

COMPUTER SCIENCE RESEARCH SEMINAR

Programming Language Support for Sustainable Software

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Friday, February 16th at noon in room R15, Engineering Building

Abstract: This talk presents Eco, an energy-aware and temperature-aware programming language with first-class support for sustainability. An Eco program may adaptively adjust its own behaviors to stay on a given energy or temperature budget, avoiding both deficit that would lead to battery drain or CPU overheating, and surplus that could have been used to improve the quality of results. Sustainability management in Eco is captured as a form of supply and demand matching, and the language runtime consistently maintains the equilibrium between supply and demand. Among the efforts of energy-adaptive and temperature-adaptive systems, Eco is distinctive in its role in bridging the programmer and the underlying system, and in particular, bringing both programmer knowledge and application-specific traits into energy optimization. Through a number of intuitive programming abstractions, Eco reduces challenging issues in this domain — such as workload characterization and decision making in adaptation — to simple programming tasks, ultimately offering fine-grained, programmable, and declarative sustainability to energy-efficient computing. Eco is a minimal extension to Java, and has been implemented as an open-source compiler.

Bio: David Liu is an Associate Professor in the Department of Computer Science at SUNY Binghamton. His research interests are programming languages, computer systems, and software engineering.

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Wraps, chips and soda will be provided!