College of Computational, Mathematical, and Physical Sciences
Department of Chemistry

# Departmental Seminar

Wednesday June 24, at 10:30 AM
MACN 101

**Prof. Ida Tiwari**
Banaras Hindu University, Varanasi, India
Visiting Research Professor at the University of Waterloo.

**Title: "Facile sensor designs for clinically relevant analytes"**

**Abstract:** Advanced functional materials have emerged as powerful enablers of next-generation healthcare and forensic sensing technologies. The growing demand for rapid diagnosis, therapeutic drug monitoring, and on-site forensic screening necessitates sensing platforms that are highly sensitive, selective, portable, and reliable. Engineered nanomaterials, conducting polymers, hybrid nanocomposites, rare-earth-modulated heterostructures, and biofunctionalized surfaces offer enhanced surface area, superior charge transport, and tunable interfacial properties, enabling ultra-trace detection of biological biomarkers, pharmaceuticals, toxicants, and environmental contaminants in complex real-world matrices. The transition from conventional bench-top systems to miniaturized, screen-printed, and portable electrochemical platforms has significantly improved field applicability. Integration with handheld and point-of-care (POC) devices allows real-time monitoring in clinical, environmental, and forensic settings. Furthermore, the incorporation of Artificial Intelligence (AI) and Machine Learning (ML) into sensing workflows has transformed raw analytical signals into intelligent, data-driven decisions. Our research group has been continuously contributing to this evolving domain through the development of innovative nanocomposite-based sensing architectures, rare-earth-engineered two-dimensional heterostructures, and portable electrochemical devices validated in real samples.

**Coffee and Timbits will be served at 10:15 AM**