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**David Plaxco\*** (dplaxco@vt.edu), 460 McBryde Hall, Virginia Tech, 225 Stanger Street,  
Blacksburg, VA 24061. *Reverse Cayley Graphs: Imposing Group Structure on the Platonic Solids.*

The algorithm for generating a Cayley graph for a given group presentation is relatively straightforward. However, there are no general techniques for carrying out the reverse process: determining which group presentations might generate a given graph. Some characteristics of the graph, such as regularity or connectivity, might provide relatively straightforward insight into whether a graph could even be considered a Cayley graph. Skeletons of the five classical Platonic solids provide good initial candidates for the reverse Cayley graph problem based on their regularity, planarity, and finiteness. In this presentation, I discuss ad hoc approaches to determining which group presentations generate Platonic solid skeletons as Cayley graphs. I then discuss an exhaustion of the problem using all presentations of groups of order 4, 6, 8, 12, and 20. (Received September 01, 2014)