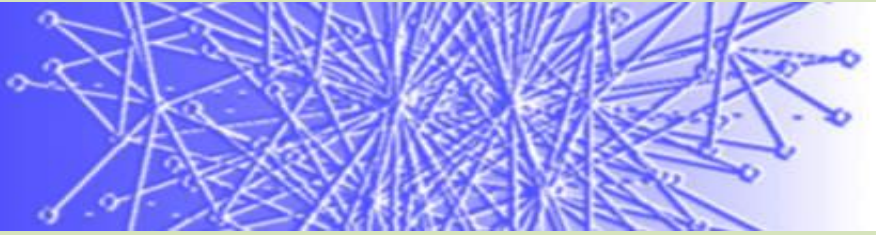


# CoCo Seminar Series Spring 2015



## **Computational Sustainability: A Dynamic Game Approach**

**Dr. Sung Hoon Chung**

Systems Science and Industrial Engineering  
Binghamton University

**Wednesday April 1st, 2015 8:30-9:30am**  
**Engineering Building R-3**  
**(SSIE Conference Room)**



This talk is on developing computational and mathematical models, effective numerical algorithms, and analytical tools for Computational Sustainability, a rapidly growing interdisciplinary field that has received a surge of interest for modeling and computing the solutions of sustainability problems. The range of problems includes biodiversity and species conservation, natural resource management, environmental operations management, humanitarian logistics, and sustainable transportation networks. This talk will introduce the audience to several sustainability problems and discuss the systematic, dynamic-game based framework to tackle such problems. In particular, the approach to dealing with design and computing the solutions of complex sustainability problems is based on expression of the model as a differential variational inequality (DVI), which in turn can be solved using numerical optimization methods/algorithms such as successive linearization, fixed-point, penalty, complementarity, and gap function. This is a significant departure from the usual dynamic programming approach and should be of intrinsic interest since it allows the inclusion of many behavioral features that make the mathematical models more realistic and, therefore, provide ample opportunity to generate insights into complex sustainable management systems. This approach also provides analytical tools and qualitative results such as decision rules derived from necessary conditions, existence and uniqueness of the solution, comparative dynamics, and sensitivity analysis to complement numerical solutions. In summary, the focus is to present a systematic framework for the development of policies for balancing environmental, economic, and societal needs, in support of sustainable development and a sustainable future.

Dr. Sung Hoon Chung is an Assistant Professor of Systems Science and Industrial Engineering at Binghamton University. His research interests include mathematical optimization, computational game theory, healthcare operations management, and supply chain management.

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