1120-14-84        **David Cook II** and **Brian Harbourne\*** (bharbourne1@unl.edu), Math Department, University of Nebraska-Lincoln, Lincoln, NE 68588-0130, and **Juan Migliore** and **Uwe Nagel**. *Line arrangements and configurations of points with an unusual geometric property.*

I will give part 1 of a joint talk with Juan Migliore. We discuss parts of a paper, arXiv:1602.02300, written jointly also with D. Cook and U. Nagel. The well-known SHGH conjecture proposes a solution to the question of how many conditions a general union of fat points imposes on the complete linear system of plane curves of fixed degree $d$. We propose a new problem, namely to understand the number of conditions imposed by a general union of fat points on the incomplete linear system defined by the condition of passing through a finite set of points, $Z$ (not general). Clearly the geometry of $Z$ has to play a role, but how it manifests itself is slowly emerging. We give a careful analysis of the first interesting case, namely that of just one fat point, having multiplicity $d - 1$. After studying the geometry inherent in those $Z$ which admit unexpected curves (i.e. those $Z$ for which a naive dimension count doe not correctly predict the number of conditions imposed on the linear system), we relate our results to properties of the arrangement of lines dual to $Z$, using work of Di Gennaro-Ilardi-Vallès and Faenzi-Vallès. We also relate our results to a certain Lefschetz property, leading to a connection to Terao's conjecture on the freeness of line arrangements. (Received February 13, 2016)