

Faculty Candidate Seminar

Variability-Aware System Engineering: Modeling, Prediction, and Optimization

Jianmei Guo, University of Waterloo

Wednesday, November 12, 2014 11:00 to 12:00pm

Venue: CS206

(Refreshments will be served at 10:45 a.m.)

Abstract - Variability is a fundamental property of software systems that can be customized for different market segments or contexts of use. Variability is ubiquitous in the design, development, and deployment of software systems in many domains, such as aircrafts, automobiles, integrated circuits, and mobile phones. However, variability introduces essential complexity of managing a large number of variants and diverse artifacts (e.g., requirements, architecture, code, and tests) involved. A major challenge is to accurately and efficiently find the optimal variant that meets certain functional and quality (e.g., performance, cost, and energy consumption) requirements of stakeholders. To address this challenge, I will present a systematic methodology called Variability-Aware System Engineering, which involves: (1) variability modeling using feature-oriented analysis and constraint solving, (2) quality prediction using statistical machine learning, and (3) multi-objective combinatorial optimization using approximate algorithms and exact, parallel methods.

Bio - Jianmei Guo received his Ph.D. in Computer Science and Engineering from Shanghai Jiao Tong University in October 2011. Since April 2012, he has been working as a Postdoctoral Fellow in the Generative Software Development lab within the Department of Electrical and Computer Engineering at the University of Waterloo. His research interests are in Software Engineering and Knowledge Engineering, focusing on methods, techniques, and tools for developing adaptable and reliable software systems. Currently, he investigates algorithms of Statistical Machine Learning, Multi-Objective Combinatorial Optimization, and Parallelization to accurately and efficiently predict and optimize the quality attributes (e.g., performance, cost, and energy consumption) of configurable software and products. Moreover, he studies Model-Driven Engineering for sustainable evolution of LinuxKernel and eCos.