Gaëtan Borot

French.
Born in St-Wendel (Germany), June 14th, 1986.

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Languages: French (native), English, German.

Curriculum

2013-2019	*Advanced researcher (W2)*, MPIM, Bonn.
Fall 2013	*Visiting scholar*, MIT Maths Department, Cambridge.
2011-2013	*Postdoctoral assistant*, Section de Mathématiques, Genève, in the group of Stanislav Smirnov.
2008-2011	*PhD thesis in Theoretical Physics*, IPhT, CEA Saclay, under the supervision of Bertrand Eynard.
2005-2009	Studies at ENS Paris.

Awards

Best paper 2013 Prize in J. Phys. A for *Purity distribution for random Bures mixed states*, with C. Nadal.

Selected talks

More than 70 talks up to October 2014. The full list is available on my website.

- **2010** ○ *Conf. Random matrix theory and its applications*, MSRI, Berkeley.
- **2011** ○ *Selected talk, Arbeitstagung*, MPIM, Bonn.
- **2012** ○ *Probability seminar*, Zürich Universität.
  ○ *Conf. Integrability in topological field theory*, HCM, Bonn.
  ○ *Conf. Low-dim. topology and number theory*, Oberwolfach.
- **2013** ○ *Probability seminar*, Harvard, Cambridge.
  ○ *Conf. Hamiltonian PDEs, Frobenius mfd. & moduli spaces*, SISSA, Trieste.
  ○ *Conf. Number Theory and Physics*, Clay Mathematics Institute, Oxford.
  ○ *Mirror Symmetry and Physics*, Perimeter Institute, Waterloo.
  ○ *Semester Non-equilibrium dynamics and random matrices*, IAS, Princeton.
- **2014** ○ Day *Recent advances in log-gases*, IHP, Paris.
  ○ *Conf. Geometry, quantum topology and asymptotics*, Geneva.
- **2015** ○ *Conf. Swissknots*, Geneva.

Teaching (assistant)

- **Physics, Université d'Orsay (2009-2011)**
  Tutorials (L1), Evolutions laws in physics.
  Practical works (L3), Fiber optics.
  Oral examinations (L2), training to entrance exams to French engineer schools.
- **Mathematics, Université de Genève (2011-2013)**
  Complex analysis (2^{nd} year), *Prof. A. Karlsson*.
  Probability and statistics (2^{nd} year), *Prof. H. Duminil-Copin*.
  Advanced topics in the theory of manifolds (4^{th} year), *Prof. P. Turner*.

Teaching (lecturer)

- **Mini-course, research level**, *Theory of loop equations*, MIT, Fall 2013.
- **Master course**, *Random matrix theory*, Bonn Universität, 4h/week, Fall 2014.

The lectures notes are available on my website.

Event organization

- **Workshop**, *Geometric quantization and topological recursion*, MPIM Bonn, 24-28 Nov. 2014.
- **Workshop**, *Topological recursion and TQFTs*, Oberwolfach, 14-20 Feb. 2016.

Two other activities are pending decision of the committees:

- **Workshop**, *Asymptotic analysis in strongly coupled systems*, HCM, Bonn, Winter 2016.
- **Thematic trimester**, *Combinatorics and interactions: mathematical physics, representation theory and probability*, IHP, Paris, Winter or Spring 2017.

Service

- **Jury TIPE.** Since 2013, I am an examinator for oral exams taken by students of Classes Préparatoires to enter French engineer schools.
- **Reviewing** for Annales Henri Poincaré, SIGMA, Random Matrix Theory and Applications, J. Phys. A: Math. Theor., Duke Math Journal, Commun. Math. Phys., European Physics Journal.
- **Editor.** Since 2014, I am responsible for the preprint series of the MPIM.
- **Committees.** Since 2014, as a member of the staff at the MPIM, I participate to the evaluation of researchers applying for a stay at our institute, and of students applying for graduate program IMPRS (International Max Planck Research School on Moduli Spaces).

Other activities and interests

- **Scientific popularization.**

  Early scientific journalism, 10-15 Sciences et Techniques (2000-2003).
  Tutoring of 15-17 y.old pupils for the association Science Academy (1 week, 2010).
  Participation to *Fête des Sciences* for the Maths Department at UNIGE (2012).

- **History and philosophy of science.**

Publication list

1 *A matrix model for simple Hurwitz numbers, and topological recursion*
with B. Eynard, M. Mulase, B. Safnuk.
J. Geom. Phys. **61**, 26, 522-540 (2010), math-ph/0906.1206

2 *Enumeration of maps with self avoiding loops and the $\mathcal{O}(n)$ model on random lattices of all topologies*, with B. Eynard.
J. Stat. Mech. P01010 (2011), math-ph/0910.5696

3 *Large deviations of the maximal eigenvalue of random matrices*
with B. Eynard, S.N. Majumdar, C. Nadal.
J. Stat. Mech. P11024 (2011), math-ph/1009.1945.

4 *Tracy-Widom GUE law and symplectic invariants*, with B. Eynard.
nlin.SI/1011.1418 (2010), preprint.

5 *A recursive approach to the $O(n)$ model on random maps via nested loops*
with J. Bouttier, E. Guitter.
J. Phys. A: Math Theor, **45** (2012), math-ph/1106.0153

6 *Asymptotic expansion of β matrix models in the one-cut regime*, with A. Guionnet.
Commun. Math. Phys., **317** 2, 447-483 (2013), math-PR/1107.1167.

7 *Geometry of spectral curves and all order dispersive integrable system*, with B. Eynard.
SIGMA **8** 100, (2012), math-ph/1110.4936.

8 *Purity distribution for random Bures mixed states*, with C. Nadal.
J. Phys A: Math Theor, **45** (2012), cond.mat-stat.mech/1110.3838

9 *Right tail asymptotic expansion of Tracy-Widom beta laws*, with C. Nadal.
Random matrices: Theory Appl. (2012), math-ph/1111.2761

10 *More on the $O(n)$ model on random maps via nested loops: loops with bending energy*
with J. Bouttier and E. Guitter.
J. Phys. A: Math. Theor. 45 (2012) 275206, math-ph/1202.5521

11 *All-order asymptotics of hyperbolic knot invariants from non-perturbative topological recursion of A-polynomials*, with B. Eynard.
to appear in Quantum Topology (2014), math-ph/1205.2261

12 *Loop models on random maps via nested loops: case of domain symmetry breaking and application to the Potts model*, with J. Bouttier and E. Guitter.
J. Phys. A, special issue in honor of F. Wu (2012), math-ph/1207.4878.

13 *Resolvent methods for steady premixed flame shapes governed by the Zhdanov-Trubnikov equation*, with B. Denet and G. Joulin.
J. Stat. Mech. (2012), P10023, cond-mat.stat-mech/1207.5416.

14 *Asymptotic expansion of β matrix models in the multi-cut regime*, with A. Guionnet.
math-ph/1303.1045, submitted.

15 *Abstract loop equations, topological recursion, and applications*,
with B. Eynard and N. Orantin, math-ph/1303.5808, submitted.

16 *Formal multidimensional integrals, stuffed maps, and topological recursion*
AIHP Comb. Phys. Interact. 1 (2014), 225–264, math-ph/1307.4957.

17 *Rational differential systems, loop equations, and application to the q-th reductions of KP*
with M.C. Bergère and B. Eynard, math-ph/1312.4237, submitted.

18 *Large-N asymptotic expansion of N-dimensional integrals*
with A. Guionnet and K.K. Kozłowski, math-ph/1312.6664, submitted.

19 *Root systems, spectral curves, and analysis of a Chern-Simons matrix model for Seifert fibered spaces*, with B. Eynard and A. Weiße, math-ph/1407.4500, submitted.

In preparation

20 *Blobbed topological recursion: properties and applications*, with S. Shadrin.

21 *Asymptotic expansion of a partition function related to the sinh-model*,
with A. Guionnet and K.K. Kozłowski.

22 *Nesting statistics in the $O(n)$ loop model on random maps*, with J. Bouttier.

23 *Generating series of critical random maps and Tau functions of (p,q) minimal models*,
with B. Eynard.

24 *Maps with simple boundaries, free cumulants, and symplectic invariants*.

Proceedings

1 *Loop equations and spectral curves*, Mathematische Arbeitstagung 2011, Max-Planck-Institut für Mathematik.

2 *Asymptotics of invariants of 3-manifolds and topological recursion*, Oberwolfach Reports, workshop "Low dimensional topology and number theory", August 2012.

3 *Blobbed topological recursion*, to appear in Theor. Math. Phys. as proceedings of "Combinatorics of Moduli Spaces, Cluster Algebras, and Topological Recursion", May 2014.

4 *Analytic properties of fiber knots invariants in Seifert spaces*, to appear in Oberwolfach Reports, workshop "Low dimensional topology and number theory", August 2014.