Title: Asynchronous parallel hybrid optimization combining DIRECT and GSS

Speaker: Tamara G. Kolda, Sandia National Labortories

Abstract: In this talk, we explore the benefits of hybrid optimization using parallel versions of DIRECT and asynchronous generating set search (GSS) for optimization. Both of these methods are derivative-free, making them useful for a variety of science and engineering problems. Our goal is to ideally find a global minimum, but practically to find a good local minimum in a small amount of time. DIRECT is a global search method that systematically divides the search space into ever-smaller rectangles, and GSS is a local search method. The combination of these method guarantees a good local minimum but is better than a purely local approach because it finds more global solutions. We compare the performance of hybrid and non-hybrid methods on a suite of standard global optimization test problems. Overall, the hybrid methods are more robust than the non-hybrid methods at the cost of more function evaluations. In terms of wall-clock time on a parallel system, the hybrid methods are actually less expensive due to nearly perfect parallel load balance and scaling.