

Department of Biochemistry and Molecular Biophysics Seminar

Wednesday, October 14 at 4:00 p.m. in Ackert 120

Coffee and cookies at 3:45 p.m. in Chalmers 168



Dr. Uttam Garg

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Mass Spectrometry: Revolutionizing Clinical Laboratory Diagnosis

Mass spectrometry (MS) has emerged as a cornerstone technology in modern clinical laboratories, transforming diagnostic testing through its exceptional analytical specificity, sensitivity, and ability to simultaneously quantify multiple analytes. Unlike many traditional techniques such as immunoassays, MS-based methods generally do not rely on specialized antibodies or reagents, offering greater analytical flexibility and reducing susceptibility to assay interferences. As the clinical applications of MS continue to expand, laboratorians, clinicians, assay developers, and basic scientists require a deeper understanding of its fundamental principles and practical applications to optimize patient care and advance the development of future MS-based diagnostic tools.

This presentation will provide an overview of the core principles of mass spectrometry, including instrumentation, analyte detection, and quantitative analysis. The advantages of MS over conventional analytical methodologies will be reviewed, along with its expanding role across a wide range of clinical disciplines, including toxicology, therapeutic drug monitoring, metabolic disease testing, newborn screening, and proteomics. Real-world clinical examples will illustrate how MS has improved diagnostic accuracy, enhanced analytical performance, and enabled the measurement of biomarkers that are difficult or impossible to assess using traditional approaches. Through these examples, participants will gain a practical understanding of how MS is shaping the future of laboratory medicine and advancing precision diagnostics.