1053-05-313 **Hemanshu Kaul*** (kaul@iit.edu), Engineering 1 Building #208, 10 West 32nd Street, Chicago, IL 60616, and **YoungJu Jo**. *Guarding Orthogonal Art Galleries with Holes.* Preliminary report.

The original art gallery problem (V.Klee, 1973) asked for the minimum number of guards sufficient to see every point of the interior of an n-vertex simple polygon. Chvatal (1975) proved that $n/3$ guards are always sufficient. If all the edges of the given simple polygon are either horizontal or vertical, then such a polygon is called an orthogonal polygon. Kahn, Klawe and Kleitman (1983) proved that $n/4$ guards are sufficient for such a n-vertex gallery.

We are interested in orthogonal gallery with holes, i.e, an orthogonal polygon enclosing some other orthogonal polygons called holes such that interior of each hole is empty (these are obstructions to visibility). In 1982, Shermer conjectured that any orthogonal polygon with n vertices and h holes can be guarded by $(n+h)/4$ guards. This conjecture remains open. The best known result shows that $(n+2h)/4$ guards suffice (O'Rourke, 1987). In this talk we will discuss the history of these problems and some of the proofs involving graph coloring. We will outline our approach using graph coloring to prove that $(n+(5/3)h)/4$ guards suffice for an orthogonal gallery with n vertices with h holes. (Received September 08, 2009)