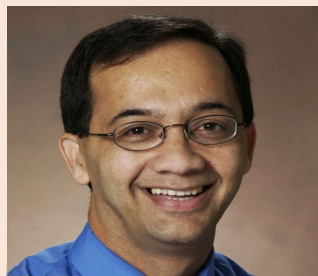




Centre for Environmental Science & Engineering (CESE), IIT Kanpur



Invited Talk By

Prof. Achintya N. Bezbaruah

Gehrts Presidential Professor of Environmental Engineering
Civil, Construction and Environmental Engineering
North Dakota State University (NDSU), Fargo, USA

8th July, 2025

117, Seminal hall, CESE, IIT Kanpur

4:30 PM

Title: Nanotechnology for Disentangling Metalloids from Water and Food

Abstract

Metal and metalloid contamination in water and food represents a critical global public health challenge, impacting millions of people worldwide. Recent advances in nanotechnology offer promising avenues for the removal or reduction of these contaminants. However, the practical implementation of nanomaterials is often limited by concerns related to their environmental sustainability, safety, and scalability. Research conducted at NDSU focuses on developing sustainable, scalable, and efficient nanomaterials for use in environmental remediation. In particular, the work emphasizes the design and application of adsorptive nanomaterials to improve water quality and reduce associated health risks. One project involves the synthesis of carbon-metallic nanohybrids that integrate iron and/or cerium within carbon matrices to enhance adsorption performance and selectivity. This work includes a mechanistic investigation into their interactions with contaminants, especially arsenic. The project also explores the impact of these nanohybrids on arsenic uptake by rice, including the molecular-level responses of the plant to nanomaterial exposure. This presentation will highlight the synthesis, characterization, and safety assessment of three nanohybrid systems, viz., iron-graphene, ceria-graphene, and sulfonated iron nanoparticles, and their potential applications in drinking water treatment and agriculture.

About the Speaker

Prof. Achintya Bezbaruah is a Gehrts Presidential Professor of environmental engineering and the current Department Chair of Civil, Construction and Environmental Engineering, at NDSU. He is also the Director of NDSU Grand Challenges Scholars Program. Achintya is a Fulbright Scholar and participated in the fellowship twice in 2018 and 2022. He is the current President of the Sustainable Nanotechnology Organization (SNO, Washington, DC). With more than 80 peer-viewed publications and multiple patents, his research group works on environmental nanotechnology and food-environment-water systems (FEWS). The group's work involves applying nanomaterials for water treatment and developing the next generation of fertilizers and pesticides, including fortification of food crops with nutrients and micronutrients. Achintya completed his doctoral (Ph.D.) research at the University of Nebraska-Lincoln (2002) and worked for one of the largest engineering consulting firms in the world, the URS Corp (now AECOM), in their groundwater remediation division (2003-2005) before joining NDSU as a faculty member in 2005.