**Multi-Agent Systems – Applications and Challenges**

**Abstract:** The key features of Multi-Agent Systems (MAS) are communication, coordination, and collaboration, enabling agents to achieve common, often challenging, goals more effectively and efficiently. While MAS have numerous applications and offer substantial benefits, they face challenges in resilient communication, safe collaboration, and adaptability under dynamic constraints. This talk discusses real-world applications of MAS, especially in autonomous systems, and their current challenges in open and dynamic environment. It presents the analysis and design of novel cooperative control strategies to address these challenges. Experimental examples are provided to validate these innovative design techniques and assess their practical performance. Possible technological breakthroughs in the next five years are discussed, emphasizing MAS as a cornerstone in the evolution of autonomous systems and robotics.