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Title of talk: The ecological effects of nanomaterials and the development of data and models to inform predictions of risk

Abstract: Our research on carbon nanomaterials with varying surface chemistries has shown that nanomaterials may be toxic to organisms in the environment, but that this toxicity depends on the type of nanomaterial as well as the surface chemistry of the materials. In addition, like other emerging contaminants, our research has shown that the interactions of nanomaterials and a given organism may not be an acute toxic response but may involve subtle impacts to physiology, behavior and gene expression. In addition, the impacts of an initial exposure may be multigenerational where effects are seen one to two generations after the initial exposure. To make better predictions about the ecological effects of nanomaterials we need to consider these longer-term impacts on a broad array of physiological pathways in the organism. In addition, if we wish to consider true ecological impacts we have to move from the organism to community and ecosystem level responses. However, endless assays are not practical. This talk will discuss our research and that of the new Center for Sustainable Nanotechnology regarding the sublethal impacts of nanomaterials, the links with surface chemistry alterations, and methods such as genomics and model membrane platforms that provide promising methods for developing data for predictive models of the molecular interactions of organisms with nanomaterials. In addition, the research that exists on larger scale interactions will be discussed and its ability to inform risk assessment.

References:

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Bio for Dr. Klaper

- Dr. Klaper's lab investigates the potential impact of emerging contaminants such as nanomaterials and pharmaceuticals on freshwater systems using traditional toxicological and genomics techniques. The goal of her research is to inform the design process and use of these chemicals so they may be more sustainable and have the least environmental impact.
- Dr. Klaper has been a AAAS-Science and Technology Policy Fellow where she worked in the National Center for Environmental Assessment at the U.S. Enviromental Protection Agency evaluating the potential use of genomic technologies in risk assessment.
    - She has served on the National Research Council Panel to Develop a Research Strategy for Environmental, Health, and Safety Aspects of Engineered Nanomaterials.
- She has served as a technical expert for several government organizations including the OECD, IJC, and EPA regarding emerging contaminants, genomics in risk assessment and nanotoxicology.
- She is currently a member of the Center for Sustainable Nanotechnology an NSF CCI Phase I Center that is a collaboration of UW-Milwaukee, UW-Madison, U. of Minnesota, Northwestern and University of Illinois
- Dr. Klaper is also the founding director of the Great Lakes Genomics Center whose goal is to develop genomic tools to be used to answer questions regarding the environment