

# Recent Research Activities in the Applied Electromagnetics Laboratory

**Date:** Tue. 8<sup>th</sup> Oct.

**Time:** 1:10 pm

**Location:** Building 59, Room 2016

## Speaker:

**Dr. Hussein Attia**

Associate Professor EE Department  
KFUPM

## Abstract:

In this talk, the current research activities in the Applied Electromagnetics Laboratory will be highlighted. The first research topic to be covered is the design of microwave sensors for breast tumour detection; a loop antenna array will be employed as a microwave sensor for nearfield microwave breast tumour detection. The proposed sensor has a high sensitivity to detect an abnormality in the dielectric properties of breast tissues. The second research topic is the employment of metamaterials to improve the isolation between printed antennas for WLAN and 5G applications. Metamaterial structures have been used to mitigate unwanted waves in microstrip antennas due to their extraordinary properties when subjected to EM waves. They have the unique ability to manoeuvre electromagnetic waves depending on their structure and orientation. The third research topic covered in this talk is the design and implementation of a smart wireless seismic data acquisition system that provides real-time data transmission for seismic surveys. A system that comprises a wireless sensor node and a gateway unit is considered as a proof of concept. The wireless node includes a smart geophone acting as a sensor that receives reflected elastic waves from the earth sub-layers.

## Bio:

After joining KFUPM in early 2016, Dr Hussein Attia has managed to attract 2 Million SR in research funding to the Electrical Engineering department. His research interests include microwave sensing of breast tumours, metamaterials for 5G antennas design, and wireless sensor network for seismic data acquisition. He obtained his PhD degree from the University of Waterloo, Canada in 2011. He worked as Research Engineer at the Coding and Signal Transmission Lab., Waterloo from 2011 till 2013. He was granted a post-doctoral fellowship at Concordia University, Montreal, Quebec from Aug. 2014 - Jul. 2015. Also, He was a visiting scholar at University de Quebec (INRS) from Aug.-Dec. 2015 and during June-Aug. 2017. Dr Attia published 60+ journal and conference papers.