

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

12:00 pm, Tuesday, November 29, 2016, 243 Altgeld Hall

Clayton Shonkwiler (Colorado State University)

The Symplectic Geometry of Polygon Space and How to Use It

Abstract: In statistical physics, the basic (and highly idealized) model of a ring polymer is a closed random flight in 3-space with equal-length steps, often called a random equilateral polygon. In this talk, I will describe the moduli space of random equilateral polygons, giving a sense of how this fits into a larger symplectic and algebraic geometric story. In particular, the space of equilateral n -gons turns out to (almost) be a toric symplectic manifold, yielding a (nearly) global coordinate system. These coordinates are powerful tools both for proving theorems and for developing numerical techniques, some of which I will describe, including a very fast and surprisingly simple algorithm for directly sampling random polygons recently developed with Jason Cantarella (University of Georgia), Bertrand Duplantier (CEA/Saclay), and Erica Uehara (Ochanomizu University).

[Video](#)