**Henry Adams (Stanford)**

***Mobile Sensors and Pursuit-evasion: Can Directed Algebraic Topology Help?***

This is not the abstract for an original research paper; it describes an unsolved problem I will present during the GETCO 2010 poster session.
Consider a mobile sensor network and an intruder attempting to avoid detection.
In "Coordinate-free Coverage in Sensor Networks with Controlled Boundaries via Homology", Vin de Silva and Robert Ghrist prove that when a sensor network satisfies a certain homological criterion, no intruder can avoid detection. However, the criterion is not sharp, as it cannot distinguish physically impossible evasion routes which require the intruder to move backwards in time. Can one find sharper criteria, perhaps with the help of directed algebraic topology?

**Kenneth Deeley (Durham)**

***Configuration Spaces of Thick Particles on a Graph***

My poster describes PhD work in progress under the supervision of Professor M. Farber. We study the configuration space of two robots of positive radius moving on a metric graph. As the size of the robots increases, the homotopy type of the configuration space varies. We show that there are finitely many critical values where this homotopy type changes, and describe these critical values in terms of metric properties of the graph. Provided that the robots are sufficiently small, we show that the configuration space of two robots is homotopy equivalent to the two-point configuration space.

**Barbara Di Fabio (Bologna)**

***Stability of Reeb graphs of closed curves***

Let M be a closed compact smooth manifold endowed with a Morse function f:$M \to \mathbb{R}$. The quotient space obtained from M identifying points that belong to the same connected component of each level set of f is the body of a finite simplicial complex of dimension 1, called a Reeb graph.

Reeb graphs were introduced in Computer Graphics at the beginning of the 1990s, becoming, in a few years, very popular shape descriptors in computational frameworks, especially in applications such as 3D shape matching, shape coding and comparison. Indeed, they capture both geometrical properties of the shape, according to the behavior of the function over the space, and its topological features, described by the connectivity of the graph.

Some different comparison methodologies have been proposed in literature to compare Reeb graphs for estimating the similarity of the shapes they are describing. In this context, one of the most important open questions is whether Reeb graphs are robust against function perturbations. In fact, it is clear that any data acquisition is subject to perturbations, noise and approximation errors and, if Reeb graphs were not stable, then distinct computational investigations of the same object could produce completely different results.

In this poster we present an initial contribution to establishing stability properties for Reeb graphs. More precisely, focusing our attention on 1-dimensional manifolds, i.e. closed curves, we define an editing distance between Reeb graphs, in terms of the cost necessary to transform one graph into another. Our main result is that changes in Morse functions imply smaller changes in the editing distance between Reeb graphs.

**Juliane Lehmann (Bremen)**

***Equivariant closure operators and trisp closure maps***

Trisp closure maps are compact certificates for the collapsibility of a trisp (triangulated space) onto a certain subtrisp. We study the interaction between trisp closure maps and group operations on the trisp, and give conditions such that the quotient map is again a trisp closure map, as well as for lifting trisp closure maps from a quotient trisp to the original trisp.

The name already implies a relationship to closure operators on posets, stemming from the fact that the nerve of a poset is a trisp, and that a monotone closure operator on a poset induces a trisp closure map on its nerve. The converse is not true: there are trisp closure maps on the nerve of a poset that do not come from a closure operator.
This special case, that the trisp is the nerve of a poset, lends itself to a variation: taking first the categorial quotient of the group action on the poset and then the nerve. It turns out that in this situation, where we have little hope to get a closure operator again, we still obtain a trisp closure map on the nerve.