

## **Topic 2:**

### **Evolutionary Mobile Robots Using Computational Intelligence Techniques**

#### **Abstract**

Evolutionary robots, like autonomous artificial organisms, automatically develop their own skills by interaction with the environment. This talk will focus on evolutionary locomotion control of mobile robots using computational intelligence techniques, including fuzzy systems and evolutionary computation. First, I will introduce the basic concept of evolutionary fuzzy systems (EFSs). Next, for wheeled robots, an obstacle boundary following behavior learned through EFSs will be introduced. Evolutionary fuzzy control of a single wheeled robot and multiple wheeled robots cooperatively carrying an object through multi-objective evolutionary computation algorithms for obstacle boundary following will be introduced. Then, to boost the learning efficiency of multiobjective EFSs in this application, the technique of reinforcement neural fuzzy surrogate-assisted learning will be given. Finally, navigation of a single and multiple cooperative wheeled robots in unknown environments will be presented.