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Title: The Model Deformation Phenomenon for Random Polynomials

Abstract: Recently, my collaborators and I have discovered a "model deformation phenomenon" for random polynomials: when we apply differential operators to a random polynomial, the evolution of the roots can be described using a continuous family of push-forward maps. In this talk, the two examples will be (1) the heat evolution of a random polynomial; and (2) repeated applications of the differential operator

$$z^a \left(\frac{d}{dz}\right)^b$$

to a random polynomial, where a is an integer and b is a non-negative integer. I will talk about the explicit formulas for the root distributions in the limit as the degree approaches infinity, as well as how we can describe the limiting root distributions using a PDE and a family of push-forward maps. I will also discuss a surprising connection to random matrix theory. The talk will be self-contained and will have many pictures and animations.