



University at Buffalo

Department of Civil, Structural
and Environmental Engineering

School of Engineering and Applied Sciences

Environmental and Water Resources Engineering Seminar

Developing Analytical Methods for the Detection and Quantification of Engineered Nanoparticle Release in Complex Environmental Matrices

Abstract

Engineered nanoparticles (ENPs) are being produced in relatively large amount due to their specific and unique novel properties. ENPs may thus enter natural the environment (e.g., waters, soils, and sediments) where they may pose risk to environmental and human health. Detection and quantification of ENPs in environmental matrices is key for robust risk assessment of ENPs. However, detection and quantification of ENPs in environmental systems is challenging because of 1) the high concentration of natural nanoparticles (NNPs) in comparison to ENPs and 2) the similar elemental composition of NNPs and ENPs. This seminar will discuss the ongoing effort to develop analytical approaches to overcome the challenges in detecting and quantifying ENPs in soils and surface waters. The presentation will then elaborate on the quantification and characterization of TiO_2 and Ag ENPs in surface waters impacted by sewage overflows in South Carolina. Estimates suggest that 20-30 kg of TiO_2 is released annually to surface waters in South Carolina from sewage overflows only.

Dr. Mohammed Baalousha

Assistant Professor, Environmental Nanoscience
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Dr. Mohammed Baalousha obtained a BSc in Civil Engineering from the Islamic University of Gaza, Palestine in 2001. After that, he moved to France where he completed a Masters degree in Applied Mechanics from the University Bordeaux 1 in 2002 and a PhD in Environmental Biogeochemistry entitled “Environmental role of colloids as carriers of trace elements” in 2006. Between 2006 and 2013, he undertook a variety of postdoctoral research role at the University of Birmingham, UK in the area of the Environmental Nanoscience. He moved to the University of South Carolina as Assistant Professor in Environmental Nanoscience in January 2014. Dr. Baalousha is a recipient of the 2014 Emerging Investigator award, the 2016 NSF CAREER award and the 2017 NSF-EPSCoR fellowship award.

Dr. Baalousha's research interests are interdisciplinary in nature including understanding the role of natural nanoparticles as carriers of trace contaminants and understanding the fate, behavior and biological effects of manufactured nanomaterials in the environment. In particular he is interested in:

- Understanding the environmental and human health effects of nanomaterials
- Quantifying the environmental exposure to nanomaterials in the environment
- Developing analytical tools and methodologies for analysis of nanomaterials
- Understanding the transformations, fate, behavior and effects of nanomaterials in environmental systems
- Understanding the interactions between nanomaterials and natural organic matter (NOM-corona)

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Location: 223 Jarvis Hall, North Campus, University at Buffalo