1120-14-193 **Emma Previato***, Department of Mathematics and Statistics, Boston, MA 02215-2411. *Sato's tau function in Painlevé theory.*

In the 1970s, via probability in random-matrix theory, equations of statistical mechanics were given isomonodromic form and written by tau functions; this powerful method is based on the intrinsic meaning of the tau function as a determinant. One offshoot of the formula is that tau solves ODEs of Painlevé type. The tau function also gives the general solution to "integrable hierarchies" of PDEs, archetypally KP and Toda hierarchy. Independently, self-similar solutions of the hierarchy satisfy Painlevé equations. The relationship of the theories is still a mystery. Notably, Painlevé VI, the most general, was long absent from either model. In 1999, L. Haine and J.-P. Semengue produced Painlevé VI for a random-matrix ensemble whose tau function solves the Toda hierarchy, linking it with the Jacobi polynomials. The goals of this talk include an interpretation of the hierarchy flows in terms of the monodromy variables in random-matrix theory; and a construction of self-similar solutions on the one hand, and a finite-dimensional Hamiltonian system built from the random-matrix data with deformations those of the hierarchy, on the other hand. We use the work by Haine and Semengues, but revisit the idea of C.A. Tracy and H. Widom to produce the Hamiltonian (1993). (Received February 22, 2016)