1012-13-213 **Susan Marie Cooper*** (sucooper@math.syr.edu), Department of Mathematics, 317 H Carnegie Building, Syracuse University, Syracuse, NY 13244. *Hilbert Functions of Subsets of Complete Intersections.*

A characterization of which sequences of numbers can be the Hilbert function of a finite set of distinct points in $\mathbb{P}^n$ follows from the work of Macaulay, Hartshorne, and others. Although Hilbert functions of complete intersections are well-known, Hilbert functions of subsets of complete intersections have not yet been classified, even for the reduced zero-dimensional case. Let $1 \leq d_1 \leq d_2 \leq \cdots \leq d_n$ be positive integers and $\mathcal{H}$ be a Hilbert function of some finite set of distinct points in $\mathbb{P}^n$. We wish to determine if there exists some reduced zero-dimensional complete intersection C.I.$(d_1, \ldots, d_n)$ which contains a subset whose Hilbert function is $\mathcal{H}$.

The special case of this problem where the ideal of the complete intersection is generated by products of linear forms follows from the combinatorial results of Clements-Lindström and Greene-Kleitman. We will show that the problem in general is connected to the Lex-Plus-Powers Conjecture of Eisenbud-Green-Harris and discuss the cases of $n = 2$ and $n = 3$. We conclude with applications to subsets with the Cayley-Bacharach Property and extremal subsets similar to $Sub_d(\mathcal{H})$. (Received September 20, 2005)