

## **MAT 566: Differential Topology Spring 2018**

### **Presentation 4: Exotic Differentiable Structures on $S^7$ (after the Signature Theorem)**

You will need to thoroughly cover Sections 1-3 of Milnor's famous paper, including the following (and not necessarily in this order):

- (1) an invariant of 7-manifolds (that bound);
- (2) quaternions,  $SO(4)$ , and  $S^3$ -bundles over  $S^4$ ;
- (3) computation of  $p_1$  of such manifolds;
- (4) gradient flow and a characterization of  $S^n$ , with examples.

On the other hand, do not cover what is not directly relevant to the main objective, e.g. it is not too important what  $\pi_3$  and  $\Omega_7$  are.