LUCAS MOL, University of Winnipeg
The Threshold Dimension of a Graph

Let G be a graph. A set of vertices S of G is called a *resolving set* of G if every vertex of G is uniquely determined by its vector of distances to the vertices in S. One can think of the vertices in a resolving set as "landmark" vertices. If an agent is sitting at some vertex of the graph, and its distance to every landmark vertex is known, then one can determine the exact location of the agent.

Imagine that there is a cost associated with each landmark vertex. Then one would be interested in finding a resolving set of minimum cardinality in G; this is the well-studied *metric dimension* of G. Imagine further that we can add edges to G in a highly cost effective manner. Then one would be interested in finding a resolving set of minimum cardinality across all graphs H obtained by adding edges to G; we introduce this parameter as the *threshold dimension* of G.

We give a more geometrical description of those graphs with threshold dimension b, characterizing them as graphs that have certain constrained embeddings in the strong product of b paths. We provide a sharp bound on the threshold dimension of G in terms of the chromatic number. We also study *irreducible graphs* – those for which the threshold dimension is equal to the metric dimension. This is joint work with Matthew Murphy and Ortrud Oellermann.