Program Analysis:
On the Search for Faults and Programs

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Abstract:

The program analysis game has changed dramatically in the last decade with the advent of symbolic and hybrid analyses, powerful constraint solvers, and massive computing power. The most noticeable impact of this change has been in the area of automated fault detection, but this is just the beginning. In this talk I am going to provide an overview of two projects that illustrate what we can expect from program analysis techniques in the future. First, I will describe how we have adapted symbolic execution to transform the way we perform load testing, moving from simply increasing the input size to automatically crafting inputs that induce extreme loads and better characterize a system's performance. Second, I will introduce how we are leveraging constraint solvers to transform the way developers search for code, moving from the current syntactic-keyword search to a semantic code search where the desired functionality is specified through inputs and outputs. I will finalize by sharing some of the challenges ahead in making these approaches broadly applicable in practice.

Biography:

Dr. Sebastian Elbaum is Professor of Computer Science and Engineering at the University of Nebraska-Lincoln. His research aims to improve software dependability through testing, monitoring, and analysis. His teaching focuses on instilling cost-effective software development principles. He is the recipient of an NSF Career Award, an IBM Innovation Award, 3 ACM SigSoft Distinguished Paper Awards (FSE2006, ICSE2008, ICSE2012), and an UNL Award for Excellence in Graduate Education. He served as Program Chair for the 2007 International Symposium on Software Testing and Analysis, as Program Co-Chair for the 2008 Empirical Software Engineering Symposium, and as Co-Editor for the Information and Software Technology Journal. He is currently in the Editorial Board of the ACM Transactions on Software Engineering and Methodologies Journal. He is a co-founder of the EUSES Consortium to support end user programmers, the E2 Software Engineering Group at UNL, and the Nimbus UAV Lab (also known as the UAV Lab) at UNL. He received his Ph.D. from the University of Idaho, and a Systems Engineering degree from Universidad Catolica de Cordoba, Argentina.