Title: **Implantable wearable antennas for biomedical devices and different wireless applications**

In this research paper, novel techniques and designs of implantable antennas used for wireless biomedical devices and wireless applications are discussed and summarized. Implantable antenna or textile antenna is a critical module for RF enabled linked devices and many challenges arise in terms of quantitative and qualitative treatments. New technology for soldier support improves combat effectiveness catering to the different requirements of the devices aiming with clothing, light weight and flexible power packs. Due to the increased understanding of potential applications and the demands of new systems, wearable antennas fulfill many functions both in terms of communications from on to off the body, on body channels and communications to implants. The common factor in design is the presence of the human body and the variability of tissue parameters around the body and of the orientation and distance of the antenna from the body. Proposed wearable antennas needs to meet requirements such as compact size, operating bandwidth, gain and sufficient radiation efficiency, and minimum SAR value for safety of humans. The purpose of this paper is to give an overview of the current progress and achievements and address the challenges for wearable antenna design. Firstly, the overview of the requirements related to the implantable antenna design is provided. Further, simulation and test methods for implantable antenna design are examined. Different antenna types, operating frequency bands and design environments are reviewed.

Research and development on wearable antennas shows high impact on providing effective communication capabilities to the soldiers in the battlefield. Besides, this system reduces the heavy load carried by the soldiers across the borders on the battlefield and allows them to communicate on the frontline without the need for conventional radio whip-antenna systems. Wearable technology is also being explored for use by fire-fighters and police patrol team members in conducting search and rescue operations. The technology results in the applications of individual communications, navigation and location equipment, computing capability, sensors, personal armor, and precise guided munitions.

Key words: Wearable antenna, biomedical application, wireless application, compact size, SAR