Talk Title: Grand Challenges in Evolutionary Computing

Speaker: Daniel Tauritz Slides

Affiliation: Missouri S&T

Venue: Computer Science Department 209

Time: Feb' 5th Thursday, 12:30 to 1:30pm

Abstract:

During the last few decades, Evolutionary Computing (EC) has emerged as a powerful methodology for tackling the often highly complex problems of modern society, such as optimizing engineering design, job shop scheduling, and transport systems. Such real-world optimization problems typically are characterized by huge, ill-behaved solution spaces which are infeasible to exhaustively search and defy traditional optimization algorithms because they are for instance non-linear, non-differentiable, non-continuous, or non-convex. EC encompasses a class of stochastic, population-based, optimization algorithms inspired by biological evolution and genetics which have been shown to perform well on problems with huge, ill-behaved solution spaces. This talk will discuss current grand challenges in EC and describe several active research projects being carried out at Missouri S&T's Natural Computation Laboratory which aim to address some of those grand challenges.

Bio:

Dr. Daniel Tauritz is an Associate Professor of Computer Science at Missouri University of Science and Technology where he is Director of the Natural Computation Laboratory, Research Investigator in the Intelligent Systems Center, and Investigator in the Energy Research & Development Center. He received a Ph.D. in Computer Science from Leiden University in 2002. His primary research interest is in Evolutionary Computing, both the design of novel types of Evolutionary Algorithms and their application to real-world problem solving in areas such as Critical Infrastructure Protection (e.g., coevolutionary arms-races for hardening electric power transmission systems), Automated Software Engineering (coevolving test cases and software artifacts), Transportation Engineering (e.g., multi-objective traffic system design), and Inverse Diffusion Analysis (employing Genetic Programming). His long-term research goal is to create parameterless autonomous Evolutionary Algorithms which require no parameter tuning by users and which employ an autonomous control structure. Such structures have the potential to autonomously regulate population dynamics via emergent behavior rather than the centralized control structures traditionally employed by Evolutionary Algorithms.