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Green IT and Sustainable Computing

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Review

Sustainability is one of the greatest challenges in information technology. In the book Computing Research for Sustainability written by Lynette I. Millet and Deborah L. Estrin, this topic is discussed in three chapters. The first chapter elaborates on domains of potential impact in order to illustrate the role and available opportunities of IT on the broader path toward sustainability. IT and computer science could have a huge impact in a wide diversity of sustainability challenges. The examples represented in the first chapter illustrate some of the efforts that are needed. Also important thing in the first chapter was that individual problems are highly multidimensional and they require innovation in different areas of computing as well as deep domain knowledge, for example complete solutions to global sustainability challenges will require deep economic, political and cultural changes. The chapter basically addresses the question, in what ways and where can computing research have measurable and significant impact?

The second chapter provides examples of important technical research areas and outlines a broad research agenda for computer science and sustainability. Although there are numerous opportunities to apply well understood technologies and techniques to sustainability, there are also hard problems—such as mitigating climate change—for which current methods offer at-best partial solutions, and rapid innovation is essential in light of the pressing nature of the challenges. The second chapter also highlighted the centrality of data and information to sustainability and the highlighted areas in this chapter—measurement and instrumentation; information-intensive systems; analysis, modeling, and simulation; optimization; and humancentered systems—are counterparts to well-established research areas in computer science. This overlap has clear positive implications. However, finding a way to have a significant impact may require new approaches to these problems and almost certainly new ways of conducting and managing research.

The third chapter explores ways of conducting and managing research so that computer science research can have an even greater impact on sustainability challenges. In

addition to the research areas discussed in second chapter, the third chapter gives information about additional areas of promising computer science and related research for sustainability. Aside from the main topic, this chapter also gives list of some of computer science's most significant achievements over the years. But all in all, the third chapter has argued for a bottom-up approach to research that values application-driven results while also supporting the iterative process that eventually leads to more universally useful contributions. Chapter mentions that committee has argued for a series of validation metrics that explicitly explore the true impact of a piece of work in the arena of sustainability and such validation metrics should include those that deal directly with humans, economics, and ecosystems and those metrics that engage with the concept of scale.