Interactive Effects of Turbulence, Light and Phosphorus on Microcystis Dominance in Michigan Lakes

Elena Litchman, Phanikumar Mantha, Steve Hamilton, and Orlando Sarnelle

Project Abstract
We propose to develop a predictive theory of Microcystis dominance in lakes of different trophic status and morphometry. This theory builds on the work of Huisman et al. (2004) and links turbulence, water clarity, nutrient levels and phytoplankton competitive interactions to forecast Microcystis blooms. We will test this theory a) by simultaneously surveying turbulence levels, nutrient concentrations, water clarity and Microcystis abundance in multiple lakes in Michigan representing a wide range of physical, chemical conditions and lake size and b) by conducting a temporally detailed monitoring of the effects of physical structure on the Microcystis growth in two lakes of contrasting nutrient status. We will also use the model of light and nutrient competition between Microcystis and other phytoplankton species developed in this project to explore how future climate change may impact the occurrence of harmful algal blooms.