

Bay Area Differential Geometry Seminar
Saturday, February 6, 2016
Stanford University
Department of Mathematics Room 380C

The seminar will take place from 10AM to 5PM on Saturday, February 6, 2016. Participants and their significant others are invited to a dinner to be arranged at a local restaurant on Saturday evening. The cost of the dinner will be reduced for students and postdocs. Details will be forthcoming on the signup page for the dinner (which you can access by this link: [signup list](#)).

Directions to the Stanford Mathematics Department are available on the department website. Parking on the campus is plentiful and unrestricted on weekends.

- 10:00–11:00 **Reception, Morning Coffee**

- 11:00–12:00 **Olivier Biquard, École Normale Supérieure, Paris:** *Hamiltonian diffeomorphisms and hyperKähler metrics.*

Hitchin recently proposed an analog of the Hitchin component for $SL(\infty, \mathbf{R})$. I will explain a construction of this component. This involves the notion of folded hyperKähler metrics on pseudoconcave cotangent domains.

- 12:00–2:00 **Lunch**

There are several places on the Stanford campus that serve lunch. In addition, downtown Palo Alto is a 5-minute drive or a 20-minute walk. There will be a brief organizational meeting at 1:45.

- 2:00–3:00 **Mark Haskins, Imperial College, London:** *Exotic Einstein metrics on the 6-sphere and on the product of two 3-spheres, nearly Kähler 6-manifolds and G_2 cones.*

A long-standing problem in almost complex geometry has been the question of existence of (complete) inhomogeneous nearly Kähler 6-manifolds. One of the main motivations for this question comes from G_2 geometry: the Riemannian cone over a nearly Kähler 6-manifold is a singular space with holonomy G_2 . Viewing Euclidean 7-space as the cone over the round 6-sphere, the induced nearly Kähler structure is the standard G_2 -invariant almost complex structure on the 6-sphere induced by octonionic multiplication. Three other homogeneous nearly Kähler 6-manifolds have been known since the late 1960s, but the existence of complete inhomogeneous examples has remained an open problem. We resolve this problem by proving the existence of exotic (inhomogeneous) nearly Kähler metrics on the 6-sphere and also on the product of two 3-spheres. These give new Einstein metrics with positive scalar curvature on these two spaces. (This is joint work with Lorenzo Foscolo, Stony Brook & MSRI).

- 3:00–4:00 **Afternoon Tea-Coffee**

- 4:00–5:00 **Gang Tian, Princeton University:** *Gauged Witten equation and its application.*

This talk is based on my recent papers joint with Guangbo Xu. I will first introduce the gauged Witten equation which generalizes the symplectic vortex equation. Next, I will discuss some analytical aspects of this equation, including the Fredholm property and the compactness. In the end, I will explain how to construct

the gauged linear σ -model invariants by using the gauged Witten equation and the virtual technique Li-Tian used. These invariants provide a connection between the σ -models on Calabi-Yau manifolds and the Landau-Ginzburg models.

- 6:00 **Dinner** (*Please sign up using the link **signup list** at the top of this announcement.*)