Tom Needham* (needham.71@osu.edu). Kähler Structures on Spaces of Framed Curves.

Symplectic structures on moduli spaces of polygons have recently been used to give new sampling algorithms for closed random walks. In this talk we extend this idea to the space of smooth framed curves and show that this space is an infinite-dimensional Kähler manifold. Working with smooth curves allows us to consider the action of the infinite-dimensional Lie group of reparameterizations. This group action interacts with the Kähler structure of framed loop space in interesting ways. On the symplectic side, we will show that the reparameterization action is Hamiltonian and has a momentum map which is related to the twist functional. On the Riemannian side, we show that the action is also by isometries and use this fact to induce a metric on the quotient space of unparameterized framed curves. Geodesic distance with respect to this metric is invariant under rigid motions and can be efficiently calculated, so this gives a practical solution to the curve matching problem. (Received January 03, 2017)