Gary G. Yen
Professor in the School of Electrical and Computer Engineering, Oklahoma State University, USA

Topic: **State-of-the-Art Evolutionary Algorithms for Many Objective Optimization and Visualization and Performance Metrics in Many-Objective Optimization**

Abstract:

Evolutionary computation is the study of biologically motivated computational paradigms which exert novel ideas and inspiration from natural evolution and adaptation. The applications of population-based heuristics in solving multiobjective optimization problems have been receiving a growing attention. To search for a family of Pareto optimal solutions based on nature-inspiring problem solving paradigms, Evolutionary Multiobjective Optimization Algorithms have been successfully exploited to solve optimization problems in which the fitness measures and even constraints are uncertain and changed over time.
When encounter optimization problems with many objectives, nearly all designs perform poorly because of loss of selection pressure in fitness evaluation solely based upon Pareto optimality principle. ***The first talk*** will survey recently published literature along this line of research- evolutionary algorithm for many-objective optimization and its real-world applications. In addition to various Many-Objective Evolutionary Algorithms proposed in the last few years, ***the second talk*** will be devoted to address three issues to complete the real-world applications at hand- visualization, performance metrics and multi-criteria decision-making for the many-objective optimization. Visualization of population in a high-dimensional1 objective space throughout the evolution process presents an attractive feature that could be well exploited in designing many-objective evolutionary algorithms. A performance metric tailored specifically for many-objective optimization is also designed, preventing various artifacts of existing performance metrics violating Pareto optimality principle. A minimum Manhattan distance (MMD) approach to multiple criteria decision making in many-objective optimization problems is proposed. This procedure is equivalent to the knee selection described by a divide and conquer approach that involves iterations of pairwise comparisons

Bio:

Gary G. Yen received the Ph.D. degree in electrical and computer engineering from the University of Notre Dame in 1992. He is currently a Regents Professor in the School of Electrical and Computer Engineering, Oklahoma State University. His research interest includes intelligent control, computational intelligence, evolutionary multiobjective optimization, conditional health monitoring, signal processing and their industrial/defense applications.

Gary was an associate editor of the *IEEE Transactions on Neural Networks* and *IEEE Control Systems Magazine* during 1994-1999, and of the *IEEE Transactions on Control Systems*

Technology, *IEEE Transactions on Systems, Man and Cybernetics* and IFAC Journal on *Automatica* and *Mechatronics* during 2000-2010. He is currently serving as an associate editor for the *IEEE Transactions on Evolutionary Computation* and *IEEE Transactions on Cybernetics*. Gary served as Vice President for the Technical Activities, IEEE Computational Intelligence Society in 2004-2005 and is the founding editor-in-chief of the *IEEE Computational Intelligence*