1154-54-2465 **Clara Buck*** (clara.buck28@gmail.com), **Sean Gallagher** and **Aniruddha Nadiga**. *On the Knotting Probability of Random Equilateral Hexagons.*

The rigidity of equilateral geometric knots makes them useful in certain applications of knot theory. An n-sided geometric knot is a polygon in $\mathbb{R}^3$ consisting of n straight edges and no self-intersections. The space of n-sided geometric knots is a $3n$-dimensional manifold where path components determine geometric knot type. We will consider the submanifold of equilateral knots, consisting of embedded n-sided polygons with unit length edges. The space of equilateral hexagons up to translation modulo the rotation group, Pol(6)/SO(3), is 6 dimensional and can be parameterized by 3 action coordinates from the interior of a moment polytope and 3 angle coordinates from the three-torus. Results from symplectic geometry show that the map between these action-angle coordinates and Pol(6)/SO(3) is measure preserving. We use this parameterization to randomly sample 50 million equilateral hexagons and find that 0.01383% are non-trivial knots. Furthermore, we prove that a portion of the moment polytope consists of unknots, lowering the previous theoretical upper bound on the knotting probability of random equilateral hexagons. (Received September 17, 2019)