Environmental Science Graduate Program Student Seminar Series

Energy Footprints of Energy and Water Footprints of Water

- **Soomin Chun**

Smith 3150 | 2 - 8 - 19 | 3:00 - 4:00 pm

Abstract:

Modern societies rely on various inter-related systems to provide food, energy, and water for human survival. These systems and their accompanying natural resources are coupled in many ways. For example, the production of energy requires water throughout the supply chain; water is required to, or co-produced with, the production of fossil fuels and biomass, as well as the materials that comprise solar photovoltaics and wind turbines. Power plants also require water for cooling. This water can be sourced from surface waters, or depending on the process, municipal water systems—both of which require energy in various ways (e.g., pumping, treatment). Since water and energy are inextricably linked, research into the implications of the energy-water nexus has been a focus of effort over the past decade. But if energy is required for the production of water and water is required for the production of energy, then there exists a recursive relationship whereby energy requires energy and water requires water. Depending on the sources, uses, processes, and their locations, these footprints can be substantial. But there has been little identification of this recursion, and no systematic investigation of these recursive footprints over space. This presentation will discuss these issues and present the initial development of an Integrated Hybrid Input-Output Life-Cycle Model which, in contrast to methods that focus on supply chains, tracks the flows and requirements of resources through the economy. The model will be applied to the U.S. Great Lakes Region, as a part of grant funded by the U.S. National Science Foundation.