CEAT RESEARCH SEMINAR SERIES

Friday, February 26, 2016
12:30 - 1:30 pm, 103 ATRC

Systems Analysis of the Interactions between Food, Energy, and Water systems

David Lampert, Ph.D. Assistant Professor
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Food, water and energy intimately interrelated—energy production processes such as electric power generation and fossil fuel extraction consume water and diminish water quality; water and wastewater treatment and distribution consume energy; food production processes consume water and energy and diminish water quality. The sustainability of food, energy, and water must therefore be analyzed holistically rather than on an individual basis. This seminar will provide an overview of research into these relationships. High-level programming languages such as Python can be used to integrate datasets and quantitatively analyze relationships including water resource availability in changing climates, geospatial and temporal variability of water consumption associated with electric power generation, and diminishment of water quality from food and energy production processes. Systems-based life cycle assessments (LCA) can be used to compare the environmental impacts of functionally equivalent products developed from different supply chains. LCA and Python programming are useful tools that can enrich engineering and technology research into other fields including alternative energy production, water treatment, and food processing.

Optimizations of Memory-based Elementary Functions within Computing

James E. Stine, Jr., Ph.D. Professor
School of Electrical and Computer Engineering

Recent advances in memory architecture have enabled the computation of elementary functions or transcendental functions (e.g., sine and cosine) precisely and with more accuracy. However, there is still a significant amount of improvements that can be achieved in this area to reduce application-specific and general-purpose processing in the 21st century. This presentation discusses several high-speed current and future methods for computing elementary functions using parallel table lookups and multi-operand operations. This talk will also discuss possible areas of collaboration in the area of computation within hardware and its applicability towards areas in science, technology, engineering and mathematics.

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