

**Title:**

Antenna an an Element of a Communication System

**Speaker:**

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**Abstract:**

Antenna is a critical element of a wireless communication system because it is the most efficient filter and is the gateway between the RF front end and the free space. The better the antenna works, the larger the link margin and the higher the data-rates. Yet it is often overlooked in communication system design or is an after-thought (i.e., the antenna engineer is asked to add an antenna after everything else is finalized). Though this talk will not cover how to design a particular antenna, it will study how a particular antenna design affects the communication system that it is part of or how to select a particular design to satisfy the requirements of a communication system. The talk will cover the fundamental parameters of antennas such as bandwidth, gain, radiation efficiency, input impedance, and pattern as an extension of the wireless link. Therefore, standard parameters of a communication link such as Friis Equation, link budget, receiver sensitivity, channel capacity, bit error rate, and propagation effects will also be covered. Multiple-In-Multiple-Out (MIMO) systems will be presented to illustrate how seemingly separate subjects, i.e., antennas, propagation and communication theory, that are typically covered separately in academic curriculums must be treated simultaneously to explain how they work. The talk is also intended to emphasize why it is important to get the fundamentals right during college education for a successful career later in life.

**Bio:**

Dr. Tayfun Özdemir is the co-founder and President of Virtual EM Inc. (Ann Arbor, Michigan, USA) where he is responsible for technology development and commercialization in addition to managing day-to-day operations and business development. Since its establishment in 2002, Virtual EM has received over \$10M in R&D funding and has two commercial products. Virtual EM has also spun off three ventures to commercialize its technologies in the three three years. The company's core competency is in the areas of Antennas, Computational Electromagnetics, Wireless Sensors and Machine Learning. Dr. Özdemir was also the co-founder and Chief Technology Officer of Monarch Antenna, Inc. (Ann Arbor, Michigan, USA), where he led the development of tunable antenna solutions for 5G handsets. He published 7 refereed journal papers, made over 50 conference presentations and holds four patents on antennas. Dr. Özdemir received his B.S. degree from Karadeniz Teknik Üniversitesi (Trabzon, Turkey), M.S.E degree from the University of Pennsylvania (Philadelphia, Pennsylvania, USA) and PhD degree from the University of Michigan (Ann Arbor, Michigan, USA), all in Electrical Engineering.

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