SLE, KPZ and Liouville Quantum Gravity

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(Joint work with Scott Sheffield.)

When two boundary arcs of a Liouville quantum gravity random surface are conformally welded to each other (in a boundary quantum-length-preserving way) the resulting interface is a random curve described by the Schramm-Loewner evolution (SLE). This allows to develop a theory of quantum fractal measures (consistent with the Knizhnik-Polyakov-Zamolochikov relation) and to analyze their evolution under conformal welding maps related to SLE. As an application, one can construct quantum length and boundary intersection measures on the SLE curve itself.