1077-13-205   **Bernadette M Boyle*** (`bboyle2@nd.edu`), University of Notre Dame, 255 Hurley Hall, Notre
Dame, IN 46556. *On the Unimodality of Pure O-Sequences.* Preliminary report.

We will discuss some properties of pure O-sequences, or the Hilbert functions of Artinian level monomial algebras, particularly to see when they are unimodal. Due to Macaulay's theorem, one knows that algebras in two variables are unimodal. Furthermore, it has been shown that monomial Artinian level algebras of type two in three variables have the Weak Lefschetz Property (in characteristic zero), and thus are unimodal. On the other hand, for any $r > 2$, there exists a monomial Artinian level algebra in r variables whose Hilbert function fails unimodality with an arbitrary number of peaks. This poster will show the unimodality of the Hilbert function in two of the smallest open cases, namely that of monomial Artinian level algebras of type three in three variables and type two in four variables. Since the Weak Lefschetz Property does not necessarily hold for such algebras, we give a new approach for each case. Furthermore, we will discuss how the socle degree affects the unimodality of pure O-sequences. (Received August 11, 2011)