

***The University of Alabama***  
***Department of Computer Science***  
***Colloquium Series***

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**University of Tennessee**



**Generating Dynamic Multi-Robot Coalitions for Tightly-Coupled Tasks**

**Monday, March 8th**

**Presentation at 11:00 a.m. in SEC 3437, refreshments across the hall in SEC 3438 at 10:45 a.m.**

**Abstract:**

Multiple robot teams can solve challenging tightly-coupled tasks by sharing their sensor, computational, and effector capabilities to form coalitions. In practice, however, this is difficult to achieve because these resources are fixed on a particular platform, and provide information only from that device's frame of reference. We have developed a two-step strategy for addressing these dynamic coalition-formation problems. The first step is our ASyMTRe ("Automated Synthesis of Multirobot Task solutions through software Reconfiguration") system, which provides a flexible resource-sharing mechanism for autonomous sensors and robots. Our approach can automatically (re-)configure the networked sharing of environmental sensors and perceptual, computational, and motor processes, based on the required flow of information through the team to accomplish the given task. The second step of our solution strategy is a mechanism enabling the coalition to maintain sensor constraints between robots during task execution. Our approach is based on measures of sensor information quality using sampling techniques, combining the use of sensor models, environment sampling, measures of information quality, a motion model with sampling, and a constraint model. This talk will discuss these approaches and present results that illustrate the flexibility and robustness of the approaches for generating dynamic multi-robot coalitions performing tightly-coupled tasks.

**Bio:**

Dr. Lynne Parker is Professor in the Min H. Kao Department of Electrical Engineering and Computer Science at The University of Tennessee, Knoxville, where she directs the research of the Distributed Intelligence Laboratory. She joined UTK in 2002, after working for several years as a Distinguished Research and Development Staff Member at Oak Ridge National Lab. Dr. Parker received her Ph.D. degree in computer science from MIT, performing her research in MIT's Artificial Intelligence Laboratory. Dr. Parker has published over 100 articles in the areas of mobile robot cooperation, human-robot cooperation, robotic learning, intelligent agent architectures, and robot navigation. For this research, she was awarded the PECASE (Presidential Early Career Award for Scientists and Engineers) in 2000. She is a senior Editor of IEEE Transactions on Robotics, and is on the Editorial Boards of IEEE Intelligent Systems and the Swarm Intelligence journal. She is a Fellow of IEEE.