

# **East Carolina University®**

## **Department of Physics**

### **Colloquium**

**Friday, April 19<sup>th</sup>, Room N109, Howell Science Complex  
3:15 p.m. (Refreshments at 3:00 p.m.)**

**Professor Qianqian Liu  
University of North Carolina – Wilmington**

### **Development of Harmful Algal Blooms Forecasting System using Satellite Remote Sensing and Numerical Modeling**

The coastal ecosystem is complex due to its multidisciplinary nature involving intertwined webs of living and nonliving elements, which makes the development and assessment of ecological forecasting systems challenging. However, with valid assumptions we can often use simple models to provide forecast users with helpful information. My research is focused on developing numerical models in combination with remote sensing/in-situ observations and statistical and machine learning models to understand the science of ecosystems and help forecast users for decision-making. For example, collaborating with NOAA, we develop an approach to predict the spatially- and temporally-resolved probability of exceeding a public health advisory level of microcystins in the western basin of Lake Erie, by innovatively combining different harmful algal blooms (HABs)/toxin detection and HAB location and movement forecast techniques. The forecast of HAB location and movement uses satellite remote sensing and a numerical hydrodynamic model to predict the location and movement of the bloom up to five days ahead. By focusing on well quantified physical drivers and a short enough forecast period that biomass sources and losses can reasonably be neglected, much of the ecological complexity can be avoided. Another example is the ongoing development of an HABs forecast system for the Albemarle Sound, combining satellite imagery and a numerical modeling system covering the Albemarle-Pamlico Sound.

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