

DATE and TIME: June 6, 2024, 12.30 PM IST (9 AM CET or 5 PM AEST)

Title: Identification of Transgenic Plant Species using THz Spectroscopy

PhD Dissertation Abstract: With growing concerns over food security and plant genetic diversity conservation, we aimed to develop a non-invasive, rapid, robust, and high-fidelity technique to discriminate between genetic variants. Our study focused on Terahertz (THz) spectroscopy and imaging to distinguish between genetic variants of the Allium genus rapidly and accurately. This was done by measuring the cellular water dynamics in the epidermal tissues as it interacts with the biomechanics and the biomolecules within the cells over a period of time through THz time domain spectroscopy, continuous wave THz frequency domain spectroscopy and by using laser feedback interferometry with THz quantum cascade lasers. The effectiveness of THz spectroscopy and imaging allowed us to capture these time lapse changes in high resolution, leading for us to deem this technique to be suitable for real-time observation of minute changes in cellular water dynamics, and in the future, could be used for swift and efficient genetic discrimination in agricultural and genome conservation applications.