TITLE: "Verification-Aided Regression Testing"

ABSTRACT: This talk presents Verification-aided regression testing, a novel extension of regression testing that is significantly less sensitive to the completeness of the validation test suite due to the use of model checking. We extend the use of test case executions from the conventional directfault discovery to generation of behavioral properties specific to the new version by (i) automatically producing properties that are proved to hold for the base version of a program, (ii) automatically identifying and checking on the upgraded program only the properties that, according to the developers' intention, must be preserved by the upgrade, and (iii) reporting the faults and the corresponding counter-examples that are not revealed by the regression tests. Our empirical study on both open source and industrial software systems show that verification-aided regression testing produces properties that can be extremely beneficial in increasing the effectiveness of regression testing by timely and automatically detecting faults invisible to existing test suites.