Title: Lefschetz properties and a problem on fat points

Abstract: Given *general* points $p_1, \ldots, p_d$ in the projective plane and positive integers $m_1, \ldots, m_d$, "how many" curves of fixed degree j pass through the points with multiplicity at least m_i at p_i? There is a natural guess, and the Segre-Harbourne-Gimigliano-Hirschowitz (SHGH) conjecture says what should be the only counterexamples to the natural guess. This can be interpreted as a conjecture giving the number of conditions on the complete linear system of plane curves of degree j imposed by the "fat point scheme" $m_1p_1 + \cdots + m_dp_d$. We extend this problem by replacing the complete linear system with the linear subsystem defined by a *fixed* set of points Z in the plane, and study the first interesting case. Our study involves line arrangements in the plane, and so-called "Lefschetz properties. This is joint work with David Cook II, Brian Harbourne and Uwe Nagel.