

CURRICULUM VITAE

GUIONNET ALICE

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French, three children.

CURSUS :

10 : Médaille d'argent du CNRS
09 : Loeve prize
06 : Miller Institute Fellowship, Berkeley, USA.
06 : Doisteau-Blutet Prize from the French Academy of Science.
05 : Promoted CNRS research director.
03 : My second daughter, Jeanne, was born.
03 : Rollo Davidson prize.
03 : Habilitation à diriger des recherches.
01 : My daughter Anna joined us.
00 : Move to Ecole Normale supérieure (Lyon).
99 : Oberwolfach's prize.
99 : Move to Ecole Normale supérieure (Paris).
98 : My son Joseph was born.
95-96 : Post Doc position at Courant Institute, NYU, USA
95 : Defense of my PhD thesis, directed by G. Ben Arous
on the dynamics for Sherrington-Kirkpatrick model
of spin glasses
1993 : Permanent position as a chargée de recherche, CNRS,
at université Paris-Sud (Orsay, France)
1989 : Admission to Ecole Normale Supérieure (Paris)

RESEARCH :

I started my Ph-D thesis in 1991-92 under the direction of Gerard Ben Arous. We studied Langevin dynamics for Sherrington-Kirkpatrick model of spin glasses. This subject, related with the aging phenomenon, was a subsequent part of my research [6], [7], [8], [26], [47], [48], [4], [23].

After my PhD thesis, I was interested by completely different problems with P. Del Moral related with non linear filtering problems and more specifically by particle approximation to non linear filtering equations (see [19], [20],[21]).

I did also a short post Doc with B. Zegarlinski. It was a great opportunity to learn about coercive inequalities and in particular log-Sobolev inequality [49]. We studied the latter for short range interaction models of particles in random environment [47, 48].

Just at the end of my PhD thesis, I was also interested, because of their occurrence in Sherrington-Kirkpatrick model, by large random matrices with Gaussian entries first studied by Wigner. I obtained with G. Ben Arous large deviations estimates for the empirical measure of the eigenvalues of these matrices (see [9]).

On a technical point of view related, due to a logarithmically singular potential, I studied with Thierry Bodineau the static of vortex systems introduced by Onsager and proved large deviation for the law of their empirical measure (see [15]).

However, [9] was the beginning of many of the projects I worked on since then and which concern large random matrices, with applications to free probability and large deviations questions. Indeed, the study of large deviations in the more general framework proposed by Voiculescu could be attacked [16, 17, 28, 14] via hydrodynamics ideas that I learned at Courant institute where I had the chance to do a one year Post Doc in 1995-1996.

Coming back to the more classical study of the spectrum of one large random matrix, I obtained with O. Zeitouni concentration of the spectral measure in [50] for diverse models of large random matrices. We also proved a full large deviation principle for the spectral measure of generalized Gaussian sample matrices by studying the asymptotics of Itzykson-Zuber integrals (see [51, 52]). In the same direction, we studied with A. Dembo and O. Zeitouni the moderate deviations for the spectral measure of a non centered Gaussian Wigner matrix [24]. More recently, I studied with G. Ben Arous [11] and S. Belinschi and A. Dembo [3] the behaviour of the spectral measure of random matrices with heavy tailed entries, hence putting on a firm mathematical ground an article by Cizeau and Bouchaud. With O. Zeitouni and M. Khrshnapur, we considered the spectral measure of non-normal matrices with law invariant by unitary conjugation and proved that it converges to a deterministic measure whose support is a single ring [37].

A recent line of research concerns matrix models; [51, 52] can also be used to study some matrix models. I characterized the limiting spectral measures of two matrices distributed according to the Gibbs measure of Ising model on random graphs [31]. I improved this study of matrix models with M. Maida in two papers [38] and [39] ; the first article [38] considers the problem of generalizing these results to more complicated interaction by using characters expansions. The second article [39] tackles easier asymptotics but answer harder questions such as second order corrections, analyticity etc This work could also be used by M. Maida to obtain large deviations for the largest eigenvalue of perturbed Gaussian matrices. We recently generalized this result by completely different techniques with F. Benaych-Georges [12, 13]. With E. Maurel-Segala, we gave general criteria to prove a perturbative expansion of general Gaussian matrix integrals [41, 40] and show that this expansion can be seen as generating functions for the enumeration of interesting graphs sorted by their genera; this allowed to put on a firm mathematical ground

that the topological expansion obtained formally by Brézin-Itzykson-Paris and Zuber are also asymptotic. We generalize these results to matrices over the unitary and the orthogonal groups with B. Collins [18]. On another line of research, I extended the first order asymptotics of matrix models to non perturbative but convex situations with D. Shlyakhtenko [44]. With V. Jones and D. Shlyakhtenko, applying the connections between random matrices and combinatorics, we built matrix models for general loop models, in fact traces on planar algebras, and constructed a tower of free group factors in [45]. We more recently studied the associated von Neumann algebras [46].

In the few last years, I wrote two lecture notes on random matrices [35, 36] and a book with G. Anderson and O. Zeitouni [1] published by Cambridge University Press.

Most of my research is motivated by the understanding of the global behaviour of systems in high dimensions, often coming from physics, using techniques from large deviations or coercive inequalities. From this theme, deviations to combinatorics, free probability or PDE's occurred and were (and hopefully will still be in the future) rather enjoyable.

SEMINARS AND CONFERENCES :

Chosen invited talks :

- Two invited talk at Hypathie seminar, november 1999.
- Invited speaker at the European Statistician conference in Prague, august 2002.
- Invited talk at the ICIAM 2003 conference in Sydney, Australia, july 2003.
- 6 hours course at XXIX Conference on Stochastic Processes and their Applications in Rio, Brazil, august 2003.
- Invited talk at Karlsruhe Stochastic-Tage, march 2004.
- Invited talk at SPA meeting, Vancouver may 2004.
- Invited talk at the European mathematical society conference at Stockholm, june 2004.
- Short course on random matrices, Eurandom, march 2006.
- Invited talk at ICM 2006, Madrid.
- Course on random matrices at St Flour summer school, july 2006.
- Course on random matrices at IAS/PCMI, Utah, july 2007.
- Plenary talk at the second Canada-France congress, june 2008.
- Levy Lecture at the 7th world congress in probability, Singapour, july 2008.
- Plenary lecture at ICMP, august 2009.

I have been editor in chief at the Annales de l'Institut Henri Poincaré since June 2006. I was an associated editor at Stochastic processes and applications from 1999 to 2006.

I have been responsible for the probability group at ENS-Lyon since I arrived in Sept. 2000 when the group was very tiny ; with only 2 full time (me and J. Michel) and percentage of other people connected with the discipline (e.g. C. Villani, D. Gaboriau); this included organization of the seminar, working group, administration of a fellowship etc. Today, probability in ENS-Lyon is much better represented (with the arrival of V. Beffara, C. Bernardin, C. Garban, and in physics of F. Toninelli).

I am member of CNRS national committee. I was member of the Conseil National des Universités from 1998 to 2001 and of the ANR project scientific committee in 2005-2006. I was a member of the scientific committee of the French Mathematical Society from 2003-2007 and I am a member of the scientific committee of the CRM (Montreal) since 2007.

I am in charge of the ANR project GranMa with F. Benaych-Georges and B. Eynard on Random Matrices <http://www.umpa.ens-lyon.fr/~aguionne/ANRGranMa.html>. I have organized a few conferences in ENS Lyon (séminaire Hypathie, Rencontres mathématiques, Rencontre de l'ANR GranMa), and coorganized a few conferences in the USA (with D. Shlyakhtenko and D. Voiculescu in Berkeley (2007) and UCLA (2010), with L. Saloff Coste in Cornell (2007)) I am coorganizing a semester at MSRI to be held during fall 2010 and a conference in Oberwolfach 'Stochastic Analysis', June 2011.

I had two PhD students, E. Maurel-Segala and M. Maida who are now maitres de conférences at Orsay. Camille Male started his PhD thesis in 2009. Being at CNRS, I have no teaching duties but try to teach a topics course regularly (in 2008-2009, I taught Random partitions and random matrices, in 2009-2010 Large deviations and concentration of measures and will teach a course on concentration inequalities in 2010-2011). I gave a topics course on random matrices in 2007 at Berkeley University.

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