The SLAI Methodology: A Systematic Aspect-Oriented Identification Process for Functional and Non-Functional Requirements

**Wednesday, 3/29/17 | 10:45 – 11:45am | East Hall E2214**

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**Abstract:** Aspect-oriented software development (ASOD) was created to deal with crosscutting concerns, or aspects, that make software complex and hard to understand. These aspects, normally considered non-functional items such as logging and synchronization, cannot be encapsulated into one class as is the goal of object-oriented development. The implementation of aspects is well defined and many languages have designed solutions to weave this code into objects using join points. This dissertation focuses on the identification and definition of aspects in the early phases of software development for the enablement of the true benefits of aspect-oriented programming to be realized. This paper proposes a definition of what an aspect is in the requirements phase of software development that focuses not only on traditionally non-functional requirements, but also functional requirements as well. In addition, this paper presents a methodology, the SLAI (Structural Lexicon for Aspectual Identification) Methodology, for the systematic identifications of aspects at this phase of software development. This methodology examines all the vocabulary used to define the requirements of the system to ensure that all terms are reused as much as possible, eliminating similar terms for the same concepts. The reuse of the terms and verb phrases allows for a systematic process for the identification of aspects at the requirements phase. The SLAI Methodology was validated using a case study of a partial use case requirements document including some non-functional requirements. Overall, seven aspects were identified by following the SLAI Methodology, six of which were from the functional requirements. Since aspects have traditionally resulted from non-functional requirements, the SLAI Methodology demonstrated that it is possible to identify aspects systematically from all requirements. The SLAI Methodology’s systematic process and clear definition of an aspect provide support for complete identification of aspects in the early stages of software development and, when integrated with a corresponding aspectual design view, will move ASOD further in the realization of its true benefits.

**Biography:** Dr. Caroline Budwell is Associate Professor at John Tyler Community College. She received her Bachelor’s degree in Mathematics and a Masters in Teaching from the University of Virginia. She received her PhD. in Computer Science from Nova Southeastern University.