

# Modified Genetic Algorithm for Performance Prediction in Radar, Audubon and Energy Systems

The Oakland University and School of Engineering and Computer Science communities are invited to attend Mr. Hatem Elgothamy's defense of his Ph.D. dissertation. Seating is limited. RSVP with Katie Loodeen at loodeen@oakland.edu.

## Modified Genetic Algorithm for Performance Prediction in Radar, Audubon and Energy Systems

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**Time:** 3:00 – 5:00 p.m.  
**Date:** Friday, March 9, 2018  
**Location:** 347 EC

This thesis introduces an enhanced Genetic Algorithm (GA) that is faster and more efficient. The proposed enhancements include using multiple weighted roulettes in the selection process, recombining using multiple sites and multiple mates, and the fitness measurement to be able to measure both objective and subjective results.

To test the new enhanced GA, it was used in three different applications. (1) To detect the angle of arrival of an approaching object by obtaining readings from an array of sixteen radars. (2) The enhanced GA was applied to a dynamic large optimization problem that uses symbolic data to differentiate between edible and poisonous mushrooms using twenty two different characteristics. (3) For optimal sizing of an off-grid hybrid microgrid (MG) system in order to achieve a certain load demand.

The results obtained from the enhanced GA were compared to the standard GA. When the enhanced GA was used it almost cut the computing needed by half, which means it uses less resources and time to reach the result.

