Guionnet Awarded 2009 Loève Prize

The 2009 Line and Michel Loève International Prize in Probability is awarded to Alice Guionnet of the Ecole Normale Supérieure de Lyon. The prize, which carries a monetary award of $30,000, will be presented at a ceremony in Berkeley in October 2009.

She received her Ph.D. in 1995, advised by Gerard Ben Arous. Her thesis dealt with Langevin dynamics in the Sherrington-Kirkpatrick model of spin glasses, via a large deviations approach. The study of dynamics for complex systems (spin systems, particle approximations to the nonlinear filtering equations and spin glasses, where logarithmic Sobolev inequalities in particular and concentration of measure methods in general are very relevant), and more specifically the study of aging phenomena, continue to be a component of her research to this day, with important collaborations with Zegarlinsky, Ben Arous, Dembo and Mazza. Maybe more important, it also naturally lead her to what would become her main area of research and best known work, namely the study of large random matrices. Starting with a proof of the large deviations principle for the spectral measure of Wigner matrices (with Ben Arous), which helped bring to the attention of probabilists the concept of noncommutative entropy coined by Voiculescu, she quickly realized that dynamics and concentration techniques can be adapted to this context and yield a systematic approach to many open questions. Results include the full large deviation principle for the spectral measure of generalized Gaussian matrices and concentration of the spectral measure in more general models (with Zeitouni), and later applications to the study of random matrix models, which had long been studied non-rigorously in mathematical physics. She has found rigorous arguments and elucidated connections with other mathematical fields, in topics such as first and second order expansions of the free energy and the connection with maps enumeration; stochastic analysis for random matrices and Dyson's Brownian motion; connections with "free probability"; and most recently, the study of planar algebras. A partial list of collaborators here includes B. Collins, V. Jones, D. Shlyakhtenko, and her students M. Maida and E. Maurel-Segala. This has been a extremely active field over the period, with many workers pursuing many partly overlapping techniques and problem domains, and her lecture notes from courses in 2003 and 2006, together with a forthcoming monograph (with Anderson and Zeitouni), have helped bring welcome clarity to the field.

About the Prize. The Prize commemorates Michel Loève, Professor at the University of California, Berkeley, from 1948 until his untimely death in 1979. The Prize was established by his widow, Line, shortly before her death in 1992. Awarded every two years, it is intended to recognize outstanding contributions by researchers in probability who are under 45 years old.