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Qatar University Research Magazine

Issue 20, December 2023

Qatar University Press
A View of the Latest Publications

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Distinguished Readers of Qatar University Research Magazine,

We welcome you again to present to you the twentieth issue of the Qatar University (QU) Research Magazine, which highlights the achievements of research and innovation along the quantitative and qualitative developments in scientific and academic progress at the university.

As featured in the issue's unique cover, we invite you to explore the latest publications through which Qatar University Press presented to the readers. The issue highlights Agricultural Research Station patented agricultural technology to grow vegetables without soil throughout the year in Qatar. In addition to, a sustainable partnership between QU and Qatar Shell, in a way that represents integration between the academic and industrial sectors.

We congratulate the Journal of Sharia and Islamic Studies (JCSIS) and Tajseer Journal, published by QU Press, which have achieved the criteria for accreditation of the Arab Impact Factor and Reference Citations "ARCIF."

A research team from the Department of Mathematics, Statistics and Physics at the College of Arts and Sciences and the College of Engineering also shares its innovation with us, inventing a new material to sense hydrogen gas with high efficiency.

We have a variety of topics and amongst them, the achievement by the Applied Sciences Sector at the university in partnership with ExxonMobil, in a dynamic study using drones to monitor the second largest dugongs' population in Qatari coastal waters. Including topics about predictive skills for reading fluency among third-grade students in Qatari public schools, the causes of palm diseases and local biological control factors. The issue features also a recent national study on consumer values, behaviors and spending preferences in Qatar, together with a presentation of the contribution of the Sheikh Faisal Bin Qassim Museum.

From the College of Medicine, there is a research that enables early detection of Multiple Myeloma, which is classified as the second most common blood cancer. Also, a joint project between QU and the Ministry of Municipality on the district cooling system and studying its effects.

We have interesting conversations, including an interview with Dr. Noora Fetais, about her patents. Among them is a mechanism to customize the security risk assessment of a computer network. We also interacted with the academic and media personality, Dr. Hanan Al-Fayadh and Mirdef Al-Qahsouti, a doctoral researcher at Durham University in Britain, about translating the book (The Foreign Policy of the Smaller Gulf States), in addition to meetings with a group of prominent researchers and graduate students.

Among our events, this issue includes, the QU's Annual Research Forum and Exhibition 2023, which was held under the theme 'Research for Future Aspirations.' The event was attended by HE Abdullah Bin Hamad Al-Attiyah, Chairman of the Abdullah Bin Hamad Al-Attiyah International Foundation for Energy and Sustainable Development and former Deputy Prime Minister and Minister of Energy and Industry. The issue featured the success of graduate students, who participated in the National 3MT Competition by presenting the importance of their research and its impact on society, where QU won the first place.

I invite you to browse this issue and get to know more of our achievements and activities. I hope it will be beneficial and enjoyabl for you all.

Prof. Mariam Al-Maadeed,

Vice President for Research and Graduate Studies,

Qatar University

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The Research and Graduate Studies Office acknowledges the contributions made in support of publishing this issue.
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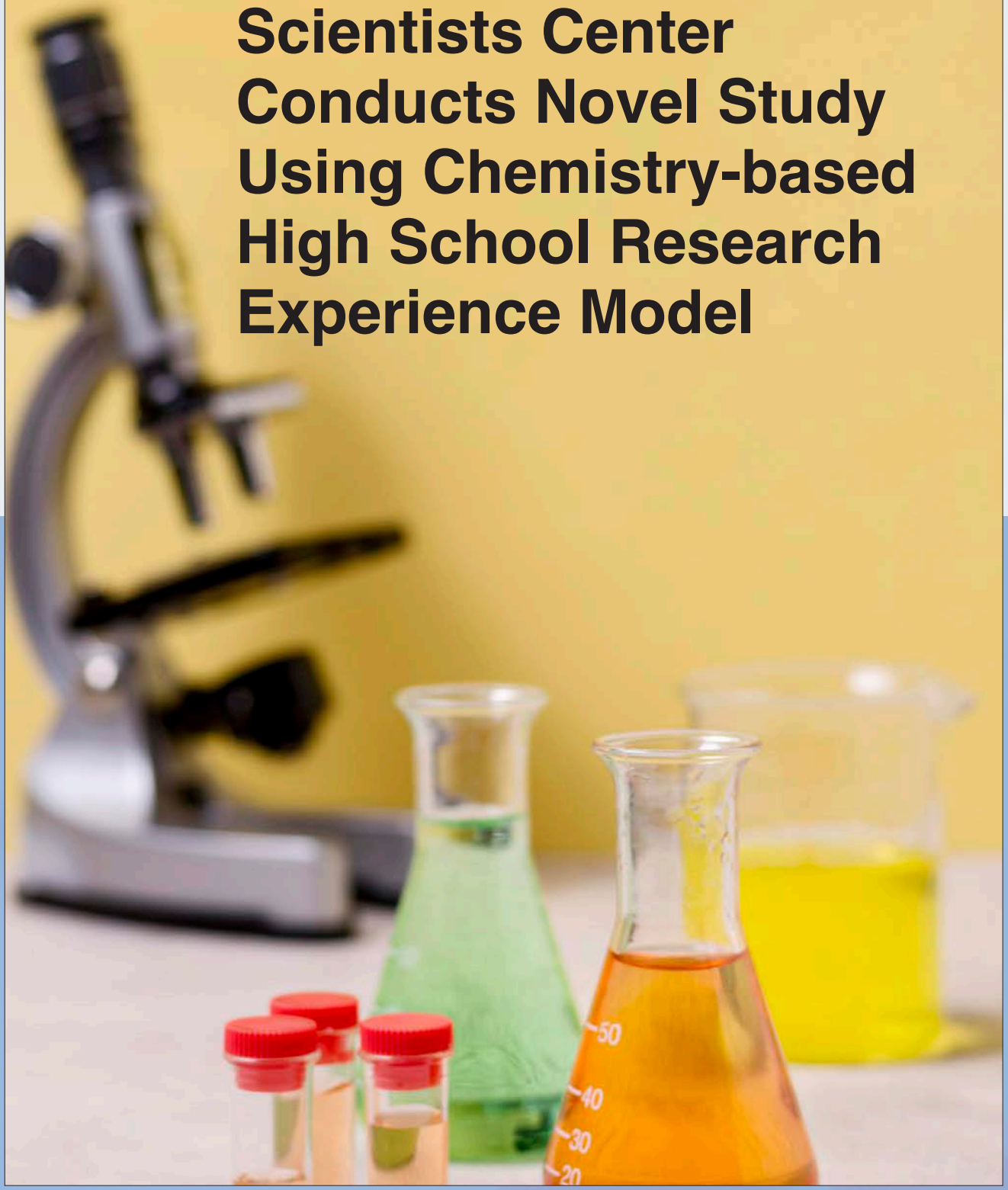
Qatar University Young Scientists Center Conducts Novel Study Using Chemistry-based High School Research Experience Model



Qatar University Young Scientists Center students during an activity at the center.

An innovative research study conducted by esteemed scientists from Qatar University Young Scientists Center (QUYSC) has unveiled the significant role of multidisciplinary chemistry informal research programs in fostering research competencies and attitudes among aspiring scientists. This study was conducted by QUYSC as part of the "I am a Researcher" program, designed for national students to nurture their research-based knowledge through advanced research experiences in real-world labs under the mentorship of research experts and scientists. The study used a mixed-method analysis of 330 high school students from 2010 to 2020 to gauge the program's effectiveness. The findings (published in journal of chemical education in the American Chemical Society) shed light on the transformative impact of these programs in shaping the future of scientific research.

The study, titled "The Role of Multidisciplinary Chemistry Informal Research Programs in Building Research Competencies and Attitudes," aimed to investigate the benefits and outcomes of informal research experiences in the field of chemistry. By examining the perspectives of participating students and analyzing their research competencies and attitudes, the research team gained valuable insights into the effectiveness of multidisciplinary approaches in nurturing scientific talent.

Through a carefully designed research program, students were exposed to a wide range of interdisciplinary research projects that combined principles from various science and engineering branches, particularly on chemistry sub-disciplines. These projects encouraged participants to explore innovative approaches, collaborate across disciplines and think critically to solve complex scientific problems. The findings of this research study have implications for educational institutions, policymakers, and organizations invested in promoting scientific research. It underscores the importance of fostering multidisciplinary collaborations, providing informal research opportunities and promoting research competencies and attitudes among young scientists.

This study serves as a call to action for the scientific community to further invest in multidisciplinary chemistry informal research programs and create an ecosystem that nurtures the scientific potential of aspiring researchers. Prof. Noora Al-Thani, the study's principal investigator, emphasized the significance of multidisciplinary chemistry informal research programs in building research competencies and attitudes. "This program provides invaluable opportunities for aspiring scientists to engage in hands-on research experiences and develop the necessary skills and mindset for a successful scientific career," Prof. Noora Al-Thani stated.

For more information kindly visit the link below:

The Role of Multidisciplinary Chemistry Informal Research Programs in Building Research Competencies and Attitudes | Journal of Chemical Education (acs.org)

Agricultural Research Station (ARS):

A Patented Vertical Farming Technology for Year-Round Soil-Free Vegetable Cultivation in Qatar

Sample lettuce growth after a 21-day growth period.

As the world grapples with increasing population and environmental challenges, traditional farming methods face unprecedented challenges. Innovative solutions like vertical farming have emerged to meet the growing demand for fresh and sustainable produce. Vertical farming represents a paradigm shift in agriculture. Instead of sprawling fields, crops are cultivated indoors in controlled environments, using stacked layers or shelves. This approach maximizes space, minimizes resource consumption and offers year-round production, all while reducing the environmental footprint. With this perspective, the Agricultural Research Station at Qatar University has worked on providing innovative scientific solutions to various challenges facing the Qatari agricultural sector. As one of these innovative solutions, the station has developed a patented hydroponic vegetable cultivation system in a facility for fresh leafy vegetables. This facility produces fresh leafy vegetables year-round using the latest scientific techniques in a highly controlled environment. This facility is designed to optimize the growth of leafy greens, by controlling and regulating environmental factors such as temperature, humidity, light, and nutrient levels. Qatar University Vegetable Factory (QUVF) is well equipped with precise climate control systems that regulate temperature, humidity, CO_2 levels and lighting to replicate the ideal conditions for each leafy vegetable species. QUVF employs specialized LED lights to provide the necessary spectrum for photosynthesis, enabling crops to grow efficiently and rapidly, regardless of external weather conditions. Sensors and automation technologies constantly monitor and adjust environmental parameters, ensuring optimal growing conditions and resource usage.

The Cultivation Process: Seed Sowing to Harvest in 30 Days

The journey begins with a careful selection of high-quality seeds, focusing on varieties that thrive in controlled environments to ensure optimal growth. Subsequently, seeds are sown on the seeding mat, using seedling trays and kept under a lighting shade cover for 1 day. These trays are placed in a seedling pool where temperature, humidity and lighting conditions are carefully controlled to encourage rapid and uniform germination. The lighting shade cover is removed 1 day after sowing (1 DAS) and the seedlings are transferred to a seedling tray, marking the start of the Non-Deep Flow Technique (Non-DFT) zone of the greening pool, where they receive LED irradiation until 3 DAS. On the fourth day (4 DAS), the circulation of hydroponic solution for the greening pool commences and the greening zone's Non-DFT seedling tray cells are collected. The seedling bottom trays are then transferred onto the seeding mesh trays and moved to the DFT zone of the greening pool. Once the seedlings reach a specific size, typically between 7 DAS and 14 DAS, they are transplanted into larger containers or grow towers, each with dedicated space and resources. The recommended weight for suitable transplanting to the planting pool is 1 to 3 grams. In the planting pool, the plants will continue to grow from 14 DAS to 30 DAS. Routine maintenance practices in (QUVF) include pruning to eliminate dead or diseased leaves and thinning to facilitate healthy growth by creating space. While vertical farms are generally less susceptible to pests and disease compared to traditional farming, QUVF implements integrated pest management techniques that are employed as a preventive measure to maintain a pest-free environment. The harvesting process in vertical farming is a precise and efficient process. Leafy vegetables are usually harvested when they reach the desired size and maturity.

The Benefits of Vertical Farming for Leafy Vegetable Production

Vertical farming offers a host of benefits. It allows for year-round production, ensuring a consistent supply of leafy greens regardless of external factors like weather and seasons. This approach also leads to reduced resource usage, as controlled environments cut water consumption by up to 90% when compared to traditional farming, while energy-efficient LED lighting minimizes electricity consumption. Additionally, vertical farming contributes to a smaller carbon footprint by being located closer to urban areas, which reduces transportation emissions and by employing controlled environments that lessen the need for chemical inputs. Vertical farms also excel in space efficiency, requiring only a fraction of the land required by conventional farming, making them suitable for urban environments. Lastly, the focus on harvesting produce at its peak freshness, results in superior taste and nutritional value. Finally, this new farming technology aligns with the environmental conditions in Qatar, considering factors such as water scarcity, limited space and high temperatures. This innovative technology stands out by separating production factors from environmental variables, ensuring production continuity, product quality and safety. The research team is currently working on adapting and developing project ideas to fit the Qatari environmental conditions, particularly in terms of cooling systems and energy supplies, in collaboration with researchers from Qatar University in these fields. This project is expected to open new research horizons for various disciplines within and outside of Qatar University, offering new training and research opportunities for students. Additionally, it is anticipated that the project will provide a domestically produced product that supports the local market.

Biomedical Research Center Purchases New Zebrafish Husbandry System Expanding Its Capacity

The Biomedical Research Center (BRC) has recently expanded its Zebrafish Facility with a new aquatic circulatory husbandry system, as a crucial step for advancing biomedical research at Qatar University and the country at large. The Zebrafish, a small fish known as Danio Rerio, is an emerging animal model that is popular in the research community. It can grow up to five centimeters in length and its name comes from the five uniform, pigmented, horizontal, blue stripes on the side of its body. Zebrafish are attractive for various research applications due to their small size, rapid development, easy raising, high reproductive rates, transparency at early stages of life and close physiological, metabolic and genomic similarity of over 70% to humans.

Under the patronage of the Vice President for Medical and Health Sciences and Director of BRC, Prof. Asma Al-Thani, the Zebrafish Facility was established in 2016 and has been actively serving researchers, students, partners and stakeholders across Qatar and abroad, resulting in more than 50 research publications, and the graduation of several undergraduate and graduate students. The facility can be used in various research fields including toxicology, genetics, diabetes, cancer, cardiovascular and others.

To better serve the purpose of research and support increased demand from QU faculty, a new Zebrafish Water Circulatory Husbandry system has been purchased and installed in the facility with generous support from Prof. Mariam Al Maadeed, the Vice President for Research and Graduate Studies.

The new system incorporates the latest technology and advanced features. It is composed of a dedicated water filtration unit, four racks, each with six shelves, and several separate tanks of different sizes. The system can host up to 6000 adult fish and could be expanded in the future to hold additional racks. Most importantly, with enhanced water filtration capabilities, the new system is expected to improve the health of aquatic animals.

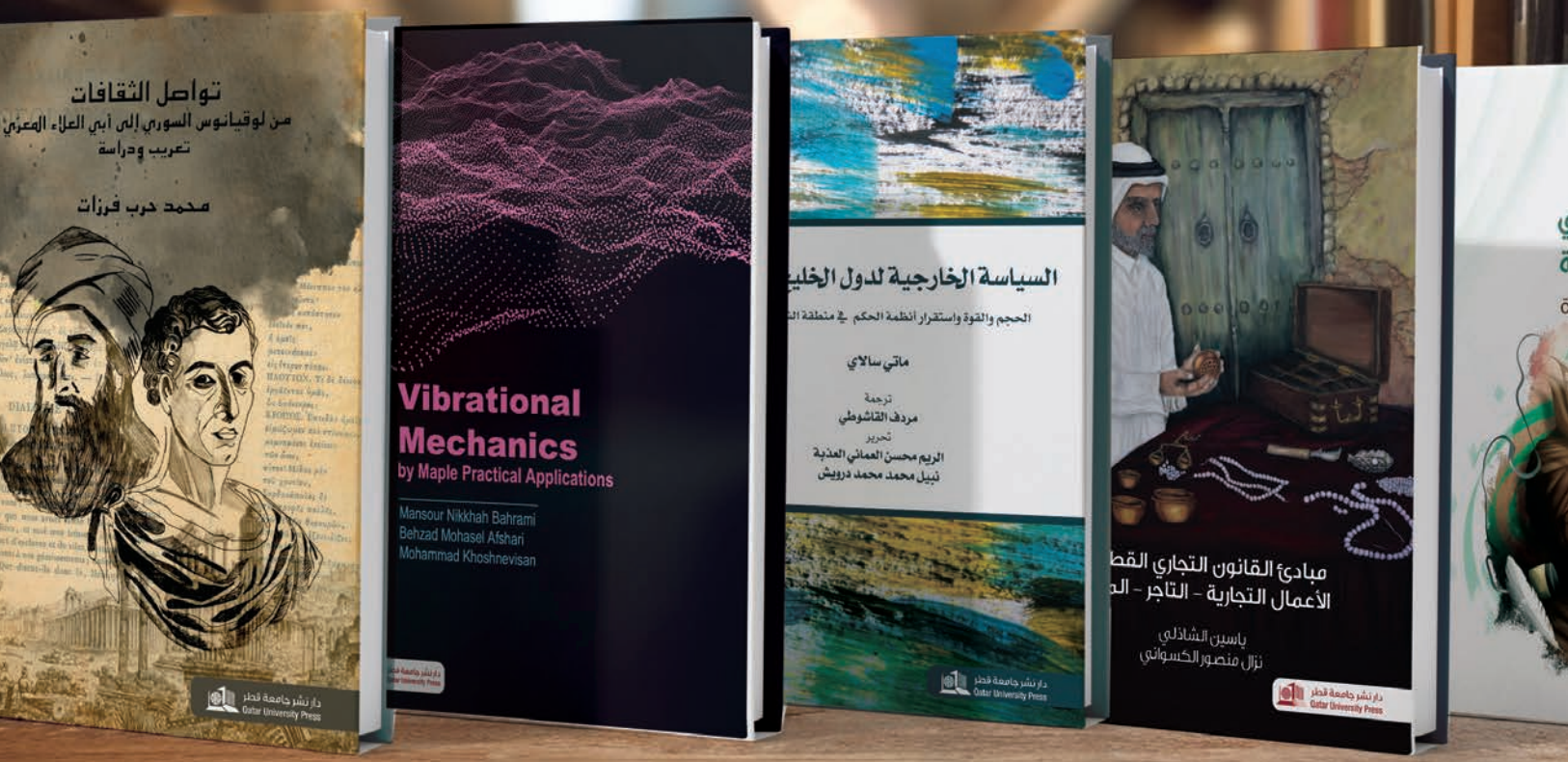
Currently, several different Zebrafish research projects are being conducted at the University. These projects are in different fields. The advancements in genetic engineering enable the use of Zebrafish as a model to study the evolution of human diseases and test drugs to cure these conditions. The University's Zebrafish facility houses wild species as well as several transgenic and mutant lines.

The Facility is equipped with the latest technologies, including Nano-injectors, fluorescent microscopes, embryo and adult motility behavioral analysis systems, as well as several Zebrafish assays and analysis software, all of which are available to University students and faculty.

The Zebrafish Facility team at the Biomedical Research Center welcomes faculty members and students at the university, to learn more about this fascinating animal model, explore how they can integrate zebrafish into their studies and look forward to more engagement. Interested individuals can visit the facility located at the Biomedical Research Center in the Research Complex and reach out to Dr. Huseyin Yalcin, Research Associate Professor and Zebrafish Facility Head, at zebrafish@qu.edu.qa.

Zebrafish Facility at the Biomedical Research Center at Qatar University.

Qatar University Press's Series of Continuous Achievements and a View of the Latest Publications



Since the publication of the previous issue of the Qatar University Research Magazine, the Qatar University Press has continued its distinguished contributions in the field of academic research and publishing. In this issue, we will review the most prominent developments and new publications through which the QU Press has appeared to the readers.

In the light of the reputation it has created in the world of publishing, locally and internationally, QU Press has witnessed a qualitative leap in receiving requests for publication; so, the number of the approved projects for publication increased by about 97 titles. The number of published publications amounts to about 71 titles, most notably the Encyclopedia of **Majalis Al-Nūr**, the first chapter of "**The Encyclopedia of Occidentalism,**" which contains four volumes, and the books "**Al Zubarah, Qatar's World Heritage City**," "**Signs and Gestures: Non-verbal Communication in the Qatari Culure**," and "**Qatar on the Arabian Gulf: A Search for Lost Times in Ancient History,**" in both Arabic and English for each.

Since January 2023, QU Press has so far published 24 new titles, most notably "**The Law of the Cooperation Council for the Arab States of the Gulf**" by Prof. Abdullah Abdullatif Al-Muslemani, **"Policy of Iran in the Arabian Gulf during the Reign of Nasser Al-Din Al-Qajari (1848-1896)** by Dr. Mustafa Aqeel Al-Khatib, "**Universal Design for Learning – A Contemporary Vision**" by Dr. Khalid Rashid Khader, and **"Principles of Housing Planning: Academic Studies in Urban Planning**" by Eng. Monthir B. Al-Adhami, "**Dysphagia for Adults: The Role of Speech-Language Pathologists in Evaluation and Treatment**" by Dr. Nabil Zairi, "**Institutional Reputation and its Role in Brand Building**" by Mr. Yahya Al-Sayed Omar, and "**The Qatari Political System–An Analytical Study in the Light of Political Systems**" by Sheikh Abdulrahman Hamad Qassim Ali Al-Thani, in addition to a unique book that may exceed the nature of traditional academic books, in which its author followed the path of dialogue and dictation, and is concerned in particular with some issues of Qur'anic rhetoric, entitled "**Put your Feet in Mud**" by Mr. Muhammad Ali Mustafa, and it is enough for us to hint at its uniqueness, which is what Dr. Emad Abdul Latif mentioned in his foreword to the book: "This is a book that is difficult to classify, beating with its feet in the lands of various fields of knowledge, the most important of which are: grammar, rhetoric, Quranic sciences, biography, hadith, studies of readings and interpretation, cognitive sciences, psychology, anthropology, architectural history, and others, but above all, it is a book on "love of heritage, love of reading, love of knowledge, love of storytelling, and love of readers."

It is also worth noting that QU Press has presented to the public with a distinguished set of legal textbooks in coordination with the University's College of Law, including "**The Combating of Corruption Crimes in the Law of Qatar in Light of the United Nations Convention against Corruption**" by Dr. Ayad Haroon Al-Douri, "**Principles of the Qatari Commercial Law (Business-Merchant-Store),**" by Dr. Yassin El Shazly and Nazzal Kisswani, "**Rights in Rem in the Qatari Civil Law**" by Dr. Farouk El Abasiri and Dr. Muhammad Ammar Torkmanie, and "**Summary of the Sources of Obligation in Qatari Law**" by Dr. Gaber Mahgoub Ali, in addition to the book "**Introduction to Qatari Law,**" by Dr. Muhammad Ammar Torkmanie.

Based on what QU Press seeks to achieve, by supporting the **open access** system for some of its publications of books and scientific journals, it has published this year five of its publications on the open electronic access system: "**Social Science Research in the Arab World and Beyond: A Guide for Students, Instructors & ,Researchers** " by Mark Tessler, a translation into Arabic by Moroccan scholar Dr. Hassan Ahjeej, as well as "**Arabic Narrative History and Visualization: A study of selected models**" by Dr. Said Bouaita, "**The Basics of International Law (Qatar Version)**" by Dr. Math Noortmann and Dr. Faisal Al-Hababi, as well as "**Vibrational Mechanics by Maple Practical Applications**," which is an important reference book for undergraduate and postgraduate students majoring in physics, mechanical engineering, electromechanical and aerospace engineering in acquiring a more thorough knowledge of vibrational mechanics using the Maple programming language. Maple® is a powerful mathematical software for solving complex problems in the field of vibration. To add, "**Proceedings of the International Conference on Civil Infrastructure and Construction (CIC 2020)**" that included about 180 research papers in which nearly 500 researchers around the world participated. It was organized in cooperation with a number of ministries, institutions and authorities of the State of Qatar, in addition to publishing the first title in the series of entrances.

In the field of translation, QU Press has published a number of publications, including the book "**The Art of Collaboration: Lessons from Families of Children with Disabilities**" translated into Arabic by Dr. Taha Adawi and Lamis Abdul Rahman, and the book "**The Foreign Policy of Smaller Gulf States – Size, Power and Stability of Regimes in the Middle East**," translated from English into Arabic by Mr. Mirdef Alqashouti, in addition to the translation of the book "**Qatar on the Arabian Gulf: A Search for Lost Times in Ancient History**" by Dr. Muhammad Harb Farzat, translated into English by Mr. Taoufik Kouki.

In addition, QU Press played its role in the issuance of a literary historical book that is one of the pioneering

Qatar University Press latest releases.

works that combined the method of Arabization and analytical and comparative study, titled "**Intercultural Communication: From Luqianus to Abu Al-Ala Al-Ma'ari**," in which its author, historian Muhammad Harb Farzat, tried to reveal the factors of communication between three pioneers of literature in the ancient East, starting from the history of literature to the golden Arab age of culture and literature, through the study of three works of the most important evidence of the human literary heritage of three sages, who are the poles of literature in the cultural history of Syria, moving through three languages; from Aramaic to Greek to Syriac, and then to Arabic, and these works are; "**The story of the wise writer Ahi Yaqir**," from the Aramaic history in the first millennium BC, and "**Dialogues of the Dead**," by the writer Lucianus the Syrian, from the Roman imperial era, which was written in Greek, and published in French in 1860, and was Arabized by the author of the book, in order to study, investigate and compare, and then "**The Message of Forgiveness**," by Abu Al-Ala Al-Maari, from the fifth century AH / eleventh century AD.

QU Press also held a book launch session at Katara Cultural Village, on the sidelines of the Novel Week and the ninth edition of the Katara Prize for Arabic Fiction Festival 2023 last October.

It should be noted that QU Press, as part of its efforts to support the translation of a number of its publications, has granted the rights to translate the book "**Majalis Al-Nūr**" into Turkish, which was published by Asala Publishers in Istanbul, in the end of 2022, in five volumes.

Given that the Arab Library suffers from the scarcity of authentic scientific literature concerned with bringing the various branches of science closer to readers in a manner that is easy to understand and circulate among specialists and non-specialists, and to make it suitable for young students and researchers, and since our current era is characterized by being an extremely complex era, in which the political overlaps with the economic, cultural and social with the virtual and cyber; and biological with the technological, this overlap imposed on the applied and natural sciences, as well as the social sciences and humanities the need to go beyond the logic of narrow specialization and monolithic subjects in favor of the logic of bridging and intersection between sciences, and to go beyond the theory of boundaries between cognitive disciplines, and to establish integration between curricula and disciplines scientific, humanistic and the social, through so-called interdisciplinary, multidisciplinary.

Therefore, QU Press has taken it upon itself to present the "**Knowledge Series**" project, through which it seeks to disseminate reliable scientific knowledge, according to a clear simplistic approach, through which non-specialized readers can understand the foundations and premises of the scientific field addressed in the book.

In this context, QU Press announced the launch of its first publication in this series with the book "**Introduction to to Aeronautical Engineering and Technology**" by Dr. Eng. Haider Salman, during the activities of the Doha International Book Fair, in June 2023.

It is noticeable that the publications of QU Press are rich in diversity in several fields, including translations, textbooks, literary and educational studies, social sciences, without paying attention to the journals of medicine, engineering, applied sciences and other fields.

At the level of scientific journals, QU Press supervises five refereed scientific journals in several disciplines, namely the International Journal of Law, the Journal of the College of Sharia and Islamic Studies, the Journal of Educational Sciences, the *Tajseer* Journal, and the *Ansaq* Journal, each of which publishes at least two issues per year, and has been able to fulfill the publication of (49) issues of journals since joining QU Press to date.

Finally, we note that the Journal of College of Sharia and Islamic Studies ranked second in its specialization in the Arab world in the 2023 ARCIF Impact Factor Report.

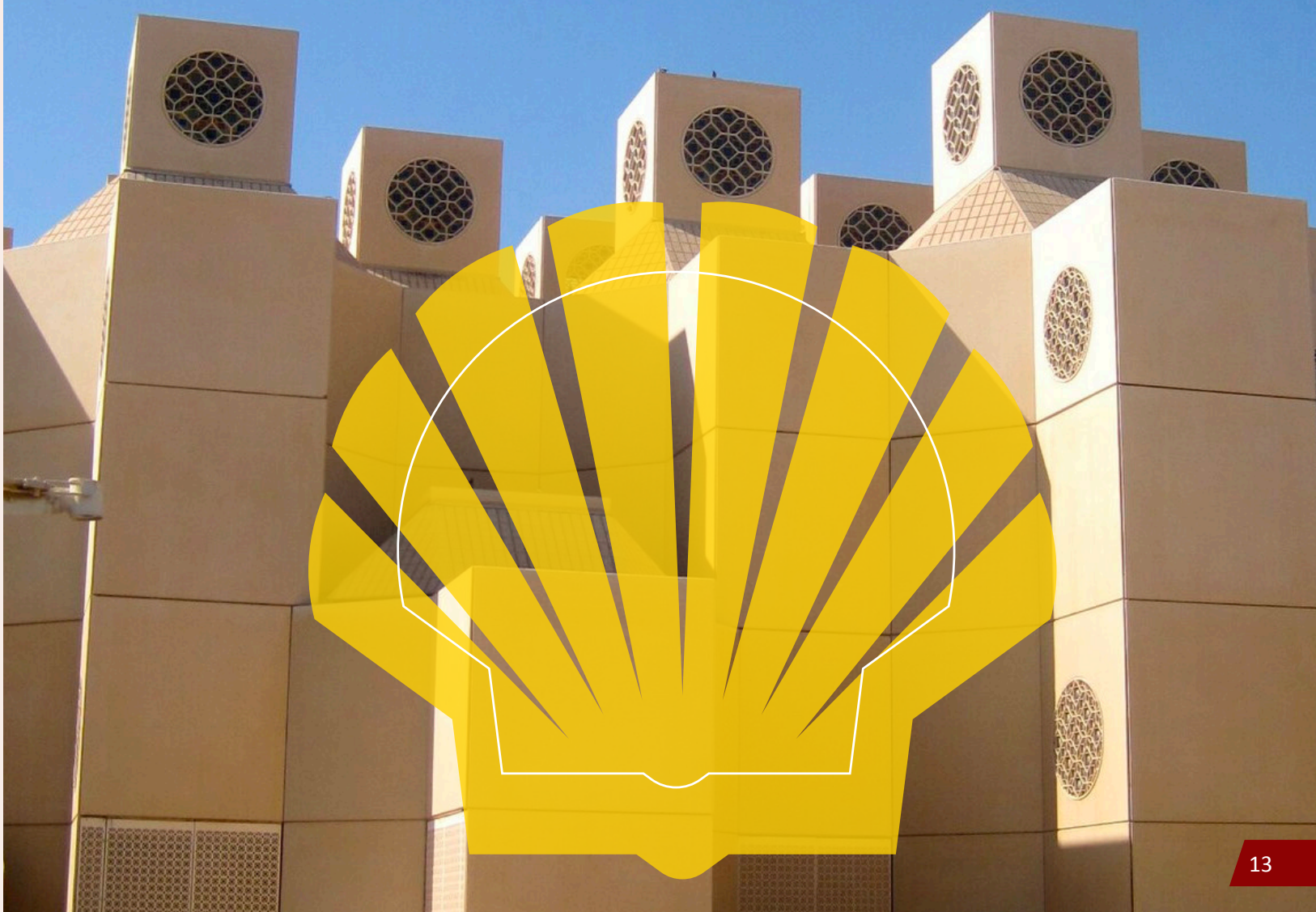
Prof. Fatima Al-Sowaidi, Director of Qatar University Press, upon sharing her thoughts said: "QU Press aims to support the University's vision and achieve its mission towards excellence in research and education, by achieving the approved scientific publishing standards, and attracting distinguished authors from all disciplines, to meet the needs of the University and society. QU Press will not only be a gateway for a book, but its mission is to root community awareness and raise the efficiency of a young generation.

Forging the Future Together:

The Enduring Partnership between Shell and Qatar University

Prof. Aboubakr M. Abdullah

Manager of Research Excellence, Research Planning and Development Department, Office of the Vice President for Research and Graduate Studies, and Research Professor of Materials Science and Engineering, Center for Advanced Materials (CAM) – Qatar University



Dr. Nicholas Laycock, Research Lead, Materials and Corrosion Research at Shell Qatar.

Prof. Aboubakr Abdullah in a workshop for joint projects between Shell and Qatar University, Hamad bin Khalifa and Imperial College London.

For many years, the Center for Advanced Materials (CAM) at Qatar University (QU) has had a close and strong collaborative relationship with Qatar Shell (QS), particularly at the Qatar Shell Research and Technology Center (QSRTC) located at the Qatar Science and Technology Park (QSTP) in Doha, Qatar. This partnership has been instrumental in driving numerous projects and innovations in the field of advanced materials for the oil and gas industry. Dr. Nicholas Laycock, Materials and Corrosion Research Lead at QS and Prof. Aboubakr M. Abdullah, Research Professor of Materials Science and Engineering, CAM at QU, stand as pillars in this relationship, representing QS and QU, respectively, and guiding numerous initiatives alongside Qatar Shell.

The year 2013 marked the start of this collaboration when the two partners came to an agreement by which Qatar Shell funded a giant research grant to study scaling and corrosion in Sour Gas Pipelines. Prof. Aboubakr Abdullah and Prof. Mary Ryan at the Imperial College London University (ICL) managed the fund. By this agreement, QS participated significantly in building the capacity at CAM, by funding one and helping two PhD students to pursue their PhDs at ICL, including two Qatari Researchers who are currently Research Assistant Professors at CAM: Dr. Noora Al-Qahtani and Dr. Maryam Al-Ejji. In addition to a third researcher, Dr. Ahmed Shamso, who left Qatar for his post-graduate studies in the UK. This mega-research project was dedicated to the in-situ study of the under-deposit corrosion (UDC) either using probes embedded under the deposits or using the Synchrotron to monitor the formation of the deposit and characterize its nature before being oxidized to other forms. Figure 1 shows the developed electrochemical cell to study the formation of the deposits on top edge of a steel sheet at the synchrotron.

At the same time, the two teams submitted their first National Priorities Research Program (NPRP) proposal to the Qatar National Research Fund (QNRF) regarding studying the effect of minor alloying elements in C-steel in the rate of carbonate deposit formation. This study revealed a significant effect of 1% Cr and 0.7% Mo in the formation of protective carbonate scales above the surface of C-steel. The protection even increased significantly to the extent that using a corrosion inhibitor (CI) is not necessary at all in the presence of 100 ppm of H2S. This study paves the way for minimally increasing the manufacturing cost of C-steel but saving the huge budget assigned to using CI.

Later, QU and QS team submitted and awarded three more NPRP research proposals from QNRF. Two of them are already concluded and their final reports were accepted by QNRF and were dealing with the UDC in the gas pipelines and boilers, while the

third one is currently active and targets developing a robust, rapid electrochemical testing technique (based on variations of Electrochemical Impedance Spectroscopy and Electrochemical Noise Analysis) that can fast-track robust CI assessment. In addition, it investigates the interaction between CIs and protective scales, and use the results to develop new models for the formation of scales in environments containing both CO_2 and H_2S. The UDC in boilers research project revealed a critical deposit thickness of about 95 µm for initiation of UDC. Also, low levels of tri-sodium phosphate dosing should be sufficient to increase the critical thickness by > 100 µm across a wide range of operational scenarios. Finally, the team is currently investigating also the corrosion and its control in the produced water re-injection (PWRI) pipeline system at Pearl.

In addition to the many workshops organized by QU and QS in Qatar and the numerous research articles published in corrosion flagship journals and top corrosion conferences, two patents are disclosed from the UDC research project in sour gas pipelines. Both are currently under examination in the USA and Qatar. The first one, is a new low-cost electrochemical sensor to measure the chloride ion build up under deposit in sour media which gives an early warning of the start of UDC. The second one, is a novel corrosion coupon that can be used to quantify the rate and form of UDC under different deposits in any industry, not only oil and gas. In addition, to help in estimating the CI efficiency.

Aside, from the funded research projects, the collaboration between QU and QS in using their mutual pieces of research equipment has strengthened research in both entities.

It is worth mentioning that Prof. Aboubakr Abdullah won the Qatar Shell Faculty Internship in 2018/2019 academic year. Qatar Shell funds this Internship aiming to provide a platform for faculty members to gain hands-on experience in the industrial sector, bridging the gap between academia and industry. Such internships offer unique insights and can reshape academic perspectives, bringing real-world challenges into the classroom and research.

In conclusion, the successful relationship between CAM at Qatar University and Qatar Shell, further strengthened by international partnerships like that with Imperial College London and Shell Technology Centers in Amsterdam, Houston, TX, and Bangalore, exemplifies the power of collaboration in advancing scientific research and development. With research team leaders from QU and QS, the future of advanced materials research in Qatar looks promising. It is easy to say that the relationship between QU and QS is a model for the integration between Industry and Academia.

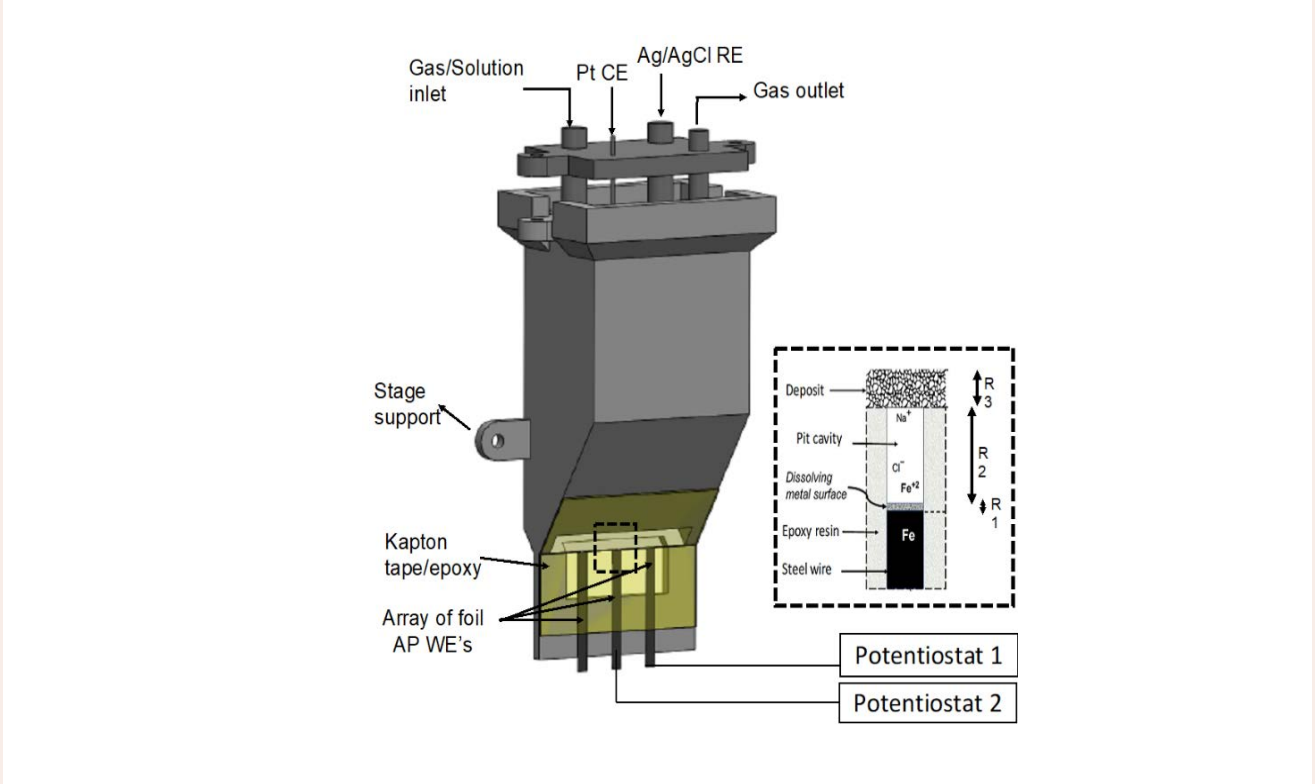


Figure 1. The newly developed 3D-printed electrochemical cell to study scales formation on top of C-steel.

QU Internal Grants Cope with the Developing Research Sector Globally, Achieve Qatar National Vision 2030 Goals

Prof. Abdelaziz Bouras, Professor of Computer Science and Engineering at the College of Engineering, and Manager of Pre-Award

Arwa Elghabeish, Senior Pre-Award Specialist

Research Support for Grants and Contracts Department, Office of the Vice President for Research and Graduate Studies - Qatar University

From the left: Arwa Elghabeish, Senior Specialist at the Pre-Award Section, Prof. Abdelaziz Bouras, Manager of Pre-Award Section and Faddi Ghemri, Senior Research Assistant at the Pre-Award Section.

The role of the Pre-Award Section at the Research Support Department is to serve and support the university's research community in efforts to pave the way for good and successful research output at Qatar University. The Department serves as the effective intermediary between faculty and funders. It helps the faculty and researchers in the preparation and submission of proposals and finding new sources and opportunities for funding, in addition to identifying funding opportunities through working with local industry, such as the Qatari government authorities and international partners.

To facilitate the growth of research and raise its positive impact, particularly in the classification of universities, the department reviews research proposals and negotiates with national and international partners to enhance the execution of all research contracts as the institutional liaison with external agencies and organizations on all matters related to the management of research and contracts.

Moreover, the Research Support Department manages internal and external grants, working closely with Qatar University departments such as; Human Resources, Procurement and Finance to crucially facilitate project tasks and ensuring compliance with the policies of funders of research at Qatar University.

The process of submission and selection begins after launching the program by the Pre-Award Section at the Department of Research Support and setting the deadline for submission. After the end of the submission period, research proposals will be sent by the department to external reviewers to evaluate the proposals. Next, the decisions of reviewers will be validated by an internal committee to prepare a list of priotirized proposals for funding based on the reviewer's feedback. Finally, the winning awards will be announced and the necessary contracts will be concluded.

The department manages three types of research grants:

1) Internal research grants which are entirely funded by Qatar University.
2) External research grants which are funded by the Qatar National Research Fund.
3) Industry research grants that are funded by companies and institutions of different sectors in the country.

Each type of these research studies has certain conditions and standards for submission that can be reviewed through the university's website.

Considering that all the submitted applications must be in line with Qatar University's vision and strategic goals, the internal grants aim to conduct distinctive research activities between Qatar University and its national partners such as private and public companies and institutions, in addition to the government sector to enhance research initiatives provided by Qatar University.

In 2017, internal research witnessed a qualitative leap by adding novel types of competitive conditions to create the infrastructure that would cope with the development taking place in the research sector globally, as well as to achieving Qatar National Vision 2030.

The University provides several types of internal grants:

At first, Qatar University offered one program for internal grants and student grants. In 2017, the following programs were designed and launched to classify research studies based on the participating groups and the desired outcomes:

1) Collaborative Grants: program enables conducting distinctive research activities through working in collaborative research groups that contain members from different disciplines. The groups facilitate capacity building and drawing high-quality research from Qatar University. They are the most prominent among the programs in terms of the number of winning grants to encourage collaboration in research. About 20 to 30 grants are provided annually.
2) High Impact Grants: aim to conduct cutting-edge research activities with government sectors and other partnerships to promote Qatar University research.

An average of 5 projects are granted annually to this program to enhance top-ranked research outcomes.

3) Concept Development Grant: provides an opportunity to fund the research that leads to advanced outcomes to communicate with industrial partners and businessmen at the first stage of preparing prototypes. This grant depends on research outcomes that need to develop preliminary concepts. This program was used during the COVID-19 Pandemic to develop medical concepts that helped to eradicate the pandemic.
4) Student Grants: offer the students and supervisors (faculty members) opportunities to build their research experiences and resumes by working on research programs aligned with Qatar University research priorities. Between 200 and 250 research projects are annually funded for undergraduate and graduate students at the various colleges at the University.
5) National Capacity Building Program: consists of two phases. The first phase enables the Qatari faculty members at Qatar University to develop their research capacity or embark on a new course to build their research resumes. The second phase seeks to achieve research outcomes that result from the first phase, in addition to conducting research that leads to peer-reviewed publications and applying for larger projects funded outside the University. This grant is considered a path in research for Qatari faculty members at Qatar University. About 8 members benefit from these grants annually.
6) The International Research Collaboration Co-Fund Program: aims to collaborate with external universities and foster international research collaboration. This program seeks to support collaborative co-funding projects.

   The International Research Co-Fund Program constituted a research platform for collaboration between Qatar University and international universities and several partners in international eminent entities. There is also a track dedicated to collaboration with universities in the Arab Gulf Countries. About 15 research projects are funded annually to foster international collaboration.

   In 2021, the efficiency of the abovementioned programs was studied. After reviewing the research outcomes and studying their impact on the Qatari research community, it was agreed to offer programs to focus on the transformative research priorities and exchanging experiences through the following programs:
7) Transformative Research Program: specializes in transformative research priorities selected within the research pillars at Qatar University. It specifically searches for prototypes, technologies and platforms with at least 5 to 7 Technological Readiness Level; and for innovative social sciences with a Social Readiness Level between 4 and 5. More than 10 research projects were funded in the first cycle.
8) Visiting Researchers: as part of the research excellence initiatives of Qatar University. In order to promote achieving strategic goals and strengthen

An Interview with a Distinguished Employee from the Research Support Department

Maysoon Gharzeddine, the Senior Specialist at the Post-Award Section

The Research Support Department (Grants and Contracts) aims to serve and support Qatar University's research community to pave the way for distinctive and successful research output. The department serves as the effective intermediary between faculty and funders. It helps faculty and researchers in the preparation and submission of research proposals, in addition to finding new funding sources and opportunities by working with the university's partners in the industry, the government and the international bodies to support research. To learn about how to apply for grants and the support provided by the department, we are meeting with Mrs. Maysoon Gharzeddine, the Senior Specialist at the Post-Award Section of the Research Support for Grants and Contracts Department, Office of the Vice President for Research and Graduate Studies at Qatar University.

Mrs. Maysoon, would you tell us in brief about the role of the Research Support Department?

First, I would like to thank you for this meeting and good initiative. Today, I am pleased to shed light on topics that are of interest to the researchers and faculty members at Qatar University.

The Research Support Department assists researchers in applying for research grants that are funded internally and externally. After awarding the grants, the Post-Award Department will help the principle investigators in the research grant activities from the first day until the end of the project.

international endeavors, the University is willing to host several highly qualified visiting fellows, scholars and researchers in various scientific fields and research disciplines related to QU research priorities. Several visiting researchers have been received since the Program started in 2021.

9) Post-Doc Initiative Program: hosts a number of high-caliber Postdoctoral researchers in various research areas that meet fundamental technological and scientific challenges, involving multidisciplinary work and a high degree of novelty. This program aims to attract talented applicants to pursue research as a career path and boost the creativity and productivity at QU and nearly 10 researchers have been granted to work as postdoctoral researchers at the University since the program started in 2022.

Currently, the department is in the phase of preparing research programs that provide PhD grants for external and internal students in cooperation with the Industrial sector, in addition to discussing research collaboration with several entities at the national, local and international levels.

As for the number of Qatari faculty members participating in the internal and external research studies, all programs witnessed an increased contribution in the last three years.

The Research Support Blog was established to be a reference for research opportunities for the university's researchers, especially the new joiners and external partners and to show the latest developments of research at the university. Furthermore, it provides research achievements over the years with some strategic statistics to promote the university's image internationally. We are proud because this blog was created by the Research Support Department team. The team works regularly to update the information and include submission deadlines for different programs, in addition to including the standards of each program and explainer videos to help researchers.

For more about grants and how to apply via the blog, scan the blog

http://blogs.qu.edu.qa/orsg/

The pre-Award unit at the Research Support Department aspires to focus efforts on directing research opportunities in line with Qatar National Vision 2030. Therefore, we seek to link research to the industrial development witnessed in the country. Challenges are basically associated with enhancing more research collaboration with the industrial sector in the State of Qatar in the fields of energy, environment, resources, sustainability, society and identity, health, and information and communication technology. Now, we are working to design and create a program for industry based graduate studies in cooperation with the industrial sector to allow students to work closely with industry sector during the grant period under the supervision of academic supervisors to ensure the achievement of the desired goals. This grant targets domestic and international students who seek research excellence.

Our services include employing researchers and students, procurement processes, travel requests and financial incentive payments. The department is also responsible for reviewing periodic and final reports, in addition to preparing annual statistics.

What conditions must the research fulfill to receive support from the department?

There are several types of internal and external grants and each grant has certain conditions. These conditions vary according to the funder's requirements. However, the positive impact and public benefit to the State of Qatar are the most important aspects of each research. The research must also align with ethical principles and its goals must be clear and achievable.

At the Research Support Department, we make sure that all the details are presented and explained on our website. Furthermore, the Pre-Award team always holds meetings and orientation sessions for all new research programs.

Please note that all the submitted research proposals are presented to international reviewers and specialists from outside the University to be assessed and peer-reviewed.

What steps must researchers follow to fund their research studies?

First, the researcher applies for a grant after obtaining the college's approval. The researcher must adhere to the rules and regulations and attach all the required documents. Then, the Research Support Department reviews the application, but the Awarding Committee, which consists of international reviewers, makes the final decision.

From your point of view since you always deal with researchers, what major challenges do researchers face to obtain grants?

Of course, the competition between all colleges of Qatar University is considered one of the major challenges, since we receive hundreds of research proposals annually. Furthermore, the researchers need to adhere to the submission dates accurately and ensure submitting their proposals within the specified period with all the required supporting documents. Besides, the annual budget allocated to research can be one of the challenges that determine and control the number of awarded grants.

What questions do researchers frequently ask? What are their answers?

At the Post-Award section, the researchers often ask about procurement processes, employment procedures and expenditures from the project budget. Therefore, we always recommend communicating with the Research Support team and reading the instructions and guidelines on our official website.

Outstanding Exchange and Research Collaboration between Qatar University and Japanese Universities

Prof. Abdelaziz Bouras, Professor of Computer Science and Engineering at the College of Engineering, and Manager of Pre-Award

Arwa Elghabeish, Senior Pre-Award Specialist

Research Support for Grants and Contracts Department, Office of the Vice President for Research and Graduate Studies - Qatar University

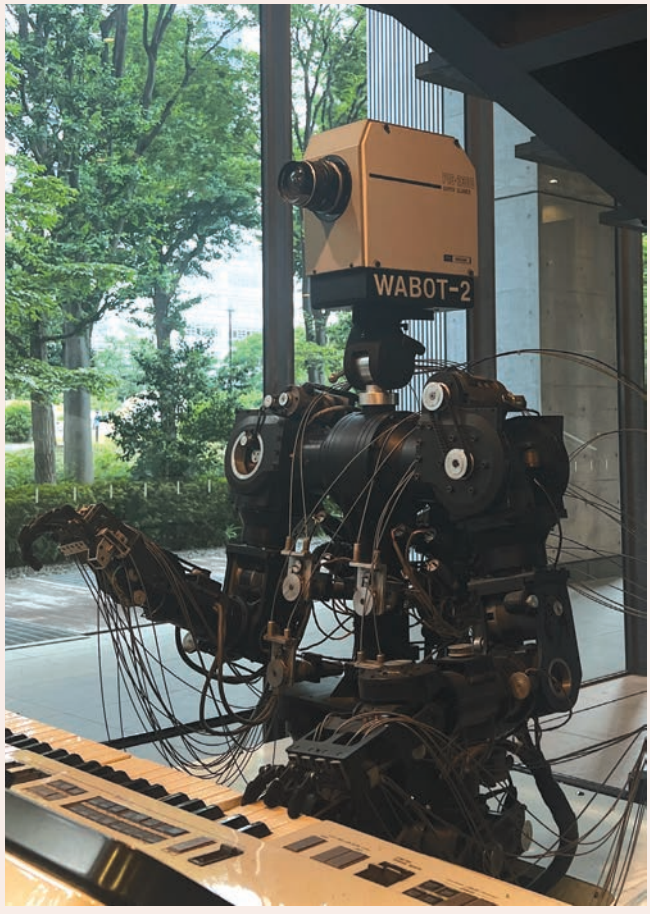
The research collaboration and exchange between Qatar University and Japanese Universities was initiated through Marubeni Corporation fund. A continuous dialog between Marubeni Corp and QU Office of Research Support (ORS) teams led to the design and implementation of successful exchange and research programs with prestigious Japanese universities, as summarized hereunder:

3. Student Exchange

Waseca Summer Session

Qatar University students have been regularly selected to participate in Waseda Summer Session in Japan. Depending on the years, the courses covered a variety of interests, including business, culture, economics, history, literature and art, politics and sociology in the context of Japan and Asia. Experienced faculty members teach these courses from Waseda and visiting professors from the top global universities. During 2023, the selected students participated in developing a *telexistence robot* attachment with a 360-degree camera.

"During my visit to Japan, I was impressed by the research community's strong sense of collaboration and innovation. Researchers' willingness to share ideas and collaborate across borders was truly inspiring," says Reema AlBouainain, BSc Student from Computer Science and Engineering Department, College of Engineering.



Robot 2 in Science and Engineering Building at Waseda University.

Japanese Language Program

Students taking Japanese linguistic classes at Qatar University were selected to travel for Japanese Language Programs and have been supported by the Marubeni Program offered by universities in Japan. During 2023, two QU students participated in this program during the summer holiday. Beyond their courses, the students attended cultural activities in different places such as tea ceremony classes, Meiji shrine visits and the yukata day.

Japanese course group picture - Sophia University

"The impact of this program resides in how it helped me develop my use of the Japanese language to a level where I can interact with people normally on the streets. While taking this course, I also learnt things like the work ethics in Japan and their way of handling their jobs and responsibilities," says Hamzah Almomani, BSc Student from Department of Computer Science and Engineering, College of Engineering.

Marubeni Internship Program

Several students from QU have been selected in 2019 and 2023 to participate in a structured internship program at Marubeni headquarters in Japan. The internship program involved learning the various processes in all areas of Marubeni's business operations, in addition to visiting clients and partner firms across Japan.

Farewell dinner for the Internship Program students at Marubeni *Headquarters*

カタール大学学生が研修のため来日

カタール大学の学生２名が７月30日に来日、２週間にわたるインターンシップ研修（丸紅株式会社主催）に参加しました。研修生はカタール大学３年生・ビジネス専攻の Jana Elbanna さんと Amna Mustafa さんのお二人です。

研修プログラムの一環として８月４日に日本・カタール友好協会を来訪、当協会の概要、日本とカタールの関係について学んでいただきました。とても積極的で元気なお二人で、多くの質問をいただき、LNG取引を通じた両国の歴史や震災復興に向けたカタールによる支援等、両国の関係が良く理解できたと喜んでいただけました。

更に研修の第２週目には宮城県を訪れ、震災後にカタールフレンド基金の支援により建設された「水産加工施設マスカー」「女川小・中学校」（いずれも女川町）や「仙台子ども体験プラザ」を視察しました。お二人からは、今回の研修を経て、日本とカタールの更なる友好関係強化・発展へ向けた架け橋となることへの思いを強くした旨の言及がありました。

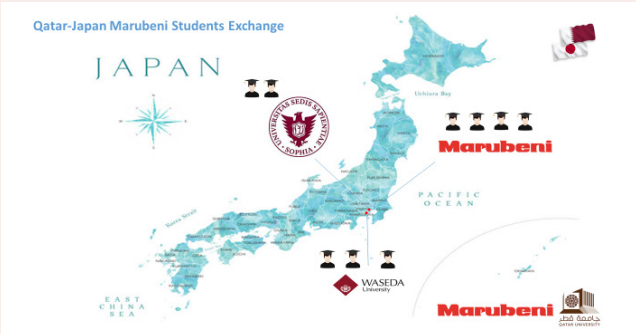
8月4日、駐日カタール大使館を訪問（左から Jana さん、Amna さん）

8月9日、仙台子ども体験プラザを視察

Journal from Japan - Qatar Friendship association

This was an exceptional experience for QU students, providing them a global perspective on several important fields for their post-university careers. During summer 2023, two QU students have participated in this program, where they visited Marubeni Headquarters, Qatar Embassy, Marubeni Hokkaido Branch, Hokkaido University, Ishikari Port, Onagwa School, Masker, Onagawa Nuclear Power Plant and Sendai's Children Activity Center. They have attended lectures from different departments and areas of Marubeni, such as Sustainability Management Department, Next Generation Group, Digital Innovation Department, Power Division Department, Lifestyle Division, Metals and Minerals Division, New Energy Business Development, Aerospace and Ship, Infrastructure Project and Food Division.

"This internship was an invaluable experience. It has really given me a wide practical insight about Japanese business culture across the variety of industries. I was given a chance to apply my academic and theoretical knowledge to real life situations, especially in a completely new context." Amna Mustafa, BSc Student from Department of Management and Marketing, College of Business and Economics said.



Qatar- Japan Marubeni Students Exchange.

2. Research Collaboration

Qatar Japan Research Collaboration (QJRC)

The objective of the Japan Research Collaboration (QJRC) is to strengthen the collaboration and cultural/ scientific exchange with Japanese Universities around all the research pillars of Qatar University. It specifically targets:

- Building human capital and developing research networks between QU and participating Japanese universities.
- Providing a vibrant cross-pollination research platform to students and researchers by creating exchange opportunities.
- Developing new partnership activities and strengthening existing ones.
- Optimal utilization of research resources, infrastructure and expertise to the joint advantage of the participants.
- Exchanging experiences and building trust in a concerted manner to fulfill Qatar's aspiration of becoming a Knowledge-based Economy.

Two calls for proposals opened in 2020 and 2022. The last call was focusing at raising the potential of joint prototypes and platforms creation (high TRL Technology or SRL Social Readiness levels). In total, 17 joint projects from 51 submissions were awarded under QJRC program.

Concept to Prototype Program (CTP)

Although QU is one of the stakeholders of the Qatari innovation ecosystem, the ambition through CTP program was to facilitate the creation of prototypes towards a roadmap for commercialization. This call was opened to all interested faculty members who has already clear concepts/designs and willing to go to a prototyping step. CTP program raised the creation of products and systems and motivated young researchers for innovation and creation activities, through multidisciplinary teams. A total of 6 projects were awarded under CTP.

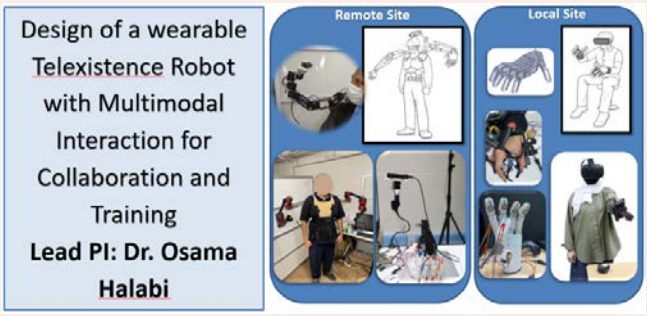
Such programs opened or strengthened the collaboration with the following Japanese universities:

- Chiyoda Corporation
- Hokkaido University
- Kindai University
- Kobe University

- Kyoto University
- Kyushu University
- Marubeni Corporation
- Nagoya University
- Okayama University
- Saitama University
- Sophia University
- Tokyo University of Agriculture and Technology
- Tokyo University of Marine Science & Technology
- Tottori University
- University of Hyogo
- University of Tsukuba
- Waseda University

3. Follow-up

A QU-Japan Steering Committee continuously does a follow up of the technical progress of the awarded projects and activities, consisting of two members from Marubeni and four members from QU Office of Research Support. Technical and Management Meetings, Progress Reports and Demo Days have been conducted. Below are two examples of projects' outcomes, presented during one of the demo days:



Moreover, ORS team benchmarked the Japanese universities based on relevant mutual strategic benefits. Several activities are currently ongoing to guarantee a sustainable collaboration during the coming years, such as:

- Advertisement of QU research in Japan.
- Proposals for programs extension through IRCC co-funding program.
- Prospect of additional sources of funding in Japan.
- Prospect possible joint funding through joint Post-doc, PhD and Visiting Scholars programs.
- Inclusion of undergraduate/graduate student exchange in all future research programs.

Both Embassy of Qatar in Japan and Japanese Embassy in Qatar fully supported the activities of this long-term collaboration.

Dialog meetings at Marubeni Corp. Headquarters in Tokyo.

Prospection meeting with the Ambassador of Qatar in Tokyo, H.E. Mr. Hassan bin Mohammed Rafei Al-Emadi.

Announcement of program awards with the presence of Ambassador of Japan in Doha, H.E. Mr. Satoshi Maeda.

Sighting the World's Second Largest Population of Dugongs' in Qatari Coastal Waters:

Using "Drone" Technology to study Dugongs population dynamics.

Dr. Yousria Soliman

Associate Professor of Environmental Sciences, College of Arts and Sciences – Qatar University

In light of the efforts made to preserve endangered species, especially the dugongs, a research team from Qatar University consisting of Dr. Mohsen Al-Ansi Al-Yafei and Dr. Yousria Soliman, Associate Professors in the Department of Environmental and Biological Sciences, Mr. Ismail Al-Sheikh, researcher from ExxonMobil and a number of assistant researchers, used drone technology to study the dynamics of the second largest population and the largest gathering of dugongs in one location in the world; in the Qatari coastal waters.

Wildlife scientists usually use the term dynamics to describe shifts in numbers, sizes and composition of animal populations over time and to explain reasons behind those shifts. The dugong, also referred to as sea cow, belongs to the order *Sirenia*, which includes three species of manatees and one species of sea cows. Sea cows belong to the family *Dugongidae*, which was diverse in the past, but its species continued to become extinct, and the last species to become extinct was *Hydrodamalis gigas* in the eighteenth century, leaving a single remaining species that belongs to that family, which is found in the coastal waters of about forty countries. However, Australia and the Arabian Gulf waters are considered the home of the largest aggregations of dugongs in the world.

Dugongs are particularly threatened with extinction due to their slow rate of reproduction, exposure to death due to accidents with fishing boats or in fishing nets and the deterioration of marine meadow habitats. The dugong is a large marine mammal with a length of more than 3 meters and weight of up to 400 kg. They have long life span of 70 years and can be distinguished by their gray color. The dugong feeds on seagrass communities and marine algae, found in shallow protected habitats, whose growth depends on abundance of light and nutrient salts.

Studies have confirmed that the largest population of dugongs is found in Australia. Their large presence in Australia is attributed to a number of factors; including the abundance of food resources, limited human activities and the implementation of laws designed to protect dugongs from exploitation. Other areas of the world where dugongs are found in smaller numbers include the Red Sea and the Arabian Gulf, most coastal areas in the Indo-Pacific region and many islands in the Pacific Ocean. However, there are no accurate evaluations of their numbers, but there are evidences that the number of dugongs has declined significantly in recent decades.

With the advances in aerial survey methodology some researchers have been able to document the presence of some fragmented and isolated numbers of dugongs in the Arabian Gulf region. The Gulf is shallow basin and is an extension of the Indian Ocean. The Gulf is characterized by extreme conditions including high temperatures, low freshwater inputs and high evaporation rate. The region is also known for its highly intensive oil and gas activities, which add to the challenges facing the Gulf environment. Despite these challenging factors creating a unique environment for the region's large ecosystem, the Gulf is home to a large population of dugongs. Previous studies conducted

Aerial survey using drones to monitor dugongs in Qatari coastal waters.

in the Gulf have estimated the numbers of dugongs at approximately 6,000. The studies that extended for a period over 13 years and covered the coastal waters of the Kingdom of Saudi Arabia, Bahrain, Qatar and the United Arab Emirates, spotted the largest single group of dugongs ever reported in the world, numbering about 674, between Bahrain and Qatar. Although the number of dugongs in the Arabian Gulf is the second largest in the world after Australia, with the largest single population in the State of Qatar, there are no accurate estimates of the numbers of dugongs in the region. An accurate count of dugongs is crucial to the goal of their management and to understanding the dynamics of the populations inhabiting the area. Obtaining an accurate count of the number of animals is difficult, especially in the marine environment. This is due to the difficulty of counting, as observers do not see the animals because they are covered, either by water or plants, or they respond to the presence of observers and leave the place before they are seen. Since dugongs are spread over wide areas, trying to count their numbers is very difficult. Remote photography technology using drones provides a useful tool for measuring population density in an effective and more accurate way.

From the left: Dr. Mohsen Al-Ansi, Mr. Ismail Al-Sheikh from ExxonMobil and Dr. Yousria Soliman.

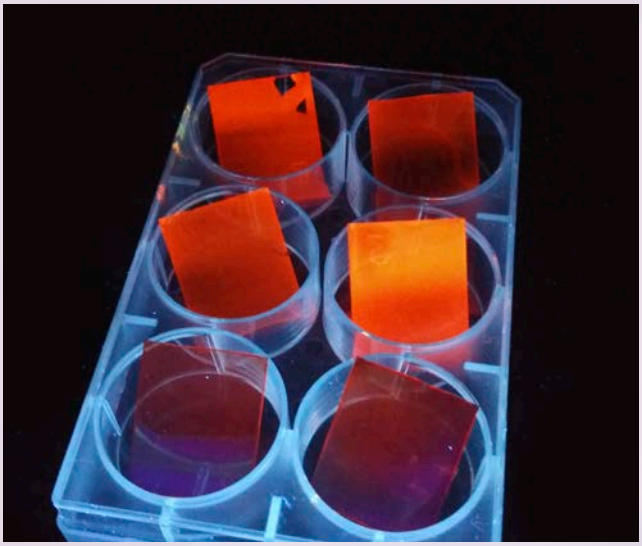
The collaborative research between Qatar University and ExxonMobil aimed to explore the population dynamics of the dugongs in the northwest coast of Qatar using an unmanned aerial vehicle. The study also aimed to explain the conditions that support largest gathering of dugongs in the world, in northwestern Qatar, which was estimated in the current study to exceed 1000 dugongs. The study extended for more than three years and included repeated aerial surveys using an unmanned aerial vehicle known as a drone. Another intensive seasonal marine survey monitored changes in the quality and density of sea grasses, which represent the main feeding grounds for dugongs. The observed changes in the population density over the study period was related to births, deaths, changes in habitats, fishing and boat accidents. The population age structure was also evaluated by measuring the ratio of calves to adults, as it is considered one of the indicators that help predict the extent of the increase or decrease in numbers of dugongs in the future. Since the survival of sea cow populations depends on the quality and density of sea grass habitats, the researchers also conducted quantitative and qualitative measurements for changes in sea grass habitats over several different seasons to determine the extent of change in these habitats, which are considered as home to sea cows. Understanding the dynamics of dugong populations and how they respond to the changing marine meadow habitats is one of the keys to successfully managing and thus conserving marine life and dugong populations. This research was supported by Qatar Foundation.

Calves depend on their mothers for over two years, as shown in a photo with a researcher and an orphaned calf.

Unveiling the Potential of Perovskite Materials for a Sustainable Future

Dr. Yasser Hassan
Assistant Professor of Chemistry, College of Arts and Sciences - Qatar University

The sun is among the greatest blessings that Allah has bestowed upon humanity, and it is considered a primary source of energy in the world. However, harnessing this energy to generate electricity is costly due to the advanced technologies required, limiting its accessibility to everyone. In reality, the current solar cells technology do not deliver the expected performance, as they fail to convert a significant amount of the energy absorbed. Moreover, the high cost of these cells, which primarily rely on silicon, poses a major barrier, making the cost of solar energy surpasses that of other sources such as wind and hydropower.



Thin film of stable perovskites nanomaterials.

Today, one of the biggest challenges in materials science and energy conversion technologies is discovering optimal materials for a long list of emergent technologies, such as efficient optoelectronics, long-life batteries, high-temperature superconductors, and quantum computing. While there is a lot of progress in the field, innovative ways to accelerate sustainable materials development processes are still in dire need. Over the years, incredible fundamental understandings and obligations have been accumulated by scientists regarding structural and multifunctional hybrid materials such as organic-inorganic composites and finding creative means for synthesizing them. Perovskite nanomaterials and their self-assembled building blocks are perfect candidates with which we can study the emergent properties of these hybrid materials. A significant step forward in unveiling the potential of recently discovered perovskite materials as versatile semiconductors for solar energy applications has been taken by renowned nanotechnology chemist Dr. Yasser Hassan. In his previous work, a groundbreaking paper was published in the prestigious journal Nature[1] by Dr. Hassan, an Assistant Professor at Qatar University with an international research team at Oxford University, UK.

Unlocking the Potential of Perovskites:

Perovskites have been in the spotlight for nearly a decade since their unique properties were first illuminated by Professor Tsutomu Miyasaka at the University of Tokyo, Japan, and Professor Henry Snaith at Oxford University, UK. Perovskites offer incredible promise for an array of emergent technologies like efficient optoelectronics and sensors, to name just a few. "Perovskites could revolutionize how sunlight is harvested, how the world is lit, how radiation is sensed, and how nuclear waste is cleaned," says Dr. Hassan, who has been researching the field for nearly a decade.

State-of-the-Art Material:

Perovskites, an emerging class of organic-inorganic hybrid materials made from metal halides (**Figure 1a; Example: $CH_3NH_3PbBrI_2$**), are outstanding candidates to revolutionize power consumption and production. Specifically, perovskites are an inexpensive material with pure color quality that promises efficient energy performance and can be fabricated using low-cost processing techniques. Their synthesis is demonstrated in (**Figure 1b**). The energy efficiency of this class of semiconductors is due to their extraordinary optoelectronic properties such as having a panchromatic absorption profile, exhibiting intense and narrow-band luminescence (strong absorption coefficient of ~10^5 cm^{-1}), and possessing excellent ambipolar charge carrier mobility as well as relatively long carrier diffusion length (>1 µm), bringing them to the forefront of emerging optoelectronic materials. Despite these promising features, the commercialization of metal halide perovskites faces significant challenges: Their bandgap instabilities and non-radiative recombination processes affect their performance metrics and eventually initiate degradation trails, putting the device's long-term stability on the line. The main persistent challenge has been their chemical instability (**Figure 2**), hindering their widespread application. This issue was taken head-on by the research team.

Learning from Nature to Solve Instability:

The Nature Journal study[1] focused on the critical issue of perovskite instability caused by unbounded lead atoms on the material's surface. These atoms are responsible for a phenomenon known as halide segregation, which leads to the degradation of the perovskite structure over time (**Figure 2 b, c**). "Learning from mother nature, particularly how biological systems like the human liver detoxify lead, it was discovered that lead-complexing multidentate ligands, such as ethylenediaminetetraacetic acid (EDTA) and L-glutathione reduced, can 'clean' the perovskite nanocrystal surface," explains Dr. Hassan.

Stabilizing the Surface for Varied Applications:

The team's innovative approach neutralizes the surface defects and inhibits halide segregation, thereby increasing the material's photo- and chemical stability. The results have been stunning, with red electroluminescence peaking at an external quantum efficiency (EQE) of over 20%. Dr. Hassan's work showcased a route to control surface defect formation and migration, a vital step for achieving band gap stability needed in light-emission applications.

In another groundbreaking study led by Dr. Hassan in collaboration with a distinguished spectroscopic team from Oregon University[2], critical insights were unveiled about the behavior of mixed halides perovskite ($CH_3NH_3PbI_xBr_{3-x}$) nanocrystals, a promising material with unique properties for optoelectronics. Yet, a significant challenge remained; halides' segregation during light exposure was causing these bandgaps to become unstable and narrower. The team meticulously tracked the excited-state dynamics underpinning this photo-induced halide segregation by deploying state-of-the-art in-situ femtosecond transient absorption spectroscopy.

Furthermore, simulations of the iodide's motion within the nanocrystal postulated two potential mechanisms for halide segregation. The team's results compellingly favored a mechanism where iodide anions cluster to form a distinct domain inside the nanocrystal. This discovery provides a deeper understanding of the halide segregation phenomenon. It paves the way for innovative strategies to stabilize the bandgap in these nanocrystals, a significant advancement for future optoelectronics.

The Wider Impact and Future Applications:

Beyond light emission, broader applications, including multi-junction photovoltaics, will likely be impacted by this breakthrough. The team's research paved the way for perovskites to be reliably used in various critical technologies that could affect everyday life. "This could be a game-changer in material sciences, opening up a range of applications from efficient solar cells to quantum computing," states Dr. Hassan.

A Blossoming Future

"Studies like this are essential in understanding how perovskites work as a material and how they could be used in everyday life," says Dr. Hassan. His latest findings are set to contribute significantly to the blossoming scientific community engaged in material sciences and energy conversion, and they raise the curtain on a future where the promise of perovskites is not just theoretical but a practical reality. The groundbreaking work done by the research team on perovskites is not just a scientific advancement but a leap toward a sustainable and efficient future.

What is beyond perovskite and solar energy for the team?

As the world grapples with energy and environmental challenges, the team's research currently focuses on the advancement of using machine learning and automated experimentation using robots to accelerate the materials' discovery. In an era striving for sustainable advancements, the research team's work at Qatar University stands out. Dr. Hassan is accelerating the discovery of transformative nanomaterials through robotics and green chemistry. His focus spans renewable energy solutions to groundbreaking sustainable and climate change remediation catalysis. As we navigate the challenges of today, the team's research shines a hopeful light on the promise of a more sustainable and technologically advanced tomorrow.

For more on this achievement:

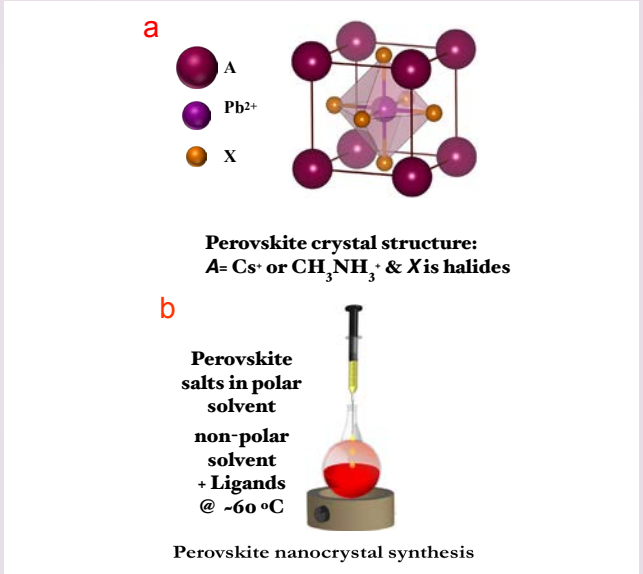


Figure 1. (a) Crystal structure of lead halides perovskite family. (b) Schematic illustration of the synthesis of perovskite nanocrystals by Ligand Assisted Reprecipitation technique.

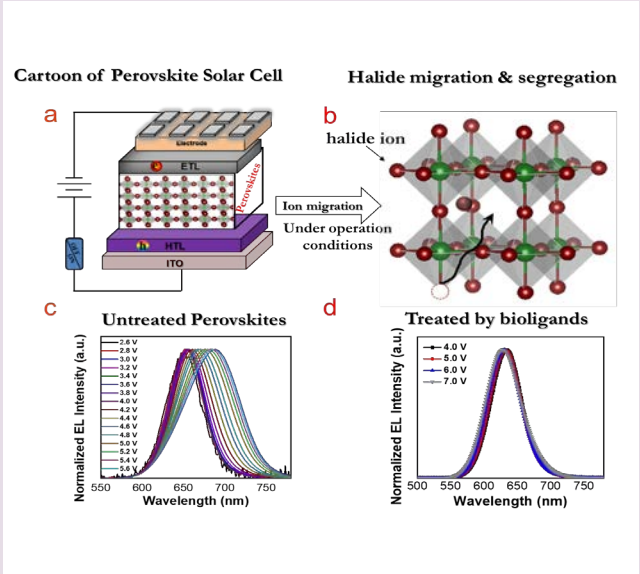


Figure 2. Researches contribution to understanding and fixing the degradation mechanism is moving beyond the state-of-the-art.

Groundbreaking Viral Detection Research Earns 10th L'Oréal-UNESCO for Women in Science Middle East Award and First Place in QU's 10th Innovation and Entrepreneurship Competition

Nadin Nagy Younes, A third year student at the College of Health Sciences - Qatar University

Supervisor: Dr. Gheyath Khaled Nasrallah, Associate Professor of Biomedical Sciences, College of Health Sciences - Qatar University

Student Nadin Younes and Dr. Gheyath Nasrallah during the Awarding Ceremony at the 10th L'Oréal-UNESCO Award for Women in Science Middle East.

Foodborne diseases, often caused by foodborne pathogens, present a significant global public health threat, affecting both developed and developing nations. In the pursuit of swift and cost-effective solutions for pathogen detection, antibody-based lateral flow assays (LFAs) have emerged as a promising tool, particularly in resource-scarce regions where access to centralized laboratories can be challenging during outbreaks or surveillance efforts. LFAs are not only rapid and cost-efficient but also user-friendly, utilizing easily obtainable samples like whole blood from a simple finger stick.

Qatar, according to the Qatar Statistics Authority, is currently experiencing a massive influx of foreign labor, with expatriates constituting over 95% of its 2 million-strong workforce. Many of these workers originate from regions highly susceptible to foodborne viruses, including Asia (India, Pakistan, Nepal and Bangladesh) and Africa (Sudan and Egypt). The COVID-19 pandemic has underscored the value of rapid point-of-care antigen tests in managing individual infections and controlling outbreaks. However, despite the availability of point-of-care diagnostic assays for various diseases, the situation for foodborne viruses remains challenging. This presents a pressing need for ultrasensitive point-of-care diagnostic assays, particularly in Qatar, given its large expatriate population and the hosting of major sporting events.

Nadin Younes, a PhD candidate in the College of Health Sciences at Qatar University, is engaged in an innovative research project under the guidance of Dr. Gheyath K. Nasrallah, Associate Professor in the College of Health Sciences, and with co-supervision by Dr. Hadi M. Yassine, Associate Professor of Infectious Diseases. The primary objective of their research is the development of two cutting-edge LFAs designed for the detection of Noroviruses (NoVs) and Hepatitis E Virus (HEV). These LFAs will offer user-friendly operation, exceptional sensitivity and significantly, enhanced cost-effectiveness compared to conventional colorimetric LFAs and other commercially available assays with limited sensitivity.

NoV is the leading cause of acute gastroenteritis, accounting for an estimated 685 million cases each year. Approximately 200 million cases occur among children under 5 years old, resulting in an estimated 50,000 child deaths annually. Frequent outbreaks commonly occur in close-contact settings such as cruise ships, military settings, hospitals, nursing homes and schools. NoVs has a very low infectious dose, a short incubation period, strong resistance to typical disinfection products and multiple modes of transmission, making early point-of-care diagnosis vital for preventing disease transmission. Traditional diagnostic methods, such as electron microscopy, reverse transcription-polymerase chain reaction (RT-PCR) and enzyme-linked immunosorbent assay (ELISA), require complicated and expensive instrumentation, and are considered too laborious and slow to be useful during severe outbreaks. In the midst of an outbreak, there is a need to quickly identify the cause of the symptoms to implement

containment measures and limit the outbreak duration, especially critical in closed environments such as cruise ships, nurseries, schools or military settings.

HEV is the most common cause of acute liver inflammation worldwide. According to the World Health Organization (WHO), there are an estimated 20 million HEV infections worldwide annually, leading to an estimated 3.3 million symptomatic cases of HEV. Most importantly, WHO estimates that Hepatitis E causes approximately 70,000 deaths (accounting for 3.3% of viral hepatitis-related mortality). HEV is responsible for severe hepatitis in pregnant patients and newborns and has been linked to up to 30% of third-trimester maternal deaths. Several serological methods are available for diagnosing Hepatitis E, including microplate enzyme immunoassays (EIA) and immunochromatographic assays. However, serology is complicated because HEV-IgM may not reach detectable levels in the early stage of infection (the "window period"), and HEV-IgM can be detectable during convalescence (3-6 months post-infection). Due to the unreliability of current serological tests in detecting HEV infection, the WHO recommends initially testing for the presence of IgM anti-HEV antibodies. If the test is positive, it indicates either active or recent infection, and a molecular test to detect HEV RNA can be performed.

Nonetheless, this standard protocol is time-consuming, expensive and not very effective when accurate and fast diagnosis is needed. Accurate and timely diagnosis of HEV infection is essential, especially in asymptomatic blood donors and organ donors, as well as a substantial population of pregnant women who could face significant health consequences due to the delayed diagnosis of HEV infection.

Dr. Gheyath's team employs fluorescent reporter particles for the development of the ultrasensitive LFAs. These fluorescent particles represent an innovative improvement in the field of biosensing technologies. This approach enhances sensitivity, enabling the detection of minute virus concentrations, even in low-concentration scenarios. The team anticipates that by utilizing these tests, the detection of viruses can be verified with greater accuracy, even in the early stages of infection, facilitating immediate preventive and therapeutic measures. This approach contributes to strengthening the capacity of healthcare institutions to respond to outbreaks and to limit the spread of diseases, especially in high-population-density environments or where medical resources are limited.

Student Nadine Younes, being awarded 1st Place in the 10th Edition of the Innovation and Entrepreneurship Competition, held at Qatar University.

The Impact and Potential

The LFAs developed by Dr Nasrallah's team will have broader applications beyond clinical settings. They can be adapted for testing food samples and environmental specimens, including treated wastewater, thereby enhancing food safety and public health management. The commercial potential of this technology benefits not only Qatar but also has global relevance, especially in addressing emerging threats such as Coronaviruses like MERS.

Celebrating Excellence: Awards and Recognition

Nadin Younes's exceptional dedication and research excellence were honored with the 10th L'Oréal-UNESCO for Women in Science Middle East Regional Young Talent Award. This distinguished award aims to promote the participation of young women in science from GCC Countries. Additionally, her project secured the first-place position in the 10th Innovation and Entrepreneurship Contest at Qatar University.

Acknowledgments

This project was made possible by the generous support of GSRA8-L-1-0501-21022 and NPRP13S-0128-200185 from the Qatar National Research Fund, a member of the Qatar Foundation. We would also like to acknowledge the dedicated efforts of our collaborators at the University of Houston, namely, Dr. Richard Wilson, Dr. Katerina Kourentzi and Dmitri Litvinov.

Achievements of Peer-reviewed Journals Published by Qatar University Press

The Journal of the College of Sharia and Islamic Studies Wins the Second Place in Arab World
Tajseer Journal Fulfils the Accreditation Standards

According to the Arab Citation and Impact Factor (ARCIF)

The Arab Citation and Impact Factor for Peer-reviewed Academic Journals in the Arab World (ARCIF) is considered the only Arabic institution in this area. It is supervised by a board that consists of representatives of several Arabic and international entities. These entities are the UNESCO Regional Bureau for Education in the Arab States in Beirut, the United Nations Economic and Social Commission for Western Asia (ESCWA), Bibliotheca Alexandria and e-Marefa Databases. In addition to an independent committee that consists of scientifically reputable experts and academics from several Arab States and Britain. In its report for 2023, the ARCIF has approved 1155 Arabic journals after examining about 5000 Arabic journals that are issued by more than (1400) scientific or research bodies in all fields of specialization in the Arab world.

Journal of College of Sharia & Islamic Studies at Qatar University Came Second at the Level of the Arab World

Prof. Abdala El Khatib

Editor-In-Chief of College of Sharia & Islamic Studies Journal, and Professor of Quran and Sunnah, College of Sharia & Islamic Studies - Qatar University

According to the Arab Citation and Impact Factor for peer-reviewed Arabic journals (ARCIF), the Journal of the College of Sharia and Islamic Studies issued by the College of Sharia and Islamic Studies and Qatar University Press stood at second position in the Arab World for 2023.

The Journal came in second place out of 91 journals that fulfilled the requirements of the Impact Factor. The ARFIC approved 1155 Arabic scientific Journals in its report for 2023. Furthermore, the Journal was classified within the first category (Q1) which is considered the highest category.

Since 1980, the Journal of the College of Sharia and Islamic Studies has been regularly issued. 41 volumes have been issued till now at the rate of two issues annually. It is a scientific peer-reviewed journal that is concerned with publishing research studies in the field of Islamic Studies in both Arabic and English, and it is published in paper-based and electronic forms (for free). The Journal is concerned with publishing peer-reviewed research studies that are focused on contemporary and novel Islamic issues. Moreover, it is concerned with developing scholarly research and its methodologies in the field of Islamic studies. The journal is supervised by the Dean of the College of Sharia and Islamic Studies at Qatar University, Dr. Ibrahim Al-Ansari. The Editorial Board contains a group of university professors from inside and outside Qatar who specialize in all fields of Islamic Studies. The Journal has a diverse international advisory board that consists of members of prestigious universities and academic bodies from all around the world.

The Journal adopts strict standards in peer-reviewing research studies as well as research and publication ethics. The journal has achieved the highest international publication standards adopted worldwide which include 32 standards. This enabled the Journal to be the first Arabic Journal specialized in Islamic Studies to be included in the international platform “Web of Science” in the category of emerging sources citation index. It bagged second place at the level of the Arab world according to the ARCIF Impact Factor for 2023 because the Journal applies the highest quality standards in several aspects, such as peer-review, selection of solemn research, publication quality and free electronic publication that is available for all the researchers worldwide via the Journal’s website.

Access to the issues of the Journal of the College of Sharia and Islamic Studies is available via its website. The first issues of the Journal can be viewed via the “Mandumah” Database. Its research studies can be viewed and cited according to the various documentation styles provided by databases and the first page of each research study.

Within the framework of the journal’s efforts to advance scholarly research in its field of specialization, the Journal organizes open training courses at the University level or in cooperation with relative entities outside the University in order to enhance the skills of graduate students and researchers to achieve the highest quality standards in their research which enable them to compete in the international publications.

Tajseer Journal Fulfils the Accreditation Standards of the Arab Citation and Impact Factor (ARCIF)

Prof. Eltigani Abdelgadir Rahma

Editor-In-Chief of Tajseer Journal, and Section Head of Social Sciences, Ibn Khaldon Center - Qatar University

On 16 October 2023, Tajseer Journal issued by Ibn Khaldon Center for Humanities and Social Studies at Qatar University was able to obtain accreditation in Citation and Impact Factor for Peer-reviewed Academic Journals. The Letter of Accreditation from the competent Committee stated that Tajseer Journal succeeded in fulfilling the accreditation standards of the Arab Citation and Impact Factor (ARCIF) which are compatible with the (32) international standards.

It is noteworthy that the ARCIF Factor is subject to the supervision of the "Supervisory and Coordination Council," which consists of representatives of several Arab and international bodies, the most important of which are: the UNESCO Regional Bureau for Education in the Arab States in Beirut, the United Nations' Economic and Social Commission for Western Asia (ESCWA) and Bibliotheca Alexandria. In addition to, an academic committee that consists of scientifically reputable experts and academics from several Arab States and Britain.

Recently, the production of knowledge has become an industry similar to all types of production. However, industries thrive only after being subject to some objective standards that determine their quality, in addition to closing passages that lead to falsehood and deceit. No doubt that academic communities in Western countries have exceeded in this domain since they worked on the institutionalization of what is known as "Citation and Impact Factors" as an effective means of assessing the quality and solemnity of what is published in the academic journals by recognizing their impact on the academic community (according to the indications of citations). Then, they are classified according to these objective standards.

Some Western institutions became prominent and well-known in this field, such as Scopus and Wos Web of Science, since their standards were adopted worldwide. However, the monitoring, assessment and classification conducted by these institutions do not include journals issued in Arabic. Therefore, many Arab researchers are forced to write in European languages to have broader exposure and international recognition.

This fact does not only confirm the negative scientific dependency on the West, but also hinders self-

sustaining innovation and growth in Arab communities, and deprives these communities of building a knowledge base on which they depend for reform and advancement. This required establishing an Arab Impact Factor that seeks to assess and measure the quality of academic journals issued in Arabic, in addition to identifying their impact on the scientific community and developing an objective classification for them. ARCIF was established in a timely manner to bridge this gap and contribute to creating the expected Arab scientific advancement.

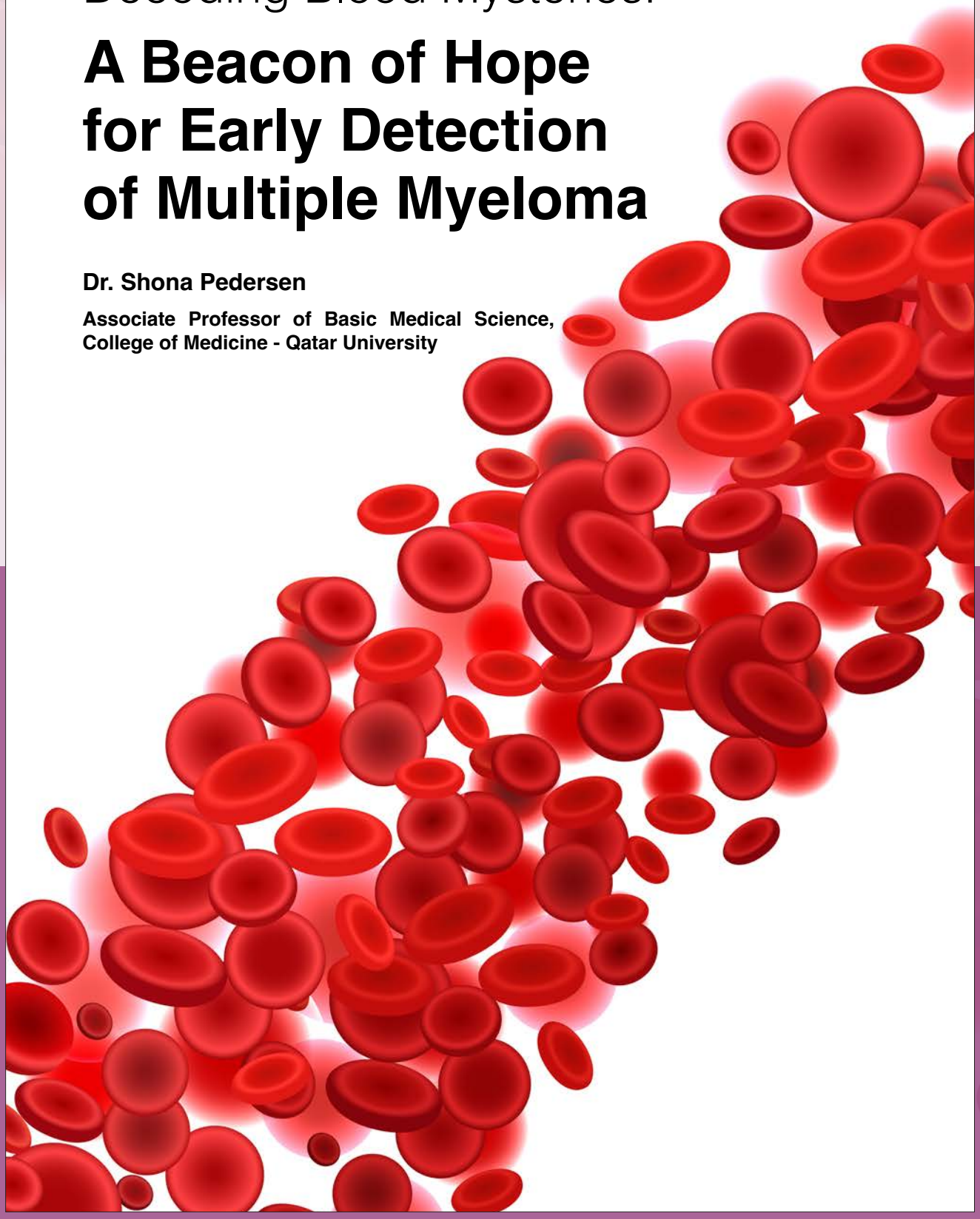
While we, in the Administration of Tajseer Journal and Ibn Khaldon Center, are very proud of this appreciation, we have to point out the great efforts concerted by Qatar University Press and its staff, because our success would not have been achieved without their efforts and commitment.

Decoding Blood Mysteries:

A Beacon of Hope for Early Detection of Multiple Myeloma

Dr. Shona Pedersen

Associate Professor of Basic Medical Science, College of Medicine - Qatar University



Dr. Shona Pedersen

A research team led by Dr. Shona Pedersen, Associate Professor of Biochemistry, College of Medicine - Qatar University and a collaborative Research team led by Professor Søren Kristensen from Aalborg University Hospital - Denmark, Professor Trygve Andreassen from Norwegian University of Science and Technology and Associate Professor Mohamed Elrayess from Biomedical Research Center - Qatar University has made a groundbreaking discovery; using advanced metabolomics and biostatistics, they have decoded potential blood markers for an elusive and incurable blood cancer: Multiple Myeloma. This pioneering work heralds a future where doctors could detect MM at its earliest stages, granting patients a powerful edge in confronting this formidable disease.

Multiple Myeloma (MM), ranking as the second most common blood cancer, remains a challenging medical enigma. It is a disease marked by diagnostic setbacks, recurrent relapses and no definitive cure. Interestingly, MM begins its course covertly as Monoclonal Gammopathy of Undetermined Significance (MGUS), but with time, manifests symptoms like bone pain, anemia, kidney issues and infections. The transition from MGUS to MM at the molecular level remains shrouded in mystery. Notably, detecting MM early can dramatically alter the disease trajectory, enhancing both prognosis and survival. However, the absence of a straightforward blood test for early detection is a significant gap. The human body, in its intricate design, presents a myriad of biochemical interactions that often hold the key to understanding the onset and progression of various diseases. In our quest to demystify the development of Multiple Myeloma (MM) from its precursor, Monoclonal Gammopathy of Undetermined Significance (MGUS), we embarked on a groundbreaking research journey.

Recent research indicates that shifts in metabolism and protein profiles could be pivotal in decoding

diseases and highlighting early markers. At present, our grasp of the metabolic changes between MGUS and MM is in its nascent stages, with only a handful of publications shedding light on MM's metabolic nuances. Our study endeavored to sharpen the molecular lens through which we view this relentless disease, pinpointing potential metabolites before they manifest clinically, thereby paving the way for more proactive interventions.

In an innovative stride, the team employed Nuclear Magnetic Resonance (NMR) spectroscopy to contrast the serum metabolomes of healthy subjects with those diagnosed with MGUS and MM. Through the meticulous application of NMR spectroscopy, their findings showcased a marked deviation in amino acids as MGUS takes shape. Delving into the metabolic profiles of MGUS patients, it was observed that levels of alanine, lysine and leucine were diminished, while formic acid levels surged in comparison to controls. Intriguingly, the pathways spotlighted encompassed a broad spectrum including phosphatidylinositol phosphate, glycerophospholipid and galactose metabolism, folate metabolism, prostaglandin formation and an array of other metabolic pathways. The metabolites identified in this research serve as significant markers linked to the transition from a typical condition to the initial phases of MGUS. They hold the potential to shed light on the progression and underpinnings of Multiple Myeloma (MM) pathology.

Additionally, the research group delved deep into the intricate relationships intertwining the clinical characteristics of MM patients, specific metabolites and certain lipoprotein subfractions. They identified a strong correlation between levels of M-protein and serum proteins, especially in conjunction with HDFC and H3CH. The team highlighted these specific lipoprotein subfractions as pivotal markers closely associated with the transition from MGUS to full-blown MM. Furthermore, clear associations were observed between creatinine and the amino acid alanine, as well as between serum protein levels and formic acid concentrations (Figure 1).

By shedding light on biological pathways previously undetected in plasma or bone marrow samples, they offer fresh perspectives on the journey from premalignant MGUS to malignant MM. Furthermore, profiling serum metabolites offers invaluable data, facilitating the discovery of novel biomarkers. These can significantly improve early detection and

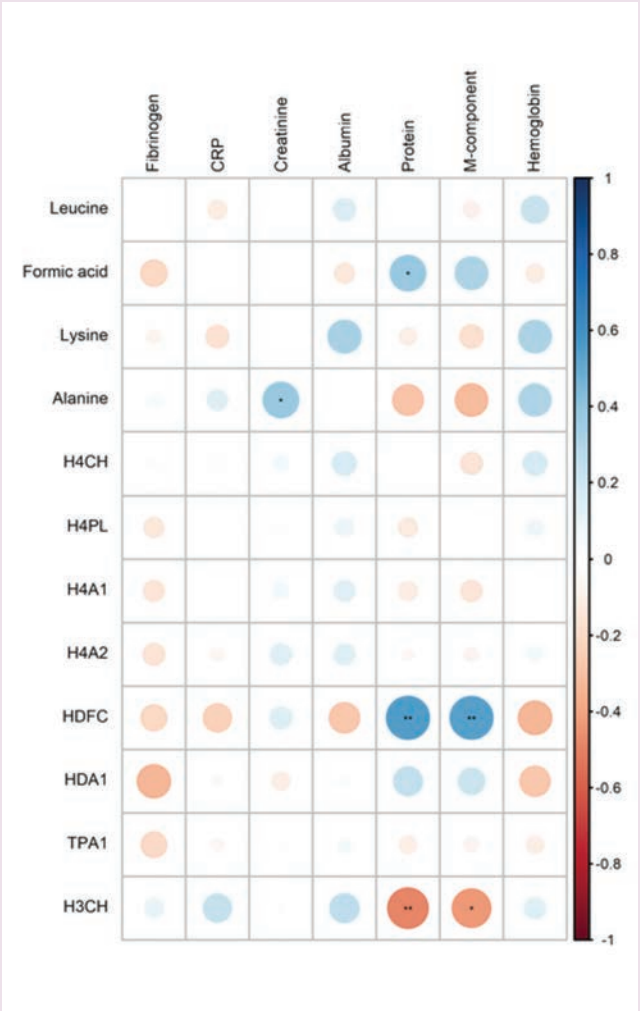


Figure 1. Correlation matrix displaying a positive/negative (blue/red) relationship between the clinical characteristics of MM patients and the lipoproteins. Significant correlations are shown using ***/**/*, which stand for p <0.001/<0.01/<0.05. H4CH: HDL-4 Cholesterol, H4PL: HDL-4 Phospholipids, H4A1: HDL-4 Apolipoprotein A-1, H4A2: HDL-4 Apolipoprotein A-2, HDFC: HDL Free Cholesterol, HDA1: HDL Apolipoprotein A-1, TPA1: Total Apolipoprotein A-1, and H3CH: HDL-3 Cholesterol.

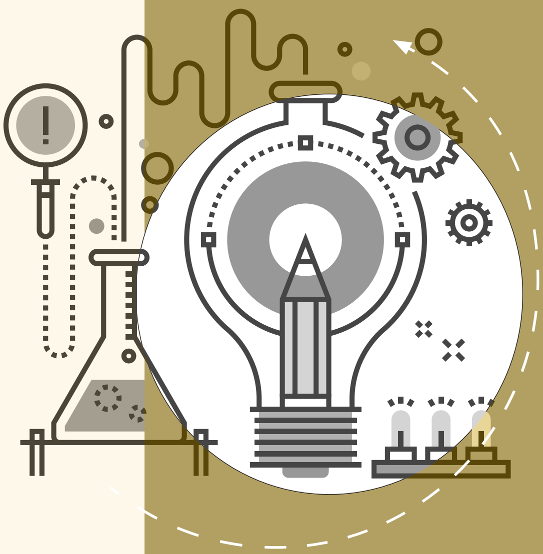
intervention for MGUS and MM.

This study offers more than knowledge-it provides a beacon of hope. By identifying these lipoprotein subfractions as potential early markers, we have opened the doors to possible early intervention strategies. The earlier we can detect and intervene in the development of MM, the brighter the prognosis for those affected by this malignancy.

For more information about this research achievement, you can browse the following link:

IJMS | Free Full-Text | Serum NMR-Based Metabolomics Profiling Identifies Lipoprotein Subfraction Variables and Amino Acid Reshuffling in Myeloma Development and Progression (mdpi.com)

Innovation
Oasis



Interview with an Inventor:

Dr. Noora Fetais,

Founding Secretary-General of the Arab Association for Cybersecurity, Associate Professor at the Department of Computer Science and Engineering, College of Engineering - Qatar University

With the increasingly widespread use of the Internet in all facets of our lives, cyberthreats have become more rampant and complex. Given these challenges, Qatar University (QU) has advanced in the field of cybersecurity and is hosting the Arab Association for Cyber Security (ArCS) affiliated with the Federation of Arab Scientific Research Councils (FASRC) associated with the League of Arab States, to support cybersecurity systems and face future challenges, in addition to discussing cooperative mechanisms to establish joint research and programs. In this context, Dr. Noora Fetais, Associate Professor of Computer Science and Engineering at the College of Engineering at QU and the Founding Secretary General of ArCS, has obtained patents for inventing new technology that serves cybersecurity. We meet with her to learn more about this innovation.

To start, Dr. Noora Fetais, how do you present yourself to the Qatar University community?

I am an associate professor, and an expert in emerging technologies, especially cybersecurity.

I studied at QU, before completing my postgraduate studies in the United Kingdom. I joined the first batches of the Qatar Leadership Center (Future Leadership Programme) and the Executive Master of Leadership from Georgetown University (USA). I am also a certified innovation leader and a Fellow of the Institute for Innovation and Knowledge Exchange (UK). I was elected to chair the Faculty Senate at QU and appointed as the Director of the KINDI Center for Computing Research as the only woman to hold these positions.

I believe Qatar can have a marked impact on the cybersecurity domain. Given this, I am proud to be the Founding Secretary-General of ArCS since 2021. In 2023, ArCS obtained official recognition from the United Nations as the first and only Arab NGO participating in the Open-ended Working Group (OEWG) on security of and in the use of information and communications technologies (ICTs) and thus, I was a speaker during the 5th Session of the OEWG. ArCS signed important agreements with the: Organization of Islamic Cooperation (OIC); the ITU-Arab Regional Cybersecurity Centre.

I established many initiatives, including "Cyber Women" to support women in the cyber field in cooperation with the University of Paris 8, obtaining the first grant from NATO to empower women in the cyber space. I was selected by the UK embassy in Qatar to join the first "UK-GCC Women in Cybersecurity Fellowship", where I became an advisor for the program. I remain committed to helping build capacity for the next generation in its ability to tackle complex future challenges in this ever-evolving domain.

At the national level, I initiated the "Cyber Week" and CTF "Sheel Al-Biraq" initiatives – the latter was organized during the National Day celebrations of the State of Qatar "Darb Alsai" in 2019. I was able to secure the first Cyber Range in the Middle East, at no cost from Thales-France. I also contributed to officially establishing the IEEE-Qatar Society, which is a branch of the Institute of Electrical and Electronics Engineers (IEEE), serving as the vice president of this society. I played a central role in initiating the first local IEEE conference on cybersecurity for emerging technologies.

Recently, I received the QU Outstanding Faculty Service Award and the She Inspires Award for the Global Raising Star category as the first and only awardee from the Arab Region.

Before speaking about the patent innovation, could you tell us about the important objectives of ArCS as hosted by Qatar University?

ArCS is aimed at providing the required support to conduct, encourage and support research, development and innovation in the field of cybersecurity to provide smart, safe solutions, and innovative issues related to information security. In addition, establishing a link of communication and cooperation between specialized Arab scientists and experts.

One significant goal of ArCS is creating opportunities to build capacity and provide the youth with needed skills. Thus, the first student branch of ArCS was launched at QU in 2022, and we encourage launching student branches in all universities.

Tell us about your patented innovation in Qatar University.

My research at QU has resulted into two USA patented innovations in the cybersecurity domain. The first innovation is a technology that keeps an eye on the security changes of a computer network with many connected devices. It checks the network at two different times, sees if anything changed in terms of security and records that information for system administrators to see how the network's security has changed. The second innovation is a method for customizing a network's security risk evaluation based on the threats that a client wants to protect against. It looks at potential threats to parts of the network, assigns importance to each threat based on the client's security requirements, and then figures out the risk for those parts of the network based on the threats that matter most to the client.

How did Qatar University support your innovation?

QU has been instrumental in supporting my innovation in the field of cybersecurity in several impactful ways. The University provides a nurturing and collaborative research environment, fostering a culture of innovation and knowledge exchange. This environment encouraged me to explore new ideas and tackle pressing cybersecurity challenges with enthusiasm and dedication.

Additionally, QU has played a vital role in facilitating research opportunities and resources. The University has allocated research funding, through internal and collaborative grants, and access to

cutting-edge laboratories and equipment, allowing me to conduct experiments, develop prototypes, and validate novel cybersecurity solutions effectively. Furthermore, the University's network of experts and collaboration opportunities with industry partners and other universities outside Qatar have been invaluable in gaining insights, feedback and real-world perspectives on my research.

How would you perceive the future and prospects of cybersecurity research in Qatar?

There are a multitude of opportunities and prospects on the horizon for cybersecurity research in Qatar with. Several factors contribute to this positive outlook:

Growing Investment in Research: Qatar has shown a commitment to investing in research and development, including cybersecurity through funding bodies such as QNRF for attracting top talent, fostering innovation and conducting cutting-edge research.

Cybersecurity Awareness: The increasing recognition of the importance of cybersecurity in both the public and private sectors has generated a demand for research and solutions. Qatar is actively addressing cybersecurity challenges, positioning itself as a regional hub for cybersecurity research and development.

Strong Educational Institutions: Universities and research institutions in Qatar have been actively involved in promoting cybersecurity education and research. They provide the foundation for nurturing cybersecurity experts and conducting impactful research and building human capacity needed to tackle current and future challenges in the field of Cyber Security.

Collaboration Opportunities: Qatar's strategic location and partnerships with international organizations create opportunities for collaborative research projects with global experts in cybersecurity. Most of my research projects that have resulted into the best innovative ideas for cybersecurity have been a direct consequence of effective collaboration with international researchers.

Industry Engagement: Collaboration between academia and industry is essential for addressing real-world cybersecurity issues. Qatar's cybersecurity research can benefit from strong ties with the private sector, ensuring that research outcomes are practical and relevant and increasing the potential for commercially viable innovations.

Government Initiatives: Qatar's government has launched initiatives to enhance the nation's cybersecurity posture, further emphasizing the importance of research in this area. One notable example is the collaboration between the newly established National Cyber Security Agency (NCSA) and QU.

What are your next research goals?

Recently, I have won an internal grant to work on a compelling research idea in the realm of AI-driven cybersecurity that involves harnessing machine learning and predictive analytics to anticipate and preempt cyber-attacks. By analyzing historical attack patterns, network anomalies and emerging threats in real-time, AI algorithms can proactively identify potential vulnerabilities and attack vectors. This enables the automatic deployment of tailored security mitigations, such as intrusion preventions system (IPS) rule adjustments, threat containment or even dynamic system reconfiguration, to thwart attacks before they are executed, thereby significantly reducing the window of opportunity for cyber attackers and enhancing overall network resilience. This proactive, anticipatory approach holds the potential to revolutionize cybersecurity, providing organizations with the means to stay one step ahead of increasingly sophisticated cyber threats.

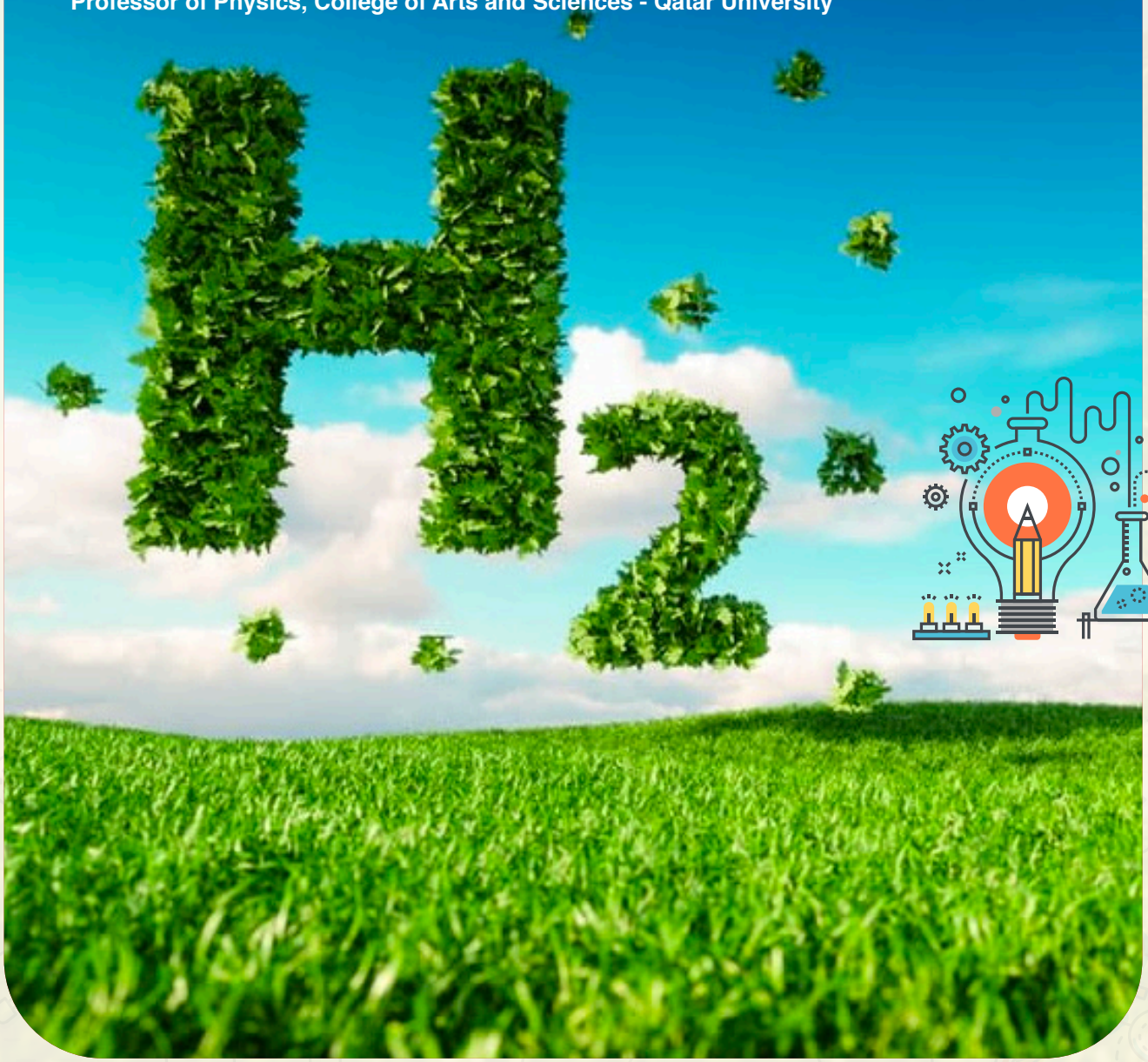
As an influential researcher, in your opinion, which innovative and invention-related skills do our students need to enhance?

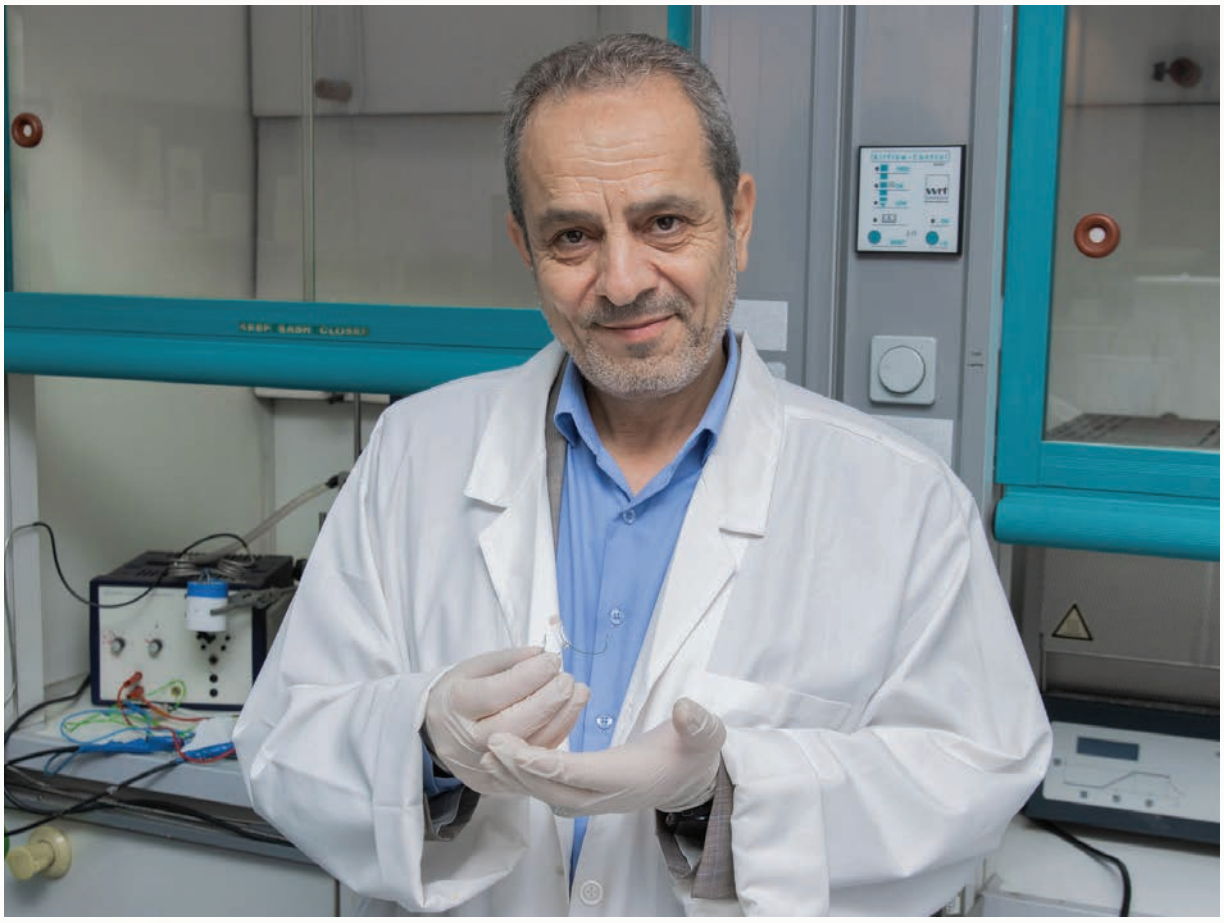
Fostering innovation and invention skills among youth is crucial in today's rapidly evolving world. To enhance these skills, youth should have access to interdisciplinary education that encourages creative problem-solving. They need opportunities for hands-on learning, collaborative projects and exposure to real-world challenges. Encouraging a growth mindset, where failure is seen as a valuable part of the learning process, can also be beneficial. Additionally, access to cutting-edge technology, mentorship from experienced innovators and exposure to diverse perspectives through networking and internships can further nurture their innovation and invention capabilities. Lastly, a supportive and flexible learning environment that allows students to explore their passions and interests is key to unlocking their full innovative potential. Students should be encouraged to explore new ideas for existing or new problems in their senior design projects rather than repeating what has already been done.

Qatar University Research Team Invents New Material for Efficient Hydrogen Gas Sensing

Prof. Ahmad Ibrahim Ayesh

Professor of Physics, College of Arts and Sciences - Qatar University





Prof. Ahmad Ayesh

Hydrogen gas is a clean fuel source that is environment friendly since it is carbon free. Hydrogen fuel can be generated using many domestic resources including natural gas, biomass, nuclear power, as well as renewable power like wind and solar. Utilization of hydrogen fuel requires its accurate detection and control to enable safe consumption.

The scalable hydrogen sensing on Pd-based sensors of hydrogen concentrations without physical destruction for Pd remains a daunting challenge. Hierarchical porous multimetallic nanocrystals that are Pd-based represent excellent structure for hydrogen gas sensing. Meanwhile, their high mass production for hydrogen sensing applications with tunable size, shape and composition remains a great challenge.

A research team from Qatar University lead by Prof. Ahmad Ayesh (Professor of Physics – Department of Math, Statistics and Physics, College of Arts and Sciences) and the team members Dr. Kamel Eid (Research Associate, College of Engineering), Mr. Belal Hussien (Research Assistant, Department of Math, Statistics and Physics, College of Arts and Sciences) and Prof. Aboubakr Abdullah (Manager of Research Excellence, Research Planning and Development Department at Research and Graduate Studies Sector) invented a new novel material for high efficiency of hydrogen gas sensing.

The invention presents production of a unique nanomaterial based on PdPt of hollow nanocages with Pd core (Pd@PtPd) in the form of yolk-shell nanoarchitectonics as shown in Figure 1. The fabrication process of Pd@PdPt yolk-shell nanoarchitectonics and hollow PdPt nanocages is feasible for large-scale applications as the production process

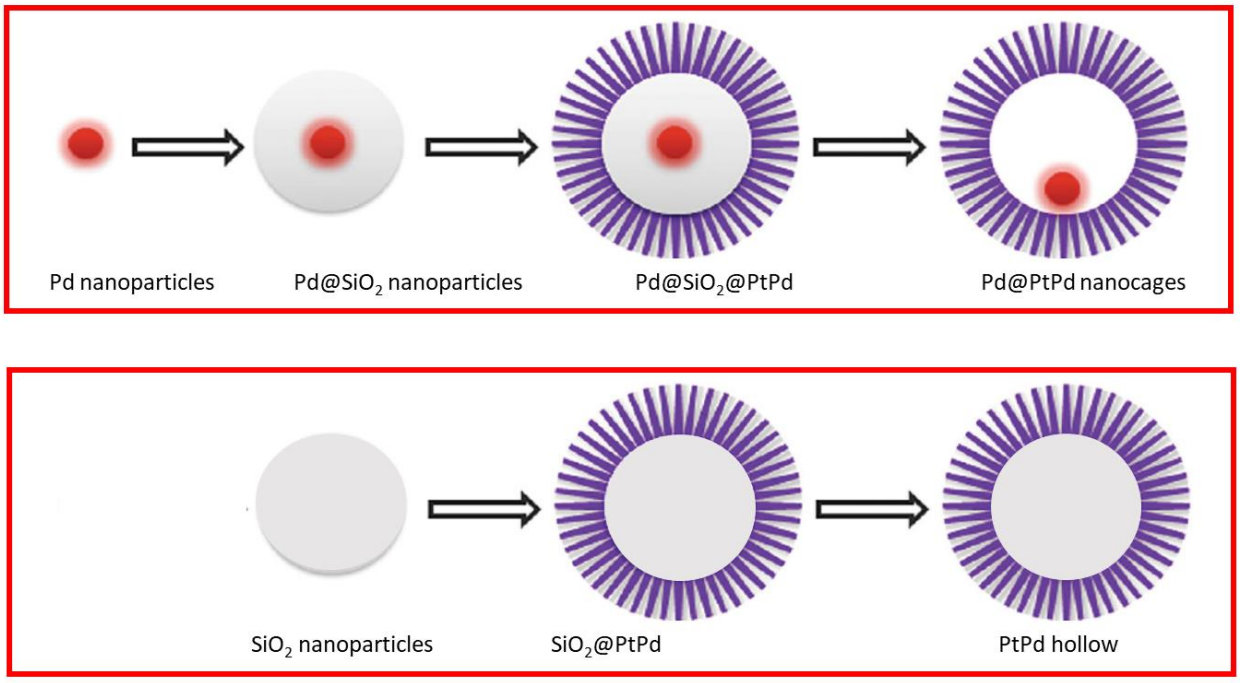


Figure 1. Fabrication of hollow nanocages of composite palladium and platinum. Top: palladium and platinum with a palladium nucleus (Pd@PtPd), bottom: hollow palladium and platinum (PdPt).

is a one-pot synthesis, green (no hazardous chemicals or organic solvents) and produced with a high mass production (up to several grams in one run) at room temperature. Pd@PdPt yolk-shell nanoarchitectonics composed of Pd nanocubes core wrapped by a hierarchal porous shell and PdPt porous spatial nanodendrites with hyperbranched arms. Meanwhile, hollow PdPt nanocages composed of hollow core and PdPt porous nanodendrites.

The obtained Pd@PdPt yolk-shell nanoarchitectonics and hollow PdPt nanocages combine between the unique physiochemical merits of multimetallic (electronic, bi-functional, synergism), inherent catalytic properties, porous (electron-rich density, high surface area to volume ratio and massive accessible active adsorption sites), core-shell shapes (electronic effect, bifunctional mechanism, sensitizing, activating effect, and spillover effect) and porous shapes (great H_2 adsorption/desorption, mechanical stability and quick diffusion rate and a high tolerance for the reaction intermediates or products).

The nanoarchitectonics exhibit ordered interconnected pores over the entire exterior surface as well as a hyper-branched outer shell. The team was able to present a high yield production of the material (100 %) and high mass production (gram-scale in one run). The new material was produced at room temperature making the synthesis energy-efficient and eco-friendly. Freestanding Pd@PtPd yolk-shell nanocages allow the efficient, sensitive and selective hydrogen sensing at room temperature without any kind of physical destruction even at low/high concentration of hydrogen in air. Distinct from previous hydrogen sensors that are Pd-based, the obtained interconnected porous yolk-shell structure can maximize the utilization of Pd core and PdPt shell during hydrogen sensing as well as accommodate a huge amount of hydrogen. The hydrogen gas detection limit in the air ranged from 0.2v% to 8v% of volume percent of Pd@PdPt hollow nanocages at 25 °C and from 0.2 v% to 6 v% at 50 °C. Meanwhile, their hydrogen response time in the air ranged between 90 sec to 170 sec at 25 °C and 50 °C.

Mobile Smart Shower Room: A Safe and Integrated Experience for the Elderly and People with Special Needs

Dr. Ahmed Elkhatat

Section Head of Research Planning, Research Planning and Coordination, Office of the Vice President for Research and Graduate Studies, and a Teaching Assistant in Chemical Engineering, College of Engineering - Qatar University

Patent No.: 109.788.877

Dr. Ahmed El-Khattat during the innovation experiment and presentation to the experts judges panel at the “Stars of Science” program.

Caring for individual needs is necessary and cannot be overlooked in an age that is characterized by rapid technical development and continuous social changes. Simple and daily issues that are considered a normal part of life for some people, such as showering, in some cases, for people who suffer from motor difficulties or certain disabilities may be considered a source of anxiety and embarrassment. This group of people often finds themselves deprived of independence and dignity, which promotes the need for developing technical solutions to give them back feelings of security and independence instead of completely depending on the help of others.

The role of the “Smart Shower Room” comes within this framework. This room was carefully designed to provide a safe, comfortable and integrated showering experience while maintaining the dignity of its users.

Smart Shower Room is distinguished by a strong building that uses fiberglass supported with epoxy and solid services, which achieves the maximum safety for users who may have balance problems. The system provides an emergency key to stop the process of showering immediately if any problem occurs to ensure more safety. Furthermore, the design is focused on providing comfort to users by providing warm water and air from the beginning and controlling the temperature of water to the user’s wish is possible. The room is endowed with the design of its front door, which is designated for entry and exit. It is also possible to control the height of the chair, which is provided with marvelous arabesques. The warm upper cover is made from a water-resistant substance to provide a feeling of safety and privacy in addition to avoiding suffocation, as illustrated in Figure 1.

The room is equipped with a group of technically developed systems and machines. As for the mechanical aspect, there is a developed hydraulic system to pump water. It consists of a central pump to draw water from a tank that is equipped with a sensor to measure the water temperature and a sensor for the water level. The pump power is controlled by a separate frequency transformer to pump water efficiently through twenty bath nozzles. There is also an air system responsible for the hot air flow that contributes to the process of drying after the shower. This system consists of a central fan that produces air with a certain flow heated through a strong heating element. Hot water is blown across special nozzles connected to a group of pipes. As for the electrical aspect, the room is equipped with electrical circuits and a control unit that enables the system to work efficiently. The room is equipped with a touch user interface, which enables the user to control several options to make this experience easier.

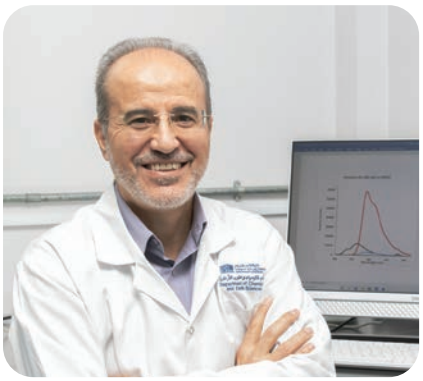
The mobile shower room is not only for providing the user with safety and comfort, but also it contributes to promoting self-confidence and a feeling of independence, which restores the user’s sense of dignity as well as the ability to live normally and independently.

It is noteworthy that in 2016, the “Mobile Shower Room” that was invented and designed by Dr. Ahmed El Khatat received a great response when it was presented on the 8th edition of the program “Stars of Science.” The dedicated team to the program worked on converting this design into a practical product that was tested on ground. The design passed through many significant tours within the events of the program and greatly attracted the attention and interaction of the audience.

The explanatory video link:

https://www.youtube.com/watch?v=VSEWXQ-gg_o

Inventor Business Card



Prof. Amjad Mahmoud Sharim

Professor of Analytical-Environemntal Chemistry, Department of Chemistry and Earth Sciences, College of Arts and Sciences - Qatar University

جامعة قطر
QATAR UNIVERSITY

Prof. Amjad Mahmoud Sharim, How would you like to introduce yourself to the Qatar University community?

I joined Qatar University in 2013 and obtained my PhD from the University of Queensland in Australia (1999), MSc from Yarmouk University - Jordan (1989), and BSc from An-Najah National University in Palestine (1985). I conducted my postdoctoral research in Japan and worked in several universities and research centers. I published more than 70 papers in international journals and conferences. I taught several chemistry courses including analytical chemistry, chromatography, environmental chemistry and forensic chemistry.

Would you tell us about your patents filed at Qatar University?

Along with my colleagues, I filed two patents. The latest patent was about inventing a typical coupling method for the preparation of 1,2-di(thiophen-2-yl)ethene-1,2-diols via a Cu(II) catalyst. Due to the importance of these compounds as building blocks for synthesizing organic compounds of important applications in materials science, pharmaceutical formulations and other chemical applications, it is imperative for researchers to develop new ways to prepare such materials with greater efficiency, higher purity, shorter time and mild experimental conditions, which as been achieved in this patent.

In your opinion, how does Qatar University create a suitable environment for inventions?

Qatar University provides a suitable work environment for researchers, faculty members and graduate students to conduct scientific research of national and global importance. While the university endeavors to excel in research, it is imperative to embrace innovative mechanisms that support researchers, increase research space and address infrastructure needs. This concerted effort is essential for fostering creativity, thereby elevating the university's ranking and visibility on an international scale. I am confident that this objective is not only viable but also crucial for the institution's advancement.

What are the latest findings in the Chemical Compounds Science, and how did this science serve the environment?

Compared to currently employed methods, this patented preparation method reduces the amount of chemical waste and preparation time. Scientists and researchers are now focussing on several important scientific fields including green chemistry, nanotechnology, high-throughput experiments, bio-inspired chemistry and other fields that combat environmental pollution.

If you are going to innovate an effective invention towards a sustainable environment by using new materials, what will it be?

I look forward to developing new superadsorbents that condense humidity from the air and can also be mixed with the soil to efficiently retain its water content for wider green covers that play important role in combating global warming. I am also interested in developing innovative and safe compounds to chelate toxic elements from our bodies, especially for patients suffering from genetic diorders such as thalassemia.

Through your experience, do you have any advice to Qatar University's students to promote their inventions and innovations?

While enjoying their university life, I advise my students to work harder, participate actively in the classes, embrace challenges, stay curious, celebrate achievements and plan for the future.

What are your future research projects?

I am currently seeking funds to conduct research to understand and evaluate the effect of environmental pollution on some emerging diseases such as autism spectrum disorder. Addionally, I am working on developing chemosensors to detect toxic elements in water and physiological fluids.

Unveiling the Genetic Secrets of the Qatari Genome:

How DNA Holds Clues to Infectious Diseases

Maria Khalid Smatti, PhD in Genomics and Precision Medicine–Hamad Bin Khalifa University (HBKU) and Research Assistant, Biomedical Research Center (BRC) - Qatar University

Supervisor: Dr. Hadi Yassine, Section Head of Research and Associate Professor of Infectious Diseases, Biomedical Research Center (BRC) - Qatar University

Co-supervisor: Prof. Omar Albagha, Professor of Genomics and Precision Medicine - Hamad bin Khalifa University (HBKU)

Student Maria Smatti and Dr. Hadi Yacine

Genomic data is the bedrock of precision medicine facilitating the transition towards personalized medical care. Its significance ranges from the early detection of diseases to the customization of treatment strategies. Not only that, providing an intricate blueprint of an individual's genetic makeup holds the potential to unlock a multitude of medical mysteries, including the susceptibility and response to infectious diseases (IDs). Until now, one of the continuously puzzling questions is the substantial inter-individual and inter-population variability in the clinical manifestations of infections, and the response to SARS-CoV-2 is a clear example. **Figure 1** describes the role of genetic variation in genes involved in host-pathogen interaction pathways on the infection outcome.

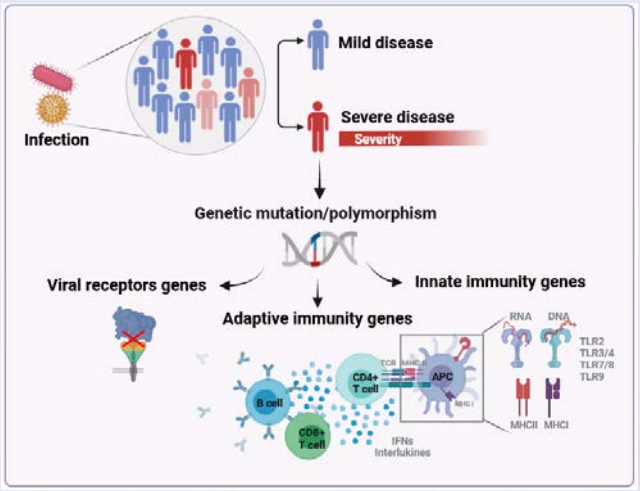


Figure 1. Individuals/populations can differ in their response to infections if they carry genetic polymorphisms or mutations in genes involved in host-pathogen interaction pathways.

Despite experiencing a heavy burden from infectious diseases, which rank as the third leading cause of death, globally, the role of host genetics in the susceptibility and clinical outcomes of IDs remains largely understudied in Qatar and the Middle Eastern region. In fact, our region is extremely underrepresented in populations' genomics studies. In the last decade, we are proud that Qatar and multiple other Arab countries have taken important steps towards building genome-sequencing capacity, which allowed for initiating diverse population genomics research. Currently, Qatar Genome Program (QGP) has completed the sequencing of over 33,000 citizens and Arab residents in Qatar, with the objective of creating the first comprehensive Qatari reference genome that will help in understanding genetic risk factors underlying different medical conditions.

In an effort to make a modest stride towards understanding the host genetics of IDs in Qatar, Maria Smatti (graduated PhD student from the Genomics and Precision Medicine program at HBKU and Senior Research Assistant at QU-BRC), worked on exploring host genetic factors related to several infections in the Qatari population. The project was supervised by Dr. Hadi Yassine (Section Head of Research and Associate Professor of Infectious Diseases at QU-BRC), and Prof. Omar Albagha (Professor of Genomics and Precision Medicine at HBKU). In this project, three main questions were raised: 1- What is the genetic composition of the Qatari population from an infectious disease Perspective 2- Are there novel genetic mutations that are exclusively present in the Qatari people and affect the response to SARS-CoV-2? 3- Is Hepatitis E virus (HEV) shaped by human genetic variation and if so, what are these variants?

To answer these questions, whole genome sequencing data and biological samples of 6000 individuals (Qatari nationals) who participated in the QGP were collected and analyzed using diverse statistical, computational, and laboratory experimental tools:

1. Qatari genomes carry remarkably different frequencies of pathogen-associated host genetic variants

The first section of the project focused on investigating the distribution of previously known infection-related host genetic variants (DNA polymorphisms) in Qatar. This included a set of 1,086 variants that were linked to IDs' susceptibility, resistance, severity, progression, clearance, response to treatment, or vaccination. By comparing the frequency of these variants in Qataris to other populations, it was found that the prevalence of human genetic variants that make people more or less prone to infections is strikingly variable. For instance, the Qatari genomes carry significantly lower frequency of most risk variants associated with susceptibility to tuberculosis (TB), malaria and hepatitis. Contrarily, a higher frequency of variants that increase the risk of chickenpox, plantar warts, pneumonia, urinary tract infections (UTIs) was observed among Qatari individuals. Inter-population differences were also observed in the distribution of human variants affecting viral clearance, viral load, viral-induced progression to cancer, and response to treatment.

2. Qatari-unique host genetic mutations were found in the *ACE2* and *TMPRSS2* genes

A large body of evidence has accumulated regarding the contribution of genetic mutations in the human angiotensin-converting enzyme-2 (ACE-2, the cellular receptor) and/or the transmembrane protease-2 (TMPRSS-2, an essential cellular protease needed for viral entry) in the vulnerability or resistance to pathogenic SARS-CoV-2. Accordingly, this part of the project investigated whether there are genetic variants located in *ACE2* and *TMPRSS2* that are uniquely present among Qataris and have not been reported elsewhere. Seven and five novel protein-coding mutations have been found among Qataris in the *ACE2* and *TMPRSS2* genes, respectively.

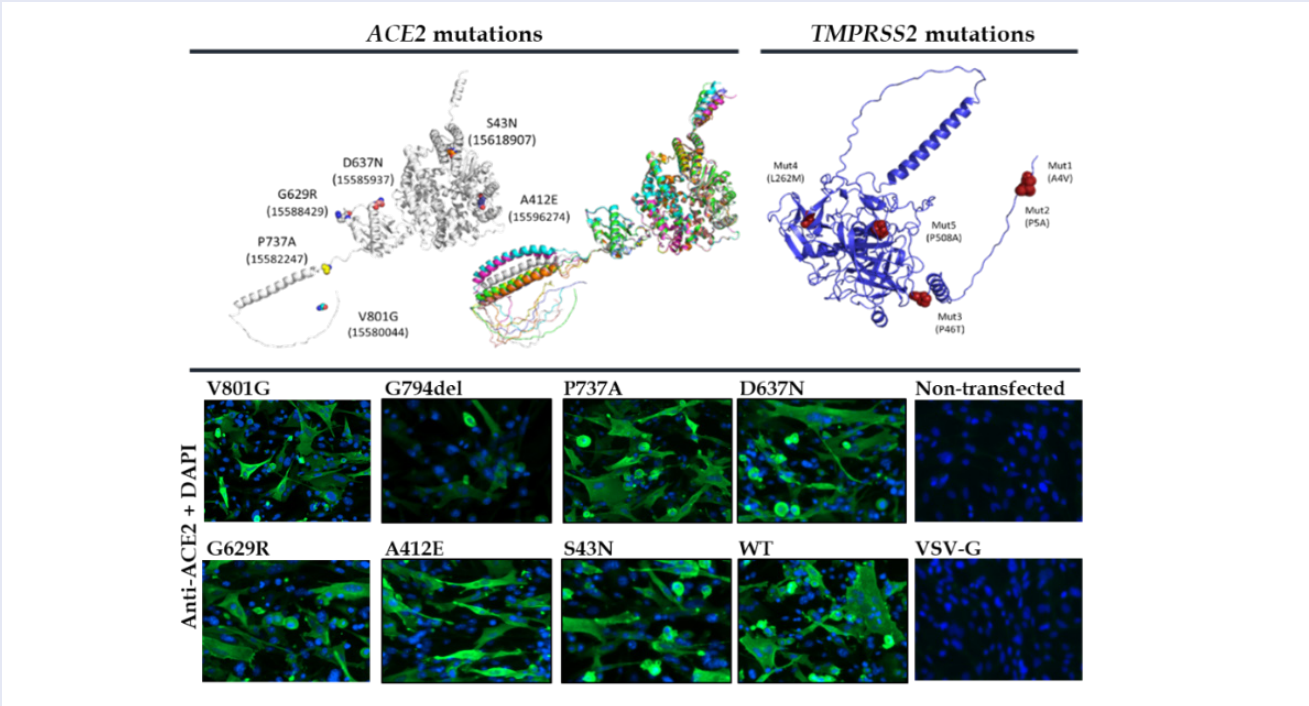


Figure 2. Novel mutations in ACE2 and TMPRSS2, and the impact on ACE2 expression.

Interestingly, while mutations within *TMPRSS2* did not show a considerable effect on the protein structure and activity, *ACE2* mutants presented variable characteristics that were reflected on binding affinity with SARS-CoV-2, receptor expression on cells, and SARS-CoV-2 viral entry **(Figure 2)**.

3. The antibody response to Hepatitis E virus is associated with host generic variation

Finally yet importantly, the researchers conducted the very first Genome-Wide Association Study (GWAS) on Hepatitis E (HEV) seropositivity and antibody levels. This approach was applied to discover associations between genetics and HEV, a widely prevalent virus that infects the liver and presents a serious risk to pregnant women and immunocompromised patients. The study pinpointed a significant genetic locus at 12p11.1, strongly linked to anti-hepatitis E antibody response. Besides, many other suggestive genetic markers were found, several of which are associated with immune regulation pathways, including interferons (alpha/beta) and interleukin 21 (IL-21) signaling **(Figure 3)**.

Collectively, this PhD project represents the first description of the host genetic factors related to IDs in Qatar, an ancestrally diverse Arabian population. It also emphasizes that this field of research needs to move forward in a manner that is effectively inclusive for previously underrepresented populations, including the Qatari population and the broader Middle Eastern populations. Indeed, there is a need for improving infectious disease management, through shifting from programmatic to personalized approaches. It is important to identify the genetic basis influencing the variable spread of infections. Identifying such markers will help in estimating the population risk and ultimately improving the prevention and control plans.

This project received two Best Poster Awards at Sidra Precision Medicine and Functional Genomics Conference (PMFG 2023) and the 6th QU-Health Symposium (2022). Additionally, it was selected by the ICESCO's Federation for the Universities of the Islamic World as one of the top 10 dissertations and was presented at the ICESCO headquarters in Morocco (2023).

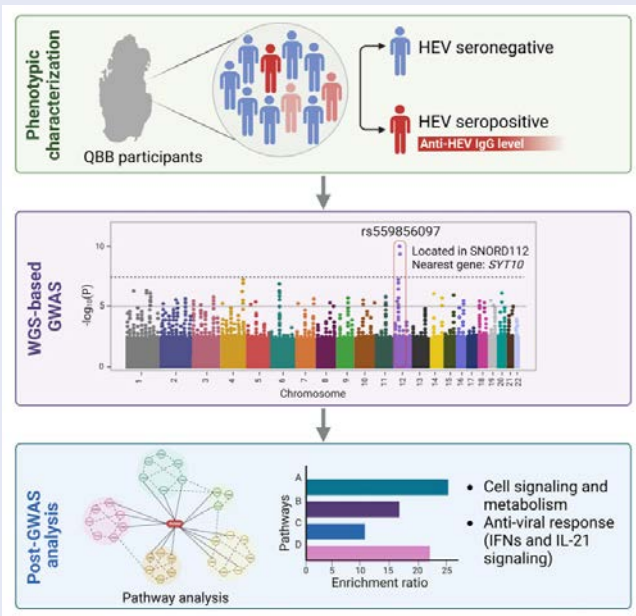


Figure 3. Genome-wide association study identifies several loci for HEV seropositivity.

Predicting Fluent Reading Skills:
The First of Its Kind Study in Qatari Public Schools

Fatima Abdulla Al-Own, a Master's student in Curriculum, Instruction and Assessment
Supervised by: Dr. Elsayed Elshabrawi Ahmed Hassanein, Associate Professor of Psychological Sciences
College of Education - Qatar University

Reading skills hold great importance at educational institutions because of their clear impact on the academic level of students which also extends to all levels of cognitive development. This study is aimed to assess the early reading skills and reading fluency of third-grade students at the governmental primary schools in Qatar to identify skills that could predict the fluency level of reading individual words and texts. The outcomes of this study will benefit a large segment of society including researchers, teachers, curriculum officers and students to address the phenomenon of reduced number of primary school students who have reading skills in the State of Qatar as indicated by previous research findings and international reading test reports which showed that the reading skills of Qatar's students is close to the lowest acheivement level.

This study discusses the role of early reading skills represented in phonological processing, orthography skills and morphological awareness skills in predicting the reading fluency level of words and texts. Phonological processing skills include phonological awareness, phonological memory and rapid automatized naming. Orthography skills refer to written symbols (shapes of letters and words) stored in memory. The morphological awareness is related to knowing the meaning of new words and the derivational structure of words. During the reading process, all these skills are interrelated. Orthography skills work as visual inputs that connect to their related phonological units stored in the reader's memory to enable the child to read words and transform the printed text into a spoken language. Then, the meaning of the word is supported by its reliance on phonological awareness.

The study adopted the Correlational Descriptive Approach because it is appropriate for answering the research question and goal. It targeted third-grade students who study at government schools in Qatar. A boys school and a girls school were randomly selected. The sample included 200 male and female students. The skills of early reading and word reading were measured in the sample of the study using the Test of Early Arabic Literacy Skills (TEALS) prepared by a group of researchers. Moreover, the researcher prepared a test that was used to assess the reading fluency skill level of the research sample.

After analysing the data statistically, the research reached several outcomes. The most important is the role of phonological processing skills in predicting the reading fluency level, particularly deletion skills, rapid naming skills and isolation skills which are sub-skills of phonological awareness skills. Orthography skills also appeared as a

Dr. Elsayed Elshabrawi Ahmed Hassanein

significant indicator for predicting reading fluency skills, whereas morphological awareness skills that were measured were not significant. The outcomes were consistent with the foundations of the reading theories and cognitive development theory which indicate that children must have basic knowledge to help them learn advanced knowledge.

The researcher provided a set of recommendations that would contribute to improving the reading skills level of students. Recommendations indicated that it is necessary to include educational activities aimed at developing early reading skills, especially phonological processing skills and orthography skills within the curricula of first three grades. This leads to achieving the desired goal and increasing the motivation to learn. In addition, training workshops for teachers in the stage of early childhood and third-grade teachers should be prepared and provided to train them on the most important methods and strategies that should be adopted in order to develop the students' reading skills in these stages. Finally, reliable standards should be prepared to be used by teachers of the first three grades to get an accurate assessment of the students' reading skills level, continuously. This contributes to the early discovery and treatment of reading difficulties.

To the best of the researcher's knowledge, this study is considered the first of its kind in Qatar, as it has particularly addressed a significant issue in the educational field. The research came up with significant outcomes that are consistent with what is indicated by theories and other previous studies' findings conducted in the same field. These outcomes urge educational institutions to further focus on these skills in the process of educating students at the early stages. At the same time, the study will be a starting point for other research studies to be conducted on a broader scale in the same field.

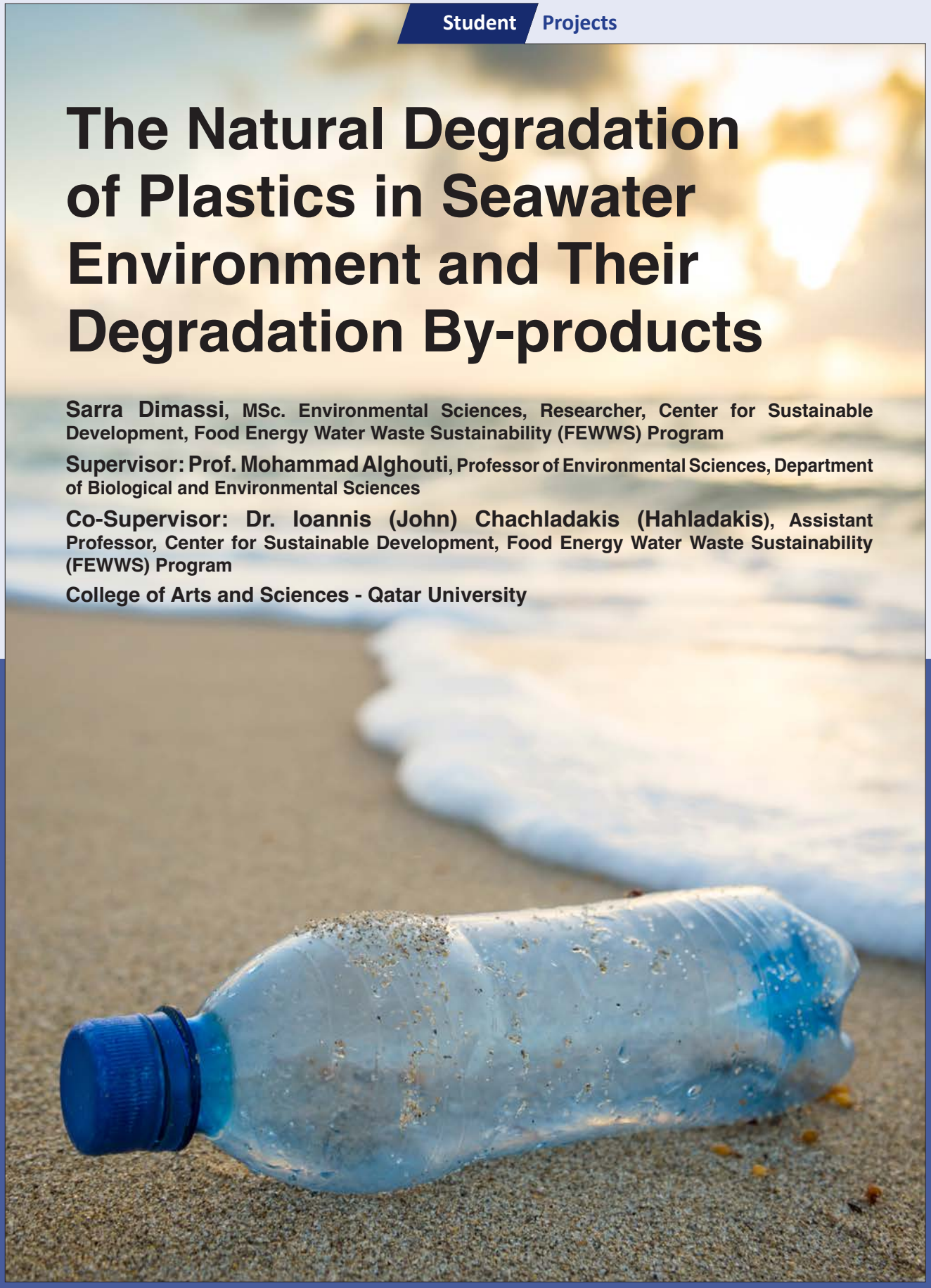
The Natural Degradation of Plastics in Seawater Environment and Their Degradation By-products

Sarra Dimassi, MSc. Environmental Sciences, Researcher, Center for Sustainable Development, Food Energy Water Waste Sustainability (FEWWS) Program

Supervisor: Prof. Mohammad Alghouti, Professor of Environmental Sciences, Department of Biological and Environmental Sciences

Co-Supervisor: Dr. Ioannis (John) Chachladakis (Hahladakis), Assistant Professor, Center for Sustainable Development, Food Energy Water Waste Sustainability (FEWWS) Program

College of Arts and Sciences - Qatar University



From the left: Dr. Ioannis Chachladakis, assistant supervisor, student Sarra Dimassi and Prof. Mohammad Al-Ghouti, main supervisor.

Plastics have a wide range of functional characteristics that make them incredibly appealing. However, substantial amounts end up in the oceans due to poor waste management practices, where they begin to degrade. As a result, it is critical to comprehend and further study the dynamics of this process. This work investigates the natural deterioration of six different plastic types, under the Qatari environment. Simulated marine conditions were applied, both in the laboratory and outdoors, for 140 days. Plastic samples before and after the experiments were examined using Fourier-transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM). In addition, the leaching potential of four different additives (bisphenol A (BPA) and phthalates (bis(2-ethylhexyl) phthalate (DEHP), dibutyl phthalate (DBP), benzyl butyl phthalate (BBP)) embedded in the different plastic types was investigated before and after the exposure to various conditions using gas chromatography–mass spectrometry (GC-MS). The results achieved herein contribute to a better understanding of the leaching impact of the harmful compounds embedded in macro/micro-plastics when exposed to harsh climatic conditions. Briefly, commercial plastics (polypropylene (PP), polystyrene (PS), low-density polyethylene (LDPE), high-density polyethylene (HDPE), polyethylene (PE), and polyethylene terephthalate (PET)) were selected for the investigation of degradation due to their crucial contribution to marine plastic waste. All plastic products were analyzed before and after exposure to marine litter conditions by using FTIR, Spectrum 400 FTIR/ UATR, and SEM. The salinity and pH of the seawater (SW) during the experiment were monitored by using a refractometer and a pH meter.

Plastics were washed with distilled water and left to dry naturally for 2 days. In turn, they were shredded into 2 sizes, which are macroplastics (Macro) (5 cm × 5 cm) and microplastics (Micros) (4 mm × 4 mm). The Macros and Micros were then washed with milli-Q water, to remove any excess dust, and dried. Subsequently, their weight was measured accurately. All plastic samples were subjected to a 140-day simulation of a marine litter condition (in Qatari SW collected from Katara Beach), under

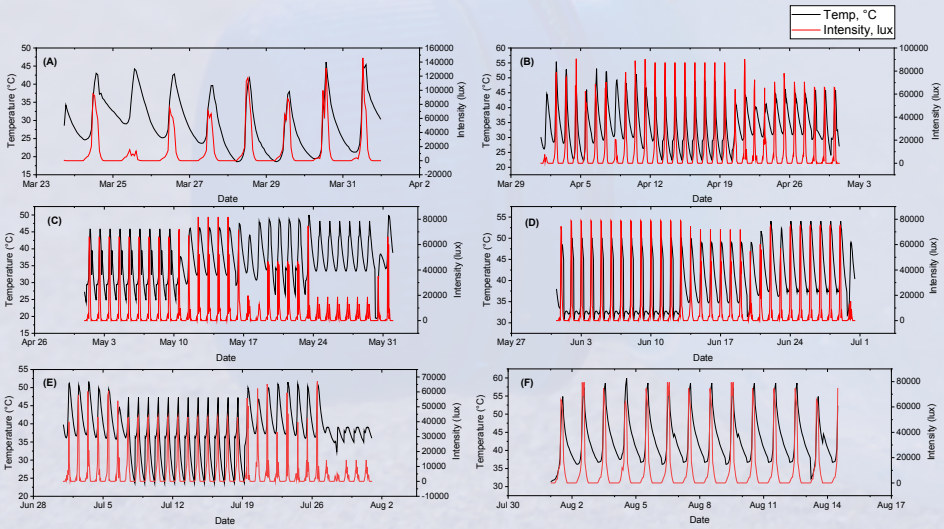


Figure 1. Environmental conditions (temperature (°C), and UV-intensity (lux)) during the experimental period (A) March, (B) April, (C) May, (D) June, (E) July, and (F) August for T1.

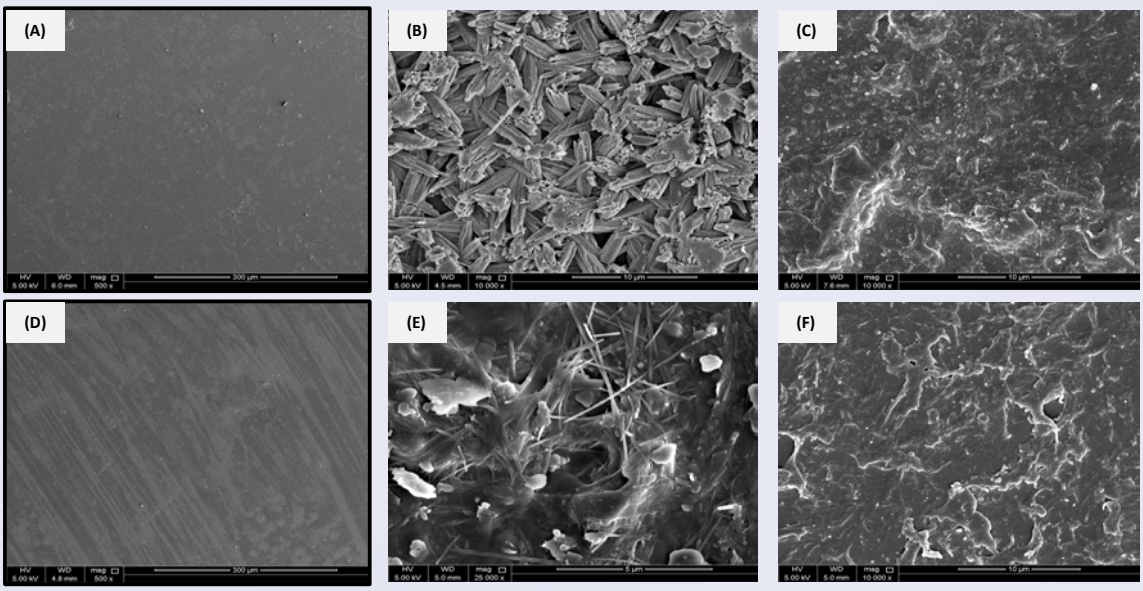


Figure 2. SEM micrographs of PP, and PET: (A) PP prior degradation (Day 0), (B) Micro-PP after 140 days of exposure to T1, (C) Macro-PP after 140 days of exposure to T1, (D) PET prior degradation (Day 0), (E) Micro-PET after 140 days of exposure to T1, (F) Macro-PET after 140 days of exposure to T1.

natural sunlight, with measurement of light intensity by using temperature/light data logger to monitor and assess the light and temperature throughout the experiment. The data from the logger was extracted and processed monthly. Each of the plastic samples with size categories and various types was exposed to two treatments; each of these treatments represents a different environmental condition.

Treatment 1 (T1), an outdoor SW tank, exposed to direct sunlight and outdoor temperature, aerated through air pumps and a wave maker to simulate the wave abrasion; this set-up was used to examine the degradation of Macros and Micros under marine conditions. Treatment 2 (T2), an indoor SW tank aerated through air pumps and a wave maker to mimic the real conditions, with a controlled laboratory temperature and no sunlight exposure; T2 represents the control for plastic degradation under marine conditions. Both tanks contained the same amount of SW. A total of 120 plastic samples (96 samples micros and 24 macros) were placed in each tank.

Plastic fragmentation-degradation under marine conditions depends on many environmental conditions. Collected data showed that temperature and sunlight varied seasonally over time during the experimental duration; the light intensities and temperatures for T1 over time are shown in **Figure 1**.

SEM micrographs revealed variations in the morphologies of all plastic types. For instance, degradation signs were shown in PET and PE, under all conditions, as illustrated in **Figure 2**. Findings indicated that Micros degraded faster than Macros, with Micro-PP having higher weight loss (49%) than Micro-PET (1%) when exposed to outdoor marine conditions. According to FTIR spectra, the different plastics showed great alteration in the characteristics of the transmission bands, where Micros in all plastic types showed greater changes in the characteristics of the transmission bands. This change gradually increased over time while being exposed to the different treatments, especially for T1. Principal component analysis was effectively combined with FTIR analysis and used as a statistical tool to compare multivariate data.

Leachability results showed that DEHP, DBP and BPA were detected in SW samples. It concluded that the leaching of DEHP was promoted by wave abrasion, high temperature and sunlight, while the leaching of DBP was favored by wave abrasion. Findings showed that PP was the most attributable type of plastic in the leaching of DBP with an average concentration of 5.3 µg/L, whereas HDPE was the most responsible plastic-type for the leaching of DEHP, with an average concentration of 123 µg/L.

The results suggest that most of the additives will eventually leach out to the SW environment after a longer period. Currently, only a few studies have investigated the degradation of plastics, as well as the presence of phthalates and bisphenols in SW environment, under such climatic conditions; hence further research is required.

For more information: Related recent work

Empowering the Youth: A Strategic Focus for a Thriving Future

Fahad Al-Boinin

Research Assistant, Social and Economic Survey Research Institute (SESRI) - Qatar University

Introduction

Qatar's commitment to nurturing and empowering its younger generation is apparent through its transformative vision for the future. The State of Qatar has always prioritized youth development, reflected in its remarkable 32nd rank globally in the Global Youth Development Index (YDI), making it the second highest-ranking country in the Middle East and North Africa (MENA) region.

Looking closely at the YDI's subcategories, Qatar (Figure 1) stands out for its impressive rankings in health and well-being, employment and opportunity, security and peace, equality and inclusion. However, Education, Political and Civic Participation, ranking 88th and 168th, respectively, may require further attention and development strategies.

Qatar's National Youth Policy

Qatar's National Youth Policy is a significant step towards youth development. The policy's seven foundational pillars reflect the country's comprehensive approach and commitment to inclusivity. An advisory committee was established, and input from over 1,500 individuals was gathered to ensure that the youth's voices were heard and considered.

Most youth prioritize education, innovation, private-sector employment and entrepreneurship, while health is vital to many. Almost 60% believe that youth involvement is crucial. This includes providing more opportunities for young individuals to participate in decision-making processes,

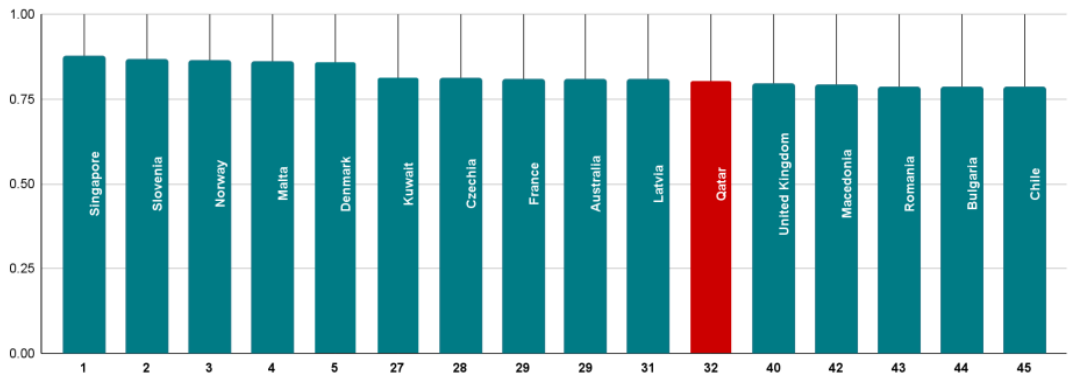


Figure 1. Youth Development Index (YDI) scores of the Most Developed Countries.

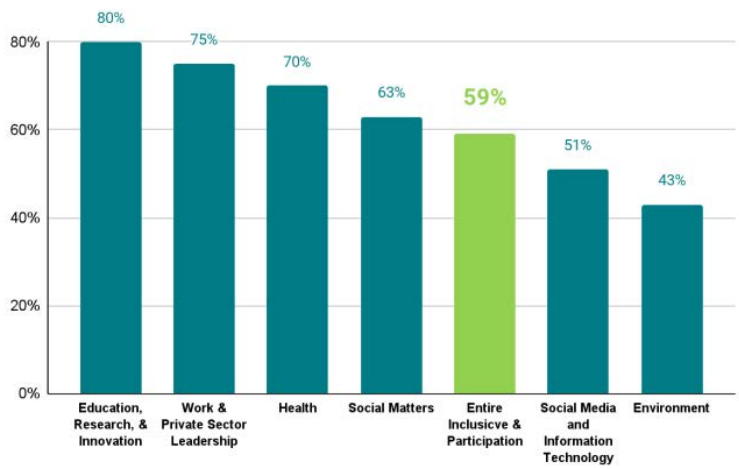


Figure 2. Youth's Most Important Axes.

investing in programs and initiatives that support them and changing societal attitudes to value the perspectives of younger generations, which could lead to more diversity and inclusivity in various fields and industries (Figure 2).

Youth's Active Involvement and Participation

In Qatar, the youth population is considered an integral part of society. They actively participate in initiatives to positively influence people's lives, including voting, volunteering and advocating for causes they believe in. Youth engagement is directly linked to civic involvement and rights recognition; not utilizing it can lead to wasted resources.

According to the Qatar National Youth Policy, the youth have mixed sentiments. While 50% are satisfied with the available opportunities for participation, the other half find them unsatisfactory or limited to specific interests (Figure 3).

Establishing and promoting a more diverse range of civil associations and decentralizing this sector is a promising path towards increasing youth participation. Such diversity allows for a broader range of opportunities for involvement. However, there may be potential challenges, such as youth's unawareness of available options and difficulty accessing these associations.

Active involvement in political processes is crucial for the youth as they play an essential role in shaping the future of their nation. Ensuring that the electoral processes are effective and lead to actual achievements and outcomes is essential. While most elections in Qatar have been transparent and fair, it is crucial to clarify the responsibilities of the candidates and the election results to avoid negatively impacting people's beliefs about the voting process and democracy.

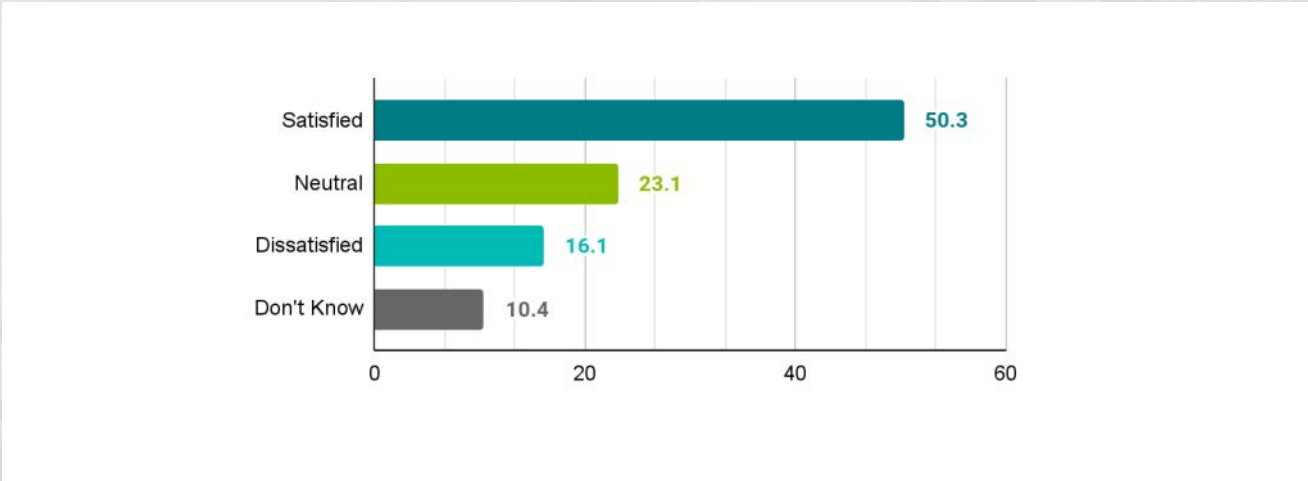


Figure 3. The satisfaction levels of the youth regarding the Open Fields in which they can participate.

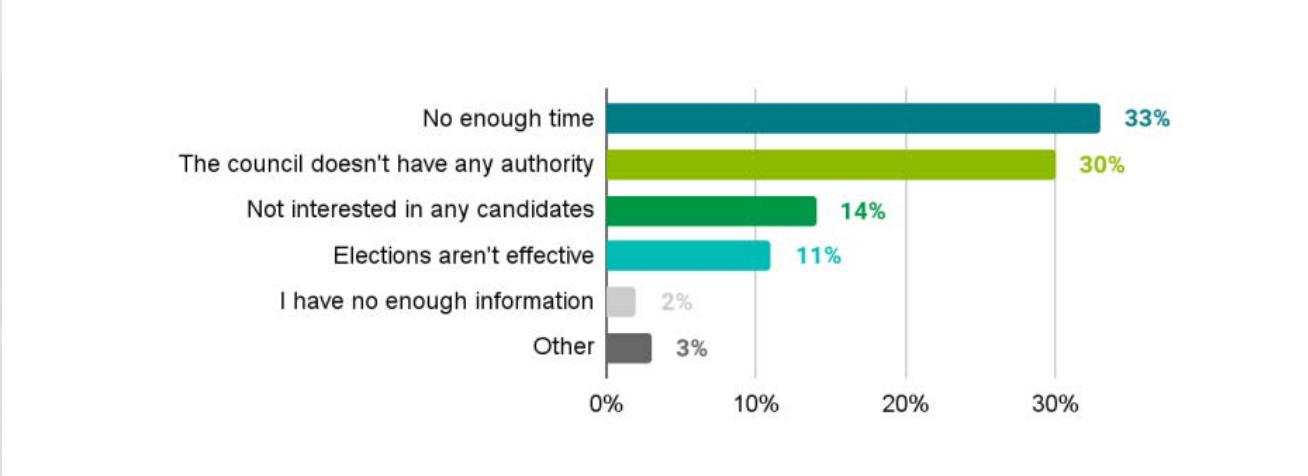


Figure 4. The reasons why some citizens choose not to vote in elections.

Insights from the SESRI 2019 Study on Central Municipal Council Elections

The 2019 SESRI study conducted on the Central Municipal Council elections in Qatar provides insights into the obstacles that impede political participation and civic engagement among citizens, including the youth.

The study revealed that 94% of the participants did not attend or were not exposed to any public campaigns related to the elections. This indicates that many citizens may need more essential information and updates. The survey results highlight the need for candidates, media outlets and other stakeholders to enhance their efforts to educate and involve the public during election periods.

According to the data analysis, almost half (47%) of the Qatari respondents require more information about the roles and responsibilities of the council. This lack of information can lead to apathy and disinterest, particularly among the younger generation (Figure 4).

The findings of this study have far-reaching implications beyond the Central Municipal Council elections. The knowledge obtained can offer valuable lessons for other civil activities in Qatar that necessitate improved public engagement and participation. Addressing the identified obstacles and increasing public awareness can foster a more involved and engaged society, with the younger generation leading the way.

Qatari Youth Civic Engagement and Empowerment

In another study conducted by SESRI that highlighted the importance of civic engagement and empowerment, the results provided valuable insights for policymakers and researchers.

According to a recent survey, 55% of Qatari respondents were interested in politics, while 63% believed that younger people are less interested in politics than the older generation. This perception could be due to different interpretations of political engagement among young adults. Unlike Kuwait and Bahrain, where parliamentary politics and civil activism have led to solid youth movements, political competition and activism vary across the Gulf region.

Furthermore, it points out that youth also lack the capacity–in terms of time, skills, or resources, to engage in public life. The respondents were asked to identify the main reason for the reduced political involvement of young people compared to older individuals. The results showed that 52% of respondents believe that a lack of experience with the political system is the primary barrier.

Mr. Fahad Al-Boinin

Conclusion

Qatar has made progress in promoting youth development and political engagement, with impressive global rankings and policies like the National Youth Policy. However, there are significant challenges to youth political participation, such as a need for more experience and knowledge gaps. The insights from SESRI studies can guide the alignment of youth aspirations with the nation's vision. Engaging and empowering Qatar's youth is vital to sustain the country's growth.

Luxury Consumption in the State of Qatar: A Study on Social Representations

Dr. Ebaidalla Mahjoub Ebaidalla

Research Assistant Professor, Ibn Khaldon Center for Humanities & Social Sciences - Qatar University

Introduction

Luxury consumption is one of the most prevalent phenomenon in most high-income countries, especially with the increasing use of technology and digital marketing in recent years. Although this trend has long emerged in Euro-American societies, nonetheless, emerging countries in general and oil-exporting Gulf countries in particular, have been affected by the fever of luxury consumption, which has become a new phenomenon and lifestyle.

Like other countries in the region, Qatar has become a destination for many famous brands of multinational companies, which offer their products, exploiting the advantages of the high average income per capita and communication media. In addition to, the spread of local traditions related to conspicuous buying, which led to the emergence of a luxury consumption culture that reflects the desire to consume all items that are new and modern. This transformed the behavior and lifestyle of a large number of citizens towards acquiring money and spending it on shopping, entertainment and all other conveniences.

The phenomenon of luxury consumption has begun to annoy decision-makers in the State of Qatar, due to its implications regarding the waste of available resources and potentials. Statistics indicate that the spending of families and individuals in the State of Qatar on luxury goods has increased in recent years, with the luxury goods market growing by approximately $1.84 billion in 2021 and is expected to grow annually by 2.55% during the period between 2022 and 2027.

The luxury consumption leads to many social, economic and psychological problems represented in extravagance and exaggeration, the decline of the values of cooperation and collective spirit, unhealthy social competition, decline of savings and investment; which adversely affects the needs of the current generation and the well-being of future generations.

This paper provides a summary of the study by Dr. Ebaidalla Mahjoub, Research Assistant Professor, and Dr. Asma Malkawi, Research Assistant Professor, alongside research assistants, El Mehdi Lahmamed, Abdulrahman Al-Marri and Ryan Zayed, from the Ibn Khaldon Center for Humanities & Social Sciences at QU. The study investigated the social representations on luxury consumption in the Qatari society.

Dr. Ebaidalla Mahjoub Ebaidalla

The Concept of Luxury Consumption

The topic of luxury consumption has received considerable attention from researchers in various fields of social sciences. Some researchers, such as Campbell (1987), define luxury consumption as the 'level of spending in excess of basics,' where luxury consumption is considered to be spending in excess level of basic commodities. Others define luxury consumption as the consumption of certain goods without a tangible function (Grossman & Shapiro, 1988; Veblen, 1899). Nueno and Quelch (1998) define luxury goods as those in which the ratio of their utility to their price is low, while their intangible functionality is high. Danziger (2005) defines luxury consumption as any attempt to seek a new experience or satisfy a particular subjective need of the purchaser. Regardless of the definitions prevailing in the literature, luxury consumption is considered an unusual state as long as the consumption patterns go beyond the necessities towards the luxuries.

Social Representations Theory

There are many approaches that sought to explain the phenomenon of luxury consumption, most of which focus on the economic, social and cultural development of society. In this study, the theory of social representations was used considering its significance in explaining the culture of consumption through the social construction of social beliefs and perceptions. The French sociologist, Emile Durkheim, laid the foundations of the social representations concept at the end of the nineteenth century, but it became more prominent with Serge Moscovici who saw it as 'an approach to a social trend' in the 1960s. Representations are defined as a set of shared opinions and collective or social ideas that establish a common understanding and behavior among community members regarding a particular trend or topic.

Methodology of the study

The study used the mixed approach (quantitative and qualitative) in collecting and analyzing data. The quantitative analysis of social perceptions of luxury consumption was based on the free association technique, which is built on asking respondents open-ended questions about the five most important words or phrases that describe their attitudes and feelings towards luxury goods. The use of the free association method in the study of social representations dates back to the central core theory of Abric (1994). Whereas, the qualitative data on participants' opinions and attitudes towards luxury consumption were analyzed through the content analysis method.

Study Results

The study found that there is consensus among respondents that luxury consumption is a relatively recent phenomenon in the Qatari society that prevailed by the emergence of digital advertising and technology, especially the rise in per capita income in the past two decades. The study also found that adolescent groups are more interested in luxury brands and that women, according to some respondents, are higher in consuming more products compared to men. There are a set of variables that affect the pattern of luxury consumption in the Qatari society, such as what is known as "the booming" or "the wave", in addition to personal bragging and the desire for social prestige.

The results of the free association method showed that the representations of the Qatari society regarding luxury consumption revolved around "brands and luxuries". By dividing the total sample into subgroups (females and males) and (employees and students), we understood that there is a similarity between these groups that they have defined luxury goods as luxuries and means of entertainment and amusement. The study also found that there are no fundamental differences in the centrality and periphery of representations depending on age, educational level or household size. The study concluded that despite the spread of the phenomenon of luxury consumption as a result of some circumstances, there is almost a consensus that it is a negative behavior, which calls for combating the same through the cultural/ religious values and references of individuals.

Recommendations

The most important recommendations of the study are the following:

- Urging members of society to rationalize their spending and encourage them to adopt a productive behavior, by promoting investment and directing funds to productive sectors.
- Raising society awareness, especially the new generation, regarding the risks of conspicuous consumption and the relevant consequences.
- Urging parents to assume their responsibilities in raising their children, teaching them a sense of discipline and responsible choice, and achieving the basic needs of the family, before thinking about offering any luxury goods/ services.
- Promoting the spirit of productive investment competition and avoiding social temptations that feeds a competition of irrational consumption.
- Promoting the role of educational, cultural and religious institutions in rationalizing and controlling consumer behavior, by focusing on the value aspect related to the prevention of extravagance and misspending, and urging moderation, contentment and moderation.
- Strengthening patriotism, especially among adolescents and women, and refusing to associate the Qatari society with negative qualities, such as excessive consumption, extravagance and excessive generosity.

***The full version of the study is accepted for publication in the Journal of Social Sciences at Kuwait University.**

Strategies for Managing Return Water from Discharging Cool Water Blowdown (CWBD):

A Joint Research Project between Qatar University and the Ministry of Municipality

Prof. Fares AlMomani, **Professor of Chemical Engineering,**
Prof. Fadwa Tahra ElJack, **Professor of Chemical Engineering,**
College of Engineering – Qatar University

District Cooling is a widely used process that delivers chilled water from a central plant to buildings to satisfy their cooling needs. As such, it is an efficient method of replacing the need to have separate individual cooling units in each building. Typically, District Cooling is suitable for large-scale, high-density developments e.g. residential/ commercial communities, airports, universities' campuses, etc.

The use of Treated Sewage Effluent (TSE) in District Cooling processes is now mandated by the state of Qatar and supported by all affected entities, including Ashghal, Kahramaa, Ministry of Municipality (Urban Planning and Environment Sectors) and the District Cooling operators. This unanimous support stems from the advantages associated with using TSE in District Cooling, including the cheaper cost of TSE compared to desalinated water and the associated savings for water/energy producers. Yet, there is a need to understand what to do with the resulting effluent water from DC facilities, mainly known as water blowdown (CWBD).

The Ministry of Municipality and Qatar University collaborated on a project to answer these questions. The study was completed in 2022 and was titled: "Investigate the Effect of Discharging Cool Water Blowdown (CWBD) on Wastewater Treatment Plant (WWTP), Groundwater and Surface Water." The project scope included (1) Identifying the chemical compounds that exist in CWBD and verifying if they are biodegradable, (2) studying the fate and transport of CWBD pollutants in the seawater taking into consideration the effect on aquatic life and (3) provide recommendation for a holistic CWBD Management Strategy.

Chemical analysis, lab-scale testing, simulation and modeling showed that mixing CWBD with these water bodies has no long/short effect on the quality of water. A CWBD dilution effect study showed that higher CWBD by volume percentage in the outfall would help in diluting the contaminants that are coming from other upstream sources to the outfall (Figure 1).

Real wastewater influent samples from WWTP were used in lab scale testing and for the calibration of the Simulation GPXS models. In addition, in the lab scale testing, we used real influent, real biomass from the WWTP reactors and the same hydraulic retention time. This represents the exact unit operation for the studied treatment processes.

The results of the study indicated most of the water quality parameters and characterization of TSE and the generated CWBD are within the typical values of the required influent limits of the WWTP. Although it was observed that there was extremely high variation in COD values their effect on the treatment process is minimal.

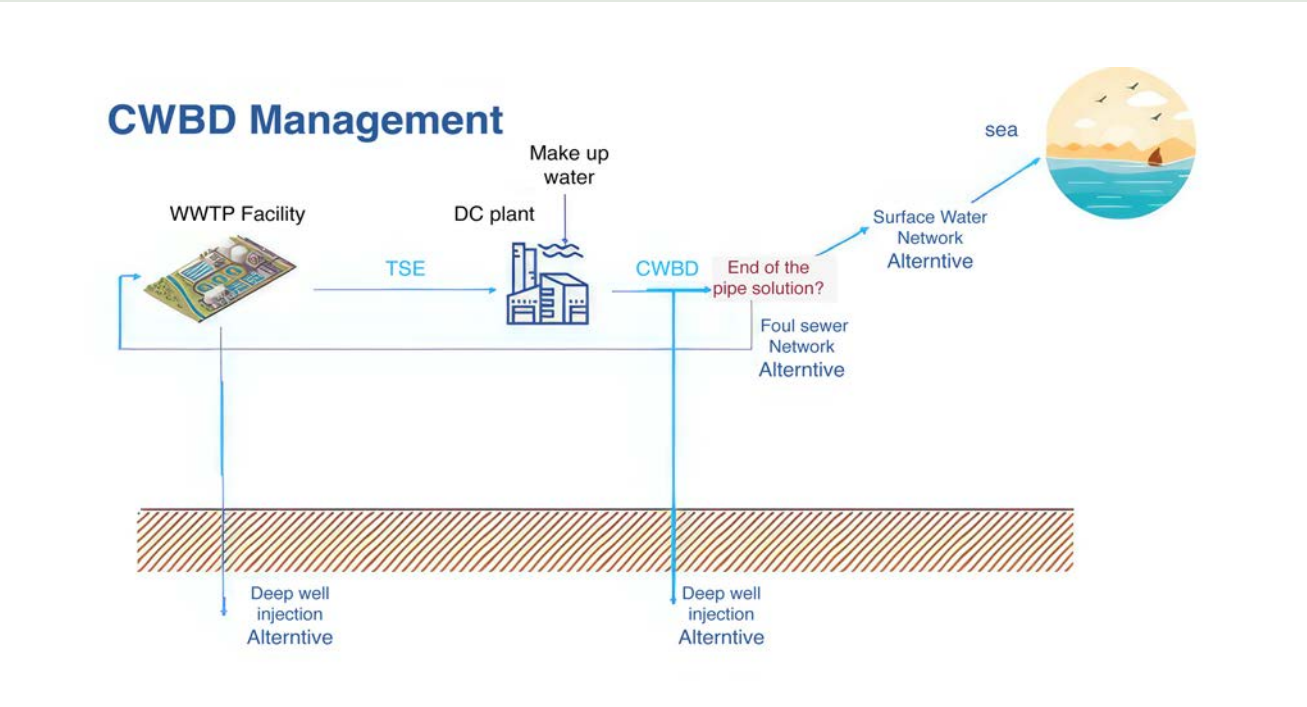


Figure 1. CWBD Proposed management strategies.

The additives used by district cooling plants to protect their cooling tower systems only increase the CWBD conductivity and alkalinity. It was observed that these additives are soluble in water and produce only ions, actions, and biodegradable organic content that can be easily removed in the biological process within the WWTP (Figure 2).

The short/long-term treatability results confirmed that the biodegradability index of a water solution consisting of up to 20 v/v % of CWBD with influent WW does not alter the biodegradability of the wastewater suggesting that even with such a high mixing ratio the biodegradability is still high and will not affect the biological treatment in the WWTP (Figure 3).

Understanding the impact of contaminants associated with cooling water blowdown discharge (CWBD) on marine life is important. The project here studied the fate and transport of the contaminants in the stream of the CWBD by using water quality modeling software to evaluate the long-term impact of such contaminants on aquatic life. The WASP8 model was used to predict the daily variations of nutrients, including nitrate, phosphate and ions; including chloride, bromide, sulfate, magnesium, calcium and sulfide. Two simulation cases were developed: (1) considering the characteristics of actual outfall and seawater and (2) considering only CWBD in the outfall as the worst-case scenario. In addition, sensitivity analysis was conducted on CWBD concentration and discharge rate in the outfall. The model developed for estimating the decay was based on real biodegradability parameters that were tested in the lab. The characterization data of real outfall discharge and CWBD samples were used as input into the model.

Prof. Fadwa Tahra ElJack and Prof. Fares AlMomani

Analysis of the outfall discharge suggests that the overall condition of the seawater is within the tolerable range because the contaminants are readily dispersed. Similarly, modeling of only CWBD being discharged at the surface water outfall suggests that CWBD water contaminants can readily dissipate within a reasonable timeframe

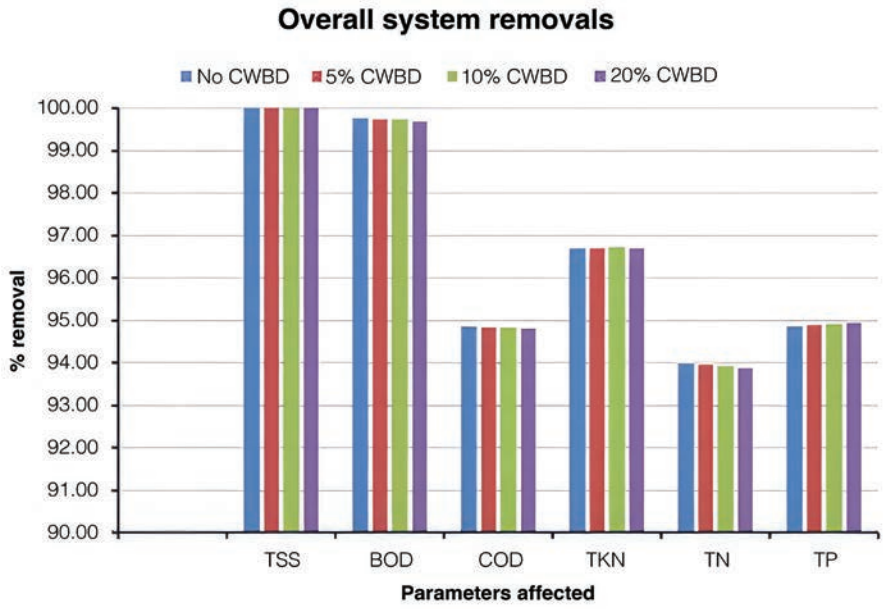


Figure 2. Overall system removals with no CWBD, 5%, 10% and 20% CWBD.

for all observed contaminants (mostly within 2-3 years). Even if the quantity of contaminants quadruples or the outfall flow rate increases by 30 percent, the seawater will be able to dissipate the contaminants and their fate is less than 2-3 years. Based on seawater modeling and historical data of water outfall to surface water, DC plants should be permitted to discharge to surface water for the purpose of overall dilution effect for the contaminants that are coming from other upstream sources.

Nonetheless, as the sea is a natural sink, an important source of water, and a habitat for flora and animals, it is prudent to contaminate it cautiously, even if there are no adverse impacts. The research team at QU suggests considering the sea as a last resort for the release of CWBD water.

The key findings and outcomes of the study are as follows:

1. **Water Quality**: The study confirmed that most water quality parameters and characteristics of TSE and CWBD met the required influent limits for wastewater treatment plants (WWTP).
2. **Biodegradability**: The study showed that even at high mixing ratios of up to 20% CWBD with influent wastewater, the biodegradability of the wastewater remained high and did not adversely affect the biological treatment process in the WWTP.
3. **Environmental Impact**: The research examined the fate and transport of CWBD contaminants in seawater, considering Qatar's strict regulations for wastewater discharge. Modeling and sensitivity analysis indicated that CWBD contaminants could dissipate within a reasonable timeframe and discharging CWBD into surface water for dilution was recommended.
4. **Caution in Marine Discharge**: Despite the favorable results, the study suggested caution when discharging CWBD into the sea, considering the importance of preserving marine ecosystems and habitats.
5. **Recommendation Adoption**: In August 2023, the Ministry of Municipality adopted the study's recommendation to reuse CWBD to sustain water resources and maximize infrastructure investments in Qatar.

Overall, the study provided valuable insights into the use of TSE in District Cooling processes leading to informed decisions regarding water resource management and environmental protection in Qatar.

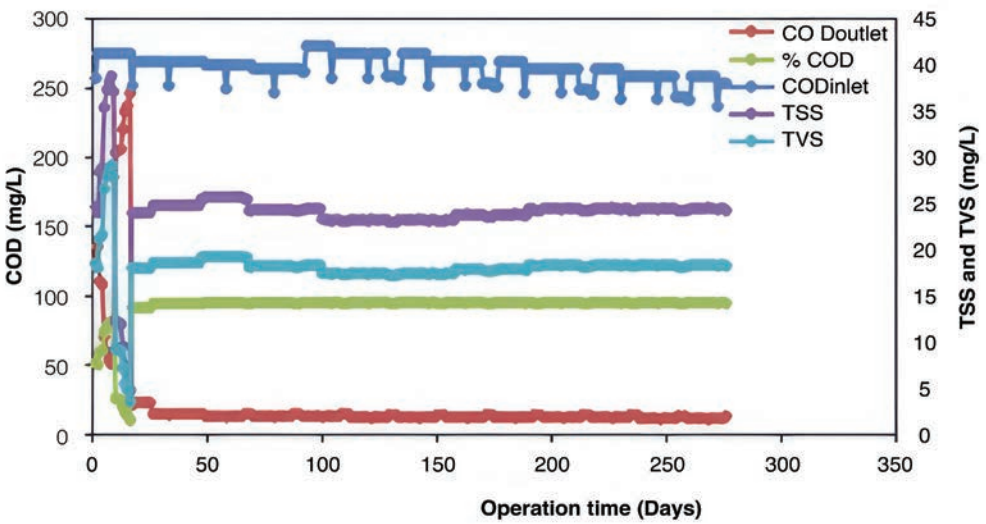


Figure 3. Performance of the ASR under extended time after mixing with 20 v/v% CWBD [DNWWTP operational conditions].

Sheikh Faisal Bin Qassim Al Thani Museum and Knowledge Economy: From Private Collections to Public Benefit

Dr. Mariam Ibrahim Al-Hammadi

Associate Professor, Humanities Department at the College of Arts and Sciences - Qatar University

Introduction

The Research discusses the contribution of investment in Humanities, Arts, cultural heritage, museums and related sectors to the Knowledge Economy. Sheikh Faisal Bin Qassim Al Thani Museum highlights the effective role of the private sector in this context since it represents a radical change in the sector that focuses on providing the public with cultural and artistic knowledge.

The research asks the question, that 'to what extent can the private or government investment in cultural heritage, antiques, arts and museums be considered a contribution to the Knowledge Economy?'

Moreover, the study explores the role of humanities and creative arts in the Knowledge Economy.

Museums as cultural institutions significantly contribute to encouraging continuous education and lifelong learning. Undoubtedly, this creates a positive environment that is not only limited to receiving knowledge but also producing it. This leads to enhancing innovation and creativity in the field of knowledge among the individuals of the society who transfer from being consumers to producers.

In this context, this research discusses how the Sheikh Faisal bin Qassim Museum enriches education, knowledge and skills to contribute to the growth of the Knowledge Economy in Qatar. The primary sources such as the Museum's environment, location and collections were analyzed to do this research.

The Future of Humanities, Arts and Culture in the Knowledge Economy

The concept of the Knowledge Economy receives a great deal of attention, especially with the continuous transformation of societies from traditional industrial economies to economies that depend on producing and spreading knowledge.

The development of Knowledge Economy policies led to a focus on giving priority to financing Higher Education and Research and the growth in the fields of Science, Technology, Engineering and Mathematics (STEM). This focus on the fields of STEM challenges the future of Humanities and specializations of Creative Arts, which leads to the question of how these specializations and their related knowledge will adapt to suit the knowledge-based economy.

The informed Knowledge Economy Policy of the Technological Economic Model definitely excludes creative arts and other humanitarian specializations because it evaluates the value of knowledge on economic foundations instead of considering it as a social commodity.

Humanities, Arts and Cultures play a great role in the Knowledge Economy. While the fields of STEM dominate discussions of the knowledge-based economy, neglecting the Humanities and Arts can have long-term consequences. These specializations enhance critical thinking, communication skills and cultural awareness. They are necessary for addressing complicated social issues. Therefore, policymakers should be aware of the value of the humanities and arts in promoting comprehensive education and the production of comprehensive knowledge.

Dr. Mariam Al-Hammadi

Qatar and its Orientations Towards Knowledge-based Economy

Qatar National Vision 2030 does not only focus on the education and research of Science, Technology, Engineering and Mathematics but also focuses on the Humanities, Culture and Arts. The Vision identifies four basic pillars to achieve sustainable development: human development, economic development, social development and environmental development. The Vision seeks to transform the State of Qatar into a developed country capable of providing a high standard of living for all the present and future citizens. This will be achieved through a diverse economy that can be expanded beyond the petrol and gas sectors. Hence, Qatar National Vision 2030 requires a knowledge-based economy with more focus on human development, in addition to increasing the role of the private sector.

Policymakers in the state of Qatar conceived the vital role of Humanities and Arts in enhancing competencies such as communication skills, critical thinking and cultural awareness that are necessary for the development of a prosperous society. Priority should be given to the development of human and cultural capital to reach an integrated society. Such a balanced focus between Science, Technology, Engineering and Mathematics on the one hand and Humanities and Arts, on the other hand, will certainly lead to long-term success for a knowledge-based economy which progresses through the value, quantity and easy access to information available to the public. Qatar National Vision 2030 acknowledges that Humanities and Arts are necessary to preserve the unique cultural heritage and national identity and that they must be promoted to build a vibrant and diverse society that appreciates lifelong learning. Therefore, the development of a knowledge-based economy that depends on the best aspects of the cultural heritage while embracing innovation and inspiration is one of the basic goals of the Vision.

Sheikh Faisal bin Qassim Museum and its Contribution to the Knowledge Economy

The Museum is built in the form of a Qatari traditional-style fort on Al Samriya Farm of Sheikh Faisal. The Museum contains objects from Sheikh Faisal's personal collection that represent different stages of his life. It is tangible

evidence of the identity of the Sheikh as a collector of antiques and a businessman who wants to contribute to spreading public awareness and knowledge on cultural materials. The collections of the Museum that were collected during his journeys around the world became available to the public for more benefit.

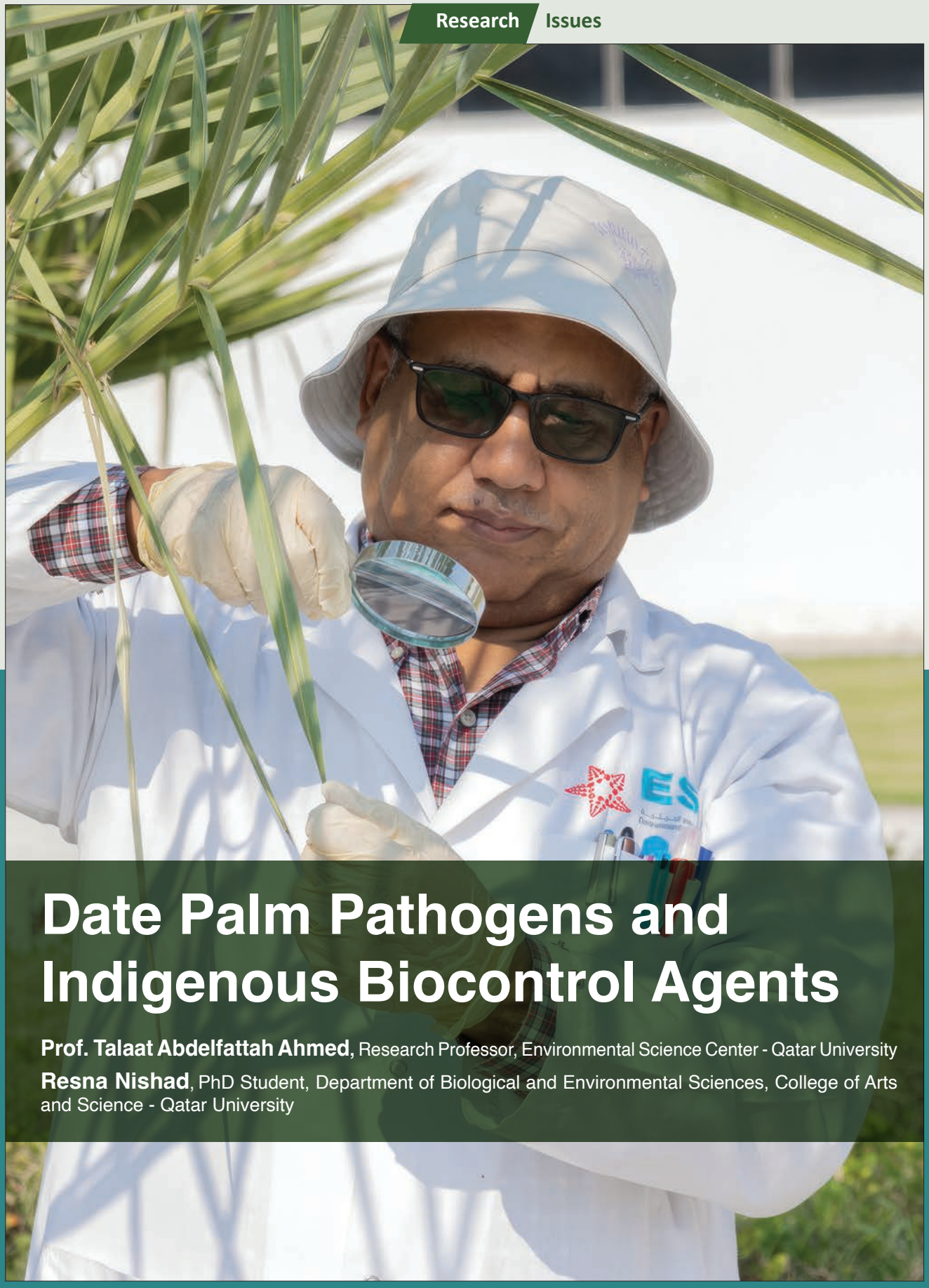
The Museum significantly contributes to the Knowledge Economy, representing a radical change in the goals and visions of private museums to preserve the cultural heritage and spread the cultural and artistic knowledge to the public. This change aligns with Qatar National Vision 2030, which emphasizes the significance of Humanities and Arts in the Knowledge Economy. Today, the Museum has become one of the iconic landmarks since it receives more than 300 thousand visitors yearly, including international guests during the events such as the FIFA World Cup 2022. It has become a symbol of the integration between Qatari and international cultures. The site of the Museum, Al Samriya, had the opportunity to host the Portuguese National Team and the Football International Federation Association members during the FIFA World Cup 2022. This trust has been established by the belief that the site provides an original Qatari heritage experience that enhances the guests' cultural knowledge. Changing the Museum from a private area to a museum for preserving antiques open to the public has transformed it into a centre for "Knowledge Democracy." It provides the public with access to international and local collections and promotes coexistence between cultures and generations (see pictures).

The Museum uses a multidisciplinary approach derived from Anthropology, History and Art, focusing on Social Museology and significantly contributing to the Knowledge Economy through its various programs and activities in research, exhibitions and education on the Qatari and international heritage. Its programs that are directed to society promote visual knowledge and critical thinking. In addition, Sheikh Faisal's support for the Educational Research Award enhances educational research and knowledge production in accordance with the educational strategy in the State of Qatar. The Museum enriches the cultural and social fabric by interacting with the local society and spreading knowledge to benefit the tourism and cultural industries sectors.

Conclusion

Investments in Humanities, cultural heritage, museums and relevant sectors significantly contribute to the Knowledge Economy by preserving the cultural identity, motivating creativity and innovation, and enhancing critical thinking and cultural awareness. Humanities and Arts are essential components of an integrated education system supporting the knowledge-based economy. To completely exploit the cultural potential, it is necessary to balance between economic and social values. This requires cooperation between policymakers, cultural practitioners and researchers to develop strategies that promote both sides. The awareness of the State of Qatar of this importance and its focus on the diversification of the economy through cultural investments are in line with international orientation towards a knowledge-based economy motivated by intellectual capital and innovation.

The displayed diversity in one of the Museum's showrooms. Objects from Asia, Africa, the Americas and Europe are displayed here to show the differences and similarities between different cultures.



Date Palm Pathogens and Indigenous Biocontrol Agents

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Resna Nishad, PhD Student, Department of Biological and Environmental Sciences, College of Arts and Science - Qatar University

Date palms, widely cultivated in arid regions for their edible fruit and medicinal properties, encompass over 5,000 recognized cultivars, but only few are used for these purposes. Thriving in harsh ecosystems, date palms constantly engage with various microorganisms, making them susceptible to diseases like Bayoud disease, Fusarium wilt, black scorch, trunk rot, root rot, foliar diseases, root diseases and false smut.

To survive in such harsh and competitive environments, constant interactions between the date palm tree and microorganisms are essential. These ongoing interactions with microorganisms can either benefit or harm the date palm, influencing its growth and disease resistance. Understanding these microorganisms is vital to identify pathogens and beneficial agents that aid plant growth and fend off infections. Research into disease-suppressive soil is crucial, as antagonistic microorganisms dwelling in the soil can help control diseases. Microbes in the rhizosphere, the soil surrounding the roots, can activate the plant's defense mechanisms and induce systemic resistance, safeguarding it from biotic threats.

Surprisingly, no comprehensive study in Qatar has explored the microbial associations with date palms, encompassing both soil and tree microorganisms. In the current study, the researchers aimed to assess fungal diversity in healthy and naturally infected date palm tissues and the surrounding soil throughout the year. Additionally, they sought to identify pathogenic, endophytic and rhizosphere-associated fungi for their potential as biocontrol agents against date palm diseases, ultimately aiming to enhance date palm health and productivity.

The researchers collected naturally infected and healthy tissues of date palm from four farms located in northern Qatar and two farms located in the southern part of Qatar. Infected plant tissues from the leaf, trunk and root were collected for the isolation of pathogenic fungi and the healthy asymptomatic leaf samples were collected for the isolation of endophytic fungi.

Each fungal isolate was identified on the basis of morphological (color of the fungal colony in different media, pattern of growth, sporulation, presence of secretion or exudates and the number of days needed for growth on different media) and microscopic (evaluation of hyphal and spore structures) characteristics. Fungus identification and confirmation were based on relevant reference illustrations.

All isolated fungi were subjected to the pathogenicity test conducted by the detached leaf assay to evaluate the pathogenicity of fungi isolated from the rhizosphere of date palms. The fungi that caused higher necrotic intensity in leaves as assessed by the detached leaf assay were selected for further pathogenicity tests on date palms in-vivo by inoculation of the rachis and leaves of 7-year-old date palms grown in large pots under greenhouse conditions (Figure 1).

Rhizosphere soil samples from healthy and naturally infected date palms were collected. Soil samples were collected during different seasons as follows: winter (December to February), spring (March to May), summer (August to September) and fall (November). In total, 15 rhizosphere soil samples were collected in each season, five samples were collected from the rhizosphere of naturally infected date palms and 10 samples were collected from the rhizosphere of healthy date palms.

Direct inoculation method and soil dilution plate method were used for fungal isolation from the soil. Fungi were categorized as pathogenic and nonpathogenic based on the results of the pathogenicity test.

All the isolated fungi from rhizosphere soil samples were subjected to the detached leaf assay to detect their pathogenicity. Endophytic fungus isolation was performed according to the method of (Arnold et al., 2000).

The pathogens that caused the necrotic lesions of the highest intensity, as assessed by the detached leaf test, were selected for ITS sequencing to confirm the species.

PCR was carried out with a Veriti thermal cycler (Applied Biosystems). The sequences obtained with an average length of 550 bp were analyzed in the NCBI database by BLASTn. ITS rDNA sequences showing >98% identity with the sequence in NCBI database were considered the same species.

After detailed analysis of fungal combination present in rhizosphere soil and plant tissues from infected and healthy date palm trees, some fungal species were characterized based on their antagonistic activity against other fungal species.

Different types of fungal interactions between antagonistic fungi and pathogenic fungi were assessed to determine whether any clear inhibition zone was present.

The study in Qatari survey of pathogenic fungi, rhizosphere fungi, and endophytic fungi associated with date palm showed that the highest number of fungal species was isolated in fall and spring, and pathogenic fungi were isolated mainly in spring.

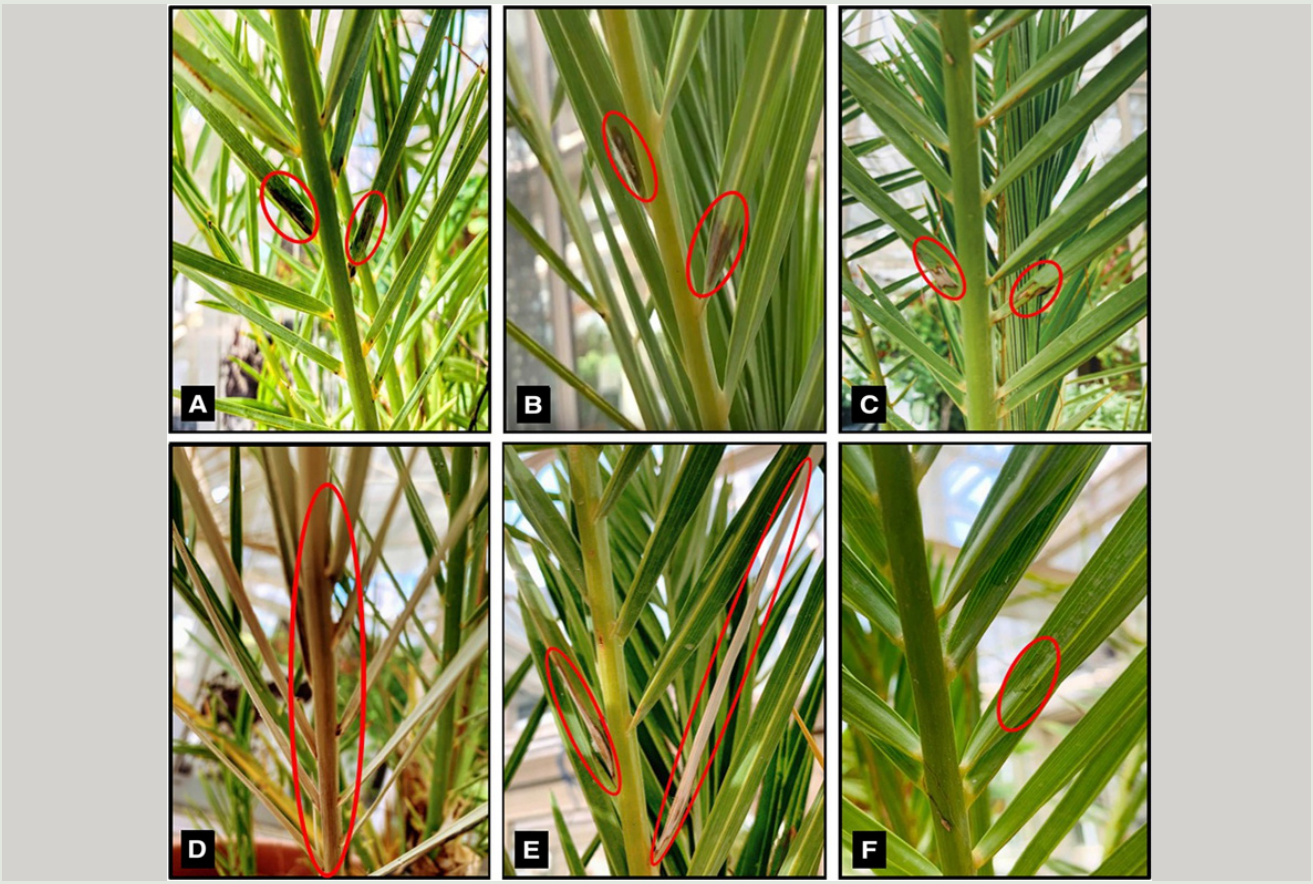

Figure 1. Pathogenicity test of *Thielaviopsis punctulata, Fusarium brachygibbosum*, and *Neodeightonia phoenicum*-inoculated on the leaves of date palms. A to C, Necrosis was observed in *T. punctulata*-inoculated leaves at 3 dpi and in *F. brachygibbosum* and *N. phoenicum*-inoculated leaves at 4 dpi. No more changes were observed in *N. phoenicum*-inoculated leaves. D, Symptoms of black scorch disease and wilting were observed in *T. punctulata*-inoculated leaves at 20 dpi. E, Leaf wilting was observed in *F. brachygibbosum*-inoculated leaves at 18 dpi. F, No necrosis was observed in mock-inoculated leaves at 4 dpi, and no more changes were observed.

This survey has resulted in identifying new fungal pathogens for date palm in Qatar, such as date palm wilt-causing *Fusarium brachygibbosum* and *F. equiseti*, diplodia- causing *Neodeightonia phoenicum* and trunk rot-causing *Thielaviopsis punctulata*, which was identified as the cause of root rot.

In addition, The study successfully conducted in-vitro assessment of endophytic and rhizosphere fungi for their biocontrol traits against the pathogenic fungi. The researchers were particularly interested in fungal pathogen distribution in Qatar. However, considering the similar climatic conditions in nearby countries, the pathogen outbreak may affect the other countries too. Of the rhizosphere fungi, *T. harzianum* and *T. longibrachiatum* proved to be effective antagonists of date palm pathogens and the endophyte *U. chartarum* was an effective antagonist against *Thielaviopsis punctulata.* Pathogenicity test of *Thielaviopsis punctulata, Fusarium brachygibbosum* and *Neodeightonia phoenicum* inoculated on the leaves of date palms. A to C, Necrosis was observed in *T. punctulata*-inoculated leaves at 3 dpi and in *F. brachygibbosum* and *N. phoenicum*-inoculated leaves at 4 dpi. No more changes were observed in *N. phoenicum* inoculated leaves. D, Symptoms of black scorch disease and wilting were observed in *T. punctulata*-inoculated leaves at 20 dpi. E, Leaf wilting was observed in *F. brachygibbosum*-inoculated leaves at 18 dpi. F. No necrosis was observed in mock-inoculated leaves at 4 dpi, and no more changes were observed (Figure 1).

The endophytic red yeast *R. marina* acted as an antagonist against *P. expansum*, which causes postharvest spoilage of fruits; because the application of biocontrol agents in date palm fields is not reported, the extensive climate-based study is needed to elucidate the time and amount of application of biocontrol agents in date palm fields. It would be interesting to test these biocontrol agents in date palm plantations in different seasons for controlling date palm diseases.

Funding: This study was funded by Qatar National Research Fund (a member of Qatar foundation) GSRA grant GSRA2-1-0608-14021. The findings achieved herein are solely the responsibility of the authors.

SESRI Launches a New National Study on Consumption Values, Behaviour and Spending Preferences in Qatar

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Prof. Kaltham Al-Ghanim, PI, Director of SESRI,
Dr. Muhammad Rashid Memon, PI, Research Assistant Professor,
Social and Economic Survey Research Institute (SESRI) - Qatar University

Prof. Arokiasamy Perianayagam and Dr. Muhammad Rashid Memon

Qatar has made exceptional progress in economy, international trade, architectural development, state of the art infrastructural development and public services provision. The nation is experiencing unprecedented economic growth and consequent transformation in social values and consumption behaviour. Qatar's economic prosperity is expected to amplify the country's social and political transformation and global integration. In addition, globalization has brought significant changes in consumption behaviour and patterns across the world including higher demand for innovative products and services especially in high-income countries like Qatar. At the micro level, consumption behaviour changes are attributable to an individual's changing incomes, relative prices, tastes and preferences, hedonistic and cultural value systems. At the macro level, such changes occur because of structural shifts in the social and physical environment. Together these factors shape individual consumption values and preferences as well as national consumption trends and patterns.

Behavioural Economic Theories pioneered by Amos Tversky and Noble Laureate Daniel Kahneman and developed further by Nobel laureate Richard Thaler provide a rich framework for understanding decision-making (including decisions relevant to consumption) that went beyond 'rationality' as presented in traditional economic models of the time. They are also useful for developing interventions and strategies that facilitate behavioural transformations including consumption behaviour. Behavioural economic theories rest on bounded rationality, self-interest, will power, risk aversion and mental accounting. In behavioural economics, social values are central to people's lives, guiding behaviours and judgments. These values define who they are, why they spend money, save or under-save for future and how their decisions are rational or irrational - all of which are influenced by lifetime experiences.

In the last decade, the challenges posed by climate change have brought the notion of sustainable consumption to the forefront and the governments and policy makers worldwide have sought to use behavioural science insights to modify consumer behaviour and realize policy objectives. These endeavours often utilize 'green' nudges to gently encourage people to think about sustainability before making choices. Large-scale interventions have included incentives such as rebates on electricity consumption and price incentives. Whether incentives work better than nudges and the ethical implications of the latter remains an active area of research. However, the general thrust of the literature is clear: the efficacy of behavioural insights is vital to policy making and it is important to understand what drives consumer behaviour. Consumers in high-income circumstances engage in conspicuous consumption to signal status and prestige and display their wealth to impress others. However, global uncertainties may negatively affect consumer behaviour and discretionary spending growth. Therefore, measuring unsustainable consumption behaviour from consumers' perspective is very crucial for actionable polices.

Qatar is one of the richest countries in the world seeking to position herself as a responsible and influential nation in the global community. However, Qatar has been challenged with high levels of consumption (particularly food, water, and energy) with critical implications for sustainability. Figure 1 presents the time trends for per-capita GDP, consumption expenditure as percentage of GDP and per-capita Carbon Dioxide (CO_2) emissions. It may be noted that GDP per-capita and consumption as percentage of GDP move in opposite directions prior to 2003 and after 2012. This is consistent with the notion that residents of Qatar prefer a stable consumption expenditure: they increase the percentage consumed when income falls and decrease it when income increases. The exception is the period between 2003 and 2013 when a roughly steady percent consumed as income rises indicates an increasing level of consumption. Overall, the figure raises more questions than answers.

Figure 1 also displays a slight declining trend (note the linear trendline) in CO_2 emissions consistent with a mild response to Qatar's focus on environmental and sustainability issues. Nevertheless, these levels are among the highest in the world. This is despite the fact that environmental responsibility was a key priority in Qatar's National Vision 2030. Several initiatives reflect Qatar's commitment to this vision. For example, Qatar has been striving to designate 30% of its land and sea area as protected areas[1]. Additionally, '*Tarsheed*', the National Program for Conservation and Energy Efficiency run by the Qatar General Electricity and Water Corporation has helped reduce Qatar's carbon footprint by 0.4 million tonnes [2]. Relevant to the purpose of our work, the ministry of Environment and Climate Change has also launched a program to raise awareness of the challenges of climate action by engaging various actors in society. With the backdrop of high carbon emissions and expenditure levels independent of income, designing programs to reach different stakeholders requires a deeper understanding of what drives decision making for different people in Qatar.

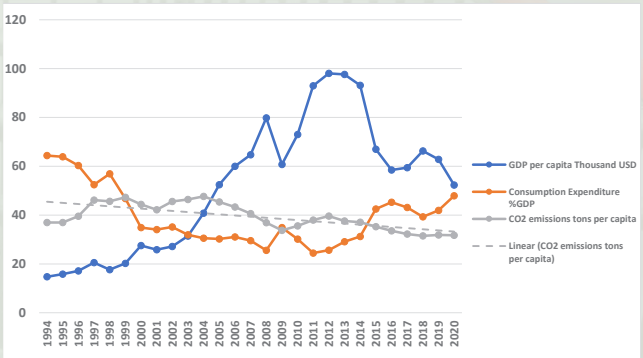


Figure 1. Trends in key economic variables and Carbon Dioxide (CO_2) Emission in Qatar, 1994-2020.

National population-based assessment of consumption values, consumer choices and spending preferences are therefore important for monitoring various dimensions of the economic, social and human well-being of Qatar's population. With the goal of assessing environmentally unsustainable consumption patterns and their impact on savings, debt and wealth creation; SESR has launched a new national study on consumption values, behaviour and spending preferences. The objective of this study is to investigate the dimensions of behavioural economics that are related to higher order choices in consumption preferences, budget planning and consumption spending, sustainability of consumer spending, appreciation of environmental issues and healthy lifestyles, economic expectations and wealth creation.

This study incorporates a national population-based household representative survey of 2000 households in Qatar. The survey adopted a multistage stratified sampling approach with a disaggregated sample size of 1000 households of Qatari nationals and 1000 households of white-collar expatriates. The study embraces a multidisciplinary approach employing multidimensional measurement scales to assess economic, socio-cultural and psychological values, as well as the environmental perceptions related to consumption behaviour. The dimensional scope of the study includes consumption values, consumption preferences, sustainable consumption behaviour, conspicuous consumption, unsustainable consumption, socially responsible purchase and disposal, economic expectations, incomes, savings and debts.

The study findings will provide benchmark measures for the policy sector including stakeholders and researchers regarding consumption values, preference and consumption behavior with comparative data of income, debts and savings, and economic well-being in Qatar. Furthermore, we will generate results linking these dimensions, according to demographic and socioeconomic characteristics. Overall, the study outcomes will help develop public policy solutions for achieving Qatar's SDG goals. Additionally, this study will help generate new data with goals that align with a) the Qatar National Development Strategy (QNDS, 2030) and b) the Qatar National Research Strategy (QNRS) mission, which seeks to advance knowledge in four fields: the social sciences, public health, environment and technology.

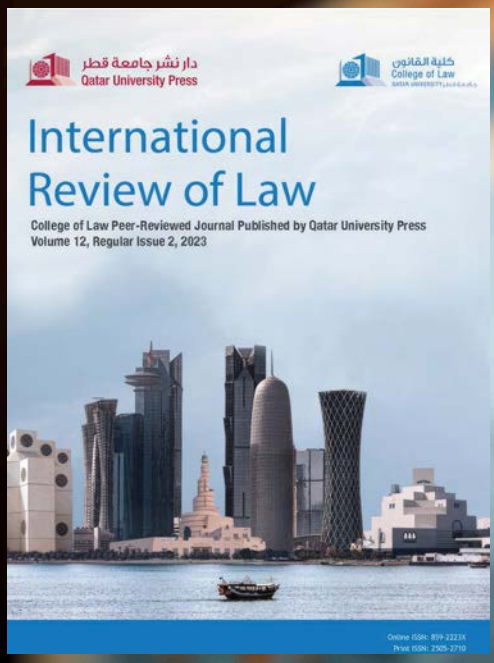
1 https://thepeninsulaqatar.com/article/23/05/2023/qatar-working-to-extend-protected-areas-in-sea

2 https://thepeninsulaqatar.com/article/23/04/2021/Tarsheed-helps-save-QR300m-during-2020#:~:text="Tarsheed%20programme%20in%202020%20reduced,Essa%20bin%20Hilal%20Al%20Kuwari

International Review of Law (IRL)

Prof. Sonia Mallek, Professor of Civil Law; IRL, Editor-in-Chief, College of Law - Qatar University

Mrs. Sabine Saad, Senior Acquisitions Editor; In-charge of Journals, Qatar University Press



Overview

The International Review of Law (IRL) is a peer-reviewed journal, published triannually by the College of Law and QU Press in Arabic, English and French. Since its establishment in 2012, IRL has been committed to fostering a contemporary legal discourse that transcends borders and cultures. The journal welcomes in-depth legal research in the field of national and comparative law in a way that enriches the Qatari legal environment and increases its international exposure and openness to comparative legal systems. IRL is concerned with research that directly intersects with law. It also focuses on publishing comparative studies between Qatari and foreign laws, as well as commentaries on legislation and court rulings. The Journal also seeks to support the Qatari legal landscape, thereby extending its international reach and openness to comparative legal systems, without restricting its scope solely to the national laws.

In addition to research related to Qatari law, IRL presents research studies in Comparative and Foreign Laws. Consequently, given its international exposure, IRL serves as a gateway through which researchers and readers are acquainted with research and studies from all over the World.

Types of Published Issues

IRL publishes two regular issues annually, scheduled for May and October. A special issue is additionally unveiled every February, featuring the research output associated with the College of Law's Annual Conference or dedicated to a specific research topic, whilst a corresponding Call for Papers is circulated in this regard. Both regular and special issues are subject to the same publishing and ethical policies, encompassing the authorship policy, writing criteria, as well as editing, review and peer-review procedures.

Research Focus and Scope

The IRL is dedicated to publishing studies related to National Laws of various countries and Comparative Legal studies with the Qatari law or with other foreign international laws in all legal specializations, such as: Civil Law, Constitutional Law, Commercial Law, Administrative Law, Public and Private International Law, as well as Emerging Laws.

The journal receives research submissions in the form of articles, theoretical and empirical research, commentaries on judicial rulings, commentaries on legislations, and high impact legal book reviews for recently published books in Arabic, English or French.

Publishing Standards

In line with Qatar University's dedication to supporting the research pillars and priorities through the provision of high-impact scientific journals the IRL has, since its inception, remained steadfast in meeting the requirements and conditions set forth by leading indexing platforms to ensure publication quality. This includes ensuring an Editorial Committee and Advisory Board that comprise of international experts with extensive scientific and research experience, esteemed authors representing various Arab universities, and referees who possess scientific and research experience and are affiliated with prominent regional universities. The IRL commits to attract top legal academic reviewers who contribute to providing detailed, specialized and research-enriched insights.

The IRL places a strong emphasis on professionalism, transparency, objectivity and expeditious peer-review processes. It maintains continuous communication with authors, adheres to publication schedules and ensures regularity in its publications.

The IRL clearly displays the publishing and ethical policies on its website, adhering to the standards set by the Committee on Publication Ethics (COPE). Furthermore, it offers a thorough technical Guide for authors, elucidating the required research level expected by the journal. This guidance serves to streamline and accelerate the publication process.

A meticulous preliminary review, conducted by the Editorial Committee before external peer review, is one of the procedures taken to ensure the quality of IRL publications. This review ensures that authors conform to the technical and structural publishing conditions and requirements, as stipulated in the Author's Guide. Additionally, to avoid the acceptance of inauthentic or duplicative research at the initial stage, articles undergo scrutiny using the iThenticate plagiarism-checking program.

In alignment with QU's vision to disseminate knowledge and science as widely as possible, the IRL embraces an open-access model. This means that its content is readily accessible to users, including institutions, without imposing any publication fees upon authors or readers.

Thus, by enhancing the production of influential legal research, the IRL aspires to ascend as a preeminent journal of legal research excellence, nationally, regionally and internationally. Its overarching goal is to promote justice and sustainable social and economic advancement.

IRL Indexing and Classification

The true value of scientific research lies in its utility and accessibility for the widest segment of readers and users. Consequently, QU Press places significant emphasis on indexing to ensure that

articles are easily discoverable and accessible to the widest segment of readers.

Therefore, QU Press has diligently undertaken the task of indexing the IRL in the Directory of Open Access Journals (DOAJ), Arab Citation and Impact Factor (Arcif), Al Mandumah, the Initiative for Open Citations (I4OC), Google Scholar, EBSCO, Crossref, Arab World Research Source, Westlaw Gulf, HeinOnline and Directory of Open Access Scholarly Resources (ROAD).

Since 2018, the IRL has met the Arcif indexing criteria, achieving a Q2 ranking.

As for the indexing in leading international platforms with more stringent application requirements, IRL is under evaluation for indexing by the "Web of Science" and plans to apply for "SCOPUS" in the near future.

The Role of QU Press in Publishing IRL

In alignment with the highest standards of publishing, QU Press assumes a pivotal role as the catalyst and supporting partner in the publication of the IRL using the University's available resources. Furthermore, QU Press ensures that the journal follows the international publishing prerequisites, thereby increasing its standing among other esteemed legal journals in order to be positioned as a preeminent and globally recognized legal research publishing platform.

To this end, QU Press assisted the IRL in developing and reviewing the IRL ethical and editorial policies and alignment with international publishing standards, especially the principles of the Committee on Publishing Ethics (COPE). Those principles set the publishing and editorial standards for all participants in the publishing process, including authors, reviewers, editors and the publisher. These principles and guidelines are being made publically and transparently accessible on IRL's website with the help of the Information Technology Services (ITS) Library Information Section, in both English and Arabic.

Moreover, QU Press helps to identify and address any gaps or deficiencies that affect the indexing of the IRL in international scientific research platforms and repositories.

QU Press assists the IRL in implementing a system for verifying that all participants' adhere to ethical standards. It also provides standardized templates and procedures to facilitate the editorial management's achievement of better quality, transparency and efficiency. Furthermore, QU Press verifies that articles and issues went through all editorial stages. It offers recommendations for continuous improvement to elevate the journal's standing as required for indexing and ranking of major platforms, including Web of Science and SCOPUS. In addition, it provides the required production support for IRL, encompassing specialized proofreading, typesetting, design and both electronic and print publication. QU Press also promotes the journal through the journals' databases, social media platforms, etc.

Additionally, QU Press periodically meets IRL's Editorial Committee to share, develop and look for ways of implementing the current and future action plans. Any commentaries received to enhance publishing, editing, marketing or production policies are shared, thereby improving overall performance and fostering readiness for international indexing and ranking.

Lastly, QU Press organizes a minimum of two open workshops annually, specifically tailored for the Arabic-speaking research community. These workshops aim to highlight and elucidate the significance of adhering to ethical standards.

IRL Issues Overview

Since its inception in 2012, the IRL has published over 300 scholarly/scientific articles, featuring contributions from esteemed local and international legal researchers and experts.

Among its publications is Volume 11, released in 2022: This volume displayed a special issue of the College of Law's Conference on "Legal Aid: Means and Challenges." This conference took place on 21-22 March 2022, in collaboration with the United Nations Office on Drugs and Crime (UNODC) and drew participation from an array of researchers from universities and research centers spanning the globe. The issue is available on the following link: https://journals.qu.edu.qa/index.php/IRL/issue/view/201

The first regular issue of 2023 was issued and made available on the following link: https://journals.qu.edu.qa/index.php/IRL/issue/view/202

Within the pages of this latest issue of IRL, readers can encounter a diverse array of articles authored by researchers who consider IRL as an open scientific platform that helps them reach the largest number of readers and as an international journal open to comparative laws. As usual, this issue is characterized by the richness of research across a spectrum of scientific subjects, as well as the geographical diversity of its contributing researchers.

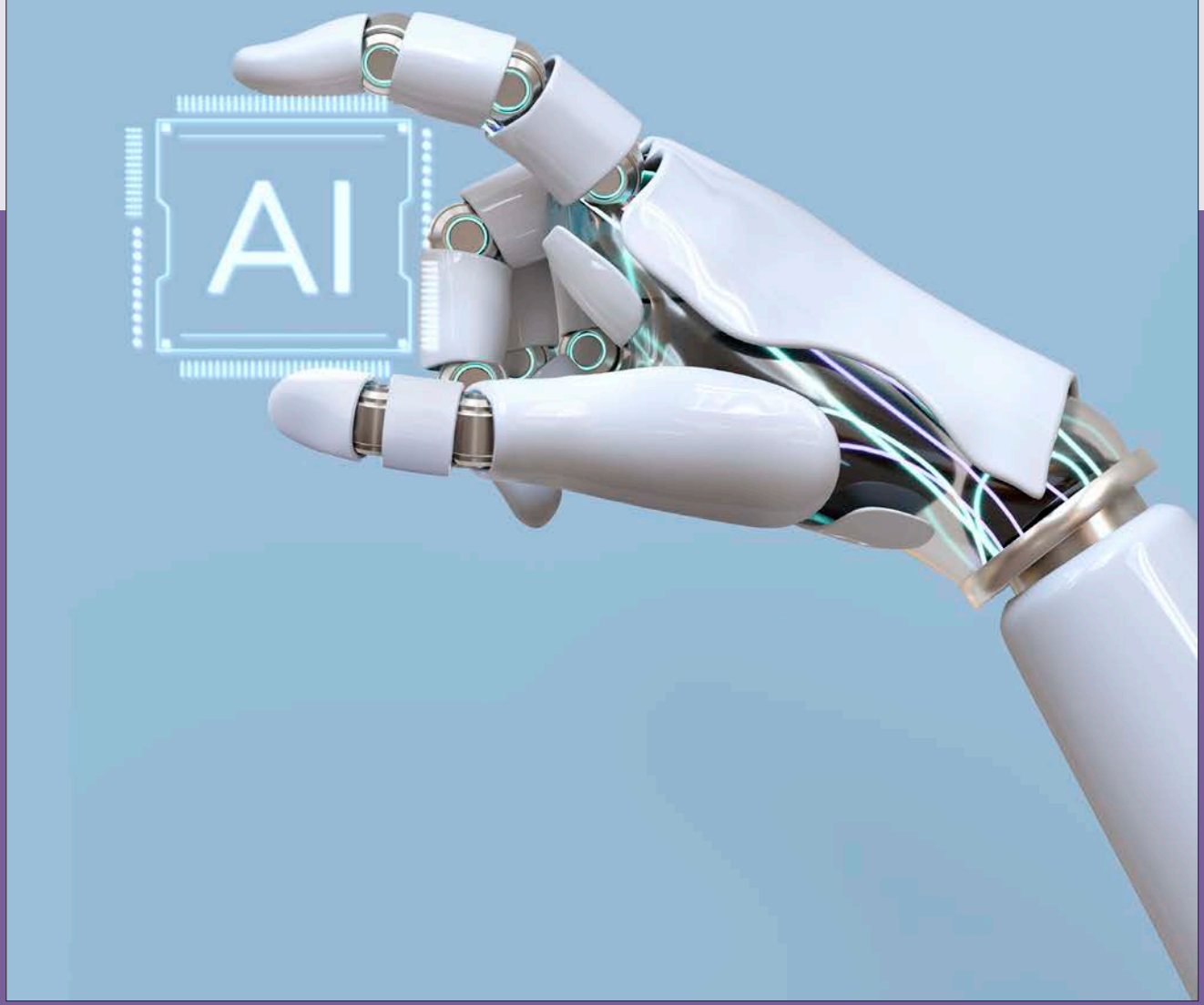
Submission Guidelines

Individuals interested in submitting their research for publication, shall sign-up on IRL's Website or send their publication request to the following e-mail: LawJournal@qu.edu.qa

Artificial Intelligence and Islamic Ethics: A Path to Pro-social Technology

Prof. Junaid Qadir

Professor of Computer Engineering, College of Engineering - Qatar University



Advancements in Artificial Intelligence (AI) have sparked a profound revolution in our daily lives, bolstering online search capabilities, driving e-commerce, providing personalized recommendations and enabling captivating conversational search and dialogue through advanced generative AI tools like ChatGPT. AI's ability to process data, recognize patterns and make predictions offers numerous opportunities that can enable human flourishing and social welfare. However, the potency of AI also carries significant risks. AI can be used by malicious actors to further their anti-social goals. Extensive data collection also raises thorny privacy dilemmas. AI can be used by commercial entities to manipulate user behavior intentionally or inadvertently in the pursuit of profits. There are also concerns that increased automation through AI will lead to job displacement affecting millions of families. This begs the question: how should we design and use such technologies? Are AI designers and engineers responsible for how their technology will be used?

Philosophers have posited three perspectives when examining the morality and ethics of technology. *Instrumentalism* posits that technologies are neutral tools, shifting the onus of moral judgment from designers and engineers to users and their context. *Determinism*, in contrast, acknowledges that technology's features can direct human behavior and thinking in predictable ways, asserting that technology is not entirely neutral, and that it promotes specific behaviors and mindsets. Finally, *Co-evolution* posits that technology and humans evolve together, mutually influencing one another through complex feedback loops. It is now being widely accepted that technology is not morally neutral, and in contrast to instrumentalism, determinism and co-evolution more accurately capture the intricate interplay between humans and technology.

In such settings, it becomes crucial for AI designers and engineers to accept moral responsibility for their AI artifacts. It becomes essential that ethical questions related to technology's practical use be examined including its potential consequences and impact on various stakeholders, like what purpose the technology is used for. Does it enhance human well-being or merely exploit individuals for corporate profit? Will the AI technology exacerbate or alleviate inequality? Does it promote human rights, or does it dehumanize people as means to some end?

The AI community recognizes the significance of these questions, particularly in the wake of observed negative implications of technology. Numerous AI ethics' codes have resultantly emerged. While many of these codes emphasize principles like transparency, fairness, non-maleficence, responsibility, explicability and privacy, implementing ethical AI has proven challenging. A key obstacle is the absence of a comprehensive systemic framework that encompasses not only principles but also laws, policies and a governance system for enforcement.

Another significant issue is the lack of diversity in this discourse, with many ethical codes rooted in Western ideals and limited engagement with the Islamic and Arabic communities. The IHSAN Lab at Qatar University, led by Prof. Dr. Junaid Qadir, is focusing on the design and development of robust ethical pro-social AI technology that is designed for the welfare of humanity in a multiplex manner that takes guidance from the Islamic worldview and accepts revelation as a source of moral guidance. Since AI technology is baked into all facets of human experience in the modern society, it intimately affects human thoughts and actions. We believe that Muslim stakeholders should proactively participate in the co-creation and co-designing of AI technologies so that these technologies do not become colonizing or misaligned with our value systems.

Our team has made pioneering contributions in the study of ethical AI keeping in view of the Islamic worldview. A team lead by Prof. Junaid Qadir organized the First Conference on Islamic Ethics and Artificial Intelligence (IEAI) in December 2021 (https://www.islamicaiethics.info/). In 2022, a collaborative multidisciplinary team from Qatar University lead by Prof. Junaid Qadir, including Prof. Khaled Shaban, Dr. Osama Halabi and Dr. Abdulaziz Khalid Al-Ali from the College of Engineering, along with Dr. Ezieddin Elmahjub of College of Law; were awarded the QU High Impact Grant for their proposed study, "Towards Robust Ethical and Pro-Social Artificial Intelligence Enabled Extended Reality (AI-XR) Metaverse Applications."

Recently, Dr. Ezieddin Elmahjub and Prof. Junaid Qadir studied the question of how the crash algorithms of self-driving cars (controlled by AI) should be programmed. When AI algorithms take the wheel, they must be programmed not only to keep the car on track but also to avoid pedestrian

Prof. Junaid Qadir

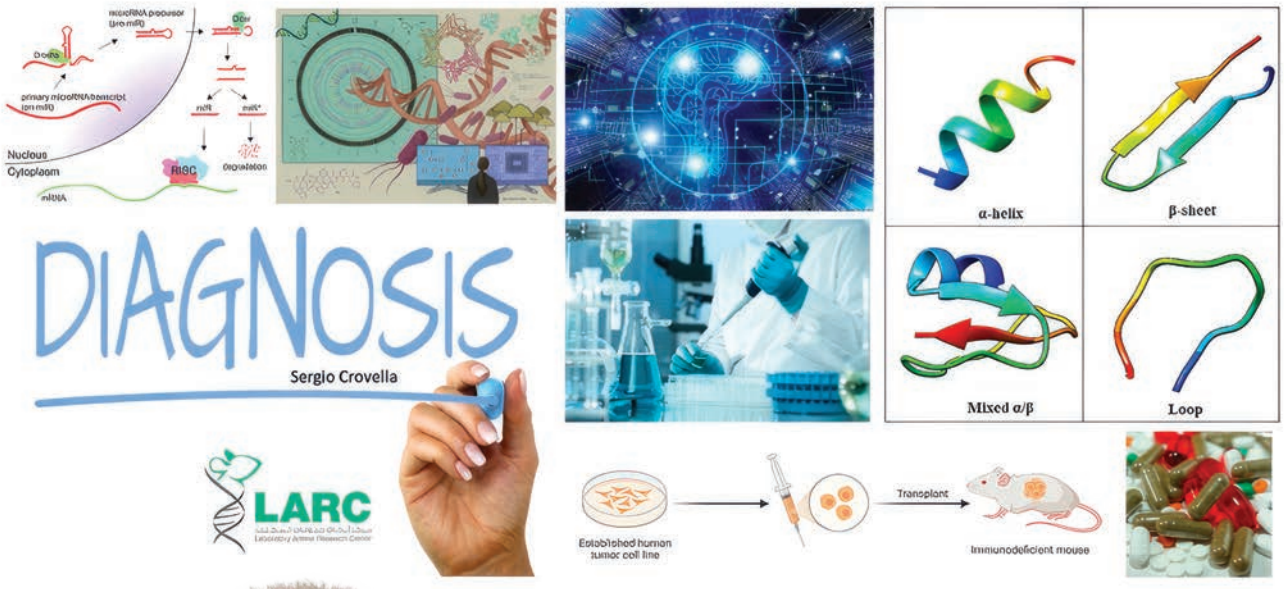
collisions. If crashes in such cases are inevitable, AI algorithms may even have to face the so-called "trolley problems," and contemplate actions that will have a bearing on the lives of people. A number of ethical questions arise: Should these decisions be taken randomly? Should utilitarian principles or deontological principles be followed? Should such decisions be pre-programed? Is there a single rule that should always apply, or can there be exceptions? In the paper "*How to program autonomous vehicle (AV) crash algorithms: an Islamic ethical perspective*" published in Emerald Journal of Information, Communication and Ethics in Society (JICES) in August 2023, the authors provided striking examples and passages from scholars such as al-Ghazāli, al-Shātibi, and al-ʿIzz ibn ʿAbd al-Salām for guidance from Islamic ethics on such issues.

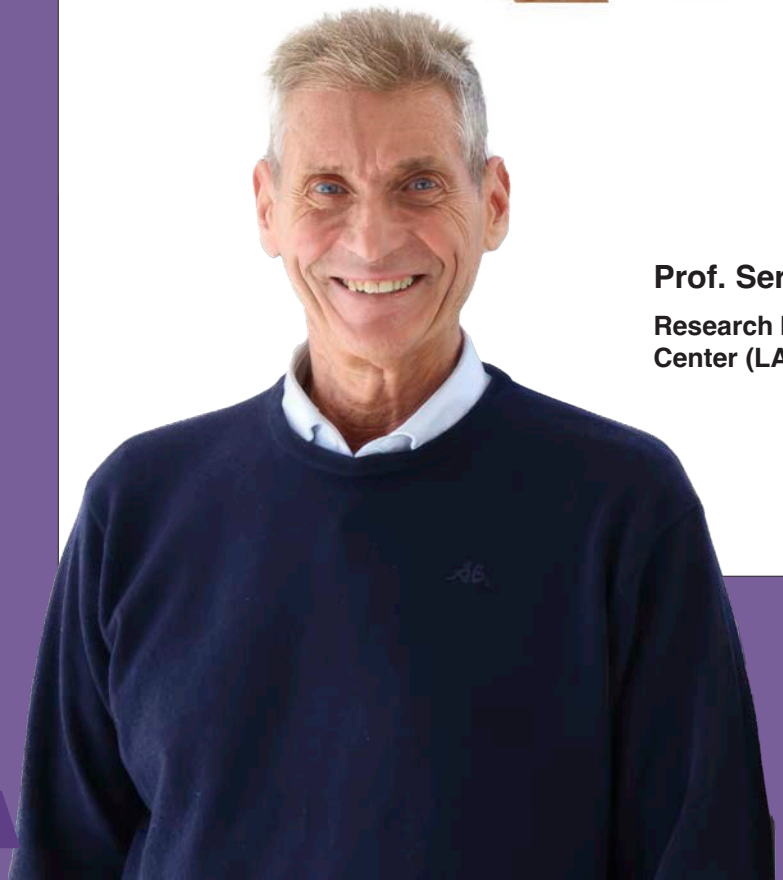
The work of the group has also caught global attention. Prof. Junaid Qadir has been interviewed by various international organizations and media outlets including the Los Angeles Time, the Australian Broadcasting Corporation (ABC) Radio, the Templeton World Charity Foundation, WIRED UK and MIT Technology Review. Prof. Junaid Qadir has given talks on this area at various fora including events organized by the College of Islamic Legislation and Ethics at Hamad Bin Khalifa University and the Lorentz Institute at Leiden University. Recently, a paper co-authored by Prof. Junaid Qadir titled, "*Toward accountable human-centered AI: rationale and promising directions*", was published in the Emerald JICES in 2022, won the Outstanding Paper Award in the 2023 Emerald Literati Awards.

These accomplishments and accolades underscore the significant contributions made by QU researchers in the field of Ethical AI, furthering the development of robust pro-social AI that aligns with the principles of the Islamic worldview and fosters human well-being and prosperity.

Revolutionizing Cancer Diagnosis and Treatment:

Harnessing Peptide-based Approaches in Vitro and in Vivo





Prof. Sergio Crovella

Research Professor, Laboratory Animal Research Center (LARC) - Qatar University

Cancer Detection and Treatment: A Paradigm Shift

In the relentless pursuit of effective cancer therapies, novel strategies are emerging at the forefront. One such trailblazing avenue involves the utilization of peptides for both early diagnosis and treatment of cancer. Peptides, short sequences of amino acids, hold immense potential to selectively target cancer cells, presenting a beacon of hope for precision medicine. The fusion of computational methods, experimental validation, and in vivo studies propels this approach into a promising realm.

Computational Precision in Peptide Discovery

The fusion of computational power and molecular insight has given rise to innovative paths in cancer research. Computational methods are orchestrating the identification and design of anticancer peptides with unparalleled precision. In silico, sequence-based strategies harness machine-learning algorithms, deciphering patterns to predict novel anticancer candidates. Structure-based techniques delve into 3D peptide-protein interactions, refining designs for enhanced efficacy. The culmination of these approaches, the hybrid strategy, synergizes sequence and structure information to yield peptides with refined specificity and binding affinity.

Early Cancer diagnosis and microRNA detection

Advancements in the fields of molecular biology, computational modeling and biosensor technology have paved the way for promising approaches in cancer diagnostics and therapeutics, particularly centered around tumor-specific circulating microRNAs (miRNAs). These miRNAs, released by tumor cells into the bloodstream, hold immense potential as non-invasive biomarkers for early cancer detection and targeted interventions. Tumor cells release miRNAs into the bloodstream, providing a unique opportunity for non-invasive monitoring of cancer-related molecular changes. These miRNAs are stable, resistant to degradation and exhibit distinct expression patterns in various cancer types. This has spurred interest in harnessing their diagnostic potential, as altered miRNA profiles can serve as fingerprints for different cancers. However, effectively capturing and profiling these elusive molecules requires innovative tools.

Computational-Based Peptide Design for miRNA Capture

The advent of computational biology has revolutionized the field of peptide design by enabling the prediction of binding interactions between molecules. In the context of miRNA capture, computational approaches play a pivotal role in designing peptides with high affinity and specificity for target miRNAs. These peptides, often termed "miRNA-specific capturing peptides," are engineered to recognize and bind to specific miRNA sequences. Sequence-based algorithms analyze known miRNA-mRNA interactions, secondary structures and thermodynamic properties to predict potential binding sites. Structure-based methods employ molecular docking simulations and molecular dynamics to explore the dynamic interactions between miRNAs and peptides. These computational strategies allow for the exploration of a vast sequence space, facilitating the identification of peptide candidates with optimal binding properties to perform a rapid and early diagnosis of tumors.

Cancer treatment by developing experimental strategies based on anti-cancer peptides

Anticancer peptides are short amino acid sequences with the potential to selectively target and disrupt cancer cells, while sparing normal cells. Computational methods have emerged as indispensable tools in the quest for these peptides, offering the ability to efficiently screen large datasets and predict potential candidates.

Computational Methods for Anticancer Peptide Discovery

Sequence-Based Approaches: These methods leverage the sequence information of known anticancer peptides to predict new candidates. Machine learning algorithms, such as Support Vector Machines (SVM), Random Forest and Neural Networks, are trained on features extracted from sequences to classify peptides as either anticancer or non-anticancer. These

models then predict the anticancer potential of new peptide sequences. Additionally, databases of experimentally validated anticancer peptides provide a foundation for pattern recognition and sequence motif analysis to guide the design of novel peptides.

Structure-Based Approaches: These methods focus on the 3D structures of peptides and their interactions with cancer-related biomolecules. Molecular docking simulations predict the binding affinity between peptides and cancer-associated proteins. Molecular dynamics simulations offer insights into the stability and dynamics of peptide-protein complexes, aiding in the refinement of peptide designs. The integration of structural information enhances the accuracy of predictions and allows for rational peptide engineering.

Hybrid Approaches: Integrating both sequence and structure information further refines the prediction accuracy. Hybrid methods leverage the strengths of sequence-based and structure-based approaches to provide a comprehensive view of peptide interactions with cancer cells. This synergy aids in identifying peptides with enhanced specificity and binding affinity.

From Bench to Bedside: In Vitro Exploration

Computational predictions propel peptides into the laboratory, where their anticancer prowess is scrutinized in vitro. These predicted warriors are synthesized and subjected to rigorous testing against cancer cell lines. Inhibition of proliferation, induction of apoptosis and disruption of cancer pathways are evaluated, validating computational forecasts. This phase bridges theory and practice, marking the proof of concept that sets the stage for further advancements.

In Vivo Validation: The Crucial Interlude

The journey from laboratory validation to clinical transformation necessitates a vital intermediary – in vivo validation. Mouse models, intricately designed to mimic human conditions, inject realism into the equation. These models assess peptide behavior within living organisms, unfurling biodistribution patterns and gauging systemic responses. Vital questions of safety, efficacy and off-target effects are answered, enabling informed progress towards clinical translation.

Overcoming Challenges, Illuminating Futures

The path to peptide-based revolution is not without hurdles. Accurate prediction of peptide-cell interactions, intricate due to cancer's multifaceted nature, remains a formidable challenge. Furthermore, aligning mouse models with human responses requires meticulous consideration.

The Synergy of Innovation: Bridging Bench and Bedside

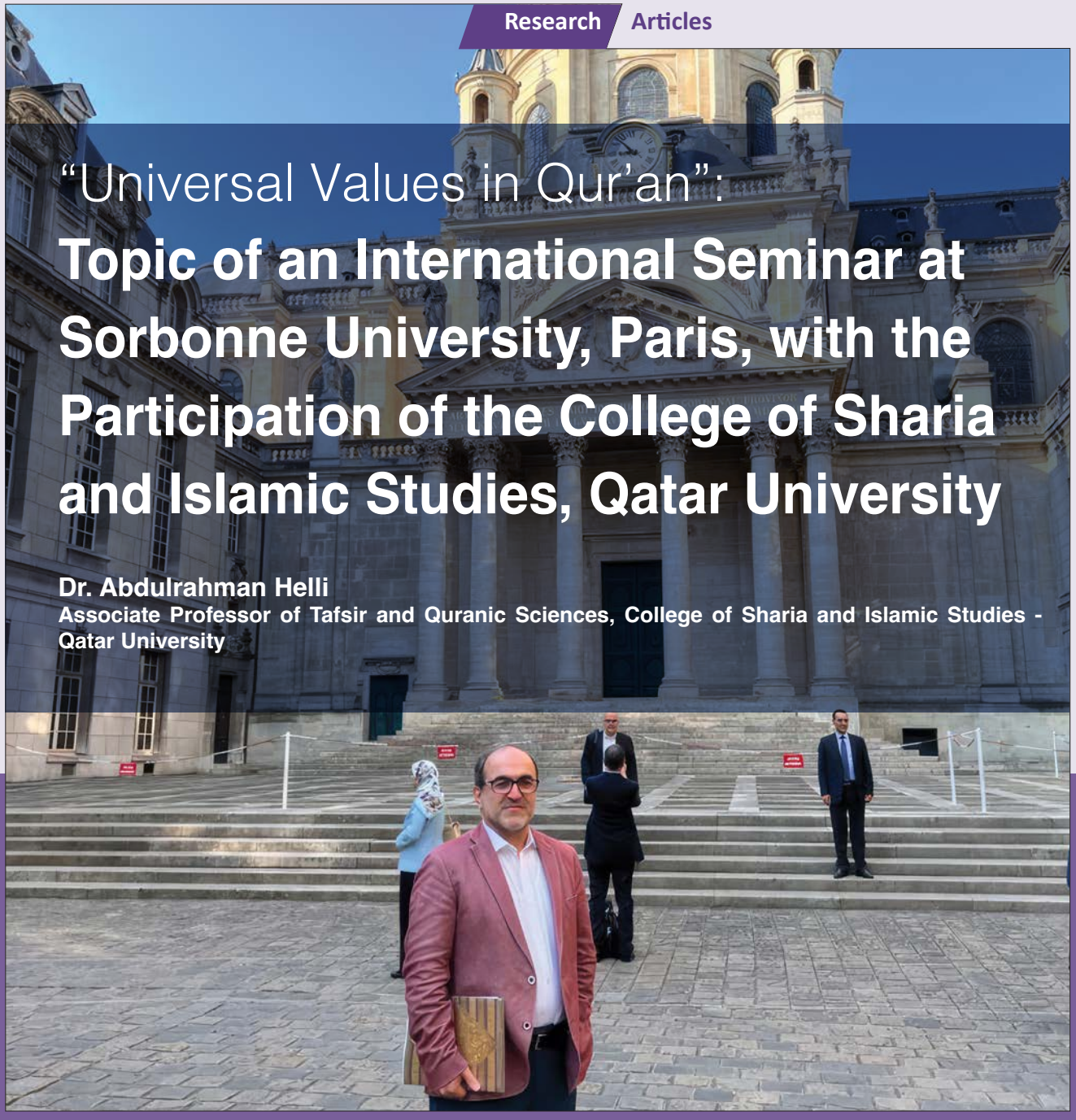
The interplay between computational design, experimental validation and in vivo insight is the fulcrum of translational success. As peptides transition from computers to clinics, their behavior within living organisms solidifies their place in the armamentarium of cancer therapeutics. This synergy converges experts from diverse disciplines – computational biologists, bioengineers, molecular biologists and clinicians – each a protagonist in this transformative journey.

Unveiling Precision Cancer Therapeutics

In conclusion, the symbiotic blend of computational acumen and experimental exploration heralds a new dawn in cancer management. Peptide-based approaches stand as a testament to the limitless potential of interdisciplinary collaboration. Through meticulous computational design, meticulous laboratory validation and rigorous in vivo testing, the realm of personalized cancer diagnostics and therapeutics inches closer to reality. The conquest of cancer may find its flag bearer in the fusion of computational prowess and experimental vigor, revealing a future of precision, hope and healing.

Application within the Laboratory Animal Research Center

In Fall 2023, Prof. Sergio Crovella, a Research Professor with expertise in human molecular genetics, computational biology and clinical pathology, joined the LARC research team. His role involves developing multidisciplinary research in vivo and tumor models. He is currently working on the engineering of synthetic anticancer peptides and on the development of biosensors to detect circulating cancer-specific miRNA in mice models.



“Universal Values in Qur’an”: Topic of an International Seminar at Sorbonne University, Paris, with the Participation of the College of Sharia and Islamic Studies, Qatar University

Dr. Abdulrahman Helli
Associate Professor of Tafsir and Quranic Sciences, College of Sharia and Islamic Studies - Qatar University

On 19-20 May 2023, the Department of Arabic Studies at the Faculty of Arts and Humanities, Sorbonne University in cooperation with the Institute for Epistemological Studies-Europe in Belgium organized a seminar on titled, “Universal Values in Qur’an.” Several research papers that were accomplished in the context of a joint project between the department and the center on the topic of the symposium were discussed. **Dr. Abdulrahman Helli, Associate Professor of Tafsir and Quranic Sciences at the College of Sharia and Islamic Studies, Qatar University, took part in the seminar with a research paper titled “The Occurrence-Frequency and Development of Ethical Concepts in the Qur’ān between the Meccan and the Medinan Periods: A New Approach to Classifying Semantic Fields.”**[1] Participants from several universities from the United States of America, Canada, France, Germany, Morocco and Qatar University took part in the seminar . The seminar and discussions were multilingual. Research papers in Arabic, French, as well as English languages were presented in the amphitheater in the most ancient building of Sorbonne University.

1 «The Occurrence-Frequency and Development of Ethical Concepts in the Qur’ān between the Meccan and the Medinan Periods: A New Approach to Classifying Semantic Fields». Dr. Abdulrahman Helli, Associate Professor of Tafsir and Quranic Sciences, College of Sharia and Islamic Studies - Qatar University. a.helli@qu.edu.qa

https://lettres.sorbonne-universite.fr/evenements/valeurs-du-coran

Seminar at Sorbonne University in Paris.

The study of Dr. Helli from the College of Sharia and Islamic Studies, at Qatar University proposed a New Approach to Classifying the Ethical Concepts in the Holy Qur'an on a statistical and quantitative basis that monitors the development of the Occurrence-Frequency and Development of Ethical Concepts between the Meccan and Medinan periods of the Qur'anic revelation. Based on these statistics and tracking, the study proposed to classify these concepts into four semantic fields. The first three fields were the most common in the Meccan Period, then they were less frequent in the Medinan Period. The first field is concerned with the concept related to the ethics of knowledge and man's attitude and stance towards truth, ego and disbelieving; and the most significant concept in this field is lying. The subjects of the second field revolve around all reprehensible values that exceed ego/oneself to the other; and the most significant concept in this field is injustice. The third field contains concepts that define all the commendable ethics strengthened in the Meccan Qur'an, which are contrary to the previous two fields; and the most important concept of this field is mercy which is the most frequent concept in the Holy Qur'an.

Then comes the fourth field which is concerned with concepts that were more frequent in the Medinan period. The common shared meaning among all is the fact that they represent the comprehensive Qur'anic ethical system. The characteristics of the Medinan Period have an impact on strengthening these frequent concepts; the most important concept of this field is Taqwā. The details of these fields were classified in the study through statistical tables and charts that reveal the development of each concept's frequency (Tawator) during the Meccan and Medinan periods in addition to analyzing the relationship between the concepts of each semantic field and highlighting what connects them to the period to which the semantic field belongs.

From a methodological perspective, the study emphasized the significance of implementing two theoretical principles in applied Quranic studies, as unanimously agreed upon in the field of Quranic Sciences. The first principle is the differentiation between the Meccan and Medinan Qur'an, focusing on their distinct characteristics and themes. The second principle underlines the crucial need for understanding these differences when interpreting the verses. However, the application of these principles has predominantly been restricted to analyzing certain aspects, such as deriving legal judgments, comparing earlier and later verses or resolving seeming contradictions between them.

The study contends that a comprehensive understanding of the Quranic methodology in ethical education can be achieved by examining the historical evolution of its ethical concepts. This involves analyzing the development of their use and the contextual implications of the verses that address or incorporate these concepts. In terms of the hierarchy of the ethical concepts, the oldest and most frequent concepts take precedence for foundational establishment. When considering ethics as a complete system, the Medinan field is deemed the most crucial. The study affirms that these fields are interconnected, with shared vocabularies and interdependence, constituting components of a unified system. However, to comprehend them as a system, a theoretical de-construction was necessary for understanding their hierarchical nature, acknowledging that alternative perspectives may propose different arrangements. Nonetheless, the chosen approach was deemed essential in light of the observed developmental progression.

The study points out that while the frequent appearance of a concept in the Quran is significant, it doesn't automatically translate to higher ethical importance compared to other concepts. Initially, the study acknowledges that numerical frequency is a formal aspect but emphasizes its critical role in textual analysis. A term's repetition indicates its importance and urgency; as the frequency of a term increases, so does the significance of its meaning, along with the possibilities of expressing that meaning using different terms. Thus, linguistic analysis of texts must consider term frequency.

In response to this, the study chose to focus on the frequency of terms in the Quranic text, considering the order of their revelation as a marker of importance and chronological development in Quranic ethics. This method involves categorizing Quranic ethics into semantic fields to aid in interpretation and understanding. The validity of this categorization is demonstrated by aligning the frequencies of terms in each field with their respective objective content. This alignment underscores the shared elements within these fields, highlighting their objective implications that can be comprehensively understood.

The study did not aim to explore each semantic field in detail. Instead, it focused on explaining the rationale for categorizing these fields based on the evolution of their vocabularies. This methodological approach facilitates the study of each field as a separate subject, along with some of its specific vocabularies. While many ethical terms have been previously examined as standalone concepts or subjects, they were not often analyzed in the context of their relationship with ethical concepts within a Quranic system. This study aims to establish this contextual framework. It argues that analyzing Islamic ethics by examining the layered structure of these fields can unveil insights, contributing to a deeper understanding of the universality and comprehensive nature of Islamic ethics.

Graph Theory Matrix Approach in Industrial Internet of Things (IIoT) Environment

Prof. Habibullah Khan

Professor of Information Systems, College of Business and Economics - Qatar University

The upcoming generation of communications is capable of providing richer mobility, higher data rate, more reliable security, a better quality of services and better support of mobility requirements in the industrial Internet of Things (IIoT) environment. For better business opportunities, integration of modern communication with industrial IoT demands more secure, scalable and resource-efficient mobility solutions. To support 6G enabled industrial IoT, a cost-effective and resource-efficient service-oriented mobility solution is required. The effects of threats in IIoT can be more severe as it jeopardize the sensitive nature of data and networks. There are several security issues such as inadequate authentication practices, port exposures; and obsolete application that invite many risks. Similarly, physical access to controlling systems known as industrial control systems (ICS) or manufacturing bolt cannot only lead to products failure and physical damage but can also risk human life. IoT device authentication, device identity validation and integrity of data have become serious concerns in the industries. Its impact becomes more lethal in case of manufacturing industries like steel, petrol and chemical due to high temperature and unstable chemicals where any leakage of data through sending false commands to endpoints and cyber-attack can lead to disastrous situations. These disastrous situations include the loss of life, causing injuries and even halting of the system. Improper and poor authentication mechanism employed in the industrial environment will create these problems.

There are multiple reasons for the unavailability of strong authentication mechanism in manufacturing industries as the communication protocols do not go under authentication process. For example, Modbus is one of the most common communication protocols used for industrial automation solutions that lacks any kind of authentication. This lack of authenticity leads to integrity issues in communication. Industries especially manufacturing require low latency to complete all the operations of critical processes in real time fashion. Sometimes, the manufacturing team and engineers become reluctant to implement security methods of authentication that suffer from latency. Other security concerns are related to the number and nature of IoT devices deployed in IIoT domain. As a huge amount of data is sent to the cloud for decision making from IoT or edge devices in IIoT environment, this data is used by various applications and operating systems residing in these devices. Attackers can

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compromise the security of network as the IoT devices are not equipped with major security in mind and physical access to these devices is easily possible. Therefore, every device must be authenticated before joining an IIoT network.

Authentication is a procedure through which a user or computer will have to prove its identity to a server or client. Therefore, IoT devices or equipments are required to be authenticated prior to getting connected to the network. This can be only achieved by selecting an efficient and robust authentication method or scheme. Over the last few years, many authentication schemes have been introduced to provide full-pledged access control mechanisms to the IIoT network and prevent illegal access to protect the network resources and infrastructure. The design of the authentication scheme must be efficient, secure, and error-prone. The efficiency and security of authentication schemes employed for IIoT devices can be characterized or measured by the authentication features. In this context, the proposed features-oriented evaluation framework is presented to check the design and functionalities of different authentication schemes with respect to the features. These features are used as benchmark in the proposed evaluation framework for selecting the best authentication approach that can be employed for IoT devices in the industrial environment. These features include session key

agreement, password change, access control, confidentiality, integrity, availability, scalability, known key secrecy, privacy, efficient wrong password, data freshness, secure functions etc.

The authentication features have significant role in evaluating the authentication mechanisms employed in any IoT-based system. Due to the huge number of authentication protocols, conflicting criteria and huge list of features supported by the schemes, it becomes a challenging task for network administrators and developers to select the best choice of security or authentication scheme for the manufacturing industry. This is due to the reason that the people working in an industry environment have less technical skills and knowledge about security deployment. Hence, there is a strong need of designing an evaluation framework that can be applied to evaluate the existing authentication solutions to provide timely solutions to the authentication challenges. Therefore, we present a proposed evaluation framework that will enable them to get the best authentication method based on their features for the security demands. Using Graph Theory Matrix (GTM), the proposed features-oriented evaluation framework assess and assign quantification score to rank the authentication mechanisms of an IIoT based system. GTM approach is a decision making and qualitative procedure that makes decisions based on decision variables. It can be applied for analysis and evaluation due to its logical and systematic nature. This model involves three major components such as graph representation, matrix building and permanent index representation. Digraph representation has the advantage of visual analysis and modelling. Matrix representation is also helpful in analysis and mathematical modelling and computer processing. The proposed evaluation model produces the most promising results and is applicable in IIoT environment to fulfil the security gaps. Below in Figure 1, is a list of features that are evaluated.

Delphi method is used to obtain the data related to the features in designing criteria for the selection of a proper target authentication solution as shown in Figure 2. The GTM approach starts from identifying attributes and alternatives, followed by graph representation of attributes and then attributes are represented in the matrix form. GTM approach steps are shown in Figure 3 and evaluation framework and feature diagram are shown in Figure 4.

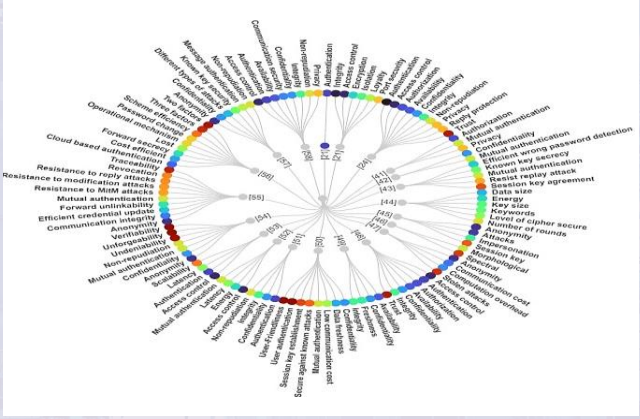


Figure 1. List of all features evaluated.

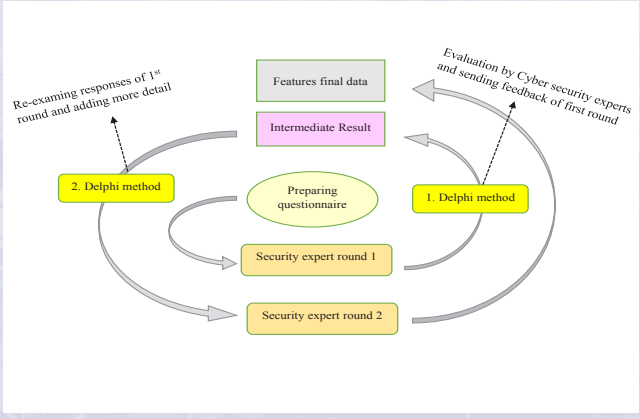


Figure 2. Delphi method for feature and data collection.

Figure 3. GTM approach step-wise procedure.

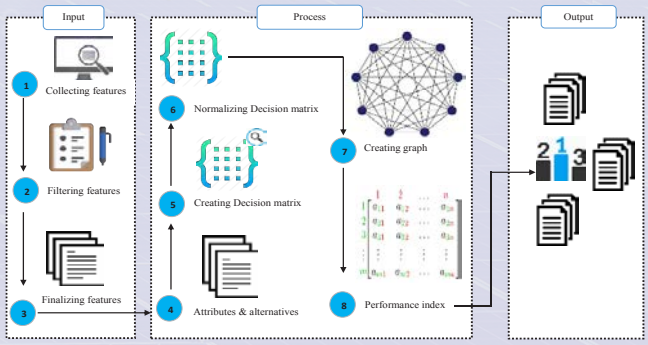


Figure 4. Evaluation framework structure.

Driving into Future:

Unveiling the Potential of Autonomous Vehicles

Dr. Wael Alhajyaseen, Research Associate Professor

Eng. Christian Justine Samson, Research Assistant

Qatar Transportation and Traffic Safety Center, Department of Civil & Environmental Engineering, College of Engineering - Qatar University

Dr. Wael Alhajyaseen and Eng. Christian Justine

The transportation industry is being revolutionized by an unprecedented surge of innovation. Enter the world of Automated Vehicles (AVs), often known as self-driving automobiles or driverless vehicles (as represented in Figure 1). These extraordinary vehicles are about to redefine how we experience movement, offering glimpses into

Figure 1. Autonomous Vehicle (AV).

a future where roads become safer, traffic flows effortlessly and there is elimination of human errors. However, here is the remarkable part: AVs are technological marvels designed to function without constantly relying on human input. How do AVs do it? Imagine an intricate combination of sensors, cameras, radars and cutting-edge computer systems all collaborating harmoniously to steer, make choices and seamlessly blend with the ever-evolving road landscape. Amidst this innovation, the market buzzes with anticipation and for good reason. The potential benefits are monumental, as industries anticipate a transformative revolution in transportation. According to market experts, the global AV market is projected to surge into trillions of dollars over the next decade. Therefore, AVs are set to become a driving force for changing the future of mobility and transforming the way we traverse our roads.

Nevertheless, the journey towards this transformation is filled with unexpected challenges and surprising discoveries. One such challenge lies in the public perception of this new technology. Building trust and addressing concerns related to safety and human interaction are crucial steps in ensuring the successful integration of AVs on the roads. In pursuit of this, the Qatar Transportation and Traffic Safety Center (QTTSC) embarked on an extensive questionnaire survey, venturing into the realm of people's perceptions and willingness to embrace the potential of AV technology. The findings are captivating – a significant majority welcomes AVs with optimism, envisioning a future where these technological marvels share the roads with us. Yet, as AVs navigate the intricate web of mixed traffic situations, encountering human-driven vehicles (HDVs) and pedestrians, concerns about safety and interaction dynamics rise to the forefront. Figure 2 shows a direct connection between the perceived safety of AVs and the readiness to welcome them. This connection signifies that individuals who hold a higher perception level of safety tend to view AVs as more secure and are more inclined to embrace this cutting-edge

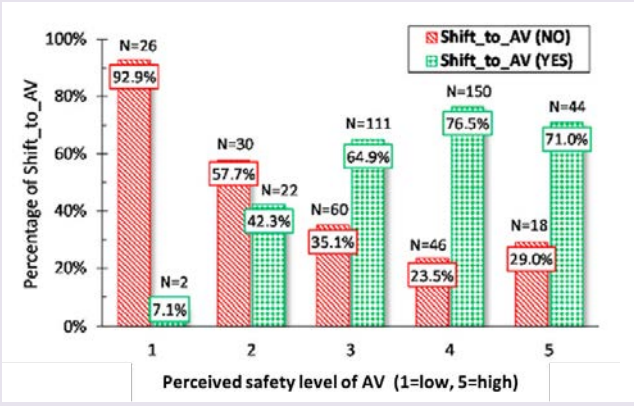


Figure 2. Perceived safety of AV vs. Shift to AV.

technology into their lives. In addition, the research findings also shed light on intriguing demographic differences in how respondents view AVs. Females, individuals with higher income levels, and non-Arab participants expressed heightened safety concerns. Moreover, education played a significant role, as highly educated individuals and families revealed increased concerns about AV safety. This inclination could be attributed to their deeper understanding of the potential risks connected to AV technology.

Furthermore, the interaction between AVs and HDVs presents yet another intricate challenge that demands thoughtful examination (as shown in Figure 3). AVs need to coexist harmoniously with HDVs to navigate through complex road networks. In light of this, QTTSC delved into AV interactions with HDVs to examine the efficiency and safety aspects of diverse traffic scenarios at signalized intersections, taking into account that AVs employ different driving strategies. AV driving strategies are designed in three ways – defensive, normal and aggressive. Defensive AVs (dAVs) prioritize

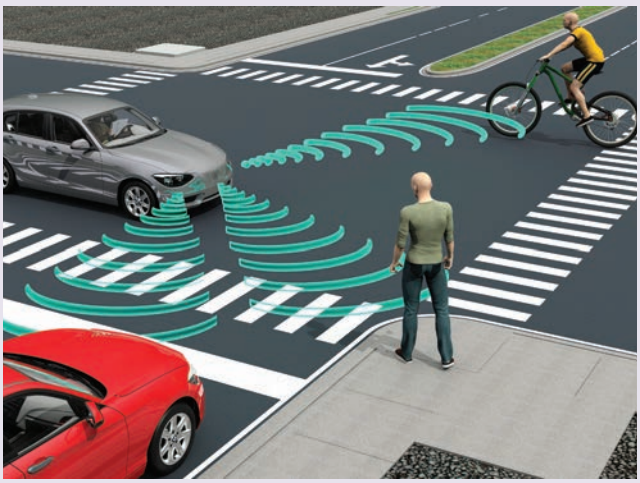


Figure 3. Autonomous vehicles in mixed traffic.

safety as the paramount goal. They exhibit a tendency to yield, stick to cautious speeds and maintain generous following distances. Moreover, normal AVs (nAVs) share a similar driving style with human drivers, helping to create a sense of familiarity and consistency in traffic interactions. On the other hand, aggressive AVs (aAVs) display a more assertive behavior on the road. Considering these driving strategies, QTTSC's investigation on AV with HDV interactions at signalized intersections revealed intriguing findings – aAVs proved to navigate through signalized intersections efficiently, minimizing congestion and delays compared to dAVs (Figure 4). Yet, their assertive nature posed potential safety risks in HDV interactions. In contrast, dAVs prioritized safety, ensuring harmonious HDV interactions but at the cost of increased congestion. Delving deeper, the study unveiled a challenge inherent to dAVs – the potential for escalating aggression among human drivers within mixed traffic environments.

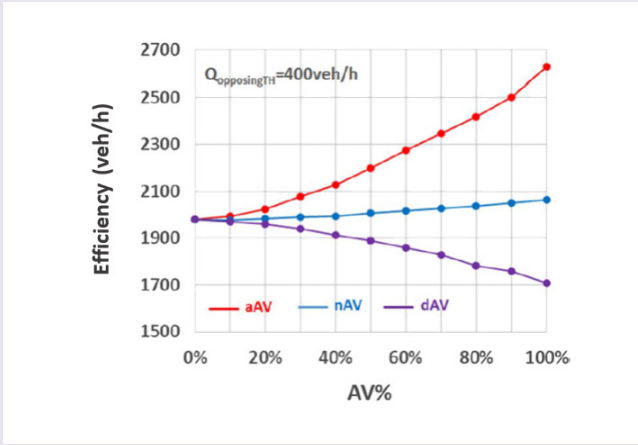


Figure 4. Efficiency Performance of AV.

Having explored the interactions of AVs with HDVs, understanding their interactions with pedestrians has also become a crucial area of research and concern in the field of transportation safety. Over 50% of the fatalities of road crashes in 2020 worldwide statistics were related to vulnerable road users (World Health Organization, 2020). Even in countries where vehicles are the dominant travel mode such as Qatar, still pedestrians share more than 30% of total annual road fatalities. This underlines the significance of pedestrian safety as a critical public concern that demands heightened efforts, especially as our roads are soon to be filled with AVs. A major challenge that AVs will face when interacting with pedestrians is occlusions caused by surrounding obstacles and the presence of HDVs, which will limit the capability of AVs to observe pedestrians. Imagine, for a moment, the AVs' eyes – their perception abilities, which could be hindered by occlusions, shrouding them in a veil of uncertainty. This is particularly true since AVs heavily rely on communication with their mechanical peers to extend their realm of perception. While road infrastructure like roadside cameras can potentially step in as allies, supporting AVs to identify pedestrians, their implementation at a larger scale remains a challenge. Similarly, pedestrians' visual field can be obstructed by vehicle bodies, especially when large-size vehicles approach from opposing lanes, limiting their visibility to AVs. Notably, pedestrian crossing behaviors like one-stage crossing (continuous walking speed) and rolling gap crossing (discontinuous walking speed) play a significant role in safety, with the rolling gap crossing proving to be more dangerous and challenging to deal with and to predict by AVs. Addressing occlusion-related challenges is crucial to ensuring safe AV-pedestrian interactions and optimizing the integration of AV technology into existing transportation systems.

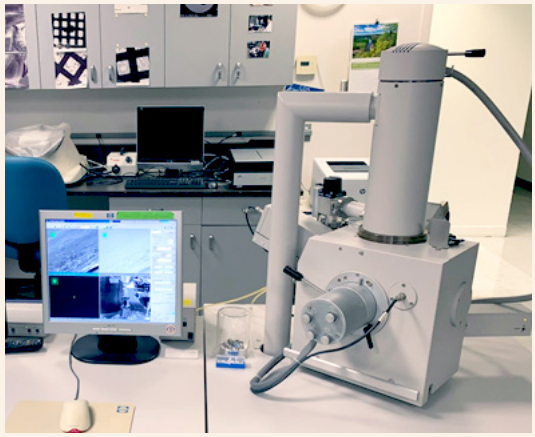
While AV technology presents promising opportunities for safer and more efficient roads, addressing safety concerns, optimizing AV interactions and evaluating the efficacy of assistive technologies are critical for its successful integration. As researchers and stakeholders work towards realizing the full potential of autonomous vehicles, a collaborative effort is required to build a future where AVs can coexist harmoniously with human drivers and pedestrians, making roads safer for all.

Story of a Knowledge Platform:

Central Laboratories Unit (CLU)

Research and Graduate Studies Sector

Qatar University



CLU provides several analytical services and equipments that support research, teaching and scientific discoveries, whether inside Qatar University or at the State level. The unit also works in accordance with the Highest Standard Operation Procedures for the best practices of the accredited scientific laboratories (ISO/IEC 17025:2017). The unit is keen on training its personnel periodically. It is considered a basic facility for analyzing samples and supporting research studies conducted by the University's faculty. To be acquainted with the unit and its services, we are meeting the Acting Head of the Central Laboratories Unit, Dr. Noora Al Qahtani.

Dr. Noora Al Qahtani, please tell us when was CLU established, and what is its mission?

In 1992, the cornerstone of CLU was laid by inaugurating the Scanning and Transmission Electron Microscopes Laboratories of the Biological and Environmental Sciences Department. In 2004, the Chemical Analysis and the Electron Microscope Laboratories were integrated and they were parts of the Chemistry Department and the Biological and Environmental Departments, consequently.

What activities does CLU provide to the University community?

CLU provides a wide range of analytical and training services through the equipment of the Atomic Spectroscopy, Chromatography, Molecular Spectroscopy and Nuclear Magnetic Resonance. In addition, to the Scanning and Transmission Electron Microscopes and Thermal Analyses equipment. The unit is equipped with the latest technical instruments and facilities. Its staff includes qualified professionals with extensive experience in their fields of specialization. Furthermore, CLU plays a vital role in supporting teaching, research and developmental activities at Qatar University. The services provided by CLU are necessary for the advancement of science and technology in the State. Additionally, the unit offers one of the most distinctive services at Qatar University by providing high purity liquid nitrogen to all service requesters from departments, colleges and research centers, saving them a lot of time, effort and cost. Notably, CLU developed and upgraded the site of the Liquid Nitrogen Generation Station, which is being prepared to be inaugurated soon after being developed.

Would you inform us about the analytical services in CLU and the equipment that distinguish it in detail?

CLU offers a distinguished group of chemical

analyses that cover a wide range of the requirements of QU faculty members, researchers and students. Its analytical services are also offered to the government, service, industry and private sectors in the State. The unit's services include analyzing chemical and biological samples using the Scanning and Transmission Electron Microscopes as the unit contains NovaNano SEM 450, the advanced, high-technology Scanning Electron Microscope which is one of its kind at the State level. It also includes the TEM - FEI Tecnai G2 Transmission Electron Microscope, of which only two are available at the State level. This laboratory was equipped with several auxiliary equipments for preparing all kinds of samples to meet the needs of researchers and service requesters.

Furthermore, the Atomic Spectroscopy Laboratory provides all the estimation analyses of the heavy, toxic and trace elements at all levels of their concentrations in chemical and environmental samples. The accuracy of the equipment reaches one part per trillion. The laboratory contains several high-technology equipment, including ICP/MS, ICP/OES and ICP/MS/MS. The Laboratory also contains Mars 6, one of the latest equipment for digestion and preparing chemical, biological and environmental samples. This enabled the unit to provide several analytical services for research

projects associated with public health and study the concentrations of toxic and polluting elements in the Qatari market products, such as different kinds of baby milk, brown and white rice samples and samples of the traditional Qatari food.

CLU also contains a laboratory equipped with several chromatographic equipment of all kinds, including liquid and gas chromatography equipment. In addition, CLU includes equipment for Ion Chromatography analyses, which provides several services in the field of environment and water analyses, two equipment for Gas Chromatography (GC/FID, GC/MS) and two equipment for Liquid Chromatography (LC/MS/MS, UPLC). This distinguishes the laboratory in providing several analytical services to service requesters from the medical, pharmaceutical and environmental sectors, as well as analyzing organic compound samples for oil companies operating at the level of the State.

Additionally, CLU contains a laboratory for Nuclear Magnetic Resonance (NMR), which includes one of the latest equipment in this field with a capacity of 600 MHz, which provides analytical services to all the departments and colleges of Qatar University, along with external service requesters and stakeholders from sectors, most importantly the Qatari Pharmaceutical Industrial Sector. Recently, faculty members of the College of Pharmacy and one of the Qatari pharmaceutical companies organized a visit to the laboratory in order to start providing the company with the service and conducting the analyses and studies required for raw materials of the Pharmaceutical Industry and Quality Assurance.

CLU contains a Molecular Spectroscopy Laboratory which includes FTIR, DXR Raman, and UV/Vis equipment, which distinguish the laboratory in providing its services of analyzing the organic and inorganic compounds and studying all kinds of environmental pollutants. An extensive study on microplastics and their existence in fish samples was one of the most significant studies supported by the laboratory recently. This is one of the current environmental challenges because microplastics are dangerous and can be absorbed into the human body through food, water and air. This adversely affects public health because the particles are minute and can easily reach the organs of the human body.

CLU Thermal Analysis Laboratory includes several equipment, including CHNS/O, TGA/MS, DSC, TGA, TOC/TN and NC%, since these equipment are considered among the most significant supportive instruments for many research and industrial fields. The laboratory supported several research projects in the field of manufacturing cancer drugs in cooperation with the College of Pharmacy at Qatar University, as well as analyzing percentages of the basic elements in soil samples that are contaminated with oil and studying elements at the marsh zones in Qatar as well as biological sciences studies, and biofuel production from algae.

CLU provides training to students, what are the unit's research training strategies and programs?

CLU is committed to nurturing student talents through training programs aligned with Qatar University's strategic goals. These programs cover Chromatographic Analysis, Nuclear Magnetic Resonance, Atomic and Molecular Spectroscopy and Electron Microscope techniques. These initiatives foster competencies and practical skills among students, encouraging their active involvement in research projects.

Would you please tell us about the most significant achievements of CLU and what are its projects for the academic year 2023/2024?

In the past academic year, CLU analyzed 17,447 laboratory samples, published 21 research articles, and supported numerous courses and research projects. Looking ahead to 2023-2024, CLU plans to increase research projects, publications and training courses. The unit aims to broaden its clientele by enhancing services and equipment and fostering partnerships with government, industry and service sectors in the state.

CLU obtained ISO Certification and Accreditation from the American Association for Laboratory Accreditation, how did the unit achieve the international standards and requirements and how will it preserve the accreditation continuity?

CLU obtained ISO Certification and Accreditation from the American Association for Laboratory Accreditation (A2LA) as you mentioned and these certifications validate the unit's capability to provide accurate and precise analysis results. CLU's Quality and Accreditation Committee ensures that all methods, both accredited and non-accredited, adhere to the highest operating standards. The unit continuously works on adding more accredited methods to maintain its international standards and preserve accreditation.

Interview with a Researcher:

Dr. Hanan Ahmed Al-Fayadh

Associate Professor of Arabic Language, College of Arts and Sciences - Qatar University

In this issue, we are meeting one of the national competencies in both Academic and Media Fields in the State of Qatar. She is distinguished in her Academic Work in the field of Syntax and Morphology in the Arabic Language, and she also was a prominent media person and author in the field of writing and publication.

We are pleased to introduce Dr. Hanan Al Fayadh, Associate Professor at the Arabic Language Department, College of Arts and Sciences, Qatar University to the University's community.

How would you introduce yourself to the University's community, Dr. Hanan Al Fayadh?

Whenever I talk about myself, I like to refer to the three fields that I am engaged in and are affliated with me; Education, Media and Literature. As an academic, I always like to mention that I am a graduate student of Qatar University, through which the vision for my future was formed. I aspired to return to QU because it greatly influenced me and to achieve that goal, I developed a clear plan since I was a student to secure my position as a faculty member at the University. Today I am an Associate Professor working at the University, and this played a great role in enabling me to gain experiences, such as my experience in Media.

Concerning plunging into literary writing, this has nothing to do with the academic aspect, but it is a passion for writing that was crystallized in the form of diverse literary works including novels and artistic prose.

Why did you specialize in Syntax and Morphology specifically?

Syntax and Morphology are among the Linguistic Specializations which learners find difficult to study. It is always described as a difficult and complicated field whose specialists were few, particularly in Qatar. For these reasons, I thought that by daring to study this specialization, I might gain a special distinction. The first step in making this decision started when I was a student. My Professor then was Ali Al Kubaisi, and I remember when I asked him about the specialization through which I could join the university without facing difficulties, his answer was: "Syntax."

Therefore, studying Syntax and Morphology was principally a rational choice through which I would achieve my goal of joining the University as a faculty member. I was encouraged by my distinguished performance in Syntax and Morphology courses which I studied with Dr. Ali Al Kubaisi who was well known for his sternness that made his students trust their capabilities in this discipline. This might have been one of the significant reasons for considering this specialization.

I would like to give credit to Dr. Ali Al Kubaisi and mention that I owe him a lot because I acquired logical thinking skills to solve and excel in Syntax questions through his distinguished method of Syntax and Morphology teaching as well as to his valuable advice that encouraged me to boldly and strongly engage in this specialization.

In your Ph.D. Thesis, you referred to Syntactic Structures, what do they mean by that in Arabic?

My Ph.D Thesis focused on the relationship between Syntactic Structure and its Semantic Influence using the poetry of Mana Al Otaiba as material to study the dimensions of this relationship. The study addressed Syntactic structure altogether and because the topic is immense, I only studied what constituted a clear phenomenon in Otaiba's poetry since I considered it the origin of the Syntactical Structure and I dealt with other issues as unessential in this Structure. The study included Syntactical phenomena such as omission, anastrophe and contrast as well as Syntactic Styles; specifically vocation, interrogation and assertion because they are the most frequent in Otaiba's poetry. These phenomena were adequate to study the main idea of this research which is questioning the meaning through its relationship with Syntactic Structures, then with the general context of the text.

In your opinion as an academic and an author, how does the literary works influence society?

Literary works represent the other side of societies, since each author has a certain conception of reality. This concept may be in the form of rejection or acceptance. However, most literary works show that rejecting reality is the prevailing attitude. Therefore, by monitoring and criticizing reality through warning or guidance the author usually attempts to rebuild an ideal picture of society. There are a lot of international literary works that influenced societies, such as the works of Dostoevsky, Anton Chekhov and others, which played a great role in changing cultures of societies and rejecting feudalism and racism as reading creative works of this kind have a great role in influencing the human mind.

Your career is distinguished by a lot of scientific research, publications, committees and awards; would you mind shedding light on the most significant of them?

My research interests are focused on the attempt to recognize the impacts of linguistic usage on the meaning through applied studies that try to examine literary texts from a linguistic point of view, in addition to the attempt to recognize the linguistic role that formed literary creativity. In the recent years, I have pursued to study the linguistic aspect at the colloquial level and compare it to the eloquent level by applying this to the Qatari dialect, seeking to serve the Qatari heritage and subject it to linguistic study. I published these research papers in a scientific peer-reviewed journal.

As for committees, I took part in several committees inside and outside the University including chairing the Fourth International Conference for the Arabic Language Department titled "The Old Arabic Text in the Light of Temporary Critical Theory" and chairing the Fifth International Conference of the Arabic Language Department titled "Linguistic Policies in the Arab World: Reality and Horizons."

Dr. Hanan Al-Fayadh in a dialogue with H.E. Mr. Abdullah Bin Hamad Al-Attiyah, Chairman of the Abdullah Bin Hamad Al-Attiyah International Foundation for Energy and Sustainable Development and former Deputy Prime Minister and Minister of Energy and Industry, at the Qatar University Research Forum and Exhibition 2023.

I also participated in several committees outside the University, including the membership of the Operative Plan of the International Organization for the Advancement of the Arabic Language. In addition, I judged several Literary Contests launched by the Ministry of Culture such as the Children's Literature Award in 2008 and other social participation too numerous to mention.

As for the field of Literary Awards, I won Literary and Merit Awards, such as:

- Media Excellence Award from Qatar University in 2015.
- Vodafone Literary Award for Novel and Story in its Third Edition in 2016 (second place) for the short story (His Eyes Dilate).
- In the field of literature, I wrote two novels, the first one in 2015 titled: No Dignity in Love, and the second novel in 2023 titled: The Land of Storytellers.

Tell us about your excellence in the field of Media.

First and formost, I entered the media field on a national point of view. I was nominated for this work in a clear orientation to build a sound and healthy relationship between Qatari women and media appearances after Qatari media, particularly visual media, had witnessed a major break with TV appearances. My role was to end this break through conscious and honorable appearance of Qatari women in TV. I think I succeeded in that because after my appearance on Alrayyan TV as the first woman on this channel, many Qatari women flocked to work on TV after realizing that the appearance of women on TV does not represent a flaw, but it is a noble and honorable work that has a noble mission.

It came to our knowledge that you have several social participations, from your experience, How does social participation in general contribute to developing the society?

Building the personality of the student and guiding his conceptions and vision of reality and life according to the values and mission adopted by the University is one of the most significant goals of university education. In order to achieve that goal, the faculty members must be open to society, able to understand its changes, active in building its orientations and be effective contributors to facing its challenges. For faculty members, social participation is not additional work, but it is fundamental work on their roles in building the personality of the student, in accordance with the values of society and the aspirations of this fast-moving world.

What is your advice to students of Qatar University?

Looking for passion and inspiration, because these are the most important elements that enable a person to face challenges. A person does not fight for something that he does not love, and cannot go on without inspirers to derive strength from to face challenges.

Success passes through many challenges, what were the challenges that faced you as a researcher?

Time is the biggest challenge in the field of scientific research. The researcher needs a long time to produce one research. This may be difficult to achieve in the circumstances of teaching and the commitments of professors in society alongside their private social life that requires special care too.

Tell us about your most important research projects for the academic year 2023/2024.

Recently, I developed an interest in studying the Linguistic Structure of the Qatari Dialect and comparing it to the Linguistic Structure of the Eloquent Language. I have already completed two research papers in this field. But many ideas appeared to me by reviewing this aspect and I found that this aspect still includes a lot of topics that have not been studied yet. Therefore, I am targeting this idea in my next research project widely to end the work in this aspect with a book that serves the Qatari and Arabic Libararies.

Researcher Business Card

Dr. Waqas Sami

Assistant Professor of Pre-Clinical Affairs,

College of Nursing - Qatar University

جامعة قطر
QATAR UNIVERSITY

Dr. Waqas, tell us about yourself.

I am an assistant professor, researcher and health data scientist, with over 17 years of experience in biostatistics, epidemiology, public health and nursing research. I have authored / co-authored over 200 research papers, authored books and presented my work at numerous international conferences. Since 2020, my focus has been the use and application of artificial intelligence / machine learning in health sciences.

What are your most important achievements and research projects in the field of nursing sciences?

My goal is to improve the quality and efficiency of nursing care to render nursing data-driven and evidence-based and to develop new tools and techniques to support nurses in their work. I am currently developing AI-based tools to support nurses in decision-making and care planning. These tools can help nurses determine the best care plan for their patients and make informed decisions in a timely manner.

What is your message to nursing students to enable them to achieve research and professional excellence?

First, make sure you have a solid foundation in science and statistics. These skills will be essential for understanding complex research literature and for designing and conducting your own research studies. Second, engage in research early in your career. There are many opportunities for nursing students to participate in research projects, both as volunteers and as paid research assistants. This experience will help you develop the skills and knowledge you need to be a successful researcher.

Find a mentor who can guide you on your research journey, participate in nursing conferences and workshops and in professional nursing organizations. This is a great way to stay up-to-date on the latest nursing trends and developments and connect with other nursing professionals.

How will academic nursing programs serve Qatar's national healthcare needs?

Academic nursing programs are essential for educating and training qualified nurses, conducting research to improve nursing practice, promoting evidence-based nursing, and advocating for the nursing profession. Furthermore, academic nursing programs can serve Qatar's national healthcare needs by collaborating with healthcare organizations, offering continuous education programs for nurses and providing community awareness programs.

How much potential and what prospects are there for the work done at the College of Nursing at Qatar University?

College of Nursing in QU is a leading nursing school offering high-quality education and preparing students for a variety of nursing roles. Qatar's healthcare sector is expected to grow significantly in the coming years, and the demand for nurses is expected to continuously increase. A rise in the demand for the graduates of the College of Nursing in QU will occur. They will be known for their skills, knowledge and professionalism. Many graduates can continue to work at Qatar's leading universities and hospitals, such as Qatar University, Hamad Medical Corporation and Sidra Medicine. Others may work in clinics and healthcare facilities.

Interview with Student:

Graduate Assistantship (GA) Award at Qatar University

Mona Farouk Moussa, Jurisprudence (Fiqh) and its Fundamentals – PhD Program, College of Sharia and Islamic Studies - Qatar University

Ja'far Mohammad Mandouri, M.Sc. in Engineering Management Program, College of Engineering - Qatar University

Qatar University seeks to achieve its vision in the areas of quality research, education programs and graduate studies in order to be the preferred choice for students and researchers. The University has been able to enhance its rank among the prestigious universities in the region and the entire world. Hence, the Graduate Studies Office at QU constantly seeks to explore new opportunities and innovative ways to improve the support and services provided to students. QU has offered a Graduate Assistantship (GA) Award, which was based on providing a set of functions/positions to colleges and research centers according to their needs, noting that the GA has been applied since Fall of 2018. This Award attracts outstanding graduate students as a way to increase high-quality research output in line with Qatar University's strategy and research priorities and to meet the needs of the State and society.

QU offers financial support, in the form of Graduate Assistantships Awards, to graduate students who engage in teaching and/or research activities that contribute to the University's academic mission. Such an Award is considered as one of the most important activities that a student can undertake during the University career to continue research as a professional and training career. In addition to financial support, the GA position provides students with the opportunity to learn more about research practices and communicate directly with their experienced professors, which greatly contributes to increasing their knowledge and skills.

In this issue, we are pleased to conduct an interview with two students who received the GA Award, Mona Farouk Moussa, Jurisprudence (Fiqh) and its Fundamentals – PhD Program, College of Sharia and Islamic Studies, and Ja'far Mohammed Mandouri, MSc in Engineering Management Program, College of Engineering at QU.

First Interview with the student Mona

Student Mona, how would you like to introduce yourself?

I am Mona Farouk Mussa, a graduate assistant and a doctoral candidate specializing in Islamic Jurisprudence and its Fundamentals at the College of Sharia and Islamic Studies, Qatar University.. I earned my Bachelor's degree in Islamic Sciences with a focus on Jurisprudence and its Fundamentals from the International Islamic University Malaysia, graduating with honors and distinction. Subsequently, I obtained a Master's degree from Qatar University with honors and research distinction. My research interests primarily revolve around the field of Jurisprudence and its Fundamentals, and I have published my research in several peer-reviewed international journals. My academic goals are centered on achieving a doctoral degree with academic and research excellence and advancing in the realm of academic teaching.

What prompted you to apply for the GA position? How would you describe the admission requirements and criteria?

Applying for this position is a wonderful opportunity and was a significant step in my academic and research journey. It has assisted me in achieving both personal and professional goals, with the aim of enhancing my academic credentials and increasing future career prospects. The admission criteria and requirements for this position were well-designed, based on rigorous and fair academic standards, while maintaining flexibility in dealing with candidates. This approach ensures academic excellence and the delivery of high-quality education and outstanding research.

What are the values you gained from this Award, and what skills did you learn through it?

The scholarship has been a great opportunity to develop my academic and professional capabilities, build valuable academic networks and gain numerous benefits. It has enriched my research and analytical skills, academic writing, research paper publishing and project execution. Furthermore, it has facilitated academic engagement, increased knowledge through participation in scientific conferences, academic discussions and expanded communication and idea exchange. I have also gained skills in teaching, time management and coping with work pressures. Additionally, it has enhanced my critical thinking and systematic evaluation of sources and data.

How have your professors' guidance and your research experience influenced your next career goals and ambitions?

The advice from my professors has had a significant impact on my professional goals and aspirations by motivating me to engage in important research projects and contribute valuable knowledge. It has also helped me in the development of my research, writing and teaching skills. I would like to express my deep gratitude to Prof. Salih Al-Zanaki, the Department Head of Fiqh and Usul Al-Fiqh, College of Sharia and Islamic Studies. He has provided me with tremendous support and invaluable guidance throughout my academic and professional journey. His teachings, valuable advice and insights on building a successful career in this field have allowed me to understand topics in a deeper and more comprehensive manner, greatly contributing to my goals, vision clarity and future ambitions.

As a graduate student, how do you encourage your colleagues to go through this experience?

I encourage my fellow students to explore this experience by sharing my positive experience, the reasons for my success, the challenges I faced and how I achieved my goals. I did this through various meetings, general discussions or individual counseling about their goals, interests and assisting them in the application process. As well as the benefits of developing research and professional skills to enhance their future job opportunities.

What are your suggestions for developing this Award/Position?

There are a few suggestions for improving the scholarship/position to make it more effective and appealing:

1. Providing better research facilities and resources.
2. Assisting students in publishing their research by facilitating communication with reputable academic journals.
3. Enhancing students' participation in specialized academic conferences and providing support.
4. Offering opportunities for student involvement in teaching to improve their teaching skills.

What support did you find from the University's Graduate Studies Office?

The university's graduate studies office played a crucial role in facilitating my academic journey, supporting me with application procedures, addressing administrative queries, providing guidance and counseling from academic advisors, organizing workshops and courses that contribute to the development of research and academic skills.

Describe a special moment you witnessed in this role.

One of the most memorable moments in this position was the feeling of gratitude for the valuable opportunity and unique experience it has provided. It has greatly contributed to my personal and professional development, allowing me to work closely with experienced faculty members, getting to know colleagues, supporting and assisting students, and participating in academic research. Being able to contribute to academic research and knowledge dissemination, as well as advancing my academic and professional goals, has been an essential part of my journey. Finally, I am deeply honored and thankful to represent my esteemed university, the Qatar University, and my beloved college, the College of Sharia, in this experience.

Second Interview with the student Ja'far

Student Ja'far, tell us about yourself?

I always introduce myself as a proud Research Assistant. My research represents me and my outlook in investigating emerging issues within sustainability in order to achieve best-for-all solutions. This introduction displays my dedication to research and my commitment to contributing to the University's academic community.

What inspired you to apply for the graduate assistant position? How do you describe the admission conditions and criteria?

I was inspired to apply for the graduate assistant position when my principle investigator (PI) submitted a proposal that was accepted. He nominated me for the position, knowing I would be a good fit for the project. The admission conditions were simple and straightforward, likely focused on my academic performance and suitability for the role.

What did this scholarship add to you, and what skills did you gain through it?

This scholarship has been incredibly beneficial for my academic and professional growth. It has allowed me to hone my research skills as I have realized how much I learnt during this short period. The opportunity to work closely on several research projects has provided practical knowledge and insights that will undoubtedly benefit my future career in Academics.

How did the advice of your professors and your research experience affect your future career goals and ambitions?

The advice and mentorship from my professors in general and my PI in specific, coupled with my research experience within sustainability, have significantly shaped my future career goals and ambitions in pursuing higher education. Their guidance has helped me better understand the direction I want to take in my field and the importance of ongoing research in achieving my goals. I have also incorporated several approaches from the courses I took into my research, which has helped me many times in finding solutions to the problems I face on a regular basis.

As a graduate student, how do you encourage your fellow students to engage in this experience?

I encourage my fellow colleagues to engage in research by sharing my own positive experiences and emphasizing the practical skills and knowledge they can gain.

I also suggest seeking out professors or mentors who align with their research interests and exploring opportunities like scholarships and assistant positions provided by Qatar University.

What are your suggestions for developing this scholarship/position?

I believe partnerships within the industry sector in Qatar within these positions would be beneficial for all, as the Graduate Assistant will engage in real-life applications and provide solutions in this matter, as well as having their complicated issues resolved based on correct scientific methods.

What support did you find from the University's Graduate Studies Office?

I found valuable support from the University's Graduate Studies Office, especially in terms of administrative assistance, funding opportunities, and guidance on navigating the graduate program. In particular, Prof. Ahmed Massoud, Associate Dean for Research and Graduate Studies, of the College of Engineering, has been of great help in this journey of research. He has always been there to try to solve any issues I face.

Describe a significant moment in this position.

This moment would undoubtedly be the call I received from my PI, informing me that our research paper had been accepted by the world-class Nature journal.

From the left: The supervisor Dr. Nuri Onat, from Qatar Transportation and Traffic Safety Center at the College of Engineering at Qatar University, with his student Ja'far Mandouri.

Student Business Card

Sara, how do you introduce yourself to the community of QU?

I am a PhD student in the Public Law Program at the College of Law, Qatar University. Before that, since 2018, I have been a researcher at Ibn Khaldon Center for Humanities and Social Sciences at Qatar University.

What motivated you to choose the specialization of Public Law?

I chose the specialization of public law because I was interested in constitutional law since the latter is the gateway to all branches of law. A state's legal system is identified according to the constitution made by the constituent authority in the country and the constitution rises above all legislation. When the constitution is good, the state's legal system will be good and when the constitution is corrupt, the state's legal system will be corrupted. In my quest for more knowlege, my attention has focused on the constitutional law branch of public law, specifically the study of constitutional control over legislation.

In this field, what does your thesis focus on? Do you have published research studies?

My PhD thesis deals with the topic of constitutional control over the legislation purpose as a solution to the problem of legislation deviating from its intended constitutional purpose. The thesis focused on analyzing the theoretical and historical issues of the topic to design a practical framework that established clear boundaries for the problem and outlined judicial standards that ensure practical efficiency in identifying what is and what is not considered a legislative deviation from the constitution in terms of the purpose.

Several of my research studies were previously published. Perhaps the most important one was a research study titled: »Qatar's Constitutional Identity and its Implications on Organizing the 2022 World Cup« that was published in Tajseer Journal issued by Ibn Khaldon Center for Humanities and Social Sciences. Furthermore, I authored a book titled "Constitutional Control by Abstention in Qatari Law and Comparative Law" that was published by Dar Al Watad for Publishing and Distribution.

What are the most obvious complications of constitutional law that should be addressed by researchers to benefit the society?

Constitutional law principles in the Arab world suffer from a fundamental problem related to adopting several Western principles in this field without localizing them to make them suitable for the Arabic community. Therefore, Western constitutional solutions are randomly adopted to solve problems that are specific to the West, distracting us from real problems that require concentrated efforts to be addressed. For example, the principle of the presumption of constitutionality, which was taken out from the context of the decentralized governance in the United States of America and was applied in the Arab countries that follow a centralized governance.

Research sharpens students' skills. What is your advice to the students of Qatar University based on your research experience?

Research practices are the fuel of research experience. The more the researcher practices and trains himself/herself on research skills, the richer his/her experience will be. When the researcher clearly identifies the problems, diversifies knowledge resources and adopts various methodologies, he/she will be more capable of providing a convincing solution in reality. Although academic programs provide the researcher with several research skills, these skills should not be the only focus. The researcher's self-awareness and personal skills are as important as the skills he/she acquires.

Would you tell us about your ambitions and what would you like to achieve in the future, Sara?

All options are open. Whaterver Allah's will for the future might be, it will all be good. I hope that in the future we will adopt the idea of localization in the field of law.

Interview with an Author:

Mr. Mirdef Al Qashouti, a Doctoral Researcher at the Durham University; on the translation of the book titled “Foreign Policy of Smaller Gulf States” recently published by Qatar University Press

Mr. Mirdef Al Qashouti

"When Scholars of International Relations look at small states as small and weak entities, they are looking at them from blind spots from many aspects. Although most communities among the great powers contain smaller entities with scarce resources, theoretical and experimental research focuses on the great powers. Scholars often lack the appropriate analytical tools to circumvent biases towards largeness, if they want to analyze small states." This is stated in the introduction of the book titled »Foreign Policy of Smaller Gulf States«. In order to delve into the book, we are interviewing its translator Mr. Mirdef Alqashouti, a Doctoral Researcher at the Durham University and a Member of the Institute for Middle Eastern and Islamic Studies.

To start, Mr. Mirdef Al Qashouti, how would like to introduce yourself to the community of Qatar University?

I am a diplomat, I started my university studies at Qatar University and then I moved between universities passing by several international capitals such as Tehran, Baku, Paris and London until I reached the British Durham University where I am about to complete my Doctoral thesis in the specialization of International Relations.

Would you tell us about the theme of the book and what motivated you to translate it?

The book takes a novel look at what is called the Smaller Gulf States, identifying the role that smallness plays in their foreign and security policies, through a theoretical and experimental endeavor on the approach that should be followed while analyzing the policies of small states in the Middle Eastern Studies by explaining the role of these states in the region, in addition to the literature of analyzing their foreign policies since their independence till the present day through comparing between their motives, behaviors and the role played by their smallness in all that.

As I mentioned in the "Translator's Foreword," despite the high-quality methodology used by the author to collect information and theoretical frameworks, some deficiencies that required my intervention appeared. So, I commented on them in the footnotes of the book to shed light on and pave the way to criticize them, hoping to establish a ground to revise some narratives that were spread about some phenomenas in the region.

On the other hand, the scientific arena of international relations is witnessing an unprecedented revolution in the Gulf countries in general and in the State of Qatar in particular. If knowledge production remains the sole property of the English language, this will prejudice the rights of Arab students who learn in the Arabic language. Because of my firm belief that the public from the region - if they are given access to Western methodologies and the latest findings of their research productions - are capable of developing perceptions that are more solid than the models developed by others; because they are from the same environment and it is easy for them to understand the characteristics of political systems, as well as the active personalities in foreign policies.

In the first chapter of the book, the four types of state size and the foreign policy of small states were discussed, would you summarize the differences between them?

The complex model of size identifies four types of state size. Most of the methods used by scholars of International Relations to explain the state size can be classified into four distinguished categories that follow the four sociology schools of International Relations. The four schools of thought provide different answers to two main questions about international relations, whether they are dealing with physical or tangible variables and whether they focus on the state level or the system level. When it is related to the state size, these two questions can be interpreted as follows: Is size a pure physical phenomenon that can be measured by identifying the available sources? or is it a structure that is formed through standards and perceptions?, and, do we have to investigate the state size within the context of one state or should we explain that within the context of a global comparison? The four types are:

- **Absolute Size**: it is a number of resources defined only in the context of the state itself.
- **Relative Size**: it is the relative quantity of specific resources, and the state's share in distributing these resources in a specific system.
- **Perceptual Size**: means the perception of the size of a state by a government or society.
- **Normative Size**: it is the perception of the size of a state by the international community.

Consequently, the different four types of size influence the decision-making process, power and independence in various ways and they are connected to different norms of political sciences. Researchers who focus on the absolute size usually concentrate on questions related to self-sufficiency, size scale economics, the relative size of different resources…etc. The normative size which is taken into consideration by the researchers of structuralism and some representatives of the English School identifies the state's influence and ability to build relations with the other actors in the international community.

The book discussed the Gulf Crisis and Qatar's Survival Strategy (2017-2021) and how the State of Qatar managed to transfer the Gulf crisis from the world of hard power and enforcement into the world of soft power and conviction, in your opinion, how did the State of Qatar succeed in doing that?

For more than two decades, the State of Qatar has played vital roles since it was a member of the Security Council during the period 2006-2007, till the present day. This is due to the great strategic vision of His Highness Shiekh Hamad Bin Khalifa Al-Thani - Founder of the Modern State of Qatar. This continues in the era of His Highness the Amir, Sheikh Tamim bin Hammad Al-Thani, May God protect them all, to achieve Qatar's Vision 2030 through the concerted efforts of the Qatari diplomacy which in turn advanced the State of Qatar to be a reliable partner for many brotherly and friendly countries. The generally balanced diplomacy and the noble soft power created a virtual strategic depth outside the region through strategic partnerships when the real strategic depth was closed during the Gulf Crisis in 2017.

What do you think of the role of the State of Qatar in the international arena despite being one of the small Gulf States?

No doubt, the State of Qatar became one of the most important countries to mediate and settle the difference of views between parties whether at the regional level or even at the international level, because of its impressive achievements. Antara Al Absi's verse: "Those who witnessed the battle encounter will tell you that I am severe in battle but I exercise restraint during the sharing of trophy" applies to the State of Qatar because it proved its goodwill and reconciliation for a noble purpose away from hidden agendas and suspicious roles.

Since the book is the production of a doctoral thesis, what do you say to the graduate students in the State of Qatar about the importance of academic research methodology that leads to the making of an author?

It is necessary to have a human base that is concerned with scientific research in various fields which creates a real understanding of facts in various sciences consistent with the real narrative of our geographic region. Several conclusions of high methodology research studies lack preciseness and they are not reflected in reality. No doubt the scientific degree has social and positional brightness aspired by everyone, however without adding significantly to the human knowledge and recognition, its benefit and effect will be limited.

If we ask you to choose a chapter from the book and invite students and researchers to carefully read and investigate its topic, which chapter will it be, and why?

The chapter that is concerned with the types of state size is one of the most important chapters that discusses several important theoretical principles in analyzing foreign policies. For anyone interested or specialized in this field, it is a good opportunity to review an excellent summary of these theories through which he can reach a deep perception of these theories or even develop and criticize them.

What do you think about the academic and societal role of Qatar University Press after your cooperation with it in publishing your book?

QU Press plays a great role in providing students and researchers with the content required for scientific research in all scientific fields. QU Press has played a great role in helping and supporting me to complete translating and editing the book to be produced in this form.

QU Hosts the Annual Research Forum and Exhibition 2023 under the Theme ‘Research for Future Aspirations’

Qatar University (QU) hosted the Annual Research Forum and Exhibition on November 14-15, 2023. This event demonstrates the university’s commitment to implementing research plans and priorities both on the national and the university level, keeping pace with scientific progress, under the theme ‘Research for Future Aspirations.’ The forum was sponsored by ExxonMobil, which shares a strong academic-industrial partnership with the university, enhancing Qatar University’s research and academic activities.

The Forum was attended by HE Abdullah Bin Hamad Al-Attiyah, Chairman of the Abdullah Bin Hamad Al-Attiyah International Foundation for Energy and Sustainable Development and former Deputy Prime Minister and Minister of Energy and Industry, HE Sheikh Dr. Faleh bin Nasser bin Ahmed bin Ali Al Thani, Minister of Environment and Climate Change, QU President Dr. Omar Al-Ansari and Prof. Mariam Al-Maadeed, Vice President for Research and Graduate Studies at QU.

During the opening of the research exhibition of the Forum by Dr. Omar Al-Ansari, President of Qatar University.

In his address, Dr. Omar Al-Ansari, the President of Qatar University, emphasized that the Forum stands as an important event for the university's ongoing commitment to research, education and community service. Adding that this event not only promotes a culture of awareness and research but also contributes to sustainability and leadership initiatives, keeping pace with technology and artificial intelligence while serving as a valuable resource for decision-makers.

He also highlighted how the Forum marks a significant milestone in the realm of research and graduate studies, serving as a platform that brings together students, researchers and stakeholders from various public and private entities, both domestically and internationally. It offers a valuable opportunity to review accomplished research milestones and explore new paths that contribute to the nation and society's journey towards establishing a knowledge-based economy, aligning with the goals of the Qatar National Vision 2030.

Prof. Mariam Al-Maadeed, Vice President for Research and Graduate Studies at QU presented the guests with an overview of the research sector at QU. She showcased the four pillars of research at QU: Energy and Environment, Health and Biomedical Sciences, Information and Communication Technologies (ICT) and Social Sciences and Humanities. She also discussed the various ways in which QU contributes to the Qatar National Vision 2030, QU's scholarly output, the external grants that support QU research and various programs and initiatives that promote research. The presentation demonstrated a strategic commitment to advancing both foundational and transformative research excellence. It also highlighted efforts to distinguish graduate students and foster interdisciplinary research, contributing to economic diversity and enhancing global competitiveness. The positive outcomes of these initiatives are evident in Qatar University's notable rankings in global university rankings, such as the QS World University Rankings and the Times Higher Education World University Rankings.

Prof. Al-Maadeed also highlighted numerous new grants that will have an impact on research output at Qatar University and in Qatar. In addition, to external research grants in collaboration with more than 360 educational institutions worldwide. International collaboration has yielded various outcomes, including the establishment of the Academic Network for Development Dialogue, aimed at promoting collaboration and dialogue between the United Nations and academic institutions. The network currently includes 36 educational institutions from around the world, supporting the goals of sustainable development.

The research exhibition saw active participation from various colleges, centers and offices within the university's Research and Graduate studies Sector. The event included a dedicated area for showcasing 234 research posters and a research museum featuring diverse models of research prototypes.

Numerous informative sessions took place during the forum, on the first day, a leadership dialogue was conducted with HE Abdullah bin Hamad Al-Attiyah; Dr. Hanan Al-Fayadh moderated the dialogue, focusing on scientific research, its global significance and its role in overcoming challenges and supporting sustainable development efforts.

Various panel discussions took place, with the first session centered on Fostering Sustainability and Socio-economic Development, which was moderated by Prof. Fatma Al-Sowaidi, the Director of Qatar University Press. The panel included the participation of HE Dr. Mohammed bin Saleh Al-Sada, former Minister of Energy and Industry, Major General Hamad Al-Nuaimi, the President of the National Service Academy and Dr. Najah Ashry, Vice President for Strategic National Advancement at King Abdullah University of Science and Technology.

Another panel discussion focused on Entrepreneurial

Qatar University Young Scientists Center's booth at the Forum.

Readiness and Innovation for the Future, this panel was moderated by Dr. Faisal Al-Hababi, Associate Dean for Research and Graduate Studies at the College of Law, Qatar University. The session featured Mr. Fahad Al-Mohannadi, a member of the Board of Trustees of the Abdullah bin Hamad Al-Attiyah International Foundation for Energy and Sustainable Development, Dr. Sheikha AlSanad, Program Manager of the Sustainability and Reliability of Infrastructure Program at the Energy and Building Research Center, Kuwait Institute for Scientific Research and Dr. Al-Hareth Al-Khater, Deputy Medical Director of the National Center for Cancer Care and Research at Hamad Medical Corporation. Additionally, PhD student Ms. Fatima Qafoud from Qatar University participated in the discussion.

Mr. Fahad Al-Boinin, a Research Assistant at the Social and Economic Survey Research Institute at Qatar University moderated a third panel session, titled "Aspirations and Challenges." The session explored various aspects, including the exploration of research and development trends. The discussion featured the insights of Sheikh Dr. Soud Khalifa Al Thani, Director of Green Development and Environmental Sustainability at the Ministry of Environment and Climate Change, Dr. Nibal Idlebi, Acting Director of the Statistics, Information Society, and Technology Cluster for the United Nations Economic and Social Commission for Western Asia (UN-ESCWA) and Eng. Jassim Ali Al-Mejali, Engineering and Systems Director at Barzan Holdings. Additionally, the session included Noof Al-Msallam, a student from the Department of International Affairs at the College of Arts and Sciences, Qatar University.

On the second day of the forum, a discussion was held on "Empowering Cancer Therapeutics: Artificial-Intelligence-Driven and Testing of Novel Bioactive Molecules in Animal Models," presented by the Laboratory of Animal Research Center at Qatar University. The second day also saw an introductory presentation on Intellectual Property Rights 101 by the Innovation Office at Qatar University, featuring Jamal Abu Ghaida, Managing Partner of ARAMARKS Intellectual Property and Square Patton Bogs.

Throughout both days of the Forum, there were acknowledgments for sponsors and the distribution of awards: Research Excellence, Qatar University Innovation, Research Posters, Visualization Challenge and Graduate Studies. The Research Support Department announced the winners of the internal grants for the seventh cycle at Qatar University.

Dominic Genetti, President and General Manager for ExxonMobil Qatar, congratulated Qatar University on the success of the Annual Research Forum. He praised the Forum for its lively discussions on achieving a more sustainable future through science, innovation and technology, anticipating valuable contributions to Qatar's sustainability efforts.

The Annual Research Forum and Exhibition is the meeting platform for students, researchers and academics from the university's colleges, research centers and institutes, including partners and stakeholders internally and externally. The Forum offers QU the opportunity to demonstrate how it has been addressing the community's challenges through research anchored on a vibrant partnership with industry and other stakeholders, including institutions and research centers. QU aims to achieve research-driven learning, discovery and entrepreneurship. The Forum also highlights the impactful and award-winning research carried out at QU that promotes the university's vision and supports Qatar's research priorities and the Qatar National Vision 2030 goals.

The presence of the University's President and the Chairman of the Abdullah Bin Hamad Al-Attiyah International Foundation for Energy and Sustainable Development and former Deputy Prime Minister and Minister of Energy and Industry, the Minister of Municipality and Environment and other distinguished guests gathered at the Qatar University Annual Research Forum and Exhibition 2023.

The first panel discussion on the first day of the Forum.

QU Dominates the National 3MT Competition with Outstanding Researchers

In the presence of esteemed dignitaries, including Dr. Omar Al-Ansari, President of Qatar University (QU), and representatives from various universities, the National 3MT Competition marked a significant milestone in the academic landscape. The National 3MT Competition, sponsored by ConocoPhillips Qatar, witnessed the participation of 17 exceptional students representing nine universities in Qatar.

Group Photo with the University President, Vice President for Research and Graduate Studies, University Presidents and the Judges Panel of the National 3MT Competition.

In his address at the event, Dr. Omar Al-Ansari, QU President, emphasized the importance of organizing such a prestigious graduate student competition. Dr. Al-Ansari stated that the National 3MT Competition is a celebration of the diversity of research projects in the country, spanning various disciplines from medicine to engineering, politics to economics and everything in between. The finalists in the competition addressed some of the most challenging issues facing the society today. He added that this event is a "testament to the power of concise communication and the art of simplifying complexity."

Dr. Al-Ansari extended a warm welcome to students from across Qatar, embracing the vibrant atmosphere of friendly competition and a collective dedication to fostering community bonds and enhancing the overall student experience on the university campus. He also expressed his deep gratitude to the esteemed judges' panel, which undertook the significant task of evaluating the students' presentations. The panel included Dr. Abdulrahman Salem Al-Kuwari, physician and writer; Ali bin Tuwar Al-Kuwari, TV presenter and adventurer, Dr. Samer Adham, Director of the ConocoPhillips Global Water Sustainability Center, Dr. Fatima Al-Sulaiti, Director of International Cooperation and Government Affairs at Qatar Museums and Amal Arab, journalist and TV presenter in Al Araby TV.

Prof. Mariam Al-Maadeed, Vice President for Research and Graduate Studies at QU, expressed her admiration for the final contestants and their remarkable presentations. She commended their dedication to research and innovation and their ability to convey ideas effectively, saying, "I applaud the final contestants and their outstanding presentations, their dedication to research and innovation and their ability to clearly convey ideas. She added, "The National 3MT Competition reminds us of the deep impact of research and its vital role in meeting national needs."

On this occasion, Mr. Brandon S. Viator, Technical Manager of ConocoPhillips Qatar, congratulated the winners and participants for another successful round of the National 3MT Competition, recognizing the inspiring academic achievements and innovations highlighted. He affirmed their commitment, alongside Qatar University, to support young academic researchers in the country, empowering them to make meaningful contributions for a better future.

The contest was characterized by intense competition and the audience applauded enthusiastically, underscoring the seriousness and significance of the researchers' subjects. The winners of the National 3MT Competition were announced during a ceremony held at Qatar University. The first place was secured by Fatima Mohammed Qafoud, a PhD student in Biomedical Sciences at the College of Health Sciences at QU. Second place was claimed by Soukayna Ait Hammou, a Master's student in Media and Cultural Studies from the Doha Institute for Graduate Studies, while the third place was awarded to Asma Anwar Elashi, a PhD student in Genomics and Precision Medicine at the College of Health and Life Sciences at Hamad Bin Khalifa University (HBKU).

The top three winning students of the National 3MT Competition.

QU Holds the Orientation Day for New Graduate Students - Fall 2023

The Office of Graduate Studies within the Research and Graduate Studies Sector at Qatar University (QU) held an orientation meeting for newly admitted graduate students for the Fall 2023 semester. The event was held on Saturday, 26 August 2023 at the Ibn Khaldon Hall and was attended by Dr. Ahmad Al-Own, Dean of Graduate Studies at Qatar University, along with representatives from various colleges within the university.

The purpose of the Orientation Day was to introduce newly accepted students to the unique academic journey of graduate studies. This event marks one of the crucial initial steps for students as they embark on their academic and professional endeavors with confidence and a steadfast approach.

Dr. Ahmad Al-Own welcomed the new students and provided an introductory overview of the Graduate Studies Office and the services it offers. He also highlighted the challenges often faced by graduate students during the transition from the undergraduate level. Dr. Al-Own concluded his speech with a set of important tips and guidance, including time management, necessity of following academic advising and recommendations and utilizing the university's facilities, with the library being one of the most significant one.

Ms. Ghada Al-Kuwari, Assistant Dean for Student Affairs at the Graduate Studies Office, provided a detailed explanation of important policies for graduate students and critical deadlines to consider for the Fall 2023 semester. Ms. Ghada elaborated on the intricacies of the add/drop period, final withdrawal processes and the procedure for deferring admissions. She also unveiled prestigious awards for outstanding research and dissertation excellence, along with the highly anticipated Three-Minute Thesis (3MT) Competition.

The meeting also included a speech by Dr. Mary Newsome, Assistant Dean for Student Support, who highlighted the services provided through the Graduate Learning Center (GLS). These services include various activities such as the tadBootCamp, which is a training camp for workshops on writing thesis and dissertation and the tadTalks event, which covers the diverse experiences and journeys of graduate students. Additionally, there are group workshops and individual support sessions available.

Qatar University Library also participated in the meeting, with Mr. Abdalhakim Bshawi providing a brief overview of using the library's electronic resources to support students in their research endeavors. This support includes access to research papers, thesis and academic references, as well as the ability to search for these resources in both Arabic and English languages.

The event also featured notable guest speakers, each highlighting their remarkable academic journeys. Latifa Al-Mansuori, a graduate of the Executive Master's program in Leadership, and Dr. Mohi El-Din Jamal El-Din, an esteemed PhD holder in Architecture and recipient of the Outstanding Graduate Research Award, shared their experiences and strategies for overcoming academic challenges. Their insights highlighted the role of the college, program coordinators, supervisors and the Graduate Studies Office in facilitating and addressing the difficulties they encountered. In their concluding remarks, they advised new students to work diligently, manage their time effectively and utilize the available university resources.

The orientation event concluded with an interactive open discussion session, offering students the chance

Ms. Ghada Al-Kuwari, Assistant Dean for Student Affairs at the Graduate Studies Office in the Research and Graduate Studies Sector.

to engage with prominent academic figures. The Dean, Assistant Deans of the Graduate Studies Office and a representative from QU Library enthusiastically answered students' queries, ensuring a solid foundation for their academic pursuits.

It is noteworthy that QU remains firmly dedicated to supporting exceptional graduate programs, forging meaningful industry connections and collaborating closely with the local community. As part of its mission, the university offers internal research grants, generously supporting national priorities. Graduate students receive a significant share of these grants, including scholarships and awards that recognize outstanding research contributions.

Qatar University consistently strives to foster a spirit of competitiveness and excellence among its students. In this context, graduate students are encouraged to excel in their research endeavors to enhance their scientific publications. The university has taken the initiative to offer numerous awards for outstanding research conducted by students during their Master's and PhD studies, such as the Outstanding Graduate Researcher Award. This commitment to recognizing and rewarding research excellence underscores the University's dedication to academic advancement and innovation.

For more details about the opportunities that QU's graduate studies offer, graduate scholarships, or Research Distinguishing Standard, please visit these links:

Graduate Studies

Grants and Funding

Research Distinguishing Standards for Graduate Students

Qatar-Korea Business Forum holds Event

To commemorate the 49th anniversary of diplomatic relations between Qatar and Korea, the Chambers of Commerce and Industry of both countries held a Korea-Qatar Business Forum at the St. Regis Hotel, Doha, on 25 October 2023.

At the Korea-Qatar Business Forum, Dr. Dong Suk Han, Research Associate Professor at the Center for Advanced Materials (CAM) at Qatar University, presented a keynote entitled "Korea-Qatar Energy & Water Partnerships: Present Insights and Forward-Looking," offering an expert perspective on the collaborative ventures between the two nations.

This event started with a congratulatory speech by President Yoon Suk Yeol of South Korea, and HE Mohammed bin Hamad Al Thani, Qatari Minister of Commerce and Industry. Over 100 people attended from Qatar, including Mohammed bin Ahmed Tawar Al-Kuwari, Vice Chairman of Qatar Chamber. From the Korean side, attendees included Bang Moon-kyu, Minister of Trade, Industry and Energy, Woo Tae-hee, Executive Vice Chairman of the Korea Chamber of Commerce and Industry and over 150 people including the Vice Presidents of HD Hyundai, Samsung C&T, SK, and Hanwha Ocean, the CEO of CJ ENM, Lee Byung-Hak, the CEO of Nongshim.

Dr. Han presented the strategy of reducing carbon dioxide in Qatar's natural gas-centric energy industry and integrating renewable energy. He also introduced technologies for energy-efficient desalination in response to climate change, the utilization of seawater resources through seawater desalination brine and the production of hydrogen energy.

Moreover, Dr. Han stressed that one of the key activities for Qatar's zero-carbon goal is a tree-planting campaign. To support this, a research consortium has been formed with QU (Center of Advanced Materials (CAM) and Agricultural Research Station (ARS) (Mohammed Alsafran)) and the main institutes like BinTech-Korea, SK Forest and Kyungpook National University, through the International Cooperative R&D Project supported by Korea's Ministry of Land, Infrastructure and Transport. They are developing technology to create green vertical gardens by recycling wastewater inside buildings and to produce smart seedlings. The energy-saving smart green city construction through this approach is an innovative way to address climate change and water scarcity simultaneously.

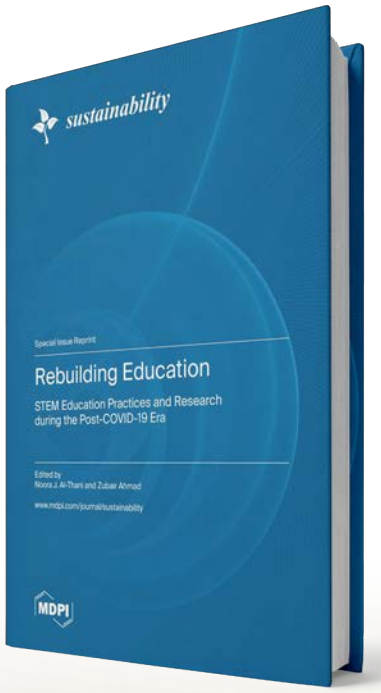
H.E. President Yoon Suk Yeol, President of South Korea and H.E. Shekh Mohammed bin Hamad Al Thani, Minister of Commerce and Industry attending the Qatar-Korea Business Forum.

Dr. Mohammad Irshidat, Director of CAM, highlighted the importance of this event as a milestone in the relationship between Qatar and South Korea in innovating solar energy. He pointed to Samsung C&T's recent contribution to constructing a solar power plant in Qatar as an example of this collaboration. He also emphasized CAM's commitment to developing blue energy technology using seawater. He explained that this technology has the potential to revolutionize the energy industry in Qatar by providing a clean and sustainable source of energy.

Prof. Mariam Al-Maadeed, Vice President for Research and Graduate Studies at QU, commemorated the enduring 49-year alliance between Qatar and South Korea, a partnership that has yielded numerous industrial and civil infrastructure projects, including power and desalination plants. Prof. Mariam highlighted QU's proactive role in fostering this bilateral cooperation, noting the university's history of hosting significant research symposiums. Notable among these were the Climate Change Forum in 2022 and the New Energy Development Forum in 2023, both of which were organized in conjunction with the Embassy of Korea. These forums underscore the shared commitment to advancing research and development, further cementing the strong ties between the two nations.

QU Students Successfully Complete the 5th Summer Research Internship Program 2023 (SRIP 2023);

Unveil the Book 'Rebuilding Education' at Training Program's Closing Ceremony



The Summer Research Internship Program has been completed successfully for the past five consecutive cycles at Qatar University (QU). The key focus of this program is the enhancement of the students' research .experiences in real-world labs and improving their scientific and analytical skills

The SRIP 2023 was organized at QU in three different tracks. Track 1, "Outcomes-Directed Intensive Research," aimed at enhancing students' research capacity with distinct outcomes, which was carried out in 2 phases, with phase 1 conducting a Research Methodology course from 12 March 2023 to 16 March 2023. Meanwhile, phase 2 was organized between 11 June 2023 and 31 August 2023 alongside the other two tracks.

Students from all three tracks received certificates (numbering up to 147) for their successful project completion. 60 students from Track 1 presented tangible outcomes, including the scientific posters and working prototypes. On the other hand, Track 2 "Research and Training Focused," witnessed active participation from 71 students who completed their projects focusing on technical skill development. In addition, Track 3 "Industry Practical Experience Program" included prominent external organizations, such as Hamad Medical Corporation (HMC), which offered internships for 16 QU students.

The research projects were accomplished by nine research centers and seven colleges. The research centers include the Center for Sustainable Development (CSD), the Center for Advanced Materials (CAM), the Laboratory Animal Research Center (LARC), the Central Laboratories Unit (CLU), the Environmental Science Center (ESC), the Biomedical Research Center (BRC), Qatar Mobility Innovations Center (QMIC), the Agricultural Research Station (ARS) and QU Young Scientists Center (QUYSC). The participating colleges were the College of Medicine (CMED), the College of Dental Medicine (CDEM), the College of Pharmacy (CPH), the College of Engineering (CENG), the College of Arts and Science (CAS), the College of Business and Economics (CBE) and the College of Education (CED).

The program reached its official conclusion on October 4, 2023, culminating in the recognition of successful trainees and the announcement of the top three research programs in Track 1, the first-place winner was granted to the project, "IOT-Based Gas Emission Monitoring Solution during Composting in Waste Management." The second place was awarded to the project "Artificial Intelligence for Detecting Cemento-Enamel Junctions on Panoramic Radiographs." The third-place winner in the best internship project was secured by the project "Identity Governance and Access Control Platform that Utilizes Artificial Intelligence.

The event witnessed the unveiling ceremony of the book "Rebuilding Education: STEM Education Practices and Research during the Post-COVID-19 Era Contributions," published by QUYSC. A copy of the book was handed to the Director of Research and Learning Services, Qatar National Library (QNL), Ms. Abeer Saad Al Kuwari. The surgery team from HMC also attended the event, led by senior scientist Dr. Abdelfatteh El-Omri.

Prof. Mariam Al Maadeed, Vice President for Research and Graduate emphasized the pivotal role of youth in empowering innovation and scientific research, stating, "Advancing knowledge and innovation is the cornerstone of our nation's progress, which is incomplete without fostering a multi-skilled and highly competent young generation. We witnessed this within the student projects in the summer program with the support of the colleges and the different research centers, as well as the cooperation with the industrial entities."

Prof. Noora Jabor Al-Thani, Director of QU Young Scientists Center (QUYSC), also conveyed her inspiration and support to the participants and emphasized, "It is a remarkable feat to witness the resounding success of our program, a testament to the dedication and hard work of our center and the enduring spirit of our students. Together, we believe in achieving remarkable milestones in securing the research-based national capacity that will undoubtedly shape a sustainable future for all."

Photo from the closing ceremony of the Fifth Summer Research Training Program and honoring the winning research projects in the program.

Ibn Khaldon Center at Qatar University Organizes First Cycle of Interdisciplinary Research between Social Sciences and Natural Sciences Conference

Ibn Khaldon Center for Humanities and Social Sciences organized the first Annual Conference on Interdisciplinary Research. The conference dedicated its first session to Interdisciplinary Research that seeks to link Social Sciences and Natural Sciences at any level of research, to facilitate interactions between these disciplines. The conference provided a networking opportunity for researchers, who would positively reflect upon their research topics and development and enhance cognitive integration among them as researchers or as graduate students, as well as open horizons for researchers in the fields of Social Sciences, Humanities and Natural Sciences.

Prof. Mariam Al-Maadeed, Vice President for Research and Graduate Studies, attending the Interdisciplinary Conference between Social Sciences and Natural Sciences.

The conference was inaugurated with a welcoming speech by the Vice President for Research and Graduate Studies at Qatar University, Prof. Mariam Al-Maadeed. At the beginning of her speech, she welcomed the guests who participated in the conference with their research papers and the honorable attendees. Then, she pointed out the importance of the conference, which acts as a bridge between Natural and Social disciplines to eliminate the gap and create new pathways for the betterment of society. She also commended the efforts exerted by Ibn Khaldon Center, which organized several events and carried out practical projects that contributed to the field of Interdisciplinary Studies between different sciences.

The conference continued for two days from 30 September to 1 October 2023, with the participation of 28 researchers of various disciplines from around the world. The researchers presented their papers that share attempts to bridge between Natural sciences on one side, and Quranic, Islamic, Social, Political, Psychological and Educational studies on the other side.

In his keynote speech, the Director of Ibn Khaldon Center, Dr. Nayef Bin Nahar spoke about the importance of the link between Natural and Social Sciences. He stressed that, "the relationship between the two disciplines is significant and dangerous at the same time, because developing such theorization is not easy, especially in the Arab world where we notice a crucial and decisive separation between disciplines. Consequently, researchers who are capable of avoiding this separation have to study other disciplines to bridge the relationship between these sciences."

In his speech, Dr. Nayef mentioned the idea prevailing among a large number of people that Natural Sciences are clearly different from Social Sciences, because "Social Sciences study man who has a will. A will means freedom and freedom means having multiple choices, which make it difficult to predict issues in Social Sciences; while Natural Sciences study matter, which entails laws and inevitability."

However, Dr. Nayef considers the differences between Natural and Social Sciences as unclear and complicated because although Natural Sciences have an inevitable and certain dimension, its results are not always fixed, but there is also what is speculative and probabilistic. Similarly, even though Social Sciences are concerned with man who was granted free will, this does not mean that he exceeds inevitability. There is a fixed dimension in man too. This fixed dimension confers Natural Sciences the right to integrate into Social Sciences. Hence, both Natural and Social Sciences have common areas that need to be investigated further so that their results can be better utilized.

The five sessions of the conference followed under the following titles: "Sociology and Natural Sciences," "Policy, Sociology and Natural Sciences," "Islamic Studies and Natural Sciences," "Quranic Studies and Natural Sciences," and "Psychology, Education and Natural Sciences." After that, there was a session titled: "Social Sciences and Humanities in Programs of College of Medicine" in which four professors presented their experiences in integrating Humanities and Social Sciences into the colleges' programs of medicine in Qatar, Egypt, Morocco and Saudi Arabia.

The conference concluded with an open session titled "Social Sciences and Natural Sciences: Questions of Connection and Separation." The session discussed the need for connection and separation between the Natural Sciences, Social Sciences and Humanities. The majority of participants in the session asserted the need for connecting these sciences, in addition to asserting the necessity of the scientific discipline as a starting point in the world of research and study.

Innovation Office

Building Intellectual Property Awareness of QU Community

The seminars and workshops were presented by Dr. Talal Altahtamouni, the Acting Manager of Innovation in the Research Planning and Development Department, Office of the Vice President for Research and Graduate Studies at Qatar University.

1. Patents Symposium titled "What Are Patents, and How Do We Obtain Them?"

The Innovation Office in the Research and Graduate Studies Sector at Qatar University (QU) organized the Patents Symposium – "What Are Patents and How Do We Obtain Them?" that was held on Wednesday 27 September 2023, in the Qatar University Library. The symposium was aimed at QU faculty members, employees, researchers, visiting professors and students from various specializations to provide them with the knowledge and educational experience and raising the level of awareness of the types and importance of intellectual property. Moreover, to determine whether their technology and research is patentable and how different the invention is from what already exists in the prior art of the intellectual property.

In the presence of the speakers. Dr. Sushil Iru and Dr. Sean Dean, Lead Attorneys and Patent Attorneys at US law firm Fish & Richardson P.C. Key, discussed the Overview of Prior Art/Patent Search, shared the Patent Search Tools, Strategies and presented the patent and patent lifecycle information.

In addition, they discussed how to make a preliminary evaluation of the invention, and the extent of its patentability, in terms of novelty, clarity and industrial applicability; while ensuring that all relevant employees in the unit receive the necessary training in areas related to intellectual property protection and management.

This symposium also enabled inventors to learn about the best-recognized practices for protecting property and to determine whether their patent will violate the rights of other patents or could invalidate a competing patent by receiving and empowering those interested and those concerned with intellectual property protection with the most basic skills in the field of searching for Patents.

By the end of the session, faculty members, researchers and students exchanged questions with the experts to further the participatory and interactive aspect.

2. Lecture on "Intellectual Property Fundamentals & Innovation Office Services"

The Innovation Office at QU conducted a lecture on the Intellectual Property Fundamentals & Innovation Office Services on October 1, 2023 for the College of Engineering's PhD Students as part of their Applied Research Methodology course. This activity aimed to promote intellectual property awareness, capacitate the students from different engineering branches, encourage intellectual property protection for every completed research and promote commercialization of technology-generated research. Overall, the activity was an informative and educational experience for the students, with positive feedback on this activity.

3. Online Workshop "Filing a Patent at Qatar University: What You Need to Know"

The Innovation Office at QU conducted an online workshop on the Intellectual Property Fundamentals & Innovation Office Services on October 8, 2023. The workshop aimed at raising awareness among the faculty, researchers and students towards the importance of intellectual property identification and protection when dealing with research projects. The workshop covered topics such as IP rights, Requirements for Patentability, Invention Disclosures, IP Evaluation and Protection and tools for Patent Searching.

From the left: Dr. Sushil Iru and Dr. Sean Dean, Lead Attorneys and Patent Attorneys at US law firm Fish & Richardson P.C. Key and Dr. Talal Altahtamouni, Acting Director of Innovation Office.

4. Lecture on "Introduction to Intellectual Property Rights, Procedures and Requirements for Filling IP"

The Innovation Office at QU conducted a lecture on Intellectual Property Rights (IPR), procedures and requirements for filling IP on October 29, 2023 for the College of Engineering's Masters Students as part of their Applied Research Methodology course. This activity aimed to create awareness and familiarization with the IPR and processes. The lecture covered topics such as Intellectual Property–Concept, Identification and Creation, Evaluation, the importance of all forms of IPR and procedures for registering Intellectual Property. Overall, the activity was an informative and educational experience for the students, with positive feedback on this activity.

5. Lecture on "Intellectual Property Rights and Their Protection"

As the Innovation Office continued to visit the graduate students in their Research Methodology Classes, the Innovation Office conducted a lecture for students of the Materials Science and Technology Master Program at the College of Arts and Sciences on October 31, 2023. The activity aimed to create awareness and familiarization with the Intellectual Property Rights (IPR) and processes of IP protection.

6. Online Workshop "Patent from Idea to Market-Inventor's Role"

To continue raising awareness of Intellectual Property and Technology Transfer (TT) among the faculty, researchers and students at Qatar University; the Innovation Office (IO) conducted an online workshop on November 12, 2023. The topics covered are publishing and protecting-can researchers have both, patent strategies, the patenting process and the TT process? Why would a researcher want to participate in the TT process? What is the role of the inventor in the TT process?