Call For Papers

2025 IEEE Congress on Evolutionary Computation (IEEE CEC 2025)
Hangzhou, June 8 – June 12, 2025

Special Session on Data-Driven Optimization of Computationally Expensive Problems

I. Summary of the special session

Meta-heuristic algorithms, including evolutionary algorithms and swarm optimization, face challenges when solving time-consuming problems, as typically these approaches require thousands of function evaluations to arrive at solutions that are of reasonable quality. Surrogate models, which are computationally cheap, have in recent years gained in popularity in assisting meta-heuristic optimization, by replacing the compute-expense/time-expensive problem during phases of the heuristic search. However, due to the curse of dimensionality, it is very difficult, if not impossible to train accurate surrogate models. Thus, appropriate model management techniques, memetic strategies and other schemes are often indispensable. In addition, modern data analytics involving advance sampling techniques and learning techniques such as semi-supervised learning, transfer learning and active learning are highly beneficial for speeding up evolutionary search while bringing new insights into the problems of interest. This special session aims at bringing together researchers from both academia and industry to explore future directions in this field.

II. Scope and Topics

The topics of this special session include but are not limited to the following topics:

- Surrogate-assisted evolutionary optimization for computationally expensive problems
- Adaptive sampling using machine learning and statistical techniques
- Surrogate model management in evolutionary optimization
- Data-driven optimization using big data and data analytics
- Knowledge acquisition from data and reuse for evolutionary optimization
- Computationally efficient evolutionary algorithms for large scale and/or many-objective optimization problems
- Federated data-driven optimization
- Real world applications including multidisciplinary optimization

III. Important Dates

Paper submission: **January 15, 2025**

IV. Submission

Papers should be submitted online through the manuscript submission system.

V. Organizers:

- Prof. Chaoli Sun, School of Computer Science and Technology, Taiyuan University of Science and Technology, Taiyuan, Shanxi 030024 China
- Prof. Jonathan Fieldsend, Department of Computer Science, University of Exeter, Exeter, Devon EX4, UK
- Prof. Yew-Soon Ong, School of Computer Engineering, Nanyang Technological University, Block N4, 2a-28, Nanyang Avenue, 639798 Singapore