



UNIVERSITY OF MIAMI  
COLLEGE of  
ENGINEERING

## MIAMI INSTITUTE FOR CLEAN ENERGY SEMINAR SERIES

Thursday, March 27, 2025 | 2:00pm  
Dean's Conference Room 289

**QUESTIONS? CONTACT**

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### **Anion-Exchange Membrane Fuel Cells**

#### State-of-the-art and Current Challenges

Significant progress has been achieved in the past five years of intensive research on Anion-Exchange Membrane (AEM) Fuel Cells (AEMFCs), bringing the AEM-based technologies closer to the required levels for practical applications. In material-related space, recent studies reported novel techniques for characterizing AEMs [1] and robust AEMs with ultra-high hydroxide conductivities of 300 mS/cm [2]. In addition, new ionomeric materials and functional groups with increasing stability were introduced [3-5], guidelines for advanced design of AEMs were reported [6], and better Pt-free and PGM-free promising catalysts were developed [7-12]. On the fuel cells front, new AEMFCs based on CRM-free catalysts were successfully demonstrated [13-14], cells with record high power density outputs were obtained [15], materials able to operate under high-temperature AEMFC (HT-AEMFC) operation mode were reported [16], simulated materials and conditions to achieve AEMFC lifetime of 5,000-15,000 hours were theoretically demonstrated for the first time [17-18], and cell lifetime of 2,000 hours of continuous operation was already experimentally proven [19]. Altogether, the research community has made impressive progress in such a short time. Having said that, we are not yet there; several remaining challenges should still be overcome to allow AEMFC to become a real alternative to mainstream fuel cell technology. In this talk, I will present and discuss the status of AEMFC technology and discuss the main challenges and latest achievements made at Technion to overcome them.



#### **Dario R. Dekel**

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Dr. Dekel holds B.Sc. in Chemical Engineering from UTN (Argentina), M.Sc. in Chemical Engineering, and Ph.D. and MBA from Technion – Israel Institute of Technology (Israel). In 1998, he joined Rafael Ltd., where he led 50 researchers and engineers in the area of high-temperature batteries. In 2007, Prof. Dekel co-founded CellEra, where as Vice President for R&D and Engineering he led 15 researchers to pioneer and develop the Anion-Exchange Membrane Fuel Cell technology. In 2015, Prof. Dekel joined the Technion, where he currently heads the TEEM Lab (Technion Electrochemical Energy based on Membranes), leading one of the largest worldwide research groups entirely focused on AEMs, AEMFCs, and AEMWEs. Prof. Dekel is a full Professor at the Wolfson Department of Chemical Engineering. In 2023, he was also appointed as the Director of the Grand Technion Energy Program (GTEP). Prof. Dekel holds more than 130 publications and was granted more than 30 international patents on battery and fuel cell technologies. At Technion, he currently holds about \$2M in government and company research grants from Europe, USA, and Israel.