

## ***TOPOLOGY SEMINAR***

**Guest Speaker: Donald Youmans**  
**University of Geneva**

**Date:** Tuesday, February 14, 2017

**Time:** 2:30 PM

**Location:** 258 Hurley Hall



**Lecture Title:**

**Geometric Quantization and Hitchin's Connection**

***Abstract***

Geometric quantization arose from the attempt to put canonical quantization, which is used in physics to pass from classical mechanics to quantum mechanics, on rigorous mathematical grounds. Starting with a symplectic manifold and its Lie algebra (under the Poisson bracket) of smooth functions, one tries to construct irreducible representations thereof. The irreducibility condition forces one to choose a polarization. A priori, the constructed quantum Hilbert spaces, i.e. the representations, depend on this choice. To probe how much the representations rely on this choice, one can organize the prequantum Hilbert spaces into a fiber bundle over the space of all polarizations. It was shown by N. J. Hitchin and others that in the case of Kähler polarizations this bundle is endowed with a projectively flat connection allowing the comparison of fibers. While the above ideas were extensively studied for manifolds, the case of super-manifolds still remains an open problem. A first step was given by S. Wu in who considered a purely odd vector space. In this talk I want to give a brief and by no means complete survey of the construction of the Hitchin connection in the case of the geometric quantization of the moduli space of flat connections. Moreover, I want to discuss what happens if one tries to geometrically quantize a purely odd Lie algebra rather than a purely odd vector space. In particular, I will outline possible interactions of Hitchin's connection with the underlying Lie theory.