



Berlin
Mathematical
School

BMS Friday Colloquium

Friday 14 December 2012 at 14:15

Tea & Cookies starting at 13:00

BMS Loft, Urania, An der Urania 17, 10787 Berlin

Jason Cantarella

(U Georgia)

The Geometry and Topology of Random Polygons

Here is a natural question in statistical physics: what is the expected shape of a polymer with n monomers in solution? The corresponding mathematical question is equally interesting: consider the space of n -gons in three-dimensional space with total length 2, modulo translation. This is a compact manifold. What is the natural metric (and corresponding probability measure) on this manifold? And what are the statistical properties of n -gons in 3-space sampled uniformly from this probability measure?

In his talk, Cantarella will describe a natural probability measure on this space, pushed forward from the standard measure on the Stiefel manifold of 2-frames in complex n -space using a construction of Hausmann and Knutson from algebraic geometry. The picture shows a random 20,000-gon in 3-space sampled from this measure. Cantarella will also give some explicit computations of expected values for geometric properties for such random polygons and discuss their topology. His talk describes joint work with Malcolm Adams (University of Georgia, USA), Tetsuo Deguchi (Ochanomizu University, Japan), and Clay Shonkwiler (University of Georgia, USA).

Jason Cantarella is an associate professor of mathematics at the University of Georgia. His mathematical interests include geometry and topology. He was previously a National Science Foundation postdoctoral fellow at the University of Massachusetts. In 2007, he was awarded the Richard B. Russell Award for Excellence in Undergraduate Teaching.