

Computational Sustainability

Carla P. Gomes

Cornell University
Ithaca, NY, USA
gomes@cs.cornell.edu

Abstract. Computational sustainability [1] is a new interdisciplinary research field with the overall goal of developing computational models, methods, and tools to help manage the balance between environmental, economic, and societal needs for sustainable development. The notion of sustainable development — development that meets the needs of the present without compromising the ability of future generations to meet their needs — was introduced in *Our Common Future*, the seminal report of the United Nations World Commission on Environment and Development, published in 1987. In this talk I will provide an overview of computational sustainability, with examples ranging from wildlife conservation and biodiversity, to poverty mitigation, to large-scale deployment and management of renewable energy sources. I will highlight overarching computational challenges at the intersection of constraint reasoning, optimization, data mining, and dynamical systems. Finally I will discuss the need for a new approach that views computational sustainability problems as “natural” phenomena, amenable to a scientific methodology, in which principled experimentation, to explore problem parameter spaces and hidden problem structure, plays as prominent a role as formal analysis.

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Reference

- [1] Gomes, C.P.: Computational Sustainability: Computational methods for a sustainable environment, economy, and society. *The Bridge*, National Academy of Engineering 39(4) (Winter 2009)