

# Technical Talk

## Reimagining Health Monitoring Using Applied Electromagnetics

### Synopsis

Recent advances in radar sensing, electromagnetics-based digital twins, and physics-aware artificial intelligence are unlocking new possibilities in healthcare—particularly for remote regions with limited medical infrastructure.

This talk explores practical, low-cost systems leveraging mmWave radar for contactless monitoring of glucose levels, vital signs, falls and sleep patterns, and daily activity tracking. These solutions are designed to be privacy-preserving and scalable, making them ideal for both rural clinics and urban homes. Through live demonstrations, we highlight how antenna design choices and enhanced signal processing algorithms work together to interpret radar signals and detect subtle health changes—from early signs of frailty to abnormal breathing patterns. We also examine the benefits of electromagnetics-based digital twins, which simulate device placement, integrated antenna architectures, and human-radar interaction. These models accelerate product development cycles and improve system reliability.

### About the Speaker

AP. Dr. George Shaker

George Shaker (Senior Member, IEEE) is currently the Lab Director of the Wireless Sensors and Devices Laboratory at the Schlegel-University of Waterloo Research Institute for Aging, where he founded and directs “THE MIRADA - Technology for Health Empowerment: Monitoring, Intervention, and Response for Aging Demonstration Apartment,” a groundbreaking initiative aimed at improving healthcare for aging populations through advanced sensing technology. He is also the Chief Scientist at Spark Technology Labs, where he has been leading innovation in wireless sensor technologies since its founding in 2011. Concurrently, Dr. Shaker is an adjunct associate professor in the Department of Electrical and Computer Engineering at the University of Waterloo, Waterloo, ON, Canada.

Previously, Dr. Shaker was an NSERC scholar at the Georgia Institute of Technology, Atlanta, GA, USA. He also held multiple roles with Research In Motion (RIM, now BlackBerry), where he significantly contributed to the development of wireless communication technologies. With close to 20 years of industrial experience in technology and approximately ten years as a faculty member, Dr. Shaker has led numerous projects related to the application of wireless sensor systems in healthcare, automotive, and unmanned aerial vehicles (UAVs). His work has had a direct impact on the design and launch of numerous commercial products available from over 20 multinationals.



8 Sept 2025 (Mon)



9.30am – 11.30am



Dewan Serbaguna, FKTN1,  
Universiti Malaysia Perlis, Pauh,  
Perlis

**BEM CPD Hours: 2**

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Moderators:

~ Ir Dr Huzein Fahmi bin Hawari

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