

**School of Computer Science
M.S. Final Defense**

By

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CONTROL OF BIO-NANO ROBOTS

Bio-nano robots are nano-scaled robots made from biological components like proteins and DNA structures. Their nano-scaled size, ready availability (in nature), and high efficiency make them excellent tools for diagnosis and therapeutic treatments in nano-medicine. Techniques like *swarm intelligence* and *quorum sensing* help these individually insignificant (limited capabilities) nano-scaled robots to accomplish complex tasks (such as tumor removal or nano-scale medical diagnosis) by working as a group rather than individually. Four different goal-seeking behaviors, which could establish communication and coordination strategies for multiple nano robots, are studied using simulation at a high level of abstraction. Among the four different goal-seeking behaviors, one involves a relatively complex and sophisticated sensing and motion, another one is a mimic of bacterial sensing and motion, and the other two are random motion and straight motion models with no communication capabilities. The robots executing the first two models act intelligently, making informed decisions at every move. The other two models are the results of unintelligent behaviors. We study the trade-offs between different goal-seeking behaviors of multiple nano-scaled robots based on intelligent and unintelligent actions and also based on their complexity of physical structure.

Date: Friday, May 5, 2006

Time: 3:30 p.m.

Place: Computer Science Conference Room, EL 139

**Committee members: Dr. Dean Hougen – Chair - CS
Dr. Andrew Fagg - CS
Dr. Thomas Ray - Zoology**

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