Keynote Presentation

Wednesday Afternoon September 5rd

Nano-Evolution: Balancing Safety and Applications of Nanotechnology in Aquatic Systems

Tara Sabo-Attwood

Department of Environmental and Global Health, College of Public Health and Health Professions, University of Florida, Gainesville, FL USA sabo@phhp.ufl.edu

The development of synthetic nanomaterials over the past decade has led to the expansion of innovative uses and applications of such materials in the field of aquatic science and industry. Nanomaterials by definition, are typically composed of small (nano)particles of 1 – 100 nm in at least one dimension. Synthesizing nanoparticles on such a small size scale significantly changes their physiochemical properties as compared to their bulk counterpart materials which are highly desired for applications such as water disinfection and pathogen removal. For example, aquaculture is the fastest growing food-producing sector however, the presence of waterborne pathogens in high-density fish farming operations is a primary cause for aquaculture crop loss, globally. Therefore, providing safe and pathogen free water for this important food industry is essential to increase production and to ensure future food security. But with growing utility and use of nanomaterials in much desired and needed applications with little regulation, innovative physiochemical properties associated with nanomaterials may also produce unintended or unexpected consequences to exposed organisms and ecosystems. Based on these notions, the focus of this talk is to describe the current state of nanomaterial applications specifically to the aquatic and aquaculture fields, highlighting the need for safety assessments that consider a 'safety by design' paradigm. The talk will be grounded in case studies that showcase several cutting edge approaches to water disinfection in tandem with safety assessments. Current gaps in the field, from both a basic and applied research viewpoint and education and training considerations for future incorporation of nanomaterials in aquatic industries will be presented.