Surfaces of Large Genus

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007 Kemeny Hall, 4:00 pm
(Tea 3:30 pm 300 Kemeny Hall)

Abstract

Surfaces of large genus are intriguing objects. Their geometry has been studied in different ways by finding geometric properties that hold for all surfaces of the same genus, and by finding families of surfaces with unexpected or extremal geometric behavior.

A classical example of this is the size of systoles, i.e., the study of the shortest non-trivial loop on a surface. On the one hand Gromov showed that there exists a universal constant C such that any (orientable) surface of genus g with area normalized to g has a systole of length less than $C\log(g)$. On the other hand, Buser and Sarnak constructed a family of hyperbolic surfaces where the systole length grows roughly like $\log(g)$. Another important example, in particular for the study of hyperbolic surfaces and related Teichmüller spaces, is the question of finding of short pants decompositions, introduced by Bers and developed by Buser. The talk will discuss some ideas on how to further this understanding of surfaces of large genus through the study of curves on surfaces. In particular, I'll relate some recent progress in the study of systoles, pants decompositions and other sets of short curves including upper bounds on pants decompositions (joint work with F. Balacheff and S. Sabourau), and how to use random constructions to obtain surfaces with large pants decompositions (joint work with L. Guth and R. Young).

This talk should be accessible to graduate students.

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