate in connected episodes about Qatar's history, its land and societies throughout history. In these episodes, it was possible to establish the traditional role of Qatar that lasted for many centuries as it ruled over the maritime transport route in the Gulf. It was an inevitable situation imposed by geography, as this route had to be crossed by ships going from Sumer and Akkad/ Babylon to Maluha, which is a general name for the countries of the South Arab, Indian and East African coasts and to the island of Socotra, which requires searching for the linguistic source of its name as well.

Ships and boats passing along the coasts must pass and stop at the coasts of the land of Qatar, chosen as their terminals. This was why these archaeological sites, which were uncovered by the Danish, British, French and Japanese excavations, and studied by the national Qatari missions, were found in this location. Commercialization of copper, which was brought from Majan, Persia and India, which is a basic strategic commercial material along with other goods, including precious stones and pearls, was the basis of the economy for two thousand years before iron (in the third and second millennium BC), which became the preferred commercial material in the first millennium BC. In this regard, the book provides important material for the history of ancient economy in the Gulf.

The main focus of the study presented in this book was observation of the name of Qatar in the Greek and Roman manuscripts, as well as through the history of the Syrian Nestorian Church, which extended to Mesopotamia and the Gulf region, in which two ecclesiastical institutions were found that belonged to the Syrian Nestorian Church, namely Beit Qatarya and Beit Mazoon/ Oman. This is evidence of the progress of Christianity over ancient pagan religions.

As such, historical documents testify to the authenticity of name "Qatar" alongside the name "Oman", and that it was circulated uninterruptedly throughout the ages of the history of Eastern civilizations.

You have highlighted the influence of the geographical factor on the history of Qatar during ancient history eras. What is the significance of this geographical factor in successive eras?

Qatar's geographic location, composition, and formation of land and coasts imposed a unique role in the course of ancient history of civilization throughout its successive stages. This role continued in the history of Arab and Islamic civilization and did not stop until after the collapse of the general civilization system. After that, Qatar and the Gulf region went through a long period of havoc, destruction, poverty, ignorance, and a decline in population due to conflicts, wars and epidemics. Only Al-Huwailah and Qatar were revealed to us from the old geo-historical names. As for the names given to archaeological sites, they were names from our common Arabic language. We do not know what they were called by ancient people in ancient times because these names were not mentioned in documents written in the languages of those ages.

After a period of collapse that prevailed the Arab-Islamic world after the Mongolian invasion in the seventh century AH/ thirteenth century AD, and onward, the Arab Gulf countries began to regain awareness of their existence after the devastating European invasion. Qatari communities on the coasts began to build forts to repel the Portuguese aggression and respond to the threat. This was followed by attacks from European fleets competing over the waters of the Gulf. This situation continued until the establishment of the State of Qatar in the modern era, which enabled Qatar to regain its current regional and international role after an ongoing struggle that started from the nineteenth century and continues until today.

What made you write about ancient history of Qatar in this four-chaptered book? And have you reached intended results at the end of your research?

What motivated me to research the history of Qatar was mainly my interest in a bigger subject, which was to contribute to writing the history of Arab people. I have contributed to the production of useful and original works when I used to work at the university and when I worked at the Arab Encyclopedia in Damascus, which was published in twenty volumes. I wrote twelve entries in the first two volumes, issued more than twenty years ago. Now, my work focusses mainly on historical research, documentation and writing. History of Qatar is a major focus of my interest, and I particularly care about ancient history of Qatar as I specialize in ancient history. It is an academic mission that I am keen to deliver. It is the work that I choose for myself along other activities

that I do. I do not need to be assigned to do it. It is a personal achievement that I desire to bear its burden, as most of its resources were available to me. I am used to long term work, patience and repetition until I can achieve intended results. Qatar University Press should be credited for publishing and issuing the book under sponsorship of those in charge and with care of the assigned team. I can say that I feel happy and satisfied with what has been achieved in "Qatar on the Arabian Gulf", as well as with the results of observing as much as possible of the sought lost time.

What would "Qatar on the Arabian Gulf" add to Arab history references?

Before this book, ancient history of Qatar was scattered in general history sources, reports of archaeologists and in certain positions in sources of languages. Now, ancient history of Qatar can be observed in a single book that is the result of the work of one author. For a long time, this book will be a reference and guidebook to issues that still need reviewing, tracking, and further verification and studies. This can be corrected in later editions and works, which may encourage researchers to continue research and enrich it with their efforts and renewed work. Additionally, it invites researchers to investigate the origin of the linguistic name of Qatar in ancient Arabic, Levantine, Babylonian and other languages.

What is your advice for researchers and students who are interested in the history of Qatar and its heritage within the history of civilization? And what are your recommendations for taking care of ancient Qatari heritage?

I advice researchers and students to demonstrate patience, continuously work to learn and acquire knowledge, review current results, identify the sources in their languages and approved references, develop sequence plans for review, follow-up, study and research first, before announcing results. Historical research requires a systematic cognitive ability to deal with modern languages, in order to access scientific sources and references and to deal with ancient languages in the history of civilizations, when they are a requirement of research. A historian needs to be acquainted with complementary and assistive literature and sciences, which requires him or her to remain students who seek knowledge of reliable sources and renewed results, and to be able to conduct systematic verification and criticism. A historian does not rely on easy references to feed the knowledge stock with impromptu information, like feeding the body with unhealthy fast food. Similarly, to prepare researchers well, research methods should be developed in scientific councils and organized research seminars that deal with long-term research topics, in order to create experienced specialists who can add some of their creativity to areas of scientific research.

The book is available at the online store of QU Press

At the end of this extensive tour of your book, do you have a final word?

Knowledge of history that is based on facts and realities can broaden rational experience, and familiarity with experiences of past times can enrich human life. I quote Ibn Khaldun as he once said:

"He who fails to know history, cannot recognize the sweetness and bitterness of life.

And he who is aware of past times, adds ages to his life."

The State of Qatar owns prominent scientific, research, and academic institutions at QU and at other State-based universities in addition to Qatar National Library, specialized libraries, the National Museum of Qatar and other museums. To match scientific research in universities, we need to establish an integrated national center for research that includes departments and sections for the study of Arabic language, its history, along with other languages, including those related to various cultures of the peoples who have become parts of the socio-demographic fabric, in order to preserve Qatar's ancient civilizational and historical identity, so that it can live up to the origin of its name that goes back to the deepest layers of the history of Arabic languages that were written about four thousand years ago.

Qatar University Signs MoU with Istanbul Technical University

HE Dr. Hassan Rashid Al-Derham, QU President during the MoU signing ceremony with Istanbul Technical University.

From Right: Prof. Mariam Al-Maadeed, QU VP for Research & Graduate Studies; Mr. Mert Ozmert , Deputy Chief of Mission, Senior Advisor and Acting Ambassador of Turkey to the State of Qatar; and HE Dr. Hassan Rashid Al-Derham, QU President during the MoU signing ceremony with Istanbul Technical University.

Qatar University and Istanbul Technical University have signed a memorandum of understanding on 18 January 2021 to boost cooperation between the two entities in the fields of Science, Technology and Education, which will be managed by a collaboration between specialists and academicians from both institutions. This memorandum of understanding comes as part of the assertive commitment of Qatar University in enhancement of its collaborations with universities worldwide, and enriching the areas of science and research in education.

The memorandum of understanding was signed by Dr. Hassan Al-Derham, Qatar University President, and Prof. Ismail Koyuncu, Istanbul Technical University Rector in the presence of Mr. Mert Ozmert , the Deputy Head of Mission and First Counsellor and the Charge d'Affaires at the Embassy of Turkey - Doha, and Prof. Mariam Al-Maadeed, Vice President for Research and Graduate Studies at Qatar University, and other distinguished guests from both universities and industry.

The memorandum of understanding emphasized on the cooperation and methods of collaboration between the two entities, especially in the field of scientific research, which is reflected in the academic pathway falling under the strategic plan of Qatar University, striving for excellence in scientific research through innovation with the involvement of local and international stakeholders, to strengthen research and impact socio-economic development.

This memorandum of understanding is a result of collaboration between the Center for Advanced Materials at Qatar University (QU) with the research team led by Prof. Syed Javaid Zaidi, QAFAC Chair Professor and Istanbul Technical University (ITU) with the research team led by Prof. Levent Trabzon, Director of Micro/Nano Engineered and Manufactured Systems Research Center, for research collaboration in the field of water desalination and water treatment.

The signing of the MOU of QU with ITU will further boost the research collaboration between the two institutions and provide opportunities for capacity building to excel in the field of science and technology for the benefit of the people of the two countries as water desalination and treatment is strategic to the state of Qatar as well as Turkey. This is the first time QU is signing an MOU with ITU, which is the top technical university of Turkey.

Prof. Nasser Alnuaimi, Director of Center for Advanced Materials at Qatar University praised the signing of this memorandum of understanding, and termed it an important step forward for scientific research and collaboration between the two universities. In addition, it will be considered as a new era of collaboration between the two countries in the field of scientific and technical education in line with Qatar University's strategy to achieve Qatar National Vision 2030 in water security, as there is already an existing collaboration between the Center and Istanbul Technical University in the field of water desalination using reverse osmosis.

Istanbul Technical University

First Annual Meeting of Academic Network for Development Dialogue Held (ANDD)

ANDD
الشبكة الأكاديمية للحوار التنموي
Academic Network for Development Dialogue

During the first annual meeting of Academic Network for Developmental Dialogue (ANDD).

Qatar University (QU) and the United Nations Economic and Social Commission for Western Asia (ESCWA), held the first annual meeting of the Academic Network for Development Dialogue (ANDD) on 31 March 2021, gathering virtually representatives of renowned universities and academic institutions from the Arab region and the world, along with representatives from UN-ESCWA.

The meeting expanded on the last virtual workshop held on 9 December 2020. It aimed to discuss and approve a five-year plan of the network including necessary task forces to complete tools and services to support ANDD members, such as an Arabic based e-learning platform, dedicated data and statistic sites and a research indexing tool to make research and reports more accessible and visible. The meeting also discussed and approved a proposal to develop a standing ANDD book series program.

Additionally, the meeting included a panel discussion that tackled the subjects of research, innovation and collaboration to advance the 2030 Agenda and sustainable development goals during crisis and post-crisis times. In this context, Prof. Mariam Ali Al-Maadeed, Vice President for Research and Graduate Studies at QU and current chairperson of ANDD, confirmed that this network came for realizing the vision that the UN and universities, together, can influence the future of sustainable development in the region as well as in the world.

Mr. Tarcisio Alvarez-Rivero, Coordinator of the Strategy, Planning, Accountability, Results & Knowledge (SPARK) section of ESCWA, added that this network allowed opportunities to think about improving the region from various perspectives, in addition leverage the power that learning institutions have to influence policy decisions at all levels to advance sustainable development.

The meeting offered an opportunity to suggest ideas for collaboration in different areas identified as priorities by the members. Among the suggestions were co-funding programs and grants focusing on common issues, co-organized events and student summer internships. A number of participants representing different universities also offered to host the next annual meeting of the network that is supposed to take place in 2022.

Please visit the link to the Academic Network for Development Dialogue (ANDD) below:

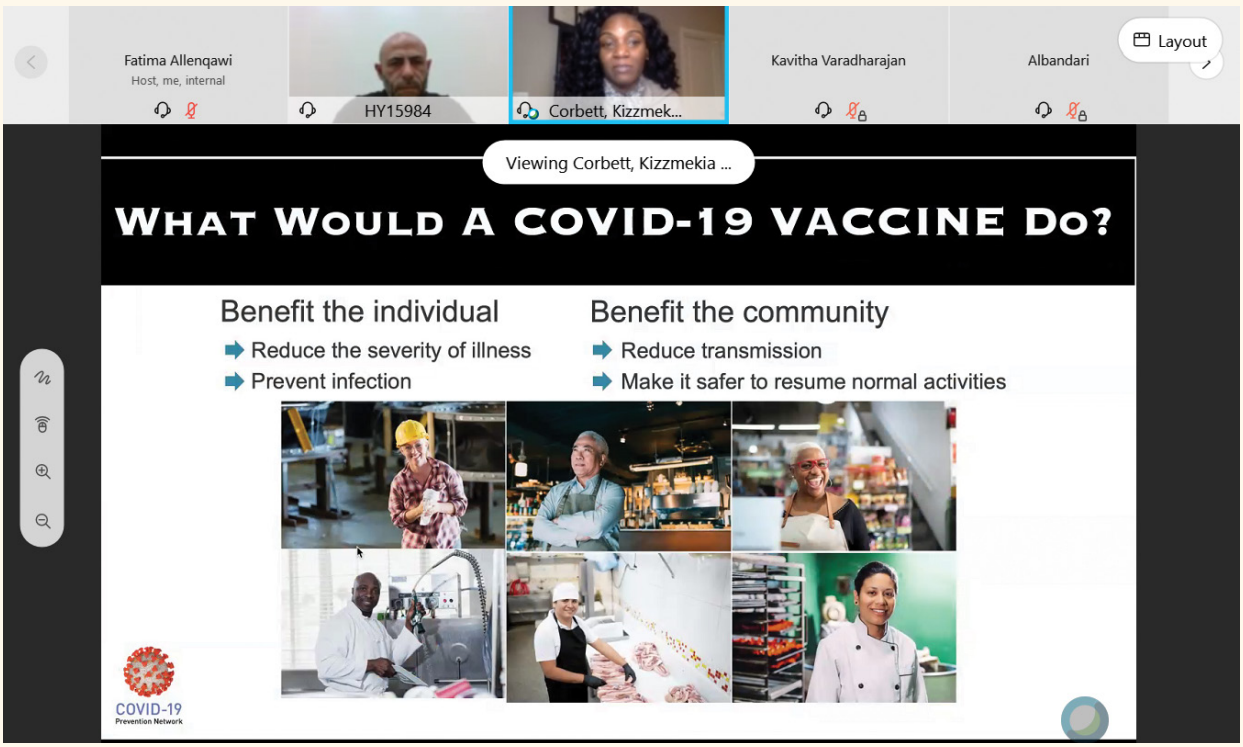
http://www.qu.edu.qa/research/research-activities/ANDD

The Biomedical Research Center Organizes Seminar on Development of COVID-19 Vaccine

The Biomedical Research Center (BRC) at Qatar University organized a lecture on Thursday, 4 March 2021, about "SARS-CoV-2 mRNA vaccine design enabled by prototype pathogen preparedness. The lecture was presented by Dr. Kissmekia Corbett, a research fellow in the Viral Pathogenesis Laboratory at the National Institutes of Health, operating under the National Institute of Allergy and Infectious Diseases.

It is reported that Dr. Corbett has led the collaboration between her institute (NIH) and Moderna to develop and evaluate the Moderna mRNA vaccine in preclinical and clinical trials. She works under the direct supervision of Dr. Barney Graham and Anthony Fauci, the director of the National Institute of Allergy and Infectious Diseases (NIAID) of NIH. Dr. Hadi Yassine, the Head Section of Research at the Biomedical Research Center at Qatar University, moderated the seminar. Dr. Yassine participated in Coronavirus vaccine development at NIH before joining the University.

Dr. Corbett presented the different stages of COVID-19 mRNA vaccine development, illustrating the utilized approaches to make the candidate vaccine available for phase I clinical trial, 66 days after the emergence of the pandemic. Relying on former knowledge from MERS vaccine development, the Viral Pathogenesis Lab at VRC-NIH demonstrated the ability of mRNA vaccine to induce potent antibody response in preclinical settings (mice and monkeys), before the vaccine was tested in phases 1-3 clinical trials. Answering some questions, the speaker recommended the vaccination of pregnant and nursing mothers, noting that phase III clinical trial is undergoing in this regard.



A photo of the symposium organized by the Biomedical Research Center on developing Covid-19 vaccine.

"Graduate Assistant" Employment: **Research and Support Opportunities from QU**

The Graduate Studies Assistant position provides opportunities for QU students to acquire much research experiences in both the academic and research fields. This position enhances research, writing and speaking skills. Given its importance, the Office of Graduate Studies within the Research and Graduate Studies Sector held an event on February 1 2021 aimed at presenting the Graduate Studies Assistant position, the support that this position provides to QU students and the academic staff, and its role in advancing scientific research. The event was held virtually in the Ibn Khaldoun Hall through the WebEx platform, taking into account all the health precautionary measures followed in the country to fight COVID-19, in order to facilitate the attendance of the largest number of students and those interested in this event. Number of viewers of the event reached more than 60 within a short period of time.

The event was initiated by the Dean of QU Graduate Studies Dr. Ahmad Al-Own. He talked about the nature of the graduate studies assistant's work and the efforts he provides, whether in the University or to the research center he is affiliated with. Dr Al-Own also highlighted the features of development for improving the system in the coming period. This will be done through engaging the students with the academic staff on a common research topic together in order to enrich their academic and work experiences.

Ms. Ghada Al-Kuwari, Assistant Dean for Student Affairs at the Office of Graduate Studies, explained the necessary conditions that must be fulfilled by the students applying for this position. She also highlighted the research pillars that the students' research has to focus on:

- Energy and Environment
- Social Studies and Humanities
- Health and Biomedical Sciences
- Information and Communication Technology

Ms. Al-Kuwari announced the dates set for the opening and closing of the application period for the Graduate Studies Assistant position, which coincides with the admission period for the fall semester 2021. She also encouraged students to communicate with their colleges for any inquiries or assistance. In the event that a problem is not resolved, students might approach the Office of Graduate Studies.

The event hosted Dr. Ahmed Massoud, Professor & Associate Dean for Research and Graduate Studies at the College of Engineering, and Dr. Mahjoob Zweiri, Director of Gulf Studies Center in the College of Arts and Sciences. They talked about the participation of

From Right: Dr. Ahmad Al-Own, Dean of Graduate Studies, Qatar University; Prof. Ghada Al-Kuwari, Associate Dean for Students Affairs in the Graduate Studies Office. "Graduate Assistant" Employment Event -YouTube

graduate studies assistants in the College, whether in research or in the teaching process, as well as standing as a role model for other students as they perform their duties as graduate studies assistants and at the same time keep their academic performance well balanced.

In order to enhance the importance of this position at the University, two students who are currently working as graduate studies assistants were invited to the event. Both talked about their experience and achievements during their work period, such as publishing scientific papers, participating in internal and external scientific conferences. Furthermore, they talked about their acquired research experience as a result of working in an academic environment with extensive experience in this field.

In this context, Muyassar Marawan, a PhD student in the Gulf Studies Program at the College of Arts and Sciences, emphasized the importance of this position. She also talked about how this job supported her to publish six research papers, write three chapters in different books, and write short articles that were published in the Gulf Studies Center. Moreover, she noted that this position gave her the opportunity to deliver a lecture to undergraduate students at McGill University in Canada.

Student Tadesse Jameeda, a PhD student in the field of Civil Engineering at the College of Engineering, talked about his acquired experiences in the academic year and the positive impact on his life. Jameeda also talked about his experience working as an assistant professor at College of Engineering Student Learning Support Center (Success Oasis). He noted that this position enabled him to teach students and develop his leadership and communication skills with the help of an elite group of professors at the Center. He added that he was able to publish 12 scientific papers in refereed scientific journals and more than 10 research articles in his field.

As QU Celebrates International Day of Women and Girls in Science:

Qatar's Women Scientists Confronting COVID-19 Receive Appreciation

A Photo of the event: " International Day of Women and Girls in Science" International Day of Women and Girls in Science Event2021- YouTube

The Research and Graduate Studies Sector at Qatar University (QU) organized the "International Day of Women and Girls in Science" in cooperation with the UNESCO Office in Doha and the Qatar National Commission for Education, Culture and Science (QNCECS), on 15 February 2021 through the WebEx platform, in line with the precautionary measures applicable in the country.

The event was attended by Dr. Hamda Al-Sulaiti, Secretary General of the Qatar National Commission for Education and Culture, Mr. Danilo Badillo, on behalf of Dr. Anna Paolini, Director of the UNESCO Office in Doha, representative of the Gulf Cooperation Council countries and Yemen, Prof. Mariam Al-Maadeed, QU Vice President for Research & Graduate Studies, and a number of researchers, students, interested parties. This event coincides with the celebration of the International Day of Women and Girls in Science on 11 February, which was adopted by the United Nations General Assembly in Resolution No. 70/212 of 2016 announcing the initiation of this International Day.

The event features the important role of women and girls in all fields, specifically in the field of science and research, and emphasizes their full and equal participation in it, and appreciates their efforts in the COVID-19 pandemic. "Qatar's Women Scientists Confronting COVID-19" was selected as the title of this year's event.

Ms. Mysar Hassan, a PhD student at Qatar University, moderated the discussion session, which was attended by a number of specialists and researchers, namely: Dr. Susu Zughaier, Associate Professor of Epidemiology and Immunology and Covid-19 research coordinator at the College of Medicine at Qatar University, Ms. Aisha Al-Fakhro, Research and Development Analyst at Barzan Holdings, and Dr. Khaled Machaca, Professor of Physiology and Biophysics and Senior Associate Dean for Research, Innovation and Commercial Handling at Weill Cornell College of Medicine, Member of the L'Oréal-UNESCO Program for Women in Science as well as Dr. Nahla Afifi, Director General of Qatar Biobank, Mr. Abdullah Al-Malki Director of University Relations and Outreach at Qatar Shell Research and Technology Sciences, Dr. Khaled Al-Saadi, Social and Legal Expert at the Qatar Foundation for Social Work.

This event highlights the global recognition of the role of women in building societies, rise of civilizations and development of nations. In addition, it appreciates the distinctive role and the tremendous efforts made by women around the world in various fields wherein they have become experts, their contribution and distinction in various scientific and research fields and their role in advancing the development of science and research despite all the challenges that they may face in this regard. It furthermore features the role of pioneering women in the State of Qatar, their distinctive efforts in supporting Qatari society, and the continuing success in the country.

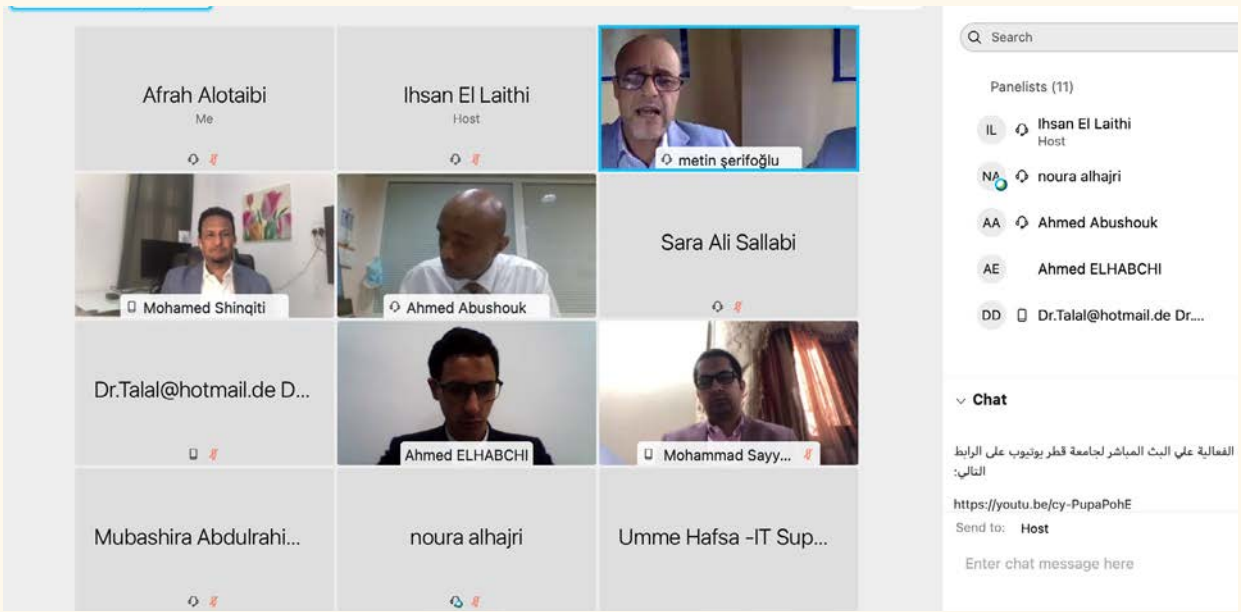
Religion in Constitutions within a Global Context: **Historical, Political, Legal, and Cultural Dimensions**

Ibn Khaldon Center for Humanities and Social Sciences at Qatar University (QU) organized a four-day (January 24-27) virtual international conference on the topic "Religion in Constitutions within a Global Context: Historical, Political, Legal and Cultural Dimensions."

The conference was inaugurated by a speech of Prof. Mariam Al Maadeed, Vice-President for Research and Graduate Studies at QU. She addressed the importance of the topic at this time, stating that 'drafting of constitutions is a crucial issue that requires great expertise, which must consider the identity of a nation, respect religions and human rights.'

Dr. Nayef bin Nahar, Director of Ibn Khaldon Center for Humanities and Social Sciences stated that 'the conference came in the context of bridging among the humanities and social sciences. It discussed the historical, political, social, and legal dimensions to better understand the relationship between religion and constitutions and its implications at the political, social and cultural levels.' He also indicated that, 'the argument about the nature of relationship between religion and power is one of the topics that has a clear effect on the tangible reality. The constitutional status of religion has not resolved any issue in any country in the world as some countries exclude religion from their constitutions, though their religious practices differ significantly from each other. Secular countries such as France, Australia, Netherlands, Norway, Belgium and others exclude religion from constitutions, but their practices towards religion vary a lot. This indicates that the presence of religion in the constitution does not end the controversy. On the contrary, there are countries whose constitutions engage religion, but their dealings with religion are also different. All of the above highlights the importance of this conference.'

Dr. Mohamed Al-Mukhtar Al-Shinqiti, Representative of the Conference Scientific Committee, said during his speech that, 'this heated controversy between religion and constitution, especially after the Arab Spring, has reached a far extent, but it lacks the



A Photo of the participants in the International Virtual Conference titled: Religion in Constitutions within a Global Context organized by Ibn Khaldon Center for Humanities & Social Sciences

necessary scientific material, and the experiences of other nations in this field have not been extrapolated. As is well known, the relationship between religion and the constitution is, in procedural terms, a translation and mirror reflection of the relationship between religion and power. Religions differ in terms of their constituents, and the extent of their inclusion in the movement of life. There are religions that only provide rituals, beliefs, and the cosmic story that tells about the origin and destiny of man, but they do not have any moral or legislative system. On the other hand, there are medium religions in which, along with the above, there is a moral system, but which do not contain legislation, such as Christianity and Buddhism. As for Islam, Allah Almighty made it the final and comprehensive religion, as all the previous religions were circumstantial and partial. Based on that, it is scientifically fair to distinguish between Maximalist Religion represented by Islam and the rest of the religions.

The conference included many sessions, the first of which was chaired by Prof Ahmed Ibrahim Abu Shouk. In the session, Dr. Metin Sharif Oglu participated with a research paper titled: “Law of Millet System and the Rights of Non-Muslims in the Ottoman Empire.” Dr. Talal Abdul Latif Al-Jassar participated with a research titled: “The Twelve Tables: Manuscript in the Middle Ages on Organizing the Relationship between Religion and Law.” Dr. Muhammad Al-Sayed Al-Sayyad participated with the research titled: “Shift Away From Constitutional State to Divine Law: A Study on Status of the Religion and Doctrine in the Constitution of the Islamic Republic of Iran,” and Prof Ahmed al-Habashi with a study entitled: “Historical Background of Religion In the Moroccan and Spanish Constitutions: A Comparative Study.”

The second session of the conference was chaired by Dr. Maryam Abu Sherida. In the session, Prof Kamal Ja’lab participated with a research titled: “Constitutionalizing Religion and General Will.” Dr. Rashad Twam, participated with his research: “Protagonist of the Novel: Religion in the Preludes to Constitutions and its Effect on Controversy Over its Legal Value.” Dr. Ahmed Deeb participated with his research titled: “Levels of Legal Issue of Religious Text in the Constitutions of Islamic States: From the Question of Stipulation to the Impasse of Procedure,” and Dr. Mohammad Barakeh with a research titled: “Legal Effects of the Constitutional Recognition of an Official State Religion.”

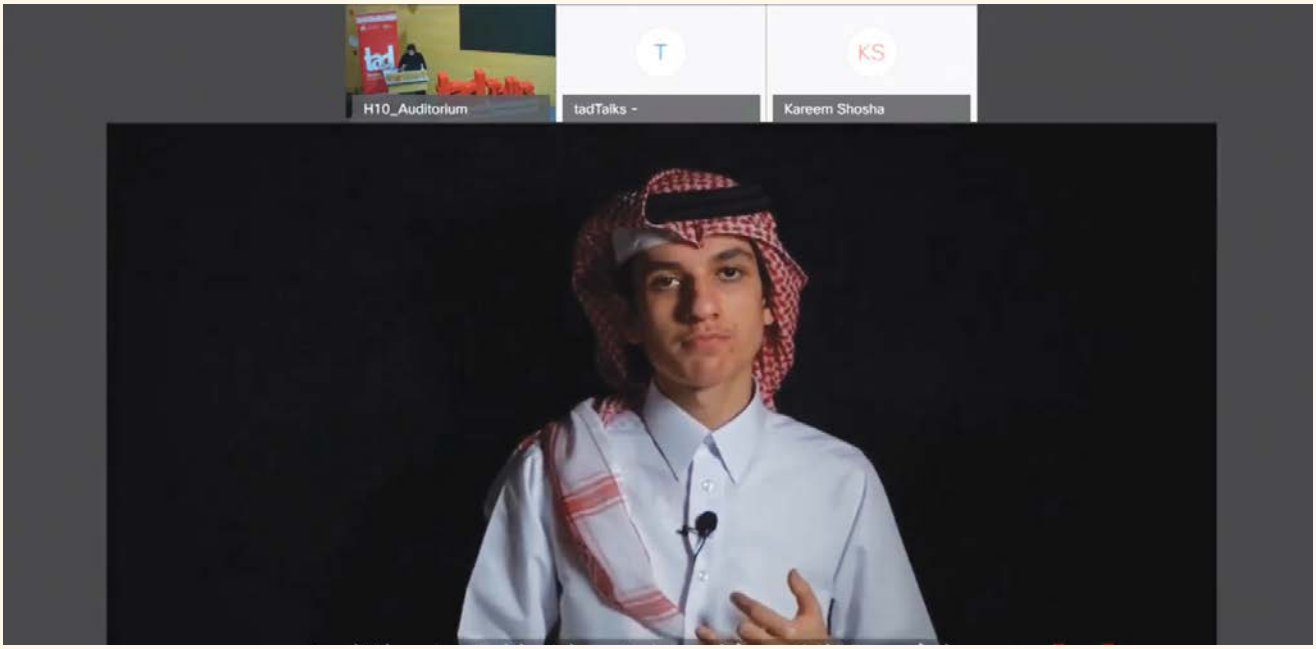
The third session of the conference was chaired by Dr. Muhammad Bubush. In the session Dr. Abd Al-Rahman Adam participated with a research titled: “Religion and Secularism in the Constitutions of the East African Community (EAC): A Study on Status and Impact.” Dr. Mostafa Benmoussa with his research: “Stipulation of Religion in Western Constitutions: Between Religious Embrace and Political Recruitment,” and Dr. Abdel Qader Sudani with his study entitled: “The Constitution of Tunisia, 1861: The Local Context and External Control.” Dr. Hakim Ibrahim and Ahmed Al-Shammari also participated with a research paper titled: “The Constitution of Malaysia and its Religious Laws: A Study of Sharia and Law.”

Finally, the fourth session of the conference was chaired by Dr. Hamad Hamed Al-Ahbabi. In the session Dr. Dahman Hamadou participated with a research paper titled: “Freedom of Thought, Between Legal Standpoint and Practical Exercise in Algeria and France: A Comparative Study.” Dr. Mohamed Al-Mosawi participated with a research titled: “Emirate of Believers in the Political System of Morocco: Between the Constitutional Text and Political Recruitment.” Prof Thamer Saadawi with his research: “Religion in the Constitutions of Tunisia: in both of 1959 and 2014 Constitution,” and Prof Talib al-Doghim with a research paper titled: “Controversy over Stipulation of Religion in the Context of Constitutional Debates in Syria: A Historical Reading Against Official Documents Between 1920-2012.”

tadTalks®

Research Matters FOUNDED BY QATAR UNIVERSITY

Graduate Learning Support (GLS) in the Office of Graduate Studies held the 2021 tadTalks event on April 5th, 2021. The international graduate event showcased recently graduated doctoral students and post-docs from various disciplines in nine different countries including US, Canada, Japan, France, Russia, Malaysia, Brunei, Singapore, and Qatar. Speakers shared international perspectives on the graduate research experience with current and prospective graduate students from around the world. The virtual event welcomed nearly 150 attendees with nearly 400 views on YouTube.



The youngest participant in the event, a junior student at QU's College of Medicine, Student: Mohamed Al-Horr tadTalks 2021 Event – YouTube

Qatar University Vice President for Research and Graduate Studies, Prof. Mariam Al-Maadeed, opened the event by commenting on the significance of graduate research, "The current pandemic has highlighted, more than ever, the importance of research in solving global challenges, and graduate students play a vital role in driving much of the world's cutting-edge research. Consequently, the dissemination of their strategies for success is crucial towards excellence in graduate research".

The event also included a powerful keynote speech given by Dr. Gigi Do, Associate Vice President and Senior International Officer of Global Learning & Strategy at the Diplomacy Institute of University of Houston-Clear Lake who has been an advocate of international education and higher education for over 25 years. Dr. Do shared her experiences as a young refugee from Vietnam and emphasized how education provided many solutions to the problems she faced throughout her journey. Drawing from her own life, Dr. Do spoke passionately about graduate researchers as global ambassadors for diplomacy stating, "This is a shining example of how we can connect and engage our youth through diplomatic means in the global community." Dr. Do went on to praise the event for its many diverse perspectives on pursuing (and completing) graduate research by adding, "Meetings of the mind such as this are vital in recognizing the next generation of leaders and scholars who will become the critical voices in addressing complex, global challenges that we collectively face today such as climate change, food security, water sustainability, conflict resolution, and pandemics."

Additionally, tadTalks 2021 showcased the important role of the Young Scientists Center (YSC) and the Core Curriculum Program (CCP) in helping to develop strong researchers at the earliest stages in a segment entitled Junior tadTalks in which young researchers from YSC and CCP shared their experiences conducting research and working as part of a research team. Dr. Noora Al-Thani, Director of the YSC, spoke about the center's innovate approaches to engaging primary students, middle schoolers, and high schoolers in scientific research before introducing the event's youngest speaker and first-year medical student at QU, Mr. Mohamed Al-Horr. Similarly, Prof. Rana Sobh, Director of CCP, added "We believe that developing students' appetite and ability to conduct research should start during their freshmen year when they first begin their academic journey". Both Dr. Noora Al-Thani and Dr. Rana Sobh stressed to students the importance of developing their skills as well as their appetite for inquiry in order to participate in research that impacts the community.

Due to precautionary measures related to the ongoing COVID-19 pandemic, tadTalks 2021 was held virtually via WebEx and YouTube. Consequently, we would like to invite any of our readers who may have missed the event to watch tadTalks 2021 at the Qatar University Research YouTube channel.

Third Youth Research Forum Included in Activities of Doha Capital of Culture in Islamic World

Qatar University Young Scientists Center in cooperation with the Qatar National Commission for Education Culture and Science organized the Third Youth Research Forum 2021 entitled, "Identity and Cultural Tourism: Towards a Culture and a Sustainable Legacy" in line with the strategic plans set by Qatar University to develop youths' scientific research capabilities in postgraduate studies. The forum's activities started on March 24-25, 2021, as a virtual ceremony on the WebEx platform, under the aegis of the President of Qatar University, Dr. Hassan Al-Derham, and His Excellency Mr. Saleh bin Ghanem, Minister of Culture and Sports of the State of Qatar, along a large number of attendees and researchers.

The Third Research Forum was included in the activities of Doha Capital of Culture in the Islamic World 2021, which was launched in March 2021 under the patronage of His Highness Sheikh Tamim bin Hamad Al Thani, the Emir of Qatar. The forum is an important platform for presenting scientific research and projects that focus on the role of youth in spreading and preserving Qatari culture and the sustainability of the Qatari heritage and youth efforts. A group of researchers, undergraduate and postgraduate students from the State of Qatar and from many Islamic countries such as the Kingdom of Morocco, the Sultanate of Oman, the State of Algeria and the State of Libya participated in the forum, where they presented the results of their distinguished researches that could enrich the youths' experience.

The forum aims to achieve several goals, such as to provide a platform for effective communication between youth, researchers and community institutions, and to consolidate the youth's awareness of their prominent role in the development and advancement of society through scientific research. In addition, the forum aimed to explore the research capabilities of young people with regard to consolidating the concepts of culture and identity, and promoting the culture of scientific research and linking it to historical events.

A Photo of honoring the winners of the Best Research Contest organized by the Third Youth Research Forum
The Third Youth Research Forum Event - Day 2 - YouTube

A Photo of Third Youth Research Forum co-organized by QU Young Scientists Center The Third Youth Research Forum Event – YouTube

This forum also represents an opportunity to create a database of distinguished youth in the fields of research who are capable enough in specialized and inter-disciplinary studies.

As the State of Qatar prepares to host the 2022 World Cup, it will require great organization and efforts, and the youth will have the greatest role in its success and present it in an honorable manner that reflects the culture and the Qatari identity to the world. This forum is an excellent opportunity to guide young people to their important role in preparing to host the World Cup, and to highlight the national and civilizational identity of the State of Qatar and its people. Hence, the importance of investigating and carrying out scientific research in preparation for this global event is of primary concern.

In collaboration with the Qatar National Committee for Education, Culture and Science, Qatar University Young Scientists Center launched a research competition to share studies and researches on identity issues and to encourage scientific research. Universities, institutes and researchers inside and outside Qatar were invited to participate. The researches submitted are in the domain of World Cup facilities and sustainability of the Qatari heritage, the role of museums in promoting cultural identity, economy and cultural tourism, challenges of identity and globalization, medicine, pharmacy and community health. The research posters were evaluated based on several criteria, such as the quality of the research, methodology, use of field research techniques, discussion of results and proper documentation of references. The first three winners of the Best Research competition were honored, and prizes and certificates of appreciation were presented to them.

The winners were as follows:

In the research competition; the 1st winner was Hadeel Al Attar, 2nd was Nour Hisham, and the 3rd Cheikh Modo Badr. As for the Poster competition; the 1st prize went to Hagar Menaisy, the 2nd to Raesa Al Dosary, and the 3rd to Kholeh Mortazawi.

Events at the “Research Wednesday” Series in Qatar University

QU Research

QU Research

QU Research

Qatar University Research

Qatar University Research and Graduate Studies

Research Wednesday Series Website

From Right: Prof. Fadhil Sadooni, Team Leader of Atmosphere and Geology Sciences at the QU Environmental Sciences Center (ESC); and Dr. Mohammed Saad, Director of Gas Processing Center during episode 11 of Wednesday Research Series via Instagram Platform under the title: "Energy, Environment, and Sustainability Methods".

To highlight research excellence at Qatar University, the "Research Wednesdays" Series has succeeded in achieving its goal and purpose. The Series aims at highlighting the outputs of the Research and Graduate Studies Sector, keeping abreast of local and international research issues, and exchanging research experiences in the University community. Various seminars are held every two weeks under the ambit of the Series on Wednesdays, highlighting various aspects, including: grant outputs, inventions and innovations, published scientific research, achievements and research projects, human and social research, in addition to students' researches and research activities.

The "Research Wednesdays" Series in the academic year 2020-2021, from November 2020 to May 2021, covered 12 diverse events including Webinars, Live Instagram and Podcasts, with five panel discussions and research sessions (Webinars), through the WebEx platform. Several topics were discussed, including "Cancer Research in Space: Taking Qatar to the International Space Station" in which researchers from the College of Medicine at Qatar University and the Qatar Satellite Company (Es'hailSat) participated. There was a panel discussion entitled, "The Knowns and Expected Unknowns of the Arabian Gulf" which saw the participation of researchers from Kuwait University, Sultan Qaboos University, and the Environmental Sciences Center at Qatar University. The webinar also included a panel discussion titled "Water Desalination: Innovations in the Development of Reverse Osmosis Technology" with the participation of guests from Istanbul University in Turkey, the Center for Advanced Materials and Metito Company. Moreover, a research topic on "Privacy of Individuals in the Digital Age" with the participation of researchers from the College of Engineering and the College of Arts and Sciences. The last webinar of this academic semester featured the participation of the first batch of students graduated from the College of Medicine in which they talked about their experiences, and what they gained from their years of study, and their research achievements.

The "Research Wednesdays" Series also featured distinguished guests in four interviews on Instagram Live to discuss research topics including "Publication Stages in University Publishing Houses" with Qatar University Press and "Scientific Integrity: Examples from Academic Research and Graduate Studies Cases" with researchers from the Ibn Khaldun Center for Humanities and Social Sciences and the Office of Graduate Studies at Qatar University. It also included a topic titled "Research Grants, Prospects and Challenges" with the Post-Award Department at Qatar University. Moreover, a topic titled "Energy, Environment, and Sustainability Methods" was discussed, with the participation of researchers from the Gas Processing Center at the College of Engineering and the Environmental Science Center.

One of the most important features of the "Research Wednesdays" Series in the Research and Graduate Studies Sector is the launch of the first research podcast at Qatar University on the Soundcloud platform. Three panel discussions were broadcast through this podcast that discussed various research topics, including panel discussion titled "Social Psychological, and Neuro Scientific Impact of the COVID-19 Pandemic», with the participation of researchers from the College of Medicine and the College of Arts and Sciences at Qatar University. The second panel discussion was titled "Scientific and Literary Bases for Dialogue" with guests from the College of Sharia and Islamic Studies and the College of Arts and Sciences at Qatar University. The third discussion was titled "Artificial Intelligence and the Future of Humans", which was attended by researchers from KINDI Center for Computing Research and the College of Engineering at Qatar University.

Activities of the Laboratory Animal Research Center (LARC)

Rodent Research

On 9 March 2021, the LARC presented a remote seminar on the WebEX platform titled, “Rodent Research”. Dr. Hamda Al-Naemi, Founder and Director of the Center, spoke at this seminar on rodent models used in animal research, animal welfare program requirements, and quality assurance measures. Furthermore, she highlighted the services provided by the Center to researchers through the animal house, which is equipped with the latest technology and devices. These devices ensure excellent husbandry conditions and ensure the provision of special breeding conditions under specific-pathogen-free (SPF) initiative. Moreover, she talked about the diagnostic laboratories, which support the environmental and health and veterinary monitoring programs for quality assurance of experimental animals.

Training Program on Human Care and Use of Laboratory Animals (HCULA)

The LARC provided training program on the humane use and care of laboratory animals (HCULA). This basic training program includes a theoretical and practical program. Due to the circumstances of the Covid-19 pandemic, the theoretical program was only provided remotely via the WebEx platform on 5 April 2021. The theoretical program is mandatory for all students and researchers who intend to use experimental animals at QU LARC for the purposes of scientific research or teaching, regardless of the previous training obtained by the researcher or the student in other specialized centers. The practical training program, which is only mandatory for all researchers and teaching staff who will have direct contact with live animals at the Center, has been postponed.