

## **CE 890 Graduate Seminar**

- DATE:** January 28, 2009
- TIME:** 4:00 p.m. (refreshments served at 3:45 p.m.)
- PLACE:** Fiedler 2144
- SPEAKER:** Dr. Xiaoying Yang, Research Associate, KSU Dept. of Civil Engg.
- TOPIC:** “Application of a Conceptual Groundwater Data Model with MODFLOW to Study the Upper Arkansas River Corridor Groundwater System, Kansas”

### **ABSTRACT**

Development of a conceptualization of a hydrogeologic system serves as the basis of groundwater modeling. While existing groundwater data models are designed to store groundwater system information, none is designed to capture this conceptual view. We address the need by presenting a new object-oriented conceptualization groundwater data model that represents a groundwater system as a series of aquifer layers with defined aquifer properties and water boundary conditions. A case study is presented to use the groundwater data model to study the conceptual view of the Upper Arkansas River Corridor groundwater system. A two-layer transient MODFLOW model has been developed to simulate groundwater flow and sulfate transport from the surface waters in the Upper Arkansas Corridor region from 1959 to 2005. The simulation results have shown a significant decline in groundwater level, the conversion of Arkansas River from a gaining river to a losing river in the western two-thirds of the study area, and the subsequent accelerated movement of sulfate from surface waters to groundwater. This case study illustrates the data model's promise as an effective mechanism for groundwater system conceptualization and data storage, and utility for various groundwater computational models.