

Geometry, Groups and Dynamics/GEAR Seminar  
(held at the Illinois hub of GEAR)

**Tuesday, February 17, 2015, 1:00 pm in 243 Altgeld Hall**

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A mapping class group invariant parameterization of maximal  $\mathrm{Sp}(4, \mathbb{R})$  representations

Abstract: Let  $S$  be a closed surface of genus at least 2, and consider the moduli space of representations  $\rho: \pi_1(S) \rightarrow \mathrm{Sp}(4, \mathbb{R})$ . There is an invariant  $\tau \in \mathbb{Z}$ , called the Toledo invariant, which helps to distinguish connected components. The Toledo invariant satisfies a Milnor-Wood inequality  $|\tau| \leq 2g - 2$ . Representations with maximal Toledo invariant have many geometrically interesting properties, for instance, they are all discrete and faithful. In this talk, we will give a mapping class group invariant parameterization of all smooth connected components of the maximal  $\mathrm{Sp}(4, \mathbb{R})$  representations. Our main tool is Higgs bundles. However, to utilize Higgs bundle techniques, one has to fix a conformal structure of the surface  $S$ , hence breaking the mapping class group symmetry. To restore the symmetry, we associate a unique 'preferred' conformal structure to each such representation. This is done by exploiting the relationship between the associated Higgs bundles and minimal surfaces.

[Video](#)