

*Faculty of Engineering and Natural Sciences  
Seminar  
Friday, April 26, 2013, 14:00, Fener Hall*

## **Coordination of Non-Communicating Mobile Robots**

**Prof. Dr. Feza Kerestecioğlu  
Kadir Has University**

### **Abstract**

In areas such as underwater exploration, mining, medical micro-robotics, military survey missions use of multi-robot teams are advantageous as compared to employing a single robotic device. The problem of coordinating such robot groups may turn out relatively easier under the assumption that robots can communicate with other group members or with a central coordinator. Nevertheless, in situations where such communications are not available because of environmental conditions, power or payload limitations, or security concerns, the desired group behaviour must be maintained relying only on the limited information that each individual can gather from its close neighbourhood and the autonomous movements using this information. With this motivation, the talk focuses on the coordination issues of non-communicating robot groups putting the emphasis on the maintenance of *\emph{group connectivity}*. A Local Steering Strategy is proposed, which can guarantee connectivity without any risk of deadlocks. Some group formations that can be achieved using this strategy and other implications of it are illustrated by simulation examples.

### **Biography**

**Feza Kerestecioğlu** received his B.Sc. and M.Sc. degrees from Boğaziçi University Department of Electrical-Electronics Engineering in 1983 and 1985, respectively. He completed his Ph.D. studies at the Control Systems Centre in the University of Manchester Institute of Science and Technology (UMIST). During 1992--2002 he was a faculty member in the Department of Electrical-Electronics Engineering, Boğaziçi University. After 2002 he joined Kadir Has

University, where he served at various positions, while he was affiliated first with the Department of Electronics Engineering, and after 2012, Department of Computer Engineering. His research interests include fault detection and diagnosis, input and experiment design, sequential decision theory, adaptive control, missile control and robot swarms. He is the author of the book *Change Detection and Input Design in Dynamical Systems*.