Description of Work:

The student may choose to work on research concerning one of the following topics:

1. **Genetic Transfer for Solving Combinatorial Multi-objective Problems in Operation Research and Management**

   The interested student may look at the following related Review Paper:

   Gupta, Abhishek, Yew-Soon Ong, and Liang Feng. "Insights on transfer optimization: Because experience is the best teacher." *IEEE Transactions on Emerging Topics in Computational Intelligence* 2.1 (2017): 51-64.

   The aforementioned research work is a part of funded joint research on: "**AI to the Rescue: Life-and-Death Decision-Making under Conflicting Criteria**," which we conduct in collaboration with Prof. S. Mustaghim, Chair of Computational Intelligence, Faculty of Computer Science, Otto von Guericke University, Magdeburg, Germany and with Dr. B. Adini, Head of the Department of Emergency Management and Disaster Medicine in the School of Public Health, Sackler Faculty of Medicine at Tel Aviv University.

2. **Evolutionary Algorithms for Multi-concept Optimization**
   The interested student may look at: https://www.smc2019.org/assets/data/wt_rep/SMC2019_T2.pdf

3. **Co-evolving Rationalizable Strategies for Multi-payoff Games**
   The interested student may look at papers such as: Eisenstadt, E. and Moshaiov, A. Mutual Rationalizability in Vector-payoff Games Proc. of the Int. Conf. on Evolutionary Multi-Criterion Optimization, 2019.

4. **Many-objective Topology and Weight Evolution of Neural-Network for Neuro-control and/or Multi-class Classification**

   Currently, most Topology and Weight Evolution of Artificial Neural Networks (TWEANN) algorithms are restricted to single-objective optimization. We have recently developed a novel TWEANN algorithm that aims to search for Pareto-optimal networks for problems with many-objectives. The applicability of the proposed algorithm has already been demonstrated on a problem of simultaneously evolving Pareto-optimal neuro-controllers for navigation in five different environments. The results suggest that the proposed algorithm can deal with such problems, which may allow future studies on the development of generalized controllers. Another possible application is the evolution of ensembles of expert and generalized classifiers to solve multi-class classification problems.

5. **Multi-objective Evolution of Neuro-Fuzzy Controllers for Traversing Rugged Terrains by Autonomous Mobile Robots**

   The Interested student may ask us to send him a draft of a related paper that we have just submitted to the IEEE International Conference on Fuzzy Systems, 2020.