



Spring 2009 CIS Colloquium Series

Modularity in Design: Formal Modeling and Automated Analysis

Yuanfang Cai
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12-1pm, Wednesday, April 15, 2009

Abstract: Reasoning about the evolvability properties and economic implications of design structures is critical to high-consequence decision-making, but it remains difficult, in part due to the lack of formal theories linking design structures to evolvability and economic properties, and of automated techniques facilitating value-based decision-making. One key impediment is the lack of analyzable high-level design representations that both convey design architectures and enable designers to reason precisely about their modularity properties and economics.

This talk presents such a formal and analyzable representation. It takes design decisions as first-class members and expresses their relations using constraint networks. This model formally accounts for the key concepts of important but informal theories, enables the derivation of pairwise dependence relations from formal models, enables the automation of a range of architectural analysis methods related to evolution and economic value, and generalizes to provide an account of both object-oriented and aspect-oriented notions of modularity in a unified, declarative framework.

Bio: Yuanfang Cai is an assistant professor at Drexel University. She received her M.S. and Ph.D. degrees in 2002 and 2006 respectively from the University of Virginia, advised by Kevin Sullivan. Her primary research interest is software modularity assessment, formal design modeling and automated, quantitative analysis techniques to reason about design structure and related outcomes early in the development process, as well as the synergy of software architecture and organizational structure. She has published papers in the International Conference on Software Engineering (ICSE), International Conference on Automated Software Engineering (ASE), International Symposium on Foundations of Software Engineering (FSE), etc. She has served on program committees for the Working IEEE/IFIP International Conference on Software Architectures (WICSA), International Conference on Software Maintenance (ICSM), and International Conference on Aspect-oriented Software Development (AOSD). She has also co-organized the Workshop on Assessment of Contemporary Modularization Techniques (ACoM) co-located with the International Conference on Object Oriented Programming, Systems, Languages and Applications (OOPSLA).

Location: 4th Floor Conference Room (Wachman 447)

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Refreshments will be served!