

# Center for Advanced Materials NEWSLETTER



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February 2022

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# PEOPLE

## Greetings from CAM'S:



**Dr. Mohammad R. Irshidat**  
Acting Director

Welcome to the Center for Advanced Materials (CAM), one of the strongest Materials Science and Engineering research arms of Qatar University. CAM works under the umbrella of Qatar University's Office of Vice President for Research and Graduate Studies. Established in 2002 as a Materials Technology Unit, the CAM has been dedicated to providing outstanding excellence in material science and technologies supported by well-equipped laboratories and high-caliber experts from around the world. The Center offers support and services to local oil, gas, and processing industries and Qatar's learning community. As CAM director, it is a pleasure to introduce to the reader this quarterly newsletter, which summarizes CAM's news including achievements, research activities, and services provided by CAM to the industry and the State's local community. Additionally, as he/she folds the pages of this newsletter, the reader will hopefully enjoy a tour within the labs and explore what CAM researchers are doing and know exactly their research areas, which are completely aligned with the Qatar 2030 Vision.

## Dr. Nasser Abdullah Alnuaimi

Former CAM Director

Associate VP for Research & Graduate Studies

It was the mid-year of 2016 when I was appointed as the director of CAM. The responsibility required me to lead a group of outstanding researchers and their teams, facilitate and develop their research in many materials science and engineering fields and connect them with Qatar's industry. Together, we have achieved unparalleled success in terms of work quality, time of achievements, and the benefit that accrued day after day to the center, university, and the State of Qatar. Nevertheless, this hectic work, which required hard and continuous thoughts and efforts, was not as heavy as writing this heart-touching farewell letter. Although I am leaving CAM for good and promoted to another management position, being away from family makes one really feels alienated, especially in light of the deep ties that have grown over the days between the family of this great center and myself. CAM has always been home with all meanings this word carries, from coming to it eagerly and happily in the morning to taking care of every family member as brothers. After five years of this long journey with CAM full of challenges, successes, and emotional moments, I cannot find enough words to thank every member in CAM, the center, and the home that will always occupy a special place in my heart. Now, I believe I have left the leadership to a new capable leader, Dr. Mohammad Irshidat, who is loyal to CAM and Qatar University; wishing him and CAM a great future. With every CAM member's help and support to him and CAM, the center will grow and always be an example to follow at the university, local and global scale. Although I am sure it is a new beginning for CAM and me, it is just a rearrangement for roles beneath the umbrella that we all are working under, the Vice President for Research and Graduate Studies, Prof. Mariam al-Maadeed, whose the real CAM founder and her endless support for research and graduate studies in QU is a model.



# CAM Activity & News

## Seminars

CAM hosted the 2021 CAM Webinar Series with 6 CAM faculties and 6 international speakers covering research areas such as energy, water treatment, (bio)sensors, polymeric materials, battery, and corrosion.

Date	CAM Speaker	International Speaker
27-1-2021	<b>Dr. Abdul Shakoor</b> <b>Title:</b> Materials for Energy Storage Applications; the Impact of Ceramic Coatings on their Electrochemical Performance	<b>Dr. Shahid Rasul</b> <b>Title:</b> Development of Sustainable Energy Conversion and Energy Storage Systems
28-2-2021	<b>Dr. Mohamed Hassan</b> <b>Title:</b> Nanostructured polymeric membranes for produced water treatment in the oil and gas industry	<b>Dr. Chandrasekhar Tiwary</b> <b>Title:</b> Metallurgical and materials engineering
28-3-2021	<b>Dr. Peter Kasak</b> <b>Title:</b> Nonstructural Platforms for Sustainable Energy and Biosensing Applications	<b>Dr. Jan Tkac</b> <b>Title:</b> Bionanotechnological for Construction of Biofuel cells, Biosensors and for Diagnostic Purposes
30-5-2021	<b>Dr. Anton Popelka</b> <b>Title:</b> Plasma-Induced Grafting of Polymeric Materials for Packaging and Biomedical Applications	<b>Dr. Maria 'n Lehocky'</b> <b>Title:</b> Surface Biofunctionalization
28-7-2021	<b>Dr. Kishor Kumar Sadasivuni</b> <b>Title:</b> Colorimetry and Internet of Things Coupled Advance Strategies for Next Generation Smart Sensors	<b>Dr. Ayegul Uygun Oksuz</b> <b>Title:</b> Enhanced Properties of RT rotating plasma Modified Materials
30-8-2021	<b>Dr. Aboubaker M. Abdulla</b> <b>Title:</b> Advanced Corrosion Research in Qatar	<b>Prof. Kenneth Ikechukwu Ozoemena</b> <b>Title:</b> Rechargeable zinc-air Battery as a model for Materials Electrochemistry and Renewable Energy.

## E-Conferences

CAM hosted two virtual international conferences in March and November 2021 to emphasize emerging materials and their applications in science and engineering with support from Qatar University, CAM, BRC, Emergent Materials Journal, and Texas A&M University at Qatar.

**29 – 31 March 2021**

“Materials of the Future: Smart Applications in Science and Engineering”

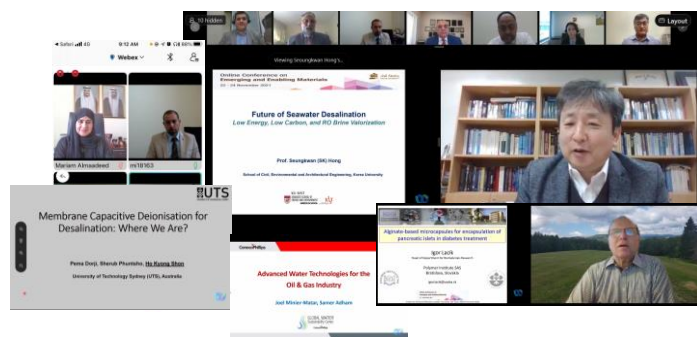


**Organizers**



**22 – 24 November 2021**

“Emerging and Enabling Materials”



**Organizers**





## Workshops

29 April 2021, Via WebEx

### Phase Change Materials for building Industry

#### Sessions

- Shape Stabilized Phase Change Materials for Building Industry
- Experimental and Numerical Investigations on Thermal Properties of Concrete Containing Micro-Encapsulated Phase Change Materials
- Rheology of Polymer System as a Tool for Transformation on Ideas into Commercial Products
- Latent Heat Storage Technology for Integration in Building Structures
- PCM Monitoring with the gSKIN U-values Measurement Device

#### Sessions

- XAFS: A Cutting-edge Technology at SEASAME for Materials in its Various Structural States
- Applications of X-Ray Powder Diffraction in Materials Science
- SEASAME, A tool for Scientific Cooperation

28 October 2021, Via WebEx

### SEASAME: An Open Research Infrastructure in the Middle East

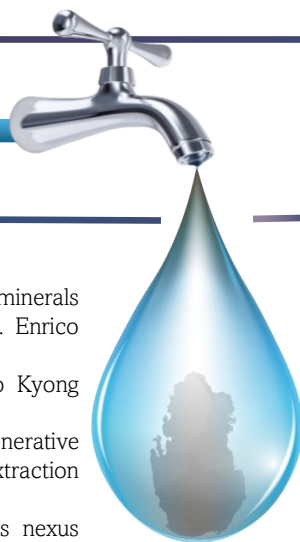
## Water Technology Unit (WTU) Activities

29 April 2021, Via WebEx

### 2<sup>nd</sup> Sustainable Water Environment and Energy Technology (SWEET) Workshop

#### Sessions

- Advanced membrane operations for minerals recovery from concentrated solutions (Dr. Enrico Drioli, Italy)
- Nutrients in a Circular Economy (Dr. Ho Kyong Shon, Australia)
- A thermo-osmosis coupled thermally regenerative electrochemical cycle for efficient lithium extraction (Dr. Yuan Chen, Australia)
- Membranes at water-energy-raw materials nexus (Dr. Efrem Curcio, Italy)
- Water-energy nexus technology to mitigate climate change (Dr. Dong Suk Han, Qatar)



## Season 2 Episode (4) of the QU Research Wednesday Series

**Title:** “Innovations in Water Treatment Technology & Importance of Academia Industry Collaboration: Advanced Membranes Fabrication Case Study”

#### Organized by:

- Research and graduate studies Sector at Qatar University
- Water Technology Unit
- Participants: Dr. Alamgir Karim, Dr. Syed Zaidi, Dr. Mohammad Hassan, Dr. Maryam Al-Ejji, Dr. Aboubakr Abdullah



# Achievements

## Awarded Grants



Researchers at CAM received sixteen new Research Grants in 2021. The new grants fall within the Qatar University pillars and Qatar National Vision 2030.

### Qatar National Research Fund (QNRF) Grants

National Priorities Research Program (NPRP)	LPI	Title
	Prof. Aboubakr Abdullah	New Electrochemical and Modeling Techniques for Optimization of Corrosion Inhibition in Oil & Gas Pipelines
	Dr. Abdul Shakoor	Bio Based Smart Coatings for Corrosion Sensing and Corrosion Healing
	Dr. Anton Popelka	Plasma-enhanced nano-catalytic polyamide membrane systems that minimize fouling and concentration polarization
	Prof. Igor Krupa	Green Houses for Qatari Climate: Energy Saving Smart and Sustainable Phase Change Materials (Green3SPCM)
	Dr. Dong Suk Han	Chemical production from industrial wastes (wastewater, brine, and CO <sub>2</sub> ) using an off-grid electrochemical process
	Prof. Syed Zaidi	Converting Salinity Gradient of Seawater Brine and Sewage Effluent into Energy Source

LPI	Title
Dr. Abdul Shakoor	Microwave Assisted Chemical Co-precipitation Synthesis of LiMn <sub>2</sub> O <sub>4</sub> – MXene (Ti <sub>3</sub> C <sub>2</sub> ) Nanocomposite Cathodes for Energy Storage Applications
Dr. Kishor Sadasivuni	Fabrication of Transition Metal Chalcogenides/Nanocomposites based Non- Enzymatic Glucose Biofuel for Self Powered Implanted Devices
Dr. Dong Suk Han	Forward osmosis (FO) based concentration of fresh fruit juices for preservation of food quality and safety
Dr. Aboubakr Abdullah	Controlled Fabrication of Porous one and multidimensional Graphitic-like Carbon Nitride Nanostructures for highly corrosion and abrasion resistant Ni-P nanocomposite coatings
Dr. Anton Popelka	Selective plasma patterned polymeric surfaces for water vapor harvesting bio-mimicking Namib Desert beetle

Undergraduate Research Experience Program (UREP)



### 2021 Qatar University Internal grants

Prof. Aboubakr Abdullah

Smart design of novel inorganic self-healing coatings for scalable corrosion protection of galvanized steel strategy and mechanism for industrial applications

Dr. Peter Kasak

Electrochemical deposition of binary alloy to activated carbide-based support for direct methanol fuel cell catalyst

Dr. Abdul Shakoor

Nickel based smart self-healing nanocomposite coating for corrosion protection of steel

Dr. Mohammad K. Hassan

3D printing of smart materials with antimicrobial properties

Dr. Anton Popelka

Plasma treated polymeric membranes for gravity driven oil/water separation

# Achievements

## Awards



1

CAM's faculty and researchers were featured prominently among 2021 the world's most-cited and top researchers in a list by Stanford. Well deserved recognition for Dr. Shakoor, Dr. Kishor Kumar, and Dr. Deepalekshmi Ponnamma



Dr. Abdul Shakoor  
Research Associate  
Center for Advanced  
Materials  
Hire Date: 23-APR-2012



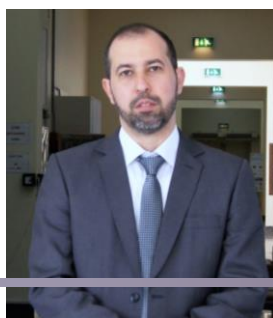
Dr. Kishor Kumar Sadasivuni  
Research Associate  
Center for Advanced Materials  
Hire Date: 01-FEB-2018



Dr. Deepalekshmi Ponnamma  
Post Doc Fellow  
Center for Advanced  
Materials  
Hire Date: 15-MAR-2015

2

CAM's faculty members, Dr. Mohammad R. Irshidat, Dr. Dong Suk Han, and Dr. Kishor Kumar Sadasivuni were recognized for a record of outstanding accomplishments in the academic year 2020-2021 at the Annual Honoring Ceremony of Research & Graduate Studies Sector



## Promotion & New Appointment

November 2021 brought good news to Dr. Aboubakr M. Abdullah and CAM. He has been promoted to Research Professor. In addition, he has been appointed as the acting manager for the Innovation & Intellectual Property Office under Qatar University's Vice President for Research and Graduate Studies



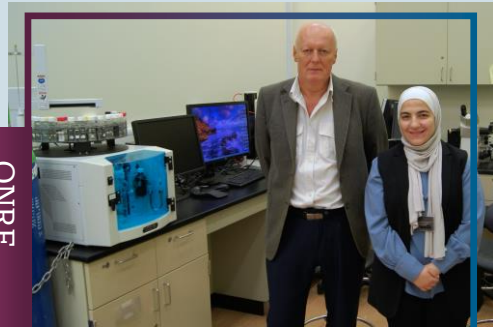
3

CAM Research Assistant, Adnan Khan, was honored at Embassy of Pakistan on being awarded Gold Medal for his Master's Degree in Mechanical Engineering at Qatar University.



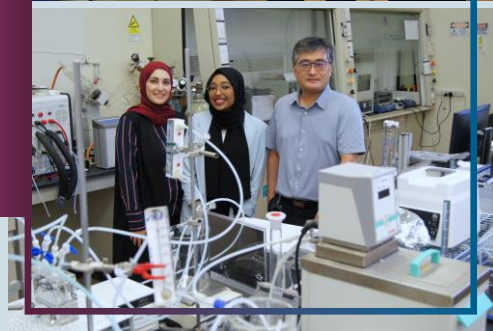
4

Prof. Igor Krupa & Ms. Roba Al-Muhtasib for winning the QNRF Graduate Sponsorship Research Award (GSRA) 8th cycle under the title of "Development of novel polymeric adsorbent media for an efficient removal of aromatic compounds (BETX) from produced waters"



QNRF  
GSRA Award

Dr. Dong Suk Han & Ms. Tasneem Elmakki won the QNRF Graduate Sponsorship Research Award (GSRA) 8th cycle entitled "Lithium capture in seawater using spent lithium ion battery (SLIB) materials-based membrane capacitive deionization (MCDI) system"



5

CAM Research Assistant, Eng. Asma A. Mohamed, wins the Outstanding Thesis Award (Sciences) at Qatar University among Graduate Studies Awards Winners 2020-2021.



6

Two CAM researchers (Ms. Tasneem and Mr. Ahmed) were awarded in Online conference on Emerging and Enabling Materials as best poster presentation



7

Ms. Umme Hafsa (Chemical Engineering, supervised by Dr. Dong Suk Han), CAM undergraduate research assistant, was awarded Best Poster Presentation in the category of Energy and Environment at the 2021 QU Annual Research Forum & Exhibition.



# Achievements

## Research Highlights

1

Dr. Hassan's research was highlighted in Nature Middle East on "Filtration fibers for cleaning water" by addressing that polystyrene, silver and zinc oxide nanocomposite fibers could improve water filtration membranes.



2



Dr. Kishor's research group developed a breathalyzer which can potentially predict COVID-19 and other lung diseases. The team including seven undergraduate students from QU, realized this outcome through an Undergraduate Research Experience Program grant (UREP27-044-3-016) titled, "Prediction of lung diseases including COVID-19 by using the Q-Breath Analyzer," provided by Qatar National Research Fund.

3

Our team of researchers led by Prof. Mariam Al-Maadeed Qatar University has developed innovative Nanostructured Membranes that can efficiently separate Oil from oil-water mixtures and emulsions. Funded under the 10th cycle of QNRF's flagship NPRP. More details can be found at [QNRF Research Matters Newsletter](#)





# Center Services



## Summer and Winter Internships

The research lab facilities and resources at CAM organized and hosted a series of summer and winter internships in 2021 to enhance the undergraduate students hands-on practice and participation in research environment.

### Summer Undergraduate student Research Internship

Course name	Mentor
Electrochemical behavior of Polyolefin based smart coatings for corrosion protection of steel in Oil and Gas industry	Dr. Abdul Shakoor
Advanced Materials and applications	Prof. Syed Zaidi
Nano-based silicone rubber composites	Dr. Mohamed Hassan
Smart Materials for seawater mining from seawater reverse osmosis (SWRO) desalination plant	Dr. Dong Suk Han
Non-destructive Testing (NDT) of metals	Dr. Maqbool
Nanomaterials for osmotically engineered desalination system	Dr. Dong Suk Han
Novel zwitterionic antibiofouling soft material based on trimethylamine-N-oxide	Dr. Peter Kasak
Understanding the behavior of cathode in Li-Ion Batteries at high temperature (Qatari Environment)	Dr. Abdul Shakoor
Materials, synthesis and characterization	Prof. Syed Zaidi

### Winter research internship 2021

Course name	Mentor
Application of 2D nanomaterials for developing high-performance lithium-ion batteries	Dr. Abdul Shakoor

# Center VIP visits

His Excellency Dr. Hassan Al-Derham, President of Qatar University, visited the CAM with a number of deputies to inspect the reality of the Center and review the research projects and the most important achievements and research outputs such as prototypes of projects.



Dr. Lotfi Belkhir, Advisor to QU President for Innovation and Dr. Mahmoud Abdulwahed, Director of Strategic Innovation Office and team recently visited CAM to explore the research outcomes and prototypes.



Distinguished guests including H.E. Dr. Abdulla Al-Subaie (Minister of Municipality & Environment) and H.E. Mr. Ahmad Al-Sayed (Minister of State and Chairman of the Board of Directors of the QFZA) visited CAM stands at Qatar University Annual Research Forum and Exhibition 2021.



## CAM's Notice

- Join the 2022 Monthly Webinar Series. Seminar information will be delivered on time every month by QU email announcement as before.
- CAM will hold WTU Short Course on “Membrane Based Water Treatment” on 22-24 March for training Kahramaa, Ashghal and QEWC Qatari engineers

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