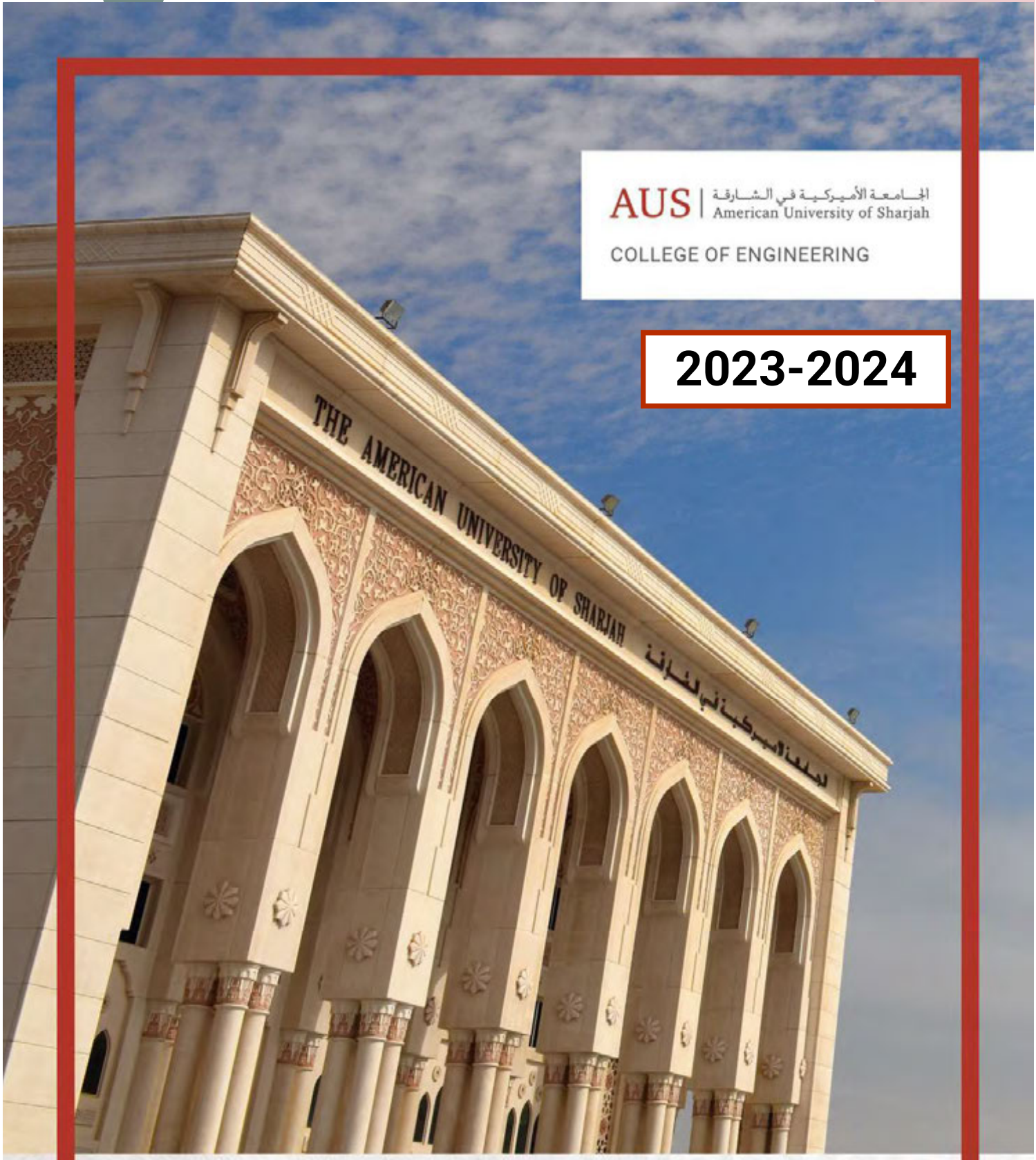

AUS | الجامعة الأميركية في الشارقة
American University of Sharjah

COLLEGE OF ENGINEERING

2023-2024

Dr. Amani Al-Othman/ Petrofac Endowed Chair in Renewable Energy

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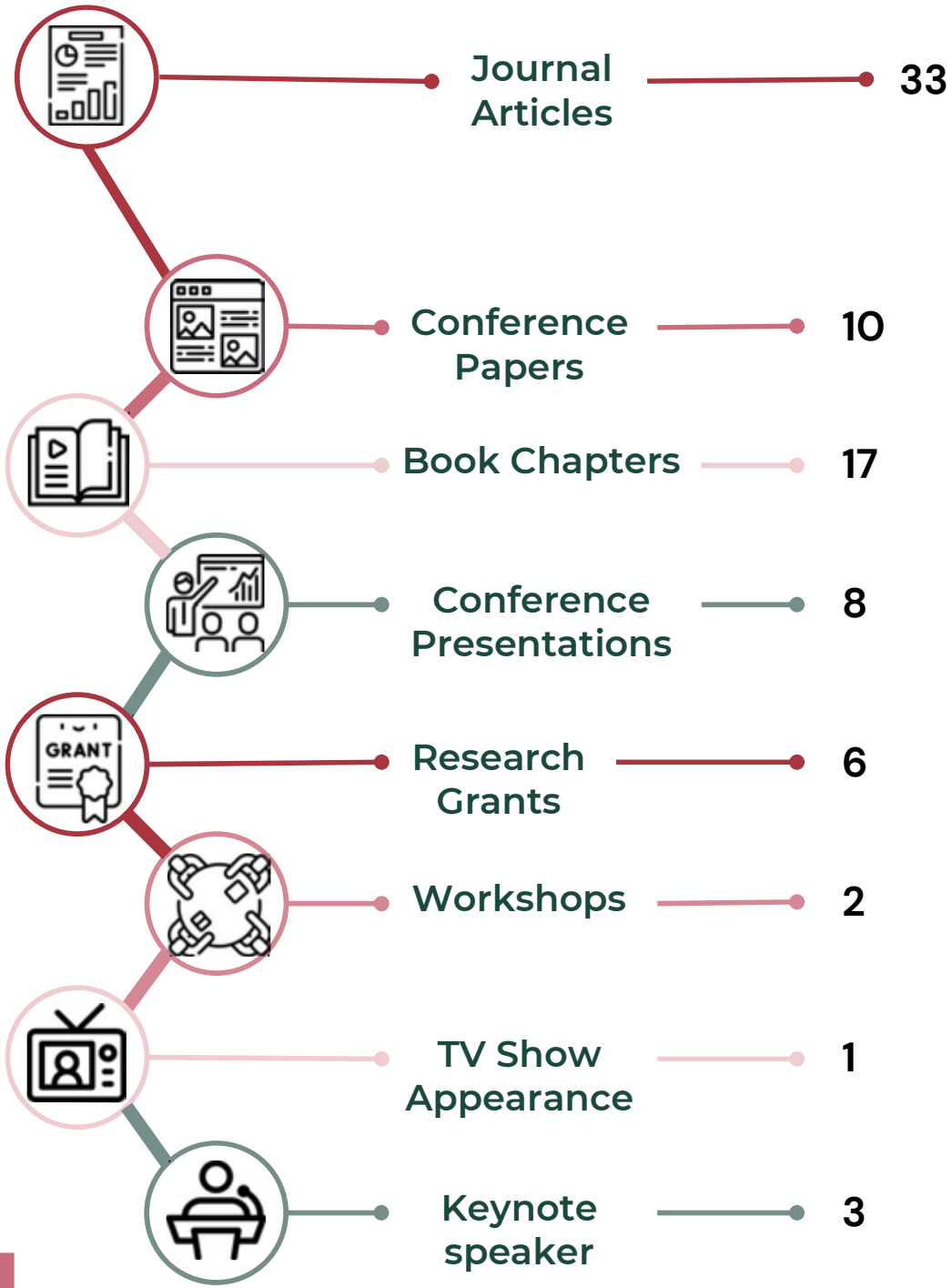
Introduction

As the Petrofac Endowed Chair in Renewable Energy at the American University of Sharjah, I am pleased to present my annual activity report for 2023-2024. This report marks an exciting milestone as it reflects on the foundational achievements and strategic vision that have been set in motion for this prestigious role. Embracing this esteemed position entails not only an honour but also a unique opportunity to drive advancements in sustainable technology. My research focuses primarily on fuel cell technology and renewable energy solutions, with a keen interest in developing nano-composite materials for fuel cells and hydrogen production.

In addition to my research, I have taken on the leadership of the energy group within AUS represented by one of the groups at the Energy, Water and Sustainable Development Research Center, where our team is dedicated to pushing the boundaries of energy research and education. In this inaugural year, my primary objectives have centred on mentoring students, leading research initiatives, and establishing joint research projects designed to develop innovative solutions for the renewable energy sector. Through these efforts, I aim to establish a strong foundation for long-term goals and strategic initiatives that will guide the future of renewable energy research and education at the university.

Research 2023-2024

Highlights



Activities Highlights

AUS top-cited researcher for the past 4 years.

Keynote speaker at Climate Action Awareness Day to empower youth in climate advocacy in collaboration with the Sharakah program.

Featured in the Middle East Women in Energy website.

Appointed as the Editorial Board Member at Elsevier Journal of Water Process Engineering

Guest editor at Elsevier International Journal of Thermofluids.

Featured in Springer Nature Emergent Materials Journal - Women in Science edition.

Advisor of IEEE-EMBS, AICHE, and The Honor Society students' clubs.

Published a total of 33 Journal papers all Scopus indexed.

Secured several national and international research grants.

Advised various graduate and Senior Design students

Co-organized the first endowed chairs symposium titled: "Empowering a Greener Future: The 1st Endowed Chairs Symposium on Building Sustainable Solutions Towards Net Zero Emissions."

Co-organized the 1st research endowed chairs research forum/ April 2024

Organized the national student poster competition as part of the endowed chair symposium

Delivered the Biomaterials workshop at the VLSI-SOC international conference held at AUS 2023

Research

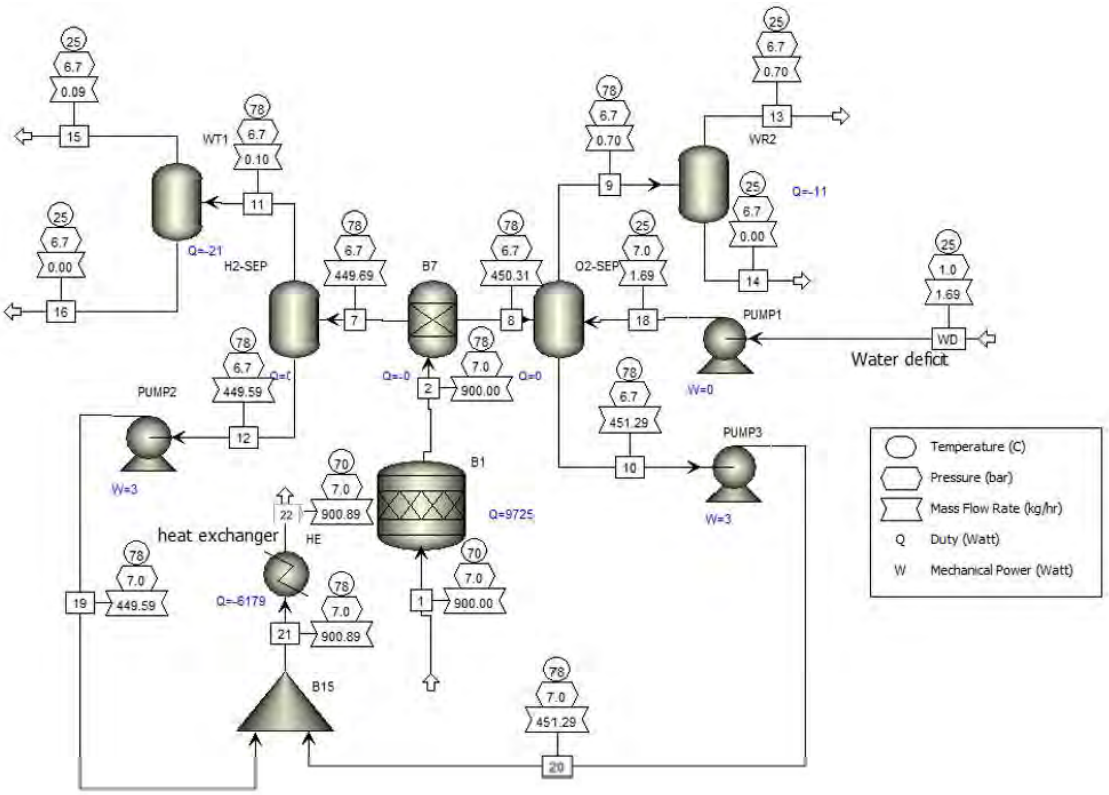
On-going research projects

Fabrication of Membranes for Hydrogen Fuel Cells

Research

On-going research projects

Hydrogen Production Via water Electrolysis



Research

Honors and Awards

Dr. Amani Al-Othman won the CEN Outstanding International Collaboration Award

Dr. Amani received a certificate of appreciation from AUS for being recognized among the world's 2% of scientists by Stanford University for the year 2023 in the "Single Year" Category.

Research

Selected Published Articles

- Al-Othman, A., Tawalbeh, M., Ka'aki, A., Shomope, I., & Hassan, M. F. (2024). Novel zirconium phosphate/MXene/ionic liquid membranes for PEM fuel cells operating up to 145°C. Process Safety and Environmental Protection, 189, 1368–1378.
- Alex, M., Khan, K. R. B., Al-Othman, A., Al-Sayah, M. H., & Al Nashash, H. (2024). MXene-Based Flexible Electrodes for Electrophysiological Monitoring. Sensors, 24(11), 3260.
- Ali, A. A., Al-Sayah, M. H., Al-Othman, A., & Al-Nashash, H. (2024). Flexible PDMS Composite Electrodes with Boronic Acid-Modified Carbon Dots for Surface Electrophysiological Signal Recording. ACS Applied Electronic Materials, 6(1), 576–586.
- Ali, A. A., Al Bostami, R. D., & Al-Othman, A. (2024). Nanogel-based composites for bacterial antibiofilm activity: advances, challenges, and prospects. RSC Advances, 14(15), 10546–10559.
- Nauman Javed, R. M., Al-Othman, A., Nancarrow, P., & Tawalbeh, M. (2024). Zirconium silicate-ionic liquid membranes for high-temperature hydrogen PEM fuel cells. International Journal of Hydrogen Energy, 52, 894–908.
- Nimir, W., Al-Othman, A., & Tawalbeh, M. (2024). Unveiling zirconium phytate-heteropolyacids-ionic liquids membranes for PEM fuel cells applications up to 150 °C. International Journal of Hydrogen Energy.
- Qalyoubi, L., Al-Othman, A., Al-Asheh, S., Shirvanimoghaddam, K., Mahmoodi, R., & Naebe, M. (2024). Textile-based biochar for the removal of ciprofloxacin antibiotics from water. Emergent Materials, 7(2), 577–588.
- Tawalbeh, M., Shomope, I., & Al-Othman, A. (2024). Comprehensive review on non-Newtonian nanofluids, preparation, characterization, and applications. International Journal of Thermofluids, 22, 100705.

Research

Selected Book Chapters

- Ali, A., Tawalbeh, M., Asaad, S. M., Darra, R., & Al-Othman, A. (2024). Case studies and analyses of bioenergy systems. In Renewable Energy - Volume 2: Wave, Geothermal, and Bioenergy (pp. 317–334). Elsevier.
- Asaad, S. M., Tawalbeh, M., Ali, A., Al Kindi, S. R., & Al-Othman, A. (2024). Definition of bioenergy. In Renewable Energy - Volume 2: Wave, Geothermal, and Bioenergy (pp. 215–243). Elsevier.
- Merhi, C., Abdulkarim, S., Piliposyan, G., Tawalbeh, M., Halalsheh, N., & Al-Othman, A. (2024). Proteomics Monitoring of Microbes During Biodegradation of Environmental Contaminants. In Microbial Bioremediation and Multiomics Technologies for Sustainable Development (pp. 393–413). Royal Society of Chemistry.
- Piliposyan, G., Merhi, C., Abdulkarim, S., Tawalbeh, M., Halalsheh, N., & Al-Othman, A. (2024). Metabolomics: An Approach to Decode the Insight of Organism Functioning in Polluted Environments. In Microbial Bioremediation and Multiomics Technologies for Sustainable Development (pp. 458–480). Royal Society of Chemistry.
- Shahin, M. B., Ismail, E., Eltaher, N., Alnaqbi, M., Al-Othman, A., & Tawalbeh, M. (2024). Microbes in Membrane Technologies. In Microbial Nexus for Sustainable Wastewater Treatment (pp. 22–46). CRC Press.
- Tawalbeh, M., Ali, A., Asaad, S. M., Darra, R., & Al-Othman, A. (2024). Simulation and modeling of bioenergy systems. In Renewable Energy - Volume 2: Wave, Geothermal, and Bioenergy (pp. 335–355). Elsevier.
- Tawalbeh, M., Asaad, S. M., Ali, A., Al Kindi, S. R., & Al-Othman, A. (2024). Developments of bioenergy. In Renewable Energy - Volume 2: Wave, Geothermal, and Bioenergy (pp. 245–273). Elsevier.

Research

Selected Conference Papers

- Ali, A. A., Al-Sayah, M. H., Al-Othman, A., & Al-Nashash, H. (2023a). A Flexible Conductive Electrode Using Boronic-Acid Modified Carbon Dots. 2023 45th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), 1–6. https://doi.org/10.1109/EMBC40787.2023.10341162
- Ali, A. A., Al-Sayah, M. H., Al-Othman, A., & Al-Nashash, H. (2023b). Modified carbon dots for potential flexible electrode applications. 2023 11th International IEEE/EMBS Conference on Neural Engineering (NER), 1–5. https://doi.org/10.1109/NER52421.2023.10123810
- Magdi, T., Al-Othman, A., & Shamayleh, A. (2023). PROTON CONDUCTION STUDIES ON ZIRCONIUM BASED COMPOSITE MEMBRANES FOR PEM FUEL CELL APPLICATIONS. Proceedings of International Conference on Computers and Industrial Engineering, CIE, 1, 58–63. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85184088695&partnerID=40&md5=dc6c753fb97a8bcc3f16fa5523f80916
- Shaikh, R. A., Al-Othman, A., Nancarrow, P., Tawalbeh, M., & Shamayleh, A. (2023). CONDUCTIVITY STUDIES IN MXENE-PVDF COMPOSITE MEMBRANES FOR PEM FUEL CELLS APPLICATIONS. Proceedings of International Conference on Computers and Industrial Engineering, CIE, 1, 94–99. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85184126964&partnerID=40&md5=7a7622ea370911e294a5d6be8a2e0121

Research

Research Workshops

As part of the VLSI-SOC international conference held at AUS 2023, Dr. Amani Al-Othman conducted an in-depth workshop on biomaterials. The workshop focused on the latest advancements in biomaterials science, exploring their applications in medical devices, tissue engineering, and other critical areas of healthcare.

Research

Research Grants and Scholarships

AUS graduate student Amaal Abdulraqeb Ali, along with Dr. Mohammad Al-Sayah, Dr. Amani Al-Othman, and Dr. Hasan Al Nashash, secured a research grant of 10,000 AED at the Third Forum for Women in Research "QUWA: Sustaining Women's Empowerment in Research & Innovation," held at the University of Sharjah, for their project titled "Carbon Dots-Based Polymer Composites for Flexible Conductive Implantable Electrode Applications."

Teaching

- Applied active learning techniques in the classroom.
- Organized an educational fieldtrip to Dubai Air show Fall 2023.
- Practiced project-based learning various courses
- Practiced technology and mobile-student survey system to conduct quizzes in all courses.
- Delivered the Chemical and Biological Engineering introductory lectures for the Fall 2023 and the Spring 2024.

Teaching

CEN Lecture Series

Dr. Amani Al-Othman delivered a lecture titled "Hydrogen Fuel Cells: 200 Years of Research, Current Opportunities, and Challenges" as part of the CEN Lecture Series at AUS, hosted by Dr. Paul Nancarrow in September 2023.

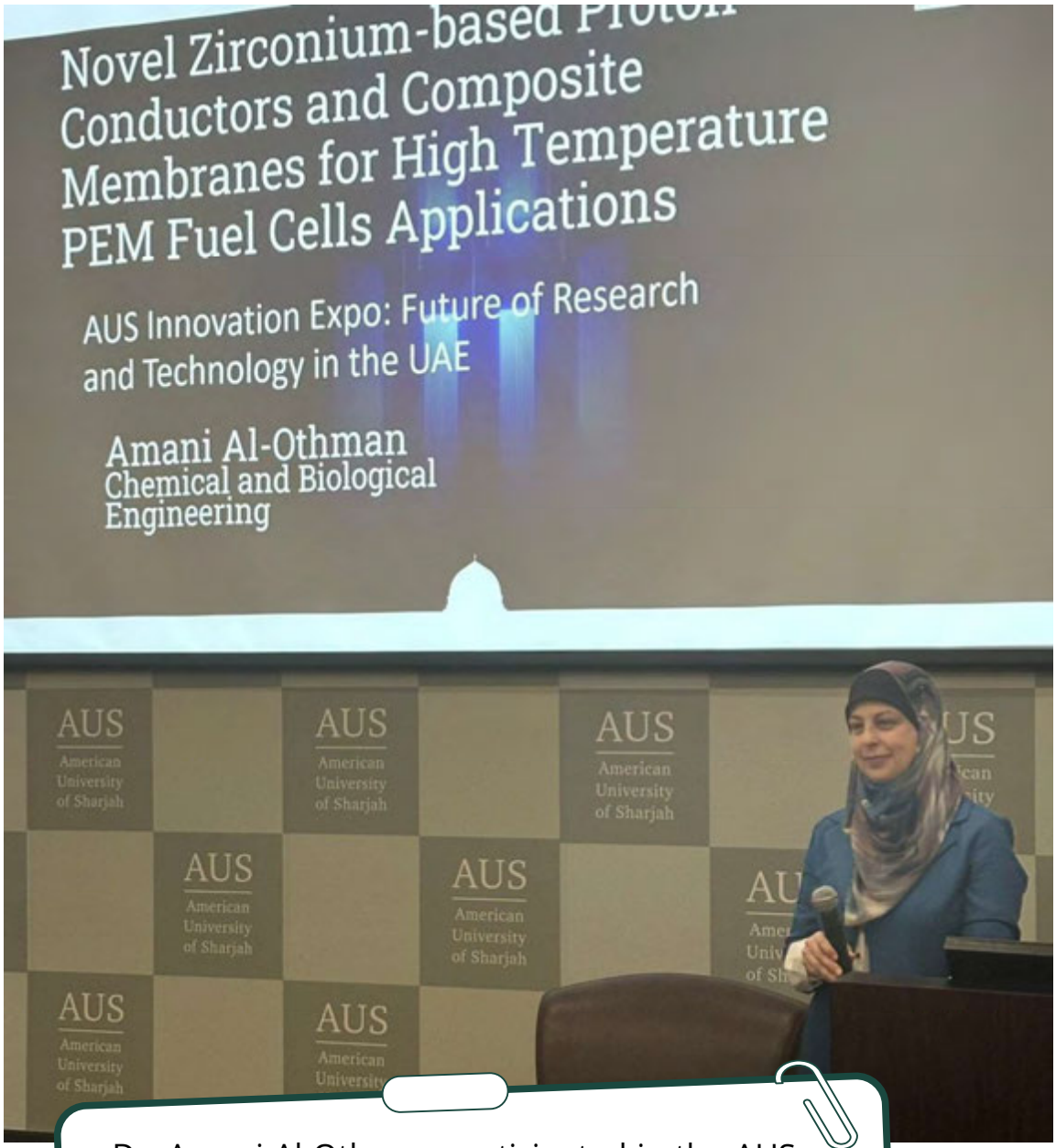
Teaching

Organized a Panel Discussion

Dr. Amani Al-Othman chaired the IEEE-EMBS panel discussion while simultaneously acting as the club advisor.

Knowledge Transfer

Keynote Speaker



Dr. Amani Al-Othman participated in the AUS Innovation Expo held in May 2024. Dr. Amani showcased her most recent project “Novel Zirconium-based Proton Conductors and Composite Membranes for High-Temperature PEM Fuel Cells Applications”.

Knowledge Transfer

Attended by 250 students from eight Sharakah schools across the UAE, the Climate Action Awareness Day aimed to deepen their understanding of environmental issues. Dr. Amani Al-Othman provided an insightful introduction to climate change and the imperative of clean energy transition at the climate action awareness day in collaboration with the Sharakah program.

Knowledge Transfer

Dr. Amani Al-Othman played a pivotal role as a scientific committee member at The International Conference on Desalination, Environment, and Sustainability (IDEAS). In this capacity, Dr. Al-Othman was instrumental in shaping the conference's academic agenda, reviewing submitted papers, and ensuring the scientific rigor and relevance of the presented research.

Community Engagement

First Engineering Endowed Chairs Symposium

The endowed chairs team organized the first endowed chairs symposium titled: Empowering a Greener Future: The 1st Endowed Chairs Symposium on Building Sustainable Solutions Towards Net Zero Emissions on December 5th, 2023.

The symposium aimed at providing participants with the latest information on sustainable technologies, policies, and practices that can help achieve energy efficiency and net zero emissions.

Community Engagement

First Engineering Endowed Chairs Symposium

This symposium included alumni and students' projects from across the UAE which provided valuable learning opportunities and showed the region's commitment towards fostering young talents.

The symposium included prominent international and national scholars who added tremendous value by bringing diverse perspectives, expertise, and insights in areas like Dr. Antonio Nanni, The American Concrete Institute president, Dr. Dean Frank, President of the new Center of Excellence for Carbon Neutral Concrete, Mr. Nedal Zatari, Chief Commercial Officer of Fine Hygienic Holding, Mr. Oliver Kraft, Executive Vice President at Siemens, and Dr. Maria Toro-Troconis, EdTech Consultant for the United Nations

Community Engagement

First Engineering Endowed Chairs Symposium

The endowed chair's team has organized a research Forum titled: Fostering Collaboration with local governmental and industrial communities for sustainable development, on April 30th,2024. The forum received the participation of 7 different esteemed entities: Petrofac, Dana Gas, SNOC, Sharjah Sustainable City, Sharjah Civil Defense Authority, Mapei Construction Chemicals, and AsianPaints.

As part of the First Endowed Chairs Symposium, Dr. Amani Al-Othman organized a poster competition featuring over 55 student participants from universities across the UAE.

Community Engagement

Meetings and Collaborations

Dr. Amani Al-Othman actively participated in the Biomedical Engineering Advisory Board meeting, contributing her expertise and insights to guide the strategic direction of the program. Her involvement in the board reflects her commitment to advancing interdisciplinary collaboration, particularly at the intersection of biomedical engineering and renewable energy.

Community Egagement

COP28

AUS students, faculty and staff engaged in a myriad of events and activities in COP28's different hubs at the Green Zone. College of Engineering faculty members, Dr. Amani Al-Othman, Aqeel Ahmed, and Dr. Ghaleb Husseini, represented the college at a booth dedicated to the American University of Sharjah in the Greening Education Hub. They engaged with the visitors and highlighted their ongoing research that will mitigate the impact of climate change.

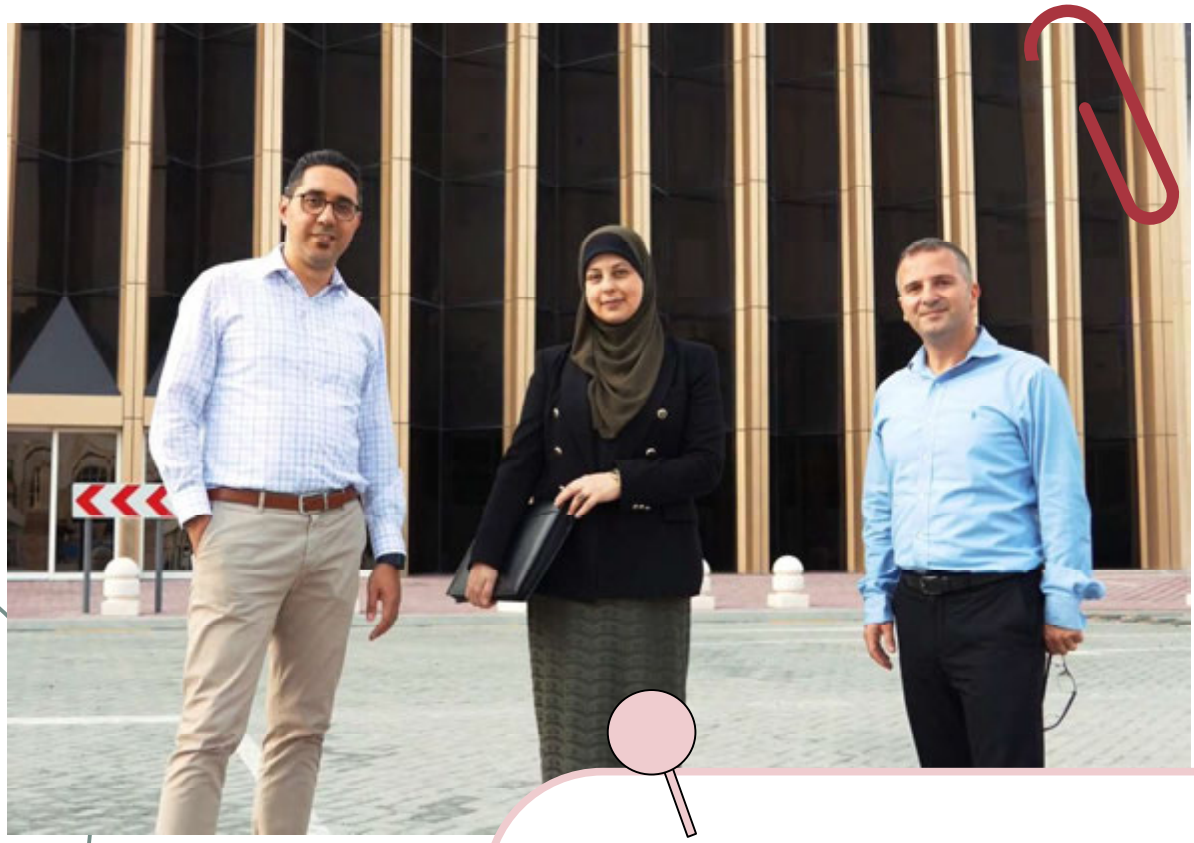
Media and E-Coverage

In December 2023, Dr. Amani Al-Othman, along with Dr. Rami A. Hawileh, Professor of Civil Engineering and Riad T. Al-Sadek Chair in Civil Engineering, appeared on Sharjah TV's Amasi show. The interview focused on the key initiatives from the inaugural Engineering Endowed Chairs Symposium, which emphasized developing sustainable solutions for achieving net-zero emissions. The complete interview can be found here.

Media Coverage

Dr. Amani Al-Othman was prominently featured by Springer in the Emergent Materials Journal as part of their special edition celebrating Women in Science. This recognition highlights Dr. Al-Othman's significant contributions to the field of materials science, particularly in the areas of renewable energy and advanced nanocomposites. The feature underscores her impactful research, leadership in academia, and her role in inspiring the next generation of female scientists.

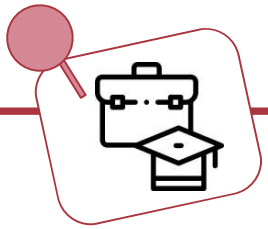
Media and E-Coverage



In collaboration with the CEN Endowed Chairs, Dr. Rami A. Hawileh, who holds the Riad T. Al-Sadek Chair in Civil Engineering, and Dr. Mehdi Ghommem, the Dana Gas Chair in Engineering, participated in a video production that showcased the professors' areas of research and expertise, and future visions. The full video can be seen here.

Future Activities

- Participate In Middles East Energy Dubai 2025



- Organize the Middle East IEEE-Biomedical Regional Conference at AUS

The Team

Thank you

Annual Report
Academic Year 2023-2024