Call For Papers

2023 Genetic and Evolutionary Computation Conference (GECCO 2023)
Lisbon, July 15-19, 2023

Track: ACO-SI - Ant Colony Optimization and Swarm Intelligence

I. Summary of the track

Swarm Intelligence (SI) is the collective problem-solving behavior of groups of animals or artificial agents that results from the local interactions of the individuals with each other and with their environment. SI systems rely on certain key principles such as decentralization, stigmergy, self-organization, local interaction, and emergent behaviors. Since these principles are observed in the organization of social insect colonies and other animal aggregates, such as bird flocks or fish schools, SI systems are typically inspired by these natural systems.

The two main application areas of SI have been optimization and robotics. In the first category, Ant Colony Optimization (ACO) and Particle Swarm Optimization (PSO) constitute two of the most popular SI optimization techniques with numerous applications in science and engineering, but other SI-based optimization algorithms are possible. Papers that study and compare SI mechanisms that underly these different SI approaches, both theoretically and experimentally, are welcome. In the second category, SI has been successfully used to control large numbers of robots in a decentralized way, which increases the flexibility, robustness, and fault-tolerance of the resulting systems.

II. Scope and Topics

The ACO-SI Track welcomes submissions of original and unpublished work in all experimental and theoretical aspects of SI, including (but not limited to) the following areas:

- Biological foundations
- Modeling and analysis of new approaches
- Hybrid schemes with other algorithms
- Multi-swarm and self-adaptive approaches
- Constraint-handling and penalty function approaches
- Combinations with local search techniques
- Approaches to solve multi- and many-objective optimization problems
- Approaches to solve dynamic and noisy optimization problems
- Approaches to multi-modal optimization, i.e., to find multiple solutions (niching)
- Benchmarking and new empirical results
- Parallel/distributed implementations and applications
- Large-scale applications
- Software and high-performance implementations
- Theoretical and experimental research in swarm robotics
- Theoretical and empirical analysis of SI approaches to gain a better understanding of SI algorithms and to inform on the development of new, more efficient approaches
- Position papers on future directions in SI research
- Applications to machine learning and data analytics

III. Important Dates

Abstract Deadline: **February 3, 2023**
Submission of Full Papers: **February 10, 2023**

IV. Submission

Papers should be submitted online through the manuscript submission system (https://ssl.linklings.net/conferences/gecco/).

V. Organizers:

- Dr. Christian Blum, Artificial Intelligence Research Institute, Spanish National Research Council, Bellaterra, Spain
- Dr. Chaoli Sun, Taiyuan University of Science and Technology, Taiyuan, China