

# Caltech

# Woff Memorial Lectures

WITH JASON MILLER  
LINDE HALL 310  
4:00-5:00PM

## MONDAY, APRIL 29

**“Random Planar Curves”** - There has been tremendous progress in the mathematical study of two-dimensional statistical mechanics models at criticality in the last 25 years. This was catalyzed by Schramm's 1999 discovery of the Schramm-Loewner evolution (SLE), which is the canonical model for a random conformally invariant non-crossing planar curve. In this talk, I will describe the origins of SLE in Loewner's 1920s work on the Bieberbach conjecture and its application in the resolution of a number of physics predictions from the 1970s-1990s about the large scale behavior of two-dimensional critical models.

## TUESDAY, APRIL 30

**“Random Surfaces”** - Over the past several decades, two natural random surface models have emerged within physics and mathematics. The first is Liouville quantum gravity (LQG), which has roots in string theory and conformal field theory from the 1980s and 1990s, and which comes with a parameter  $\gamma \in [0,2]$  that indicates how "rough" the surface is. LQG with the special parameter  $\gamma = \sqrt{8/3}$  is sometimes called "pure Liouville quantum gravity." The second is the Brownian map (TBM), which has its roots in planar map combinatorics from the 1960s. In this talk, I will describe work from the probability community starting around 2000 aimed at rigorously defining LQG, TBM, the scaling limits of other models of random planar maps, and conjectures from the 1980s about their equivalence.

## FRIDAY, MAY 3

**“Liouville quantum gravity and SLE”** - In this talk, I will describe how Schramm-Loewner evolutions (SLE) are related to Liouville quantum gravity (LQG) surfaces as random conformal weldings and some complex analytic questions which arise. I will also describe how this representation can be used to link random planar maps with LQG. Finally, I will explain how this perspective has led to a number of new results about random planar maps, SLE, and two-dimensional statistical mechanics models.



## GETTING HERE:

1200 E. California Blvd,  
Pasadena, 91125

Parking is available in Lot 3 (underground parking #126 on campus map) on California Blvd. between Wilson and Arden (near the tennis courts). Linde Hall is located directly across the street.

## FOR QUESTIONS:

Please email [mathinfo@caltech.edu](mailto:mathinfo@caltech.edu) or call 626-395-4335.