

Computer Science Seminar

Specifying and Verifying Advanced Control Features

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Advances in programming often revolve around key design patterns, which programming languages embody as new control features. These control features, such as higher-order functions, advice, and context dependence, use indirection to decrease coupling and enhance modularity. However, this indirection makes them difficult to verify, because it hides actions (and their effects) behind an abstraction barrier. Such abstraction barriers can be overcome in a modular way using greybox specification techniques, provided the programming language supports interfaces as a place to record specifications. These techniques have previously allowed specification and modular verification of higher-order functional and object-oriented programs, as well as aspect-oriented and context-oriented programs.

This work is joint with David Naumann, Hridesh Rajan, and Tomoyuki Aotani. A paper about the work will be presented at the ISoLA conference in October 2016. The work of Leavens was supported in part by US NSF grants CNS1228695 and CCF1518897.

Bio: Gary T. Leavens is a professor and chair of the department of Computer Science at the University of Central Florida (UCF). Previously he was a professor of Computer Science at Iowa State University in Ames, Iowa, where he started in January 1989, after receiving his Ph.D. from MIT. Before his graduate studies at MIT, he worked at Bell Telephone Laboratories in Denver Colorado as a member of technical staff.

Professor Leavens's research interests include programming and specification language design and semantics, program verification, and formal methods, with an emphasis on the object-oriented and aspect-oriented languages. His best known work in the area of formal methods is related to the JML project, an international effort with many associated tools (see <http://jmlspecs.org>). His work on specification languages embodies insights from his work on the theory of behavioral subtyping (with David Naumann, Don Pigozzi, and others). His best known work on language design and semantics is on aspect-oriented programming (joint with Curtis Clifton, James Noble, Hridesh Rajan, and Medhi Bagherzadeh) and multiple dispatch languages such as MultiJava. See <http://www.cs.ucf.edu/~leavens> for more information on his research.

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209 Computer Science Building

