

Bertrand EYNARD

Mathematical Physicist

Institute of theoretical physics, Saclay, CEA, 91191 Gif sur Yvette, FRANCE.

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Civil status

Nationality: french. Born: 1/24/1970 - St Mandé, France. Married, 3 children.

Formation and positions

- 1995-present: permanent position at the IPhT, CEA Saclay, France.
- 2013-present: appointed full member of the CRM, Montréal, QC, Canada
- 2010-2011: Research associate at CERN.
- 2005: Habilitation thesis, Université Paris 7.
- 2000-2002: Invited researcher at the CRM, Montréal QC, Canada. Appointed associate member of CRM.
- 1998-1999: Postdoc (NATO fellowship) in the Department of Physics and Astronomy, University of British Columbia, Vancouver BC, Canada.
- 1997-1998: TMR Postdoc (EU fellowship) in the Department of Mathematical Sciences, University of Durham, UK.
- 1995-1996: National service as the Deputy Manager of the CEDUST (the french University, Scientific and Technical Documentation Center), french embassy in Damascus, Syria.
- 1995-1996: Publisher and Chief Editor of the review *Nouvelles Scientifiques de France et du Proche Orient.*, scientific vulgarisation review broadcasted over 10 middle-east countries
- 1991-1995: **PhD**, Paris 6 University, under the guidance of Professor J. Zinn-Justin: *Random matrices and 2D quantum gravity*. Distinction with honours (“Très honorable avec félicitations”).
- 1990-1991: **DEA** (diploma of advanced studies, Paris 7 University) of theoretical physics, **rank** 1st, distinction with honours.
- 1989-1990: Degree (“Licence”) in mathematics and computer science; Master’s degree in mathematics.
- 1989-1994: Ecole Normale Supérieure of Paris (entered with rank 3rd, option Mathematics).
- 1987-1988: 3rd **price** at the **IMO** (International Mathematics Olympiads) in La Havana Cuba (1987) and Camberra Australia (1988).
- 1987: French Scientific Baccalaureat, distinction very good with honours (“mention très bien, félicitations”), Dakar Sénégal. National Concours général **mathematics**: 2nd **prize**. National Concours général **physics**: Bordeaux region’s 1st prize.

Awards and grants

- Recipient of the 2015 Aisenstadt chair, CRM Montréal Canada
- Invited lecturer (6 hours) at String-Math 2017, Hamburg, Germany
- Invited speaker at ICM 2014 in Seoul, Korea
- Plenary invited speaker at String-Math 2014 in Edmonton, Canada
- CERN research associate 2010-2011
- Nato fellowship 1998-1999 at University of British Columbia, Vancouver, Canada
- TMR EU fellowship, at University of Durham, UK
- 3rd prize at IMO (International mathematics olympiads), 1988 Cambera.
- 3rd prize at IMO (International mathematics olympiads), 1987 Cuba.

- 2nd prize Concours général de mathématiques, 1987
- regional prize Concours général de physique, 1987
- 2009-2011 ANR GranMa (Grandes Matrices aléatoires)
- 2005-2008 European network Enrage (Random Geometry)
- 2005-2008 European network Enigma (Integrability, Geometry and random matrices)
- 2000-2004 European network Eurogrid (Random Geometry)
- 2012-2015 FQRNT grant (Quebec)
- 2013-2017 associate to the Fields-Knots ERC starting grant
- 2016-2019 associate to the ANR "Quantact" grant

Languages

- French: native, English: fluent, german: 5 years, spanish: good, arabic: 1,5 year.

Teaching and students

9 undergrad students for master training, and 5 phd students.

Several lecture series given, mostly in summer schools, in particular:

- Les Houches summer school 2016, "Random matrices".
- Lecture series for Saclay's Ecole doctorale (postgrad school) 2015: "Random Matrices"
- Nov 2014: invited master class on "topological recursion" at Max Planck Institute, Bonn, Germany.
- Jan-feb 2013: invited master class on "topological recursion" at QGM, Aarhus, Denmark.
- 2010-2011: postgrad lecture series "combinatorics of maps" at University of Geneva, Switzerland.
- autumn 2009, lecture series "Enumeration of maps" at IHP Paris.
- lecture series at the trimester "Matrix Models and Geometry" IST Lisbon.
- Lecture series for Saclay's Ecole doctorale (postgrad school) autumn 2006 : "Introduction to algebraic geometry for physicists"
- Lecture series for Saclay's Ecole doctorale (postgrad school) january 2005 "Intégrabilité, modèles de matrices et géométrie algébrique"
- Lecture series for Saclay's Ecole doctorale (postgrad school) september-november 2000: "random matrices"

Editorial and research administration activity

- 2014-: Editorial board for RMTA (Random matrices, theory and applications)
- 2014-: Editor for "Combinatorics, Physics and their Interactions"
- 2011-2015: Editor for "JSTAT"
- 2 times elected member of the IPHT scientific council
- 2 times head of the mathematical physics group at IPHT.

Selected Publications

Nearly 100 publications, and preprints on the arxiv. A selection of articles:

Books and book chapters:

- Book: "counting surfaces", Birkhauser 2016.
- Book: "Random matrices", to appear as the Aisenstadt Chair monography, pre-version , math-ph: arxiv.1510.04430.
- Book chapter: "Algebraic methods in random matrices", Les Houches summer school lecture notes, 2016, to appear.
- Book chapter: "Formal matrix integrals and combinatorics of maps", Invited contribution in "Random Matrices, Random Processes and Integrable Systems" in the CRM-Springer Series on Mathematical Physics, J. Harnad Editor, ISBN 978-1-4419-9513-1, 2011.

articles:

- V. Bouchard, B. Eynard, Reconstructing WKB from topological recursion, math-ph: arxiv.1606.04498, to be published.
- B. Eynard, A short overview of the "Topological recursion" ICM proceedings,
- M. Bergère, B. Eynard, O. Marchal, The sine law gap probability, Painlevé 5, and asymptotic expansion by the topological recursion, IPhT-T13/251, CRM2013-3329, math-ph: arxiv.1311.3217
- F. David, B. Eynard, Planar maps, circle patterns and 2D gravity, math-ph: arxiv.1307.3123, AIHP D, Volume 1, Issue 2, 2014, pp. 139?183.
- G. Borot, B. Eynard, All order asymptotics of hyperbolic knot invariants from non-perturbative topological recursion 1205.2261of A-polynomials, math-ph: arxiv.1205.2261,
- B. Eynard, N. Orantin, Computation of open Gromov-Witten invariants for toric Calabi-Yau 3-folds by topological recursion, a proof of the BKMP conjecture, math-ph: arxiv.1205.1103,
- G. Borot, B. Eynard, Geometry of spectral curves and all order integrable dispersive systems, math-ph: arxiv.1110.4936, SIGMA 8 (2012), 100, 53 pages: <http://www.emis.de/journals/SIGMA/2012/100/>
- B. Eynard, Intersection numbers of spectral curves, math-ph: arxiv.1104.0176, CNTP, Vol. 8, 3.
- G. Borot, B. Eynard, S. Majumdar, C. Nadal, Large deviations of the maximal eigenvalue of random matrices, math-ph: arxiv.1009.1945.
- L. Chekhov, B. Eynard, O. Marchal, Topological expansion of the Bethe ansatz, and quantum algebraic geometry, math-ph: arxiv.0911.1664, JHEP03(2009)094.
- G. Borot, B. Eynard, Enumeration of maps with self avoiding loops and the $O(n)$ model on random lattices of all topologies, math-ph: arxiv.0910.5896, J.Stat.Mech. (2011) P01010.
- M. Bergère, B. Eynard, Universal scaling limits of matrix models, and (p,q) Liouville gravity, math-ph: arxiv.0909.0854.
- B. Eynard, A matrix model for plane partitions, math-ph: arxiv.0905.0535, J. Stat. Mech. (2009) P10011.
- B. Eynard, All orders asymptotic expansion of large partitions, math-ph: arxiv.0804.0381, JSTAT (2008) P07023,
- B. Eynard, Recursion between Mumford volumes of moduli spaces , math-ph: arXiv:0706.4403, Annales de l'IHP Volume 12, Issue 8 (2011), Page 1431-1447.
- B. Eynard, N. Orantin, Invariants of algebraic curves and topological expansion, math-ph/0702045, Communications in Number Theory and Physics, Vol 1, Number 2, p347-452,
- M.L. Mehta, B. Eynard, Matrices coupled in a chain: eigenvalue correlation, Journal of Physics A 19 (1998) 4449, xxx, cond-mat/9710230,
- C. Kristjansen, B.Eynard, Exact solution of the $O(n)$ model on a random lattice, Nuc. Phys. B455 577-618, (1995), hep-th/9506193,

Others

- Winner of the Polartech Challenge Grant 1999, as guide of the sea-to-sky expedition in the St-Elias range in Alaska, with several 1st ascents in unexplored areas.
- Mountaineering trainer, Canadian Alpine Club 1999,
- Organizer of 4 mountaineering expeditions.
- I Crossed Sahara desert, 1 month across 7 countries.