TITLE : Log symplectic pairs and mixed Hodge structures

ABSTRACT :

A log symplectic pair is a pair (X,Y) consisting of a smooth projective variety X and a divisor Y in X so that there is a non-degenerate log 2-form on X with poles along Y. I will discuss the relationship between log symplectic pairs and degenerations of hyperkaehler varieties, and how this naturally leads to a class of log symplectic pairs called log symplectic pairs of pure weight. I will give examples of families log symplectic pairs of pure weight; one coming from elliptic curves, and one coming from a hybrid toric/cluster construction. Finally, I will explain that if Y is a simple normal crossings divisor, the cohomology of a log symplectic pair (X,Y) is incredibly restricted. In particular, if there are dim(X) components of Y meeting in a point, the cohomology ring of (X,Y) has the “curious hard Lefschetz” property of Hausel and Rodriguez-Villegas.