1068-20-100 **Gregory McColm*** (mccolm@usf.edu), Department of Mathematics & Statistics, University of South Florida, 4202 E. Fowler Ave., PHY114, Tampa, FL. *Group Theoretic Methods in Nanostructure Design.*

Techniques from geometric group theory and group representation theory are applicable to the automated design of nanostructures and crystalline materials, and we examine one such application. A physical structure may be represented by a Euclidean graph $\mathcal{G}$, with vertices representing components (e.g. atoms, or even molecular building blocks) and edges representing connections (e.g. chemical bonds, or even "linker" molecules that link molecular building blocks). A path through $\mathcal{G}$ may be encoded by a list of (names of) isometries of the Euclidean space, each isometry serving as a vehicle for traveling from one vertex to an adjacent vertex. (In general, the isometries are not necessarily symmetries of $\mathcal{G}$, and successive vertices of a path are not necessarily in the same orbit of $\mathcal{G}$'s symmetry group. But compositions of isometries are required to be symmetries of $\mathcal{G}$ if the path connects two vertices from the same orbit of $\mathcal{G}$'s symmetry group.) The congruence class of $\mathcal{G}$ is fixed by the set of possible paths through $\mathcal{G}$, and using these paths. We look at an algorithm that generates finite or infinite Euclidean graphs. (Received January 14, 2011)