1011-15-202 **Wayne Barrett*** (wayne@math.byu.edu), Department of Mathematics, Brigham Young University, Provo, UT 84602, **Jason Grout**, Department of Mathematics, Brigham Young University, Provo, UT 84602, **Don March**, Department of Mathematics, University of Florida, Gainesville, FL 32611, **Hein van der Holst**, Department of Mathematics, Eindhoven University of Technology, Eindhoven, Netherlands, and **Raphael Loewy**, Department of Mathematics, Technion-Israel Institute of Technology, Haifa, Israel. *The Minimal Rank Problem and Forbidden Subgraphs.* Preliminary report.

Given a field F and an undirected graph G on n vertices, let $S(F,G)$ be the set of all symmetric $n \times n$ matrices over F whose nonzero off-diagonal entries occur in exactly the positions corresponding to the edges of G. Let $\mathrm{mr}(F,G)$ be the minimum rank of all matrices in $S(F,G)$. The graphs for which $\mathrm{mr}(F,G) \leq 2$ have been characterized in two ways and the description depends on whether or not F is finite or infinite and whether or not $\mathrm{char}\, F = 2$.

This talk will discuss the characterization in terms of forbidden subgraphs. For example, there are 6 forbidden subgraphs for the class of graphs with $\mathrm{mr}(\mathbb{R},G) \leq 2$ while, on the other extreme, there are 7 forbidden subgraphs for those with $\mathrm{mr}(F_2,G) \leq 2$. The two lists have important similarities and differences. Finding a complete list of forbidden subgraphs for $\mathrm{mr}(F,G) \leq 3$ is much more difficult, although a result of G. Ding says that the list is finite if F is. We give a progress report on the forbidden subgraph list for $F = F_2$ and $F = \mathbb{R}$. (Received August 26, 2005)