

# **Multi-Robot Systems: From Fundamental Research to Real-World Applications\***

Lynne E. Parker  
Center for Engineering Science Advanced Research  
Computer Science and Mathematics Division  
Oak Ridge National Laboratory

## **Abstract**

In this talk, I will discuss my research in the development of distributed control approaches to multi-robot cooperation. Developing operational multi-robot teams involves research on a number of topics, including fault tolerant cooperative control, adaptive action selection, distributed control, robot awareness of team member actions, improving efficiency through learning, inter-robot communication, action recognition, local versus global control, and metrics for measuring success. I will discuss several of these issues of cooperation and learning in the context of a distributed software architecture I have developed, called ALLIANCE, that facilitates robust, fault tolerant cooperative control in multi-robot teams. I will also show some video clips of the implementation of these approaches on multi-robot teams. Finally, in light of the focus and intent of this workshop, I will conclude with some remarks about my own career path and advice to new researchers just beginning their careers.

---

\* This work is sponsored by the Engineering Research Program of the Office of Basic Energy Sciences, U.S. Department of Energy. Accordingly, the U.S. Government retains a nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or allow others to do so, for U. S. Government purposes. Oak Ridge National Laboratory is managed by UT-Battelle, LLC for the U.S. Dept. of Energy under contract DE-AC05-00OR22725.