

*Invited speaker:* **Daniela ZAHARIE**

*Presentation:* **Handling Bound Constraints in Evolutionary Optimization**

*Abstract:* Most real world optimization problems requires the satisfaction of some constraints. There are various types of constraints, from simple bound constraints to complex constraints which might be difficult even to check. Bound constraints impose that the solution should be in a pre-specified hyperrectangle, called bounding box. The bounds can be hard (physical), i.e. the objective function cannot be evaluated outside the imposed hyperrectangle, or soft (operational), meaning that the desired solution should belong to the bounding box, even if the objective function has a larger domain of definition and the global optimum might be outside the bounding box. The soft bound constraints can be handled by using any of the methods for constrained optimization, e.g. penalty functions, feasibility rules, lexicographic ranking, repairing rules etc. On the other hand, when dealing with physical constraints the objective function evaluation must be avoided, thus the most popular approach relies on repairing rules which transform the infeasible elements in feasible ones.

In the evolutionary optimization field the handling of bound constraints, particularly through repairing rules, has attracted much less interest than the handling of general constraints. Since repairing rules interfere with the search process and might introduce a bias it is important to analyze their impact.

In this talk I will overview the properties of the most popular repairing rules used in the context of evolutionary algorithms and I will present a more detailed analysis of the impact of a repairing rule based on random reinitialization on the behaviour of Differential Evolution algorithms.

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*Short bio:* Daniela Zaharie obtained her PhD in 1997 with a thesis on stochastic modelling of recurrent neural networks and currently is professor at the Department of Computer Science of the West University of Timisoara. Her main research interests include evolutionary computing, machine learning, data mining, statistical modelling, image processing and high performance computing. She is member of the editorial board of "Soft Computing" and "Swarm and Evolutionary Computation" journals and proceedings co-chair for the "Symposium on Symbolic and Numeric Algorithms for Scientific Computing".