Daniyal Ali Sehrai

PhD Student at UPNA

Daniyal Ali comes from Peshawar in Pakistan.

B.Sc. in Telecommunication Eng.
M.Sc. in Electrical Engineering

Involved in research activities with industrial and academic professionals for several years in Pakistan and Spain, with international collaborations with experts from Italy, South Korea, and Saudi Arabia.

His last work experience has been as a Research Fellow in the Electrical Engineering Department of the University of Oviedo, within a research project financed by the company PHB Weserhütte, S.A.U.

Daniyal Ali is working in the Antenna Group, under the supervision of Dr. Iñigo Ederra, PhD on Telecommunication Engineering and Full Professor of the Department of Electrical and Electronic Engineering at the Public University of Navarra.

Research

Metamaterials to Improve Antennas and Sensors Performance.

Research objective: To develop millimeter wave radar sensors, which combined with metasurfaces (MTS) provide improved performance. In particular, the role of the MTS will be to enhance the sensitivity of the system. Application of these configuration can be found in areas such as photovoltaics (nondestructive inspection of solar panels) or agriculture (monitoring the status of the plants).

Abstract:

Metamaterials have been increasingly utilized to enhance the performance of antennas and sensors. In the context of antennas, metamaterials have been employed to improve characteristics such as gain, bandwidth, and the creation of compact and multi-frequency antennas. Metamaterial antennas, which incorporate metamaterials in their design, have shown potential for various applications, including surveillance sensors, communication links, navigation systems, and command and control systems. They can also be used to increase the radiated power of miniaturized antenna systems, effectively behaving as if they were larger than their actual size.

In the domain of sensors, metamaterial-based sensors have been developed for a wide range of applications, including biosensors, absorbers, energy harvesting, and microwave sensing. These sensors offer advantages such as improved sensitivity and the ability to operate over a wide frequency range. For instance, metamaterial sensor designs have gained significant interest in the field of microwave sensors, with researchers using simulation tools to create innovative designs that enhance sensor sensitivity.

Furthermore, the integration of metamaterials with antennas and sensors has led to the development of metamaterial-based sensor antennas. These structures combine the functionalities of both antennas and sensors, offering a compact and efficient solution for various applications, including medical imaging and wireless communications.

Overall, the use of metamaterials in the design of antennas and sensors holds great promise for advancing sensing, imaging, and communication systems. The ongoing research in this field is focused on exploring emerging design concepts, material platforms, and fabrication techniques to further enhance the performance of metamaterial-based antennas and sensors.

'My research interests include antennas, arrays, MIMO, metasurfaces, metasurface-based antennas, RF sensors and circuits, electromagnetic imaging/radars, and implantable antennas.'

'Engaging in industrial and academic collaborations at both national and international levels can significantly enrich my research endeavours.'