How to Draw Trees, and Why

Trees are ubiquitous in mathematics. They appear as basic objects in combinatorics and probability, as dendrites in topology and dynamics, and as real trees in geometry and analysis. In this talk, we will see that finite trees have a canonical embedding in the plane (via Shabat polynomials as Grothendieck dessin d'enfants), that conformal maps help to actually compute these embeddings, and that self-similar Julia sets from complex dynamics can be viewed as limits of these finite trees. We will also discuss motivation from probability theory and statistical physics, particularly stochastically self-similar trees (such as the Aldous' Continuum Random Tree), the Brownian map, and conjectured relations to Liouville Quantum Gravity.

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