

School on flat surfaces and interactions

Monday, March 4, 2024 - Friday, March 8, 2024

Le Teich

Scientific Program

Mini-courses**Frederik Benirschke** (compactification of linear manifolds)**Saul Schleimer**: *Computation in the mapping class group.*

We give a relaxed introduction to the mapping class group (of a surface), followed by an overview of the word problem and (if time allows) the conjugacy problem.

Peter Smillie *Convex tiled spheres and the Siegel-Weil formula.*

I will explain how to find explicit formulas for the number of convex tilings of a sphere by triangles, squares, or hexagons within a given stratum. The two ingredients are (1) the theorem of Thurston that these strata are quotients of the period domain by an arithmetic group, and therefore that tiled surfaces correspond to points in the quotient of a lattice, and (2) the theorem of Siegel that gives a formula for counting points in the quotient of a lattice. The first lecture will be about Thurston's theorem, and the remaining three lectures will contain a gentle introduction to Siegel's formula. Along the way, we will introduce automorphic forms for SL_2 , theta functions, Eisenstein series, and the Weil representation, the last of which gives a slicker interpretation of Siegel's formula and warrants the appendment of "Weil" to its name.

Long talks (Tue. 16h30-17h30, Wed. 9h-10h, Thu. 16h30-17h30)**Viveka Erlandsson** *Counting curves on surfaces inside mapping class group orbits.*

It is a classical problem to study the number of closed curves (geodesics) of bounded length L on (for ex. hyperbolic) surfaces, and see how this number grows as L tends to infinity. Huber proved in the 50s that in the case of closed hyperbolic surfaces this number is asymptotic to e^L/L and this result has since been generalized in many directions, by for example looking at other metrics or flows. In her thesis, Maryam Mirzakhani instead counted the subset of simple curves (those with no self-intersections), or more generally, curves that lie in a fixed mapping class group orbit of a simple curve, and proved their growth is instead polynomial. She obtained the asymptotic growth by studying the convergence of a certain family of measures associated to the simple curve. In this talk I will explain this and survey some generalizations and applications of Mirzakhani's result, including being able to count curves on flat surfaces, count square tiled surfaces, or do "statistics" on curves.

Matteo Costantini *Chern classes of spaces of k -differentials and applications to ball quotients.*

Linear submanifolds are the most interesting and well-studied subvarieties of moduli spaces of abelian differentials. We present a formula for the Chern classes of their closure inside the compactification by multi-scale differentials. In particular, we compute a formula for the Chern classes of strata of k -differentials and apply it to test for Deligne-Mostow-type ball quotients. This is a joint work with M. Möller and J. Schwab.

Jan-Willem van Ittersum *Computing Siegel-Veech constants using partitions and quasimodular forms.*

We discuss certain functions on partitions and corresponding quasimodular forms which help to understand the algebraic and combinatorial nature of Siegel-Veech constants on flat surfaces.

Short talks (Wed. 10h-12h15)**Carlos Ospina** *Some real Rel trajectories in $H(1,1)$ that are not recurrent***Polina Baron****Pablo Montealegre** *Stable norm of flat surfaces***Edmond Covanov** *Quantization of linear pseudo-Anosov maps***Magali Jay** *On the study of bi-triangle tiling billiards***Oscar Rutilio Molina Medrano** *Non-extremely amenable subgroups of big mapping class groups*