Abstract:

Microwave imaging (MI) is a potential alternative to conventional imaging modalities, such as – MRI, CT scan etc. for the detection and localization of anomalies (e.g. tumor, blood clot etc.) inside the human body. Though, the precision of the image is not as high as MRI or CT scan, MI can provide reasonable accuracy with low-cost, portable and simple setup, and can be used frequently without any health hazard as it uses non-ionizing radiation. MI requires the use of antennas as the transmitter/ receiver of electromagnetic wavs in the low frequency range of the microwave spectrum (~1 – 6 GHz for brain imaging). For the system to be portable, the antenna needs to be small. However, small antennas tend to resonate at high frequencies. Hence, different miniaturization techniques need to be incorporated to reduce the size of the antenna while maintaining low operating frequencies. In this project, a miniaturized antipodal Vivaldi antenna will be investigated in terms of characteristic modes to facilitate understanding the effect of different miniaturization techniques on the performance improvement of the antenna.