

This is a follow-up to my paper on the web on the geometry of three forms in six dimensions, and will also be the topic of my third lecture at Stony Brook (though I may make the Columbia one slightly different). It concerns the geometry determined by “nondegenerate” forms: i.e. when $\Lambda^p R^n$ has an open orbit under $GL(n, R)$. There is a corresponding functional whose critical points on cohomology classes of closed forms give in dimension $2n$ symplectic structures, dimension 6 complex 3-folds with trivial canonical bundle, dimension 7 G_2 structures and dimension 8 something new. The 7-dimensional case has other aspects related to Einstein metrics and Spin(7) manifolds. There is a unified point of view which gives a common approach to moduli spaces and raises questions about formality of the de Rham complex.