**MATLAB HS12 – Research Plan**

* Group Name: Qu(ant)um of solace
* Group Participants Names: Agata Kazmierczak
* Project Title: Ants orientation ability and navigation mechanisms

**General Introduction**

Basing on the work done by the research groups from previous semester (Fall 2011) I would like to further investigate the complex processes behind ant’s orientation ability in varied terrain and navigation. I will try to expand previous research by introducing additional navigation mechanism that can be found in the literature. One example could be navigation by polarized sunlight. Furthermore I will try to introduce a mechanism that would allow ants to combine/prioritize navigation methods according to varying environmental conditions. Additionally, accounting for variation in single ant sensing capabilities will be introduced to the model.

**The Model**

Agent-based model will be produced, in which an agent - ant would navigate in a 2D bounded universe. Objects will be introduced in the universe to alter ant decision making process.

**Fundamental Questions:**

*How do various proposed ant navigation mechanisms (pheromone path marking, path integration, landmark orientation and skylight navigation) work together?*

*Do ants have means of prioritizing and combining those methods?*

**References:**

Garnier, S., Tache, F., Combe, M., Grimal, A., Theraulaz, G., 2007. *Alice in Pheromone Land: An experimental Setup for the Study of Ant-like Robots.*

Jeanson, R., Ratnieks, F., Deneubourg, J., 2003. *Pheromone trail decay rates on diﬀerent substrates in the Pharaoh’s ant, Monomorium pharaonis.*

Knaden, M., Wehner, R., 2005. *Nest mark orientation in desert ants Cataglyphis: what does it do to the path integrator?*

Muller, M., Wehner, R., 1998. *Path integration in desert ants, Cataglyphis fortis.*

Some other references might be used during the work on the project. They will be further mentioned and included into final version of the project report.

**Research Method:**

Agent-based modeling

**Other:**

No specific data set will be used.