

*The University of Alabama  
Department of Computer Science  
Colloquium Series Speaker*

**Professor Jeff Gray  
University of Alabama, Birmingham**

## **"Transformations across Multiple Software Artifacts"**

**Friday, February 18<sup>th</sup>  
11:00 a.m., HO 108**

### **Abstract:**

This presentation will demonstrate the benefits of software transformation applied to multiple artifacts (e.g., models, source code, and grammars) at different levels of abstraction.

The C-SAW and GenAWeave tools support evolution of legacy software through a two-level approach using aspects. The principle strategy of these tools is to generate low-level transformation rules from higher-level domain languages. The presentation will highlight the ability to make rapid adaptations to a large cross-section of an application through simple specification changes to domain-specific models.

As case studies, the transformation of two legacy commercial applications will be shown: a large mission-computing avionics framework written in C++, and a client-server enterprise management system implemented in Object Pascal. In the avionics application, transformation rules are generated from domain-specific models specified in the Generic Modeling Environment (from Vanderbilt University). Using C-SAW, it will be shown that small changes in a representative model can regulate concurrency and logging policies across many C++ classes. The Object Pascal portion of the demonstration will illustrate the use of a program transformation system (the Design Maintenance System) as the underlying engine for an aspect weaver. A unique feature of the demonstration is the ability to weave aspects into various legacy languages (not just Java) at the source level using GenAWeave.

In addition to model and code transformations, the motivation for transforming language grammars will be presented within the context of an Eclipse debugging framework for domain-specific languages.

This work was performed in collaboration with Yuehua Lin, Suman Roychoudhury, Hui Wu, and Jing Zhang.