

**Meeting:** 1003, Atlanta, Georgia, SS 9A, AMS-MAA-SIAM Special Session on Research in Mathematics by Undergraduates, I

1003-15-69            **Margaret Lay\*** (laymarga@grinnell.edu), P.O. Box 08-33, Grinnell College, Grinnell, IA 50112, **Amanda M Pascoe** (amanda.pascoe@furman.edu), PMB 29529 Furman, 3300 Poinsett Hwy., Greenville, SC 29613, and **Ben Harris**. *Minimum Rank of Positive Semi-Definite Matrices with a Prescribed Graph.*

We may associate a graph  $G$  to a Hermitian matrix  $A = (a_{ij})$  if  $V(G) = \{v_1, \dots, v_n\}$  and  $(v_i, v_j) \in V(G)$  if and only if  $a_{ij}$  is nonzero. The problem is to determine the minimum rank of all positive semi-definite (PSD) matrices associated with a given graph. Let  $msr(G)$  denote the minimum PSD rank of  $G$ . New results from this project relate to certain classes of graphs, including bipartite graphs and those with  $msr$  of 2 and 3, and certain operations on graphs such as joins. We present further results concerning the relationship between  $msr(G)$  and  $msr(G \setminus v)$  for a given  $v \in V(G)$ , and we give a catalog of the minimum ranks of all graphs with order at most 7.

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