Topic 3: Can the Best Optimization Algorithm Please stand up?

As we do not know much about the fitness landscape of a real world optimization problem we try to solve, it can be challenging to pick the right method for a given complex real problem.
Comparisons of algorithms using numerous benchmarks may reveal the better algorithms suitable for the benchmarks. However, we do not know whether the set of benchmarks includes a problem similar to the one we try to solve. The ultimate solution to the algorithm selection problem is the characterization of the fitness landscape. The solution to this problem becomes even more challenging when the fitness landscape changes dynamically. We report on some exciting new insights on the algorithm selection problem and its applications based on three PhD projects in my lab and some work of others.

Key journal papers reflecting my own work relevant to Topic 3:

A recursive decomposition method for large scale continuous optimization
Y Sun, M Kirley, SK Halgamuge
IEEE Transactions on Evolutionary Computation, 2017, Citations: 8

Quantifying Variable Interactions in Continuous Optimization Problems
Y Sun, M Kirley, S Halgamuge
IEEE Transactions on Evolutionary Computation, 2017, Citations: 10

Algorithm selection for black-box continuous optimization problems: a survey on methods and challenges
MA Muñoz, Y Sun, M Kirley, SK Halgamuge
Information Sciences 317, 224-245, 2015, Citations: 42

Exploratory landscape analysis of continuous space optimization problems using information content
M Munoz, M Kirley, S Halgamuge
IEEE Transactions on Evolutionary Computation, 1-1, 2014, Citations: 35

Self-organizing hierarchical particle swarm optimizer with time-varying acceleration coefficients
A Ratnaweera, S Halgamuge, HC Watson
Evolutionary Computation, IEEE Transactions on 8 (3), 240-255, 2004, Citations: 2734