

Geometry, Physics, and Representation Theory  
Northeastern University

**Rob Silversmith**

Simons Center for Geometry and Physics, Stony Brook

Thursday, September 21, 2:50-3:50 pm, Lake Hall 509

## **Gromov-Witten Invariants of Symmetric Products of Projective Space.**

### **Abstract**

Through 3 general points and 6 general lines in  $\mathbf{P}^3$ , there are exactly 190 twisted cubics; 190 is a (genus-zero) Gromov-Witten invariant of  $\mathbf{P}^3$ . I will introduce Gromov-Witten invariants of a smooth complex projective variety  $X$ , and discuss how a torus action on  $X$  can help us compute its Gromov-Witten invariants. Applying this to a topic variety  $X$ , Kontsevich, Givental, and Lian-Liu-Yau proved the quintic mirror theorem predicted by string theorists. I will discuss the difficulties that arise when  $X$  is not toric. In particular, I will talk about a concrete nontoric orbifold  $X = \text{Sym}^d(\mathbf{P}^4)$ , the symmetric product of projective space. By studying the equivariant geometry of  $\text{Sym}^d(\mathbf{P}^4)$ , I extend the strategies of Givental/Lian-Liu-Yau to prove a mirror theorem for  $\text{Sym}^d(\mathbf{P}^4)$ .