The evolution of the metric dimension problem for graphs

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Given a graph G and a subset of vertices $S = \{w_1, \ldots, w_t\} \subseteq V(G)$, the metric representation of a vertex $u \in V(G)$ with respect to S is the vector $r(u|S) = (d_G(u, w_1), \ldots, d_G(u, w_t))$, where $d_G(x, y)$ represents the length of a shortest x, y-path in G. A subset of vertices S such that $r(u|S) = r(v|S)$ if and only if $u = v$ for every $u, v \in V(G)$ is said to be a resolving set for G, and the cardinality of a smallest such set is the metric dimension of G.

On the other hand, the *multiset representation* of $u \in V(G)$ with respect to S is the multiset $m(u|S) = \{\!\{d_G(u, w_1), \ldots, d_G(u, w_t)\}\!\}$. The set S is a *multsiset resolving set* if $m(u|S) \neq m(v|S)$ for every $u, v \in V(G)$. The cardinality of the smallest such set is the *multiset dimension* of G.

Some short story on the evolution of the classical metric dimension into the multiset dimension and other variations shall be presented in this talk, together with the influence of this topic in my career.