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A combinatorial approach to random hyperbolic surfaces

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Starting with dynamical triangulations of the string world sheet and matrix models, random maps have occupied a central place in the study of 2d (Euclidean) quantum gravity. Advances in combinatorics (e.g. tree bijections) and probability theory (e.g. Gromov-Hausdorff limits of random metric spaces) led to a rigorous construction of 2d quantum gravity in the form of Brownian geometry on surfaces, and its identification with Liouville Quantum Gravity. In this talk I will describe how some of these methods extend naturally to random hyperbolic geometry on surfaces, a natural alternative to random maps. In particular, I will show how a bijection between the moduli space of genus-0 hyperbolic surfaces (with boundaries) and certain labeled trees provides insight into the associated random metric space.

Based on joint works with N. Curien and with T. Meeusen and B. Zonneveld.

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