Mi Hoon received her B.A. and M.S. in Environmental Science and Engineering from the Ewha Womans University in Korea. During her master's years, she studied in specialty of water quality management and worked on water quality modeling of environmental impact assessment projects (landfill leachate, river weir construction, wastewater treatment facility, harbor construction). Before her Ph.D. program she worked for an environmental consulting company and a national laboratory. Her research interest is hydrologic and water quality management with aid of GIS and models and her dissertation has been prepared with these works.

Agricultural & Biological ENGINEERING

Dissertation Defense

Speaker: Mi Hoon Jeong

Title: Spatial Optimization for Managing Surface Runoff from Urbanization: Parameterization and Application of a Spatial Runoff Minimization Model

Major Professor(s): Bernard A. Engel

Date: Monday, June 20, 2011

Time: 10:00 am

Location: ABE 301

Abstract:

The spatial runoff minimization model (ROMIN: Runoff Minimization) identifies the optimal location of urban development which minimizes runoff increase from land use change. This study includes efforts to facilitate broad use of the model and extends the variety of model applications. First, the ROMIN GIS interface and web system were developed to provide ROMIN applications without high-performance computing platforms. The model's reliability was examined and appropriate input parameters were discussed. Second, applications of the ROMIN model were extended to identify the relationships between urban development scale (e.g. amount of development within an area of interest) and its hydrologic impact (runoff increase). The relationship was not linear and critical points showing greater hydrologic impact were identified. Critical points implied great hydrologic sensitivity to development amount. Third, the ROMIN model was adjusted to address other major issues relative to urbanization, such as socioeconomic preference when determining the optimal region. The Land Transformation Model (LTM) and weighted sum method were utilized to implement the objective. The proposed approach was demonstrated by being applied on a watershed and solution regions reflected both runoff increase management and socioeconomic consideration. This study delves into how to apply the spatial runoff minimization model to support improved development design with consideration of hydrologic management.

Application:

1) to support urban development design regarding desirable amount based on: understanding hydrologic sensitivity of new development in the watershed, exploring and comparing alternative plans around critical points, and understanding optimal locations depending on amount of development and 2) to offer identification of optimal urban regions based on multiple objectives (i.e. hydrologic impact management and socioeconomic preference consideration).