

## **Talk 2**

### **Title: Multi-Criteria Decision-Making Algorithms: From individual to collective autonomous decision-making**

#### **Abstract**

This talk is about the recent advances in decision-making techniques and their applications in autonomous systems. Decision-making is usually required when we are confronted with conflicting objectives and is in fact a very challenging task even for human decision-makers, since we first need to find all the possible optimal alternatives and then make the right choice using a decision policy.

In this talk, we replace the human decision-maker with an autonomous system and intend to provide novel methodologies for multi-criteria decision-making on a range of scenarios in which the autonomous systems are confronted with conflicting objectives. This will enable such systems to change their (pre-defined) decision policy according to the unforeseen circumstances. This ability can contribute to their applicability in critical missions, such as rescue robotics where the intervention of a human-controller is not always possible. The challenge is not only in finding and selecting the best alternative, but also in acting in a limited timeframe during the mission. One more focus of the talk is on the individual vs. collective decision-making algorithms. We will show that collective learning of a decision policy can help both the individual and the collective to act in an efficient way. Furthermore, individual decision-making and its interplay with a collective decision-making is being addressed and various forms of decision-manipulations using the environment are described and discussed.