

مركز المواد المتقدمة CENTER FOR ADVANCED MATERIALS

## Center for Advanced Materials NEVSLETER Issue 6

Ultrasonic Flow detector device located at CAM

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# Achievements

Awards & Certificates Awarded Grants

#### Academic Research Grant (ARG)-1st cycle, supported by QRDI-QNRF

LPI	Title	
Prof. Aboubakr Ali	Localized Corrosion Inhibition in Sour Media for Welded C-steel of the Oil and Gas Pipelines.	
Prof. Peter Kasak	Developing efficient atomic-scale catalysts via strong metal-to-support interactions for fuel cell technologies.	
Dr. Abdul Shakoor	Advanced surface protection solutions to manage and mitigate corrosion for in- service coated steel parts (SP&CM).	
Dr. Khouloud Jiassi	Recycled Green and Cheap Biochar-based Catalysts for Carbon Dioxide (CO2) Methanation.	

Qatar University Internal Grants – Cycle 7					
Grant type	LPI	Title			
High Impact	Prof. Mohammad Irshidat	Robotic 3D-Printing of thermally isolated structures made of sustainable and recycled construction materials.			
High Impact	Dr. Abdul Shakoor	Abdul Shakoor Novel High entropy-cation disordered rock salt (HE-DF positive electrode materials for Na-ion rechargeable batterie An experimental and theoretical approach.			
IRCC	Dr. Dong Suk Han electrochemical (ROSE) system for sustainable and sat production of irrigation water for hydroponic systems.				
IRCC	Dr. Anton Popelka	Multifunctional surface-engineered membranes with self- cleaning and anti-fouling properties for water remediation.			
IRCC	Dr. Peter Kasak	Two-dimensional-based platforms for enhanced prostate cancer biomarker enrichment and detection.			
Post-Doc	Prof. Mohammad Irshidat	Development and thermomechanical performance optimization of alkali-activated composites to fabricate insulation building blocks by 3D printing technique.			
T2RP	Prof. Syed Zaidi	Sustainable development of Cellulose Acetate membranes from Date palm waste for produced water treatment.			
Visiting Researcher	Dr. Khalid Bani Melhem	Planning of cooperation in research and education about sustainable technologies for treatment of wastewater in Qatar hot climate.			

#### Undergraduate Research Experience Program (UREP)-30th cycle, supported by QRDI-QNRF

LPI	Title	
Dr. Maryam Al-Ejji	Investigating the Effect of Sintering Additives on the Properties of Alumina Toughened Zirconia Ceramic Composites for biomedical applications.	
Prof. Syed Zaidi	Removal of heavy metals from wastewater by aerogel derived from Date p. waste.	
Dr. Dong Suk Han	Development of smart molecular recognition membrane materials for lithiur recovery from liquid solutions.	
Dr. Anton Popelka	Stimuli-responsive 4D-printed innovative materials for water treatment.	
Dr. Khalid Bani Melhem	Treatment of hydroponic wastewater solution and electrocoagulation technique.	
Dr. Mohamed Abbas	Synthesis and Characterization of Aluminum Waste Derived Nanocomposites i Water-Based Drilling Fluids.	
Dr. Mostafa Sleim	Facile one-pot synthesis of a hybrid scaffolds multi-porous bioactive glass with drug releasing achievability loaded on different types of polymeric fibers for bone regeneration.	

#### High School Research Experience Program (HSREP), supported by QRDI-QNRF

LPI	Title
Dr. Kishor Kumar Sadasivuni	A Sustainable Future: Utilizing Waste Materials in Thermoelectric Power Generation
Dr. Abdul Shakoor	Smart super hydrophobic antifouling coatings for seawater systems

#### Awards & Certificates Awards

Dr. Abdul Shakoor's team, a Research Assistant Professor at CAM, won the best poster award in the National Committee for the Prohibition of Weapons (NCPW) category at the 11th Awareness Workshop for University Students on Conventions of Weapons of Mass Destruction (WMD) held in Doha, Qatar, on November 22, 2023. The awarded poster was titled "Cloaking Effect in Materials: A Smart Way to Create Invisibility".



# **Achievements**

#### Awards & Certificates Awards



Two teams from CAM have received distinguished awards at the Qatar University Annual Research Forum and Exhibition (QUARFE)-2023. The first team, under the leadership of Dr. Abdul Shakoor (Research Assistant Professor), has attained the Visualization Challenge award along with the best poster award in the researcher's category. The second team, led by Dr. Dong Suk Han (Research Associate Professor), won the best poster award in the student category.

#### Highlighting Excellence: CAM Research Assistants Win Big at ICSEWEN'23

SEVIEN23

In a remarkable achievement, Miss Taghreed Al Gunaid and Miss Izza Fatima, research assistants at the Center for Advanced Materials (CAM), have secured first and third places in the Best Poster Presentation Award at the International Conference on Sustainable Energy-Water-**Environment** Nexus in Desert Climates 2023 (ICSEWEN'23). Their outstanding contributions underscore CAM's commitment to excellence and innovation in research."

# Achievements

**Publications** 

#### **High Impact Representative Publications**

Corresponding author	Title	Journal	Impact factor
Dr. Abdul Shakoor	Impact of alternate Mn doping in ternary nanocomposites on their structural, optical and antimicrobial properties: Comparative analysis of photocatalytic degradation and antibacterial activity	Journal of Environmental Management	8.9
	A focused review of the hydrogen storage tank embrittlement mechanism process	International Journal of Hydrogen Energy	7.14
Dr. Kishor Kumar Sadasivuni	A Path towards Timely VAP Diagnosis: Proof-of-Concept Study on Pyocyanin Sensing with Cu-Mg Doped Graphene Oxide	Biosensors	5.4
	A Novel Design and Development of Multilevel Inverters for Parallel Operated PMSG-Based Standalone Wind Energy Conversion System	Iranian Journal of Science and Technology, Transactions of Electrical Engineering	6.4
Dr. Igor Krupa	Highly conductive phase change composites based on paraffin- infiltrated graphite panels for photo/electrothermal conversion and storage	Journal of Energy Storage	9.4
	Purification of emulsified oily polluted waters with modified melamine foams	Environmental Technology and Innovation	7.1
Dr. Khalid Bani Melhem	Trehalose-conjugated lentil-casein protein complexes prepared by structural interaction: Effects on water solubility and protein digestibility	Food Chemistry	8.8
	Integrating of electrocoagulation process with submerged membrane bioreactor for wastewater treatment under low voltage gradients	Chemosphere	8.9
Dr. Peter Kasak	Glycans in extracellular vesicles toward clinical applications	Biotechnology Advances.	16
Dr. Dong Suk Han	Integrated seawater hub: A nexus of sustainable water, energy, and resource generation	Desalination	9.9
Dr. Dong Suk Han	Efficient lithium recovery from simulated brine using a hybrid system: Direct contact membrane distillation (DCMD) and electrically switched ion exchange (ESIX)	Desalination	9.9

#### Celebrating Excellence: Faculty Members Recognized as Top 2% Scientists



We are delighted to extend our sincere congratulations to our esteemed faculty members, Prof. Syed Zaidi and Dr. Kishor Kumar, for their outstanding accomplishments! We are thrilled to announce that they have been honored as top 2% scientists in academic citation according to the esteemed Stanford University ranking for the year 2023. Their dedication to excellence and contribution to their fields are truly commendable!



#### **PEOPLE** Promotion & New Appointment



CAM's director, Prof. Mohammad Irshidat, and Dr. Anton Popelika, a Research Associate at CAM, have been appointed as Associate Editor-in-Chief and Journal Manager, respectively, for the Journal of Emergent Materials at Springer. This journal is indexed in Scopus and Web of Science, boasting an impressive impact factor of 3.8 as of 2023.

Journal by

CAM's Research professor Dr. Maryam Al-Ejji Leads the ALECSO Water Chair at CAM

Qatar University (QU) announced in a press conference that it had achieved the distinction of being the first university in the Arab Gulf region to secure three academic chairs in the Arab League Educational, Cultural and Scientific Organization (ALECSO). In this, the ALECSO Chair for Water is being held under the direction of Dr. Maryam Al-Ejji, who is a Professor in QU's Center for Advanced Materials.

During the press conference, Dr. Maryam Al-Ejji noted that obtaining this chair is in line with achieving the 2030 Agenda for Sustainable Development. The activities associated with the chair aim to enhance collaborative research and scientific cooperation between the university and research institutions in the region.

Dr. Maryam Al-Ejji obtained her Ph.D. in materials science and engineering from Imperial College, London, in 2020. Dr. Al-Ejji's research activities have received over \$650,000 in funding in the past few years. Her research interests include 3D printed fabrication of membranes, nanocomposites, polymer composites, and their versatile applications.

Read more: http://tinyurl.com/mtfs6n26



#### Dr. Reema Al-Asfar Research Associate

Dr. Reema Al-Asfar joined CAM this semester as a Research associate; her experience is in the field of sustainable environment, having obtained her Ph.D. from Hamad Bin Khalifa University, Qatar, in 2023. Her research interests include polymeric nanocomposites, membrane fabrication and characterization, and mechanical modeling of polymeric materials. Dr. Al-Asfar earned her Bachelor's degree in Chemical Engineering from Texas A&M University, Qatar.

#### Mrs. Marwa Elazhari Lab Technician

Mrs. Marwa Elazhari is a lab Technician who joined this semester at the Center of Advanced Materials at Qatar University. She has a Bachelor of Science in chemistry from Qatar University. She has been working at Qatar University for 20 years. She has great experience in the analysis of inorganic elements by ICP-OES Instrument and she did extensive marine analyses in water and sediments. She has participated in a lot of internal and external projects covering different topics and fields.





A number of CAM faculty have participated in the judging process of students participating in the second session of the "STEM in Sports" program for the secondary stage. The program aims to encourage students to explore practical and innovative applications of modern technology, such as 3D printing and artificial intelligence.



## PEOPLE CAM'S visiting fellow

The Center for Advanced Materials welcomes Dr. Sahar Dalahmeh, an Associate Professor from the Faculty of Technology and Natural Science at Uppsala University, Sweden, as part of it's visiting fellow program supported by Qatar University's internal grant.

Dr. Sahar Dalahmeh is an Associate Professor in Biotechnology (specializing in Wastewater Treatment and Environmental Remediation) at the Faculty of Technology and Natural Science, Uppsala University, Sweden. Sahar holds a Ph.D. in environmental technology with a focus on wastewater treatment from the Swedish University of Agricultural Sciences. Following her Ph.D. and over more than 10 years of research, she investigated sustainable and circular wastewater treatment systems, employing nature-based processes. Her work involved biochar-based biofilters and wetlands for the breakdown of organics, nitrogen transformation, and the bio-absorption and retention of micropollutants such as pharmaceutical residues, per- and polyfluorinated alkyl acids (PFAAs), and microplastics.

In addition to wastewater treatment, she has extensive research focus and experience in analyzing environmental contamination with micropollutants. Sahar has researched in Sweden, Africa, and Asia, assessing pharmaceutical pollution and PFAAs in surface runoff, soil, and plants exposed to these micropollutants through wastewater and other vectors. Sahar has authored more than 50 scientific works, including peer-reviewed articles, book chapters, and scientific reports, and is currently supervising three Ph.D. students and 4 master students.



#### Selection for Marie Curie Fellowship

Mr. Asif Saud, research assistant at Center for Advanced Materials (CAM), Qatar University, has been selected for a prestigious Marie Curie Fellowship. Working under the expert guidance of Prof. Syed Javaid Zaidi, a renowned name in desalination technologies, Asif has achieved this competitive fellowship. Prof. Zaidi's mentorship at the Centre for Advanced Materials has been instrumental in Asif's development and achievements. Mr. Asif will join the Marie Curie Fellowship at Aalborg University, Denmark under the supervision of Dr. Ceina Anna Quist Jensen and Dr. Aamer Ali to further his research on Photothermal Membrane Crystallization for the recovery of magnesium and lithium from nanofiltration brine. His journey will include 3 secondments at KU Leuven, Belgium, CNR Italy, and Aquallia, Italy, focusing on advanced research in membrane crystallization. This project is a key part of the European Union's EXBRINER initiative. The initiative brings together 8 European universities, research centres, and 4 industrial companies, representing a significant collaboration in the field.



Asif's selection for this scholarship and participation in the Marie Curie Fellowship is a testament to the high-quality research and academic prowess fostered at the Center for Advanced Materials in Qatar University and through the mentorship of Prof. Syed Javaid Zaidi. His achievements signify a major milestone in his career, contributing to the field of mineral mining and furthering the global understanding of desalination technologies.

#### CAM Graduate Researchers Excel: Master's Program Success

We're thrilled to extend our warmest congratulations to Miss Tasneem Elmakki and Miss Roba Al-Muhtasib, graduate researchers at CAM, for their outstanding achievement in passing their oral defense exam for the Master of Science in Materials Science and Technology Program. Both their projects were part of the QNRF Graduate Sponsorship Research Award (GSRA) 8th cycle.



# **Center Activities**

#### PARTICIPATIONS

Conferences, Workshops, and Forums.

Food and water security for the GCC & its role in achieving sustainable development workshop.

Dr. Khalid Bani Melhem, research associate professor at CAM, participated in a working paper entitled "A future vision for contributing to the implementation of water security in Qatar" in the workshop organized by the Planning and Statistics Authority.



## Workshop on: Fundamentals of scientific research.

Dr. Mohamed Kamal Abbas, the research assistant at CAM, has delivered a workshop entitled "Fundamentals of Scientific Research" as part of the ongoing collaboration between Qatar University's Scientific Research Club and the Center for Advanced Materials (CAM).



## Innovation for Sustainable Water Management forum / ALECSO.

Dr. Khalid Bani Melhem from the Water Technology Unit at CAM participated in the first Arab forum on water scarcity and management in arid and semi-arid regions. The forum, titled "Innovation for Sustainable Water Management," was organized by the Faculty of Agriculture at the University of Jordan in collaboration with the Arab Organization for Education, Culture, and Science (ALECSO) and the Jordanian National Committee for Education, Culture, and Science from February 7-8, 2024.

Dr. Bani Melhem presented a paper highlighting the vision of the Water Technology Unit at Qatar University as well as its objectives to enhance the concept of water security in Qatar through qualitative research contributing to solving water sector challenges.



#### 9th Solid Chemistry Conference, SCC 2023.

Dr. Kishor, Research Assistant Professor at CAM, participated in the 9th Solid Chemistry Conference, SCC 2023, organized by the Tunisian Chemical Society with topic entitled: "Electrochemical CO<sub>2</sub> Reduction and Hydrogen Generation for Sustainable Environmental Remediation".



#### Environment and Climate Challenges in Qatar and the Gulf / Expo Doha Horticulture Exhibition 2023.

Dr. Khadija Murad from the Center for Advanced Materials participated as a keynote speaker in the panel discussion titled "Environment and Climate Challenges in Qatar and the Gulf," offering an academic perspective on addressing climate change. The event, sponsored by the Ministry of Environment and Climate Change, took place in the cultural area of the Expo Doha Horticulture Exhibition 2023.



#### Management of produced water in oil & gas.

Dr. Mohamed Hassan, research associate professor at CAM, participated as a panelist at the "Meet the Experts Series" hosted and Co-organized by Conoco Phillips and the Qatar Science & Technology Park, under the title of "Management of produced water in oil & gas"



## 4th International Sustainability Conference (ISC 2023).

Miss. Tasneem, Research Assistant at CAM, participated in the 4th International Sustainability Conference (ISC 2023) with a talk entitled: Enabling Circular Economy of Lithium Integration: A Sustainable Electrochemical System for Selective Lithium Recovery from Spent Li-Ion Batteries.







#### International Conference on Sustainable Energy-Water-Environment Nexus in Desert Climates (ICSEWEN'23)

CAM professors participated in the third edition of the International Conference on Sustainable Energy-Water-Environment Nexus in Desert Climates (ICSEWEN'23) held in Doha, Qatar. The themes of the conference comprised: Energy Transition, Water Resources, Processes and Advances, Environmental Pollution and Mitigation, Innovative Solutions for the Oil and Gas Industry, Sustainability and Digital Solutions.



Prof. Syed Zaidi, Research Professor at CAM, played a pivotal role as both the keynote speaker and a panelist at the conference. Additionally, Dr. Dong Suk Han, a Research Associate Professor at CAM, demonstrated leadership and expertise as the co-chair in two technical sessions—"Hydrogen and CO<sub>2</sub> Management" and "Water Sector Technology Advances: Moving from Research Towards Commercialization"—at the same conference.

#### 'Korea International Water Week 2023'

At the invitation of the Korea Water Cluster operated by the Korea Environment Corporation under the Ministry of Environment, Prof. Mohammad Irshidat and Dr. Dong Suk Han of the Center for Advanced Materials (CAM)- Qatar University (QU) team attended the 'Korea International Water Week 2023' held at EXCO in Daegu from December 4th to 8th, 2023. This event, co-hosted by the Ministry of Environment, Daegu City, Korea Environment Corporation, and the Water Resources Corporation, and organized by the Korea Water Forum, has been an annual international event since 2016. The event's main theme was 'Sustainable Water Management for Humans and Nature,' with a particular focus on managing the increased risk of water-related disasters in the era of climate crisis. The event facilitated discussions on global efforts and solutions to address recent water issues and provided opportunities for networking between contractors industry companies, and water along with



Sessions on 'Promotion of the Water Industry and Overseas Expansion of Water Companies' included an 'International Seminar on Water Industry Promotion Strategy,' a 'Korea-Qatar Joint Forum,' a 'Technical Presentation and Business Consultation Meeting with Overseas Buyers,' and a 'National Water Industry Cluster Technical Tour.'



# Center for Advance Adv

Zone 6

CAM recently engaged in a productive meeting with the National Science Foundation (NSF) team to explore and potential collaboration discuss opportunities. This meeting marks a significant step towards fostering partnerships that could drive innovation and advancement in research and development initiatives.



National Science Foundation (NSF)-US



The Center for Advanced Materials recently welcomed Mr. Ageel Al-Imam and Mr. Yousef Bu Hazza from Qatar Energy Company, to explore potential collaboration opportunities with the Center for Advanced Materials. The main discussion point for this visit was the possibility of conducting training courses for Qatar Energy Company technicians in the field of nondestructive testing. It is expected that this cooperation will result in great benefits for both institutions, as it will enhance the exchange of knowledge and the upgrading of skills.

# **Center Activities**

#### **SEMINARS**

#### 28 September 2023

Title: Nondestructive Testing and Evaluation using Guided Acoustic Waves. Speaker: Dr. Umar Amjad, Research Associate, CAM, Qatar University.





#### 10 October 2023

**Title:** 'Introduction to Radiative Cooling Technology and Its Applications.

**Speaker:** Professor Heon Lee, Department of Materials Science and Engineering, Korea University

#### 19 October 2023

**Title:** From Lab to Crime Scene: #Nanotech's new horizons in Forensic Sciences. **Speaker:** Prof. Ramzi Maalej, University of Sfax, Tunisia.





#### 19 October 2023

Title: Effects of free and encapsulated Probiotics and Prebiotics on Poultry Health. Speaker: Prof. Riadh Ben Salah, University of Sfax, Tunisia.

#### 29 October 2023

**Title:** Desalination and Resource Recovery using Membrane Capacitive Deionization.

**Speaker:** Prof. Ho Kyong Shon, University of Technology Sydney, Editor-in-chief, Desalination Journal, Elsevier.







#### 7 May 2023

**Title:** Battery storage systems for electric vehicles and large-scale grid applications.

**Speaker:** Dr. Masud Rana, The University of Queensland, Australia.

#### 20 December 2023

**Title:** Influence of Impurities on Transportation and Storage of  $CO_2$ .

**Speaker:** Dr. Nejat Rahmanian, University of Bradford, United Kingdom.





#### 24 January 2024

**Title:** From Basic Understanding to Potential Applications of a Fluorinated Terpolymer Material for Water Desalination. **Speaker:** Dr. Salim Ok, Associate Research Scientist, Petroleum, Research Center, KISR, Kuwait.

#### 15 February 2024

**Title:** Advanced Polymeric Sorbents for Wastewater Treatment.

**Speaker:** Dr. Patrik Sobolciak, Research Associate, CAM Qatar University.

**Title:** Research Highlights in Environmental Pollution with Micro-pollutants and the Potential of Biochar for Pollution Remediation.

**Speaker:** Dr. Sahar Dalahmeh, Associate Professor, Uppsala University, Sweden.









#### 5 March 2024

**Title:** Directed Assembly of Functional Polymer Films for Energy and Sustainability.

**Speaker:** Prof. Alamgir Karim, University of Houston, TX 77020.

# **Center Activities**

Participation in Qatar University Annual Research Forum and Exhibition 2023: Research and Future Aspirations.









Qatar University (QU) hosted the Annual Research Forum and Exhibition 2023 under the theme 'Research for Future Aspirations.' At this event, the research teams from the Center for Advanced Materials (CAM) showcased various ongoing research projects through a multitude of prototypes and poster presentations.

During the event, several dignitaries, including His Excellency Dr. Omar Al-Ansari, President of Qatar University, and His Excellency Dr. Mohammed bin Saleh Al-Sada, former Minister of Energy and Industry, as well as representatives from Sultan Qaboos University and ExxonMobil, visited the center's pavilion to learn about the showcased research endeavors.









#### QATAR UNIVERSITY PARTICIPATES IN DISTINGUISHED SCIENTIFIC SEMINARS AT EXPO DOHA 2023



The Research and Graduate Studies Sector at Qatar University organized a series of scientific seminars under the title: "Sustainability in Research and Innovation: Water and Food Security", which were presented by experts from various disciplines, and these seminars were held within the activities of Expo Doha Horticulture 2023.

These seminars were distinguished by the diversity of their topics and the depth of their contents, as they dealt with the latest innovations and technologies in the field of horticulture and agriculture, including sustainable agriculture, the use of modern technologies in water security and food production, in addition to the challenges facing the horticultural sector in the modern era, which captured the attention of the audience and affected the paths of development and innovation in this vital field.

On this occasion, Prof. Maryam Al-Maadeed, Vice President for Research and Graduate Studies at Qatar University, said: "We appreciate the efforts of the research centers participating in these seminars, and emphasize the importance of continuing cooperation and exchanging experiences to enhance our capabilities in facing future agricultural challenges and achieving sustainable development goals in this vital sector. We call on all actors in the field of agriculture and horticulture to benefit from the results and recommendations of these seminars, and to contribute to their application on the ground to achieve a better agricultural and environmental future." 

Click here to browse the news

#### QATAR UNIVERSITY PARTICIPATES IN DISTINGUISHED SCIENTIFIC SEMINARS AT EXPO DOHA 2023



Over the past few years, this annual event has become a valuable platform through which researchers, academics, and industry professionals discuss the latest trends and advances in materials science and engineering. The symposium's objective is to promote dialogue and exchange of ideas among experts from various disciplines and identify prospects for future interdisciplinary collaboration. The theme for this year's event is "Innovative Materials for Mitigating Climate Change Impacts". This year's theme aligns well with Qatar's 2030 National Vision to develop a sustainable and diversified knowledge-based economy by addressing challenges and opportunities associated with climate change. It also highlights how immensely materials science and engineering can contribute to societal development. The event will include a distinguished keynote and invited speakers, a panel discussion, and student presentations.

#### 17th Annual Gulf Petrochemicals and Chemicals Association (GPCA)

Part of the participation of Qatar University in the 17th Annual Gulf Petrochemicals and Chemicals Association (GPCA) under the theme "Mobilizing Chemistry for Impactful Transformation", which is held in the State of Qatar for the first time.

GPCA provides effective opportunities for the members and industry stakeholders to network, exchange information and knowledge to strengthen partnerships in the Gulf.



#### Research cooperation between Qatar University (QU) and the Korea Water Cluster (KWC)



Qatar University has signed a memorandum of understanding (MoU) with Korea Water Cluster (KWC) of the Korean Ministry of Environment to reinforce cooperation in the fields of water relevant studies and research. The MoU was signed by Vice President for Research and Graduate Studies, Prof. Mariam Al Ali Al Maadeed and President of KWC, Prof. Joonhong Park.

Signed in Seoul, the MoU underscores the commitment of the two parties to work together in multiple fields, such as exchanging the technology of the water industry and expertise, as well as the joint organization of seminars, workshops, and training programs for human cadres in this field. The MoU included cooperation in joint global research, joint support for local research and development in Qatar, experiences and performance evaluation, et cetera, and several relevant fields.



مركز المواد المتقدمة CENTER FOR ADVANCED MATERIALS Congratulations to CAM for receiving the new logo. We wish our center a more prosperous future with this new logo!

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