**Colorado State University's
Information Science and Technology Center (ISTeC)
*presents <u>two</u> lectures by***

Dr. Stephanie Forrest

Professor and Chair,
Department of Computer Science,
University of New Mexico

ISTeC Distinguished Lecture

in conjunction with the
**Electrical and Computer Engineering Department and
Computer Science Department Seminar Series**

"Evolutionary Software Repair"

Friday, April 1, 2011
Reception: 10:30 a.m.
Lecture: 11:00 – 12:00 noon
Location: Lory Student Center Room 205

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Computer Science Department Special Seminar

"Automated Software Repair Using Genetic Programming"
Thursday, March 31, 2011
Lecture: 3:00 p.m.
Reception: 4:00 – 4:30 p.m.
Location: Lory Student Center Room 230

ABSTRACTS

"Evolutionary Software Repair"

Computer programmers like to think of software as the product of intelligent design, carefully crafted to meet well-specified goals. In reality, large software systems evolve inadvertently through the actions of many individual programmers, often leading to unanticipated consequences. Because software is subject to constraints similar to those faced by evolving biological systems, we have much to gain by viewing software through the lens of evolutionary biology. The talk will highlight recent research applying the mechanisms of evolution quite directly to the problem of repairing software bugs. Specifically, it will describe an automated method for repairing errors in off-the-shelf, legacy programs without formal specifications, program annotations, or special coding practices.

"Automated Software Repair Using Genetic Programming"

There are many methods for detecting and mitigating software errors but few generic methods for automatically repairing errors once they are discovered. The talk will describe an automated method for repairing errors in off-the-shelf, legacy programs without formal specifications, program annotations, or special coding practices. The method uses an extended form of genetic programming to evolve a program variant that retains required functionality but is not susceptible to the error. We use existing test suites to encode both the error and required functionality. The talk will describe the algorithm and summarize experimental results on 15 programs totaling 1.2M lines of C code. If time permits, the talk will also describe results combining the method with intrusion detection to form a closed-loop repair system, extensions of the method to assembly code programs, and recent results on proactive bug repair using software diversity.

SPEAKER BIOGRAPHY

Stephanie Forrest (www.cs.unm.edu/~forrest) is Professor and Chair of the Computer Science Department at the University of New Mexico in Albuquerque. She is Co-Chair of the Santa Fe Institute Science Board. Her research studies adaptive systems, including immunology, evolutionary computation, biological modeling, computer security, and software. Professor Forrest received M.S. and Ph.D. degrees in Computer and Communication Sciences from the University of Michigan and a B.A. from St. John's College. Before joining UNM in 1990 she worked for Teknowledge Inc. and was a Director's Fellow at the Center for Nonlinear Studies, Los Alamos National Laboratory. She currently serves on the Computing Research Association Computing Community Consortium Council. She is a Senior Fellow of the International Society for Genetic and Evolutionary Computation.

To arrange a meeting with the speaker, please contact Sharon Van Gorder at (970) 491-5862 or vangord@cs.colostate.edu.

ISTeC (Information Science and Technology Center) is a university-wide organization for promoting, facilitating, and enhancing CSU's research, education, and outreach activities pertaining to the design and innovative application of computer, communication, and information systems. For more information please see ISTeC.ColoState.edu.