1086-VN-721 **Brian G Kronenthal*** (kronenth@math.udel.edu), University of Delaware, Department of Mathematical Sciences, Ewing Hall 501, Newark, DE 19716. *On Algebraically Defined Graphs and Generalized Quadrangles.*

Let q be an integer. Consider the problem of constructing a girth eight $(q+1)$-regular bipartite graph containing the minimum possible number of vertices. For a given odd prime power q, there is only one known solution: the incidence graph of a ***generalized quadrangle***. This graph contains a special induced subgraph denoted $\Gamma_3(q)$, which is called a ***monomial graph*** due to the monomials that determine its structure. Indeed, $\Gamma_3(q)$ is a bipartite graph with partite sets $P = \mathbb{F}_q^3 = L$. Vertices $(a_1, a_2, a_3) \in P$ and $[x_1, x_2, x_3] \in L$ are adjacent if and only if $a_2 + x_2 = a_1 x_1$ and $a_3 + x_3 = a_1 x_1^2$. In this talk, we will address the viability of using other algebraically defined graphs to construct additional generalized quadrangles over finite fields of odd order. In addition, we will discuss a related problem over the complex numbers. (Received September 11, 2012)