Random square-tiled surfaces and random multicurves in large genus

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Abstract: (after joint works with V. Delecroix, E. Goujard and P. Zograf) Moduli spaces of Riemann surfaces and related moduli spaces of quadratic differentials are parameterized by a genus g of the surface. Considering all associated hyperbolic (respectively flat) metrics at once, one observes more and more sophisticated diversity of geometric properties when genus grows. However, most of metrics, on the contrary, progressively share certain rules. Here the notion of "most of" has explicit quantitative meaning, for example, in terms of the Weil-Petersson measure. I will present some of these recently discovered large genus universality phenomena.

I will use count of metric ribbon graphs (after Kontsevich and Norbury) to express Masur-Veech volumes of moduli space of quadratic differentials through Witten-Kontsevich correlators. Then I will present Mirzakhani's count of simple closed geodesics on hyperbolic surfaces. We will proceed with description of random geodesic multicurves and of random square-tiled surfaces in large genus. I will conclude with a beautiful universal asymptotic formula for the Witten-Kontsevich correlators predicted by Delecroix, Goujard, Zograf and myself and recently proved by Amol Aggarwal.