

## CURRICULUM VITAE - TEODOR BANICA

Professor of Mathematics  
University of Cergy-Pontoise  
Born 05/25/1973 at Bucharest  
Romanian and French citizen

### ADDRESS

Department of Mathematics  
University of Cergy-Pontoise  
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### EDUCATION

1991-92: First year student, University of Bucharest  
1992-94: Student at the Ecole Normale Supérieure, Paris  
1994-96: Ph.D. student at Paris 7 University

### EMPLOYMENT

1996-98: CNRS researcher, Institute of Mathematics of Marseille  
1998-99: CNRS researcher, Institute of Mathematics of Paris  
1999-00: Charles B. Morrey Jr. Assistant Professor, UC Berkeley  
2000-04: CNRS researcher, Institute of Mathematics of Paris  
2004-09: Professor of Mathematics, University of Toulouse  
2009- : Professor of Mathematics, University of Cergy-Pontoise

### TEACHING

1994-96: Teaching assistant at Paris 7 University  
Mathematics - 1st year (Fall 1994)  
Linear algebra - 2nd year (Fall 1995)  
1999-00: Assistant professor at UC Berkeley  
Abstract algebra - 3rd year (Fall 1999)  
Measure theory - 4th year (Fall 1999)  
Real analysis - 3rd year (Spring 2000)  
2003-04: Lecturer at Paris 7 University  
Operator algebras - 5th year (Fall 2003)

- 2004-09: Professor at the University of Toulouse  
Analysis - 2nd year (Fall 2004)  
Integral calculus - 3rd year (Fall 2004)  
Maple and R - 2nd year (Fall 2005)  
Measure theory - 3rd year (Fall 2005)  
Integral calculus - 3rd year (Fall 2005)  
Quantum groups - 5th year (Fall 2005)  
Linear algebra - 2nd year (Fall 2006)  
Measure theory - 3rd year (Fall 2006)  
Abstract algebra - 2nd year (Spring 2007)  
Probability - 3rd year (Spring 2007)  
Differential equations - 2nd year (Spring 2008)  
Fourier analysis - 3rd year (Spring 2008)  
Mathematics - 1st year (Fall 2008)  
Linear algebra - 2nd year (Fall 2008)
- 2009- : Professor at the University of Cergy-Pontoise  
Linear algebra - 2nd year (Spring 2010)  
Abstract algebra - 4th year (Spring 2010)  
Free probability - 5th year (Spring 2010)  
Mathematics - 1st year (Fall 2010)  
Dynamical systems - 4th year (Fall 2010)  
Abstract algebra - 4th year (Spring 2011)  
Quantum groups - 5th year (Spring 2011)  
Mathematics - 1st year (Fall 2011)  
Dynamical systems - 4th year (Fall 2011)  
Abstract algebra - 4th year (Spring 2012)  
Quantum groups - 5th year (Spring 2012)  
Probability - 3rd year (Fall 2012)  
Dynamical systems - 4th year (Fall 2012)  
Linear algebra - 2nd year (Spring 2013)  
Abstract algebra - 4th year (Spring 2013)  
Real analysis - 2nd year (Fall 2013)  
Dynamical systems - 4th year (Fall 2013)  
Linear algebra - 2nd year (Spring 2014)  
Probability - 2nd year (Spring 2014)  
Mathematics - 1st year (Spring 2015)  
Real analysis - 2nd year (Spring 2015)  
Functional analysis - 4th year (Spring 2015)  
Optimization - 4th year (Spring 2015)  
Mathematics - 1st year (Fall 2015)

Linear algebra - 2nd year (Fall 2015)  
 Real analysis - 2nd year (Spring 2016)  
 Functional analysis - 4th year (Spring 2016)  
 Linear algebra - 2nd year (Fall 2016)  
 Functional analysis - 4th year (Fall 2016)  
 Real analysis - 2nd year (Spring 2017)  
 Probability - 5th year (Spring 2017)  
 Linear algebra - 2nd year (Fall 2017)  
 Functional analysis - 4th year (Fall 2017)  
 Probability - 5th year (Fall 2017)  
 Real analysis - 2nd year (Spring 2018)

## ADMINISTRATION

- 1994- : Organization of seminars  
     Student seminar “Operator algebras”, Paris 1994-96  
     Seminar “Noncommutative geometry”, Toulouse 2004-06  
     Seminar “Geometry and physics”, Toulouse 2006-07  
     Seminar “Random matrices”, Toulouse 2007-08  
     Seminar “Probability”, Cergy 2010-11
- 1996- : Computer administration and maintenance  
     Webmaster “Operator algebra team, Marseille”, 1996-98  
     Webmaster “Operator algebra team, Paris”, 1998-04  
     Webmaster “Laboratoire Emile Picard, Toulouse”, 2004-08
- 2002- : Organization of conferences  
     Conference “Groups”, Paris 2002  
     Conference “Quantum groups”, Strasbourg 2008  
     Conference “Quantum groups”, Toulouse 2009  
     Conference “Polynomial integrals and applications”, Cergy 2010  
     Conference “Quantum groups”, Clermont 2010  
     Conference “Algebra”, Cergy 2013
- 2004- : Hiring committee work  
     Hiring committee in mathematics, Toulouse 2004-08  
     Hiring committee for a junior position in mathematics, Montpellier 2009  
     Hiring committee for a junior position in mathematics, Besançon 2012
- 2005- : General campus administration  
     Institute of Mathematics of Toulouse Council, 2005-08  
     Laboratoire Emile Picard of Toulouse Council, 2006-08  
     Laboratoire AGM of Cergy-Pontoise Council, 2009-11
- 2016- : Scientific editorial work  
     Editor of Advances in Operator Theory, since 2016

## STUDENTS

- 2005-06: L. Masserey, M.Sc. Toulouse 3 University, 06/06  
 Memoir: Compact matrix quantum groups of Kac type
- 2012-15: L. Pittau, Ph.D. Cergy-Pontoise University, 10/15  
 Thesis: Free wreath products by quantum automorphism groups
- 2016-17: D. Özteke, M.Sc. Cergy-Pontoise University, 06/17  
 Memoir: Isolated complex Hadamard matrices

## AWARDS

- 1989: Gold medal at the 30th IMO, Braunschweig  
 1990: Gold medal at the 31st IMO, Beijing  
 1991: Gold medal at the 32nd IMO, Sigtuna  
 2012: G. de B. Robinson award (with S.T. Belinschi, M. Capitaine, B. Collins)

## PUBLICATIONS

- [1] T. Banica, On the polar decomposition of circular variables, *Integral Equations Operator Theory* **24** (1996), 372–377.
- [2] T. Banica, The representation theory of free orthogonal quantum groups, *C. R. Acad. Sci. Paris Ser. I Math.* **322** (1996), 241–244.
- [3] T. Banica, The free unitary compact quantum group, *Comm. Math. Phys.* **190** (1997), 143–172.
- [4] T. Banica, Hopf algebras and subfactors associated to vertex models, *J. Funct. Anal.* **159** (1998), 243–266.
- [5] T. Banica, Representations of compact quantum groups and subfactors, *J. Reine Angew. Math.* **509** (1999), 167–198.
- [6] T. Banica, Fusion rules for representations of compact quantum groups, *Exposition. Math.* **17** (1999), 313–337.
- [7] T. Banica, Symmetries of a generic coaction, *Math. Ann.* **314** (1999), 763–780.
- [8] T. Banica, Compact Kac algebras and commuting squares, *J. Funct. Anal.* **176** (2000), 80–99.
- [9] T. Banica, Subfactors associated to compact Kac algebras, *Integral Equations Operator Theory* **39** (2001), 1–14.

- [10] T. Banica, Quantum groups and Fuss-Catalan algebras, *Comm. Math. Phys.* **226** (2002), 221–232.
- [11] T. Banica, The planar algebra of a coaction, *J. Operator Theory* **53** (2005), 119–158.
- [12] T. Banica, Quantum automorphism groups of small metric spaces, *Pacific J. Math.* **219** (2005), 27–51.
- [13] T. Banica, Quantum automorphism groups of homogeneous graphs, *J. Funct. Anal.* **224** (2005), 243–280.
- [14] T. Banica and S. Moroianu, On the structure of quantum permutation groups, *Proc. Amer. Math. Soc.* **135** (2007), 21–29.
- [15] T. Banica and J. Bichon, Free product formulae for quantum permutation groups, *J. Inst. Math. Jussieu* **6** (2007), 381–414.
- [16] T. Banica and B. Collins, Integration over compact quantum groups, *Publ. Res. Inst. Math. Sci.* **43** (2007), 277–302.
- [17] T. Banica and J. Bichon, Quantum automorphism groups of vertex-transitive graphs of order  $\leq 11$ , *J. Algebraic Combin.* **26** (2007), 83–105.
- [18] T. Banica and D. Bisch, Spectral measures of small index principal graphs, *Comm. Math. Phys.* **269** (2007), 259–281.
- [19] T. Banica, J. Bichon and G. Chenevier, Graphs having no quantum symmetry, *Ann. Inst. Fourier* **57** (2007), 955–971.
- [20] T. Banica and B. Collins, Integration over quantum permutation groups, *J. Funct. Anal.* **242** (2007), 641–657.
- [21] T. Banica and R. Nicoara, Quantum groups and Hadamard matrices, *Panamer. Math. J.* **17** (2007), 1–24.
- [22] T. Banica, J. Bichon and B. Collins, Quantum permutation groups: a survey, *Banach Center Publ.* **78** (2007), 13–34.
- [23] T. Banica, J. Bichon and B. Collins, The hyperoctahedral quantum group, *J. Ramanujan Math. Soc.* **22** (2007), 345–384.
- [24] T. Banica and B. Collins, Integration over the Pauli quantum group, *J. Geom. Phys.* **58** (2008), 942–961.
- [25] T. Banica, A note on free quantum groups, *Ann. Math. Blaise Pascal* **15** (2008), 135–146.

- [26] T. Banica and R. Vergnioux, Growth estimates for discrete quantum groups, *Infin. Dimens. Anal. Quantum Probab. Relat. Top.* **12** (2009), 321–340.
- [27] T. Banica and J. Bichon, Quantum groups acting on 4 points, *J. Reine Angew. Math.* **626** (2009), 74–114.
- [28] T. Banica, Cyclotomic expansion of exceptional spectral measures, *Internat. J. Math.* **20** (2009), 275–297.
- [29] T. Banica and R. Vergnioux, Fusion rules for quantum reflection groups, *J. Non-commut. Geom.* **3** (2009), 327–359.
- [30] T. Banica and R. Speicher, Liberation of orthogonal Lie groups, *Adv. Math.* **222** (2009), 1461–1501.
- [31] T. Banica, B. Collins and P. Zinn-Justin, Spectral analysis of the free orthogonal matrix, *Int. Math. Res. Not.* **17** (2009), 3286–3309.
- [32] T. Banica, J. Bichon and J.-M. Schlenker, Representations of quantum permutation algebras, *J. Funct. Anal.* **257** (2009), 2864–2910.
- [33] T. Banica and J. Bichon, Hopf images and inner faithful representations, *Glasg. Math. J.* **52** (2010), 677–703.
- [34] T. Banica, B. Collins and J.-M. Schlenker, On orthogonal matrices maximizing the 1-norm, *Indiana Univ. Math. J.* **59** (2010), 839–856.
- [35] T. Banica and R. Vergnioux, Invariants of the half-liberated orthogonal group, *Ann. Inst. Fourier* **60** (2010), 2137–2164.
- [36] T. Banica and D. Goswami, Quantum isometries and noncommutative spheres, *Comm. Math. Phys.* **298** (2010), 343–356.
- [37] T. Banica, S. Curran and R. Speicher, Classification results for easy quantum groups, *Pacific J. Math.* **247** (2010), 1–26.
- [38] T. Banica, The orthogonal Weingarten formula in compact form, *Lett. Math. Phys.* **91** (2010), 105–118.
- [39] T. Banica and S. Curran, Decomposition results for Gram matrix determinants, *J. Math. Phys.* **51** (2010), 1–14.
- [40] T. Banica, S.T. Belinschi, M. Capitaine and B. Collins, Free Bessel laws, *Canad. J. Math.* **63** (2011), 3–37.
- [41] T. Banica, S. Curran and R. Speicher, Stochastic aspects of easy quantum groups, *Probab. Theory Related Fields* **149** (2011), 435–462.

- [42] T. Banica, B. Collins and J.-M. Schlenker, On polynomial integrals over the orthogonal group, *J. Combin. Theory Ser. A* **118** (2011), 778–795.
- [43] T. Banica, J. Bichon and S. Curran, Quantum automorphisms of twisted group algebras and free hypergeometric laws, *Proc. Amer. Math. Soc.* **139** (2011), 3961–3971.
- [44] T. Banica and A. Skalski, Two-parameter families of quantum symmetry groups, *J. Funct. Anal.* **260** (2011), 3252–3282.
- [45] T. Banica and J.-M. Schlenker, Combinatorial aspects of orthogonal group integrals, *Internat. J. Math.* **22** (2011), 1611–1646.
- [46] T. Banica, S. Curran and R. Speicher, De Finetti theorems for easy quantum groups, *Ann. Probab.* **40** (2012), 401–435.
- [47] T. Banica and A. Skalski, Quantum isometry groups of duals of free powers of cyclic groups, *Int. Math. Res. Not.* **9** (2012), 2094–2122.
- [48] T. Banica, J. Bichon and S. Natale, Finite quantum groups and quantum permutation groups, *Adv. Math.* **229** (2012), 3320–3338.
- [49] T. Banica, Quantum permutations, Hadamard matrices, and the search for matrix models, *Banach Center Publ.* **98** (2012), 11–42.
- [50] T. Banica, A. Skalski and P.M. Sołtan, Noncommutative homogeneous spaces: the matrix case, *J. Geom. Phys.* **62** (2012), 1451–1466.
- [51] T. Banica, U. Franz and A. Skalski, Idempotent states and the inner linearity property, *Bull. Pol. Acad. Sci. Math.* **60** (2012), 123–132.
- [52] T. Banica, J. Bhowmick and K. De Commer, Quantum isometries and group dual subgroups, *Ann. Math. Blaise Pascal* **19** (2012), 17–43.
- [53] T. Banica, I. Nechita and K. Życzkowski, Almost Hadamard matrices: general theory and examples, *Open Syst. Inf. Dyn.* **19** (2012), 1–26.
- [54] T. Banica and I. Nechita, Asymptotic eigenvalue distributions of block-transposed Wishart matrices, *J. Theoret. Probab.* **26** (2013), 855–869.
- [55] T. Banica, J. Bichon, B. Collins and S. Curran, A maximality result for orthogonal quantum groups, *Comm. Algebra* **41** (2013), 656–665.
- [56] T. Banica and A. Skalski, Quantum symmetry groups of  $C^*$ -algebras equipped with orthogonal filtrations, *Proc. Lond. Math. Soc.* **106** (2013), 980–1004.
- [57] T. Banica, The defect of generalized Fourier matrices, *Linear Algebra Appl.* **438** (2013), 3667–3688.

- [58] T. Banica and I. Nechita, Almost Hadamard matrices: the case of arbitrary exponents, *Discrete Appl. Math.* **161** (2013), 2367–2379.
- [59] T. Banica, I. Nechita, J.-M. Schlenker, Analytic aspects of the circulant Hadamard conjecture, *Ann. Math. Blaise Pascal* **21** (2014), 25–59.
- [60] T. Banica, First order deformations of the Fourier matrix, *J. Math. Phys.* **55** (2014), 1–22.
- [61] T. Banica, I. Nechita and J.-M. Schlenker, Submatrices of Hadamard matrices: complementation results, *Electron. J. Linear Algebra* **27** (2014), 197–212.
- [62] T. Banica, Counting results for thin Butson matrices, *Electron. J. Combin.* **21** (2014), 1–14.
- [63] T. Banica, Truncation and duality results for Hopf image algebras, *Bull. Pol. Acad. Sci. Math.* **62** (2014), 161–179.
- [64] T. Banica and I. Nechita, Block-modified Wishart matrices and free Poisson laws, *Houston J. Math.* **41** (2015), 113–134.
- [65] T. Banica and A. Skalski, The quantum algebra of partial Hadamard matrices, *Linear Algebra Appl.* **469** (2015), 364–380.
- [66] T. Banica and J. Bichon, Random walk questions for linear quantum groups, *Int. Math. Res. Not.* **24** (2015), 13406–13436.
- [67] T. Banica, The glow of Fourier matrices: universality and fluctuations, *Oper. Matrices* **9** (2015), 457–474.
- [68] T. Banica, Liberations and twists of real and complex spheres, *J. Geom. Phys.* **96** (2015), 1–25.
- [69] T. Banica, Quantum isometries of noncommutative polygonal spheres, *Münster J. Math.* **8** (2015), 253–284.
- [70] T. Banica and S. Mészáros, Uniqueness results for noncommutative spheres and projective spaces, *Illinois J. Math.* **59** (2015), 219–233.
- [71] T. Banica, The algebraic structure of quantum partial isometries, *Infin. Dimens. Anal. Quantum Probab. Relat. Top.* **19** (2016), 1–36.
- [72] T. Banica, A duality principle for noncommutative cubes and spheres, *J. Noncommut. Geom.* **10** (2016), 1043–1081.
- [73] T. Banica, Half-liberated manifolds, and their quantum isometries, *Glasg. Math. J.* **59** (2017), 463–492.



- [74] T. Banica, Liberation theory for noncommutative homogeneous spaces, *Ann. Fac. Sci. Toulouse Math.* **26** (2017), 127–156.
- [75] T. Banica, Quantum isometries, noncommutative spheres, and related integrals, *Banach Center Publ.* **111** (2017), 101–144.
- [76] T. Banica and I. Nechita, Flat matrix models for quantum permutation groups, *Adv. Appl. Math.* **83** (2017), 24–46.
- [77] T. Banica, Deformed Fourier models with formal parameters, *Studia Math.* **239** (2017), 201–224.
- [78] T. Banica, Quantum groups from stationary matrix models, *Colloq. Math.* **148** (2017), 247–267.
- [79] T. Banica, Weingarten integration over noncommutative homogeneous spaces, *Ann. Math. Blaise Pascal* **24** (2017), 195–224.
- [80] T. Banica and J. Bichon, Matrix models for noncommutative algebraic manifolds, *J. Lond. Math. Soc.* **95** (2017), 519–540.
- [81] T. Banica and J. Bichon, Complex analogues of the half-classical geometry, *Münster J. Math.* **10** (2017), 457–483.
- [82] T. Banica and A. Chirvasitu, Thoma type results for discrete quantum groups, *Internat. J. Math.* **28** (2017), 1–23.
- [83] T. Banica and I. Nechita, Almost Hadamard matrices with complex entries, *Adv. Oper. Theory* **3** (2018), 149–189.
- [84] T. Banica, Unitary easy quantum groups: geometric aspects, *J. Geom. Phys.* **126** (2018), 127–147.
- [85] T. Banica and I. Patri, Maximal torus theory for compact quantum groups, *Illinois J. Math.*, to appear.
- [86] T. Banica, Complex Hadamard matrices with noncommutative entries, *Ann. Funct. Anal.*, to appear.
- [87] T. Banica, Super-easy quantum groups: definition and examples, *Bull. Pol. Acad. Sci. Math.*, to appear.
- [88] T. Banica, Tannakian duality for affine homogeneous spaces, *Canad. Math. Bull.*, to appear.
- [89] T. Banica, The planar algebra of a fixed point subfactor, preprint, revised 12/17.

- [90] T. Banica and A. Freslon, Modelling questions for quantum permutations, preprint 2017.
- [91] T. Banica, D. Özteke and L. Pittau, Isolated partial Hadamard matrices, and related topics, preprint 2017.
- [92] T. Banica, Rigidity questions for real half-classical manifolds, preprint 2017.
- [93] T. Banica and A. Chirvasitu, Quasi-flat representations of uniform groups and quantum groups, preprint 2017.
- [94] T. Banica, Block-modified Wishart matrices: the easy case, preprint 2017.
- [95] T. Banica and A. Chirvasitu, Stationarity questions for transitive quantum groups, preprint 2017.
- [96] T. Banica, Higher transitive quantum groups: theory and models, preprint 2017.