THE USE OF A MULTI-OBJECTIVE GENETIC ALGORITHM FOR CALIBRATION OF WATER QUALITY NUMERICAL MODEL OF EAGLE CREEK RESERVOIR, IN

Elizabeth A. Agee (Meghna Babbar-Sebens)
Department of Earth Sciences, Indiana University-Purdue University
Indianapolis, Indianapolis, IN 46202

Water quality models used for water resource management require large amounts of input parameters, whose values may or may not be readily available. The calibration of these models involves the adjustment of several input parameters. The credibility of calibrated models is judged based on their agreement with actual data. However, calibration of water quality numerical models can be an exceptionally computationally challenging process. In this research, the Environmental Fluid Dynamic Code's (EFDC) HEM3D water quality model was developed for the Eagle Creek Reservoir in order to model three algal groups (cyanobacteria, diatoms, and greens) as well as reservoir nutrient dynamics. A multi-objective genetic algorithm was then used for calibration by adjusting predetermined input parameters within a certain range and based on the model's agreement with observed data in the reservoir. The genetic algorithm was parallelized to work across a network of machines and on multiple threads. This presentation will demonstrate the advantages of using such a parallelized genetic algorithm for efficiently calibrating computationally expensive numerical models.

Funding was provided by the Undergraduate Research Opportunities Program (UROP).