

Title:

**Quantum Gravity: KPZ, SLE, and Conformal Welding**

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Abstract:

What is the most natural notion of a “uniformly random” two-dimensional Riemannian manifold? To what extent can such an object be defined and investigated mathematically? Discrete and continuum versions of these questions have been studied for decades in the mathematical physics literature (where they are closely related to string theory and conformal field theory). I will describe some recent mathematical progress in this area, including a rigorous proof of the KPZ formula (joint with B. Duplantier) and a rigorous connection to certain random fractal curves called Schramm–Loewner evolutions.