For any fixed algebraic structure on a real vector space, one can consider a smoothly varying family of such structures on the tangent spaces of a manifold. In particular the exceptional algebraic structure of the octonions naturally leads one to define $G_2$ manifolds and their distinguished minimal submanifolds and Yang-Mills connections. The subject of $G_2$ manifolds involves a beautiful interplay of non-associative algebra, differential geometry, and non-linear global analysis.

We will begin with an introduction to $G_2$ manifolds for a general audience, paying particular attention to the similarities and differences of $G_2$ geometry with respect to the geometries of Kähler manifolds and of 3-manifolds. Then we will define $G_2$ conifolds, and discuss some results about them, including their desingularization and their deformation theory. If time permits, we will speculate on possible constructions of $G_2$ conifolds.

Wednesday, 26 September 2012
4:00 pm
Smith Hall 204
Tea and refreshments will be served at 3:45pm.