

University of Minnesota

Fifth Annual

William E. Larson and Raymond R. Allmaras

# Emerging Issues in Soil and Water

Lectures



## **Dr. Gary W. Petersen**

Distinguished Professor Emeritus of  
Soil and Land Resources  
Department of Crop and Soil Sciences  
The Pennsylvania State University  
University Park, PA

*“Geospatial Technologies in  
Land Use Decision Making”*



## **Dr. Ronald Amundson**

Professor, Division of Ecosystem  
Sciences  
University of California  
Berkeley, CA

*“Are Soils Endangered?”*

April 12, 2007

2:00-4:30 PM

335 Borlaug Hall

University of Minnesota

For more information, please contact Dr. Satish Gupta, [sgupta@umn.edu](mailto:sgupta@umn.edu), 612-625-1241.

# **Dr. Gary W. Petersen: “Geospatial Technologies in Land Use Decision Making”**

## **Abstract**

Land use is a broad and complex subject that requires a multidisciplinary approach to address the various issues. The causes, consequences, and controls of land use change are important in today's society. This is especially true in agriculture where landscapes have multifunctional uses beyond the production of food and fiber. Many land use issues facing society today are directly or indirectly linked to soil science. These issues cut across many different scales and political levels. The presentation will cover trends in land use and their consequences on the environment and socio-economic structure. The discussion will include sprawl development and the loss of farmlands. Discussion will also cover geospatial technologies and detailed local data sets that can assist in land use decision making. These technologies include remote sensing, geographic information systems (GIS), global positioning systems (GPS), visualization, and web based modeling and dissemination.

# **Dr. Ronald Amundson: “Are Soils Endangered?”**

## **Abstract**

The face of the planet is being rapidly changed through the combined effects of agriculture and urbanization. The combined human impact on land surfaces during the past few hundred years is as large as that which occurred during the last global glaciation. In the past 150 years, nearly 10 % of the world's land has been converted to the combined uses of cultivation and pastures, and 10 % of the world's land has been logged. By 2050, the global population is projected to grow by another 50%, and the coming 50 years are likely to be the final period of rapidly expanding, global human environmental impacts. Agriculture imparts profound changes on soil processes, and these human induced changes in state factors create new soils which begin to undergo largely unknown and unstudied geochemical trajectories. Assuming soil series are equivalent to biological species, GIS-based analyses of soil diversity has shown that many soil types in the United State are endangered, and a handful are extinct, with the percentage of endangered soils in any state being closely tied to the state's agricultural production value. The agricultural soils of the US, which have been termed “domesticated soils” in an analogy to biological species, comprise vast newly-configured landscapes which will have pronounced biogeochemical effects on the region and the planet for centuries to come. This lecture describes the methodology for characterization of extinct and endangered soils and the need to preserve landscapes across a broad spectrum of climate, geology, and landform age.