

# Pierre Tarrès

## Curriculum vitæ

### PERSONAL DATA and CONTACT INFORMATION

Born in Brest (France) on 3/5/1974.

Married, french citizenship.

New York University Shanghai, 1555 Century Avenue

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### POSITIONS

- 2020-: Tenured Professor of Mathematics, NYU Shanghai, Global Network Professor, NYU and Courant Institute
- September 2019-: Director of NYU-ECNU Institute of Mathematical Sciences, NYU Shanghai
- 2018-: Associated Professor at Courant Institute
- 2018-2019: Tenured Associate Professor of Mathematics, NYU Shanghai, Global Network Associate Professor, NYU and Courant Institute
- 2016-17: Visiting Professor, NYU Shanghai, NYU-ECNU Institute of Mathematical Sciences
- 2015-: Tenured CNRS Senior Research Scientist (“Directeur de recherche”), at Ceremade, Université Paris-Dauphine and Département de mathématiques, Ecole Normale Supérieure de Paris, currently on leave

- 2005-14: Associate Professor at the Mathematical Institute, University of Oxford, tenured in 2010
- 2007-15: Associate member of the Oxford-Man Institute of Quantitative Finance, Oxford
- 2002-15: Tenured CNRS Research Fellow (“Chargé de recherche”), on leave in Oxford, 2005-10 and 12-14
- 2001-02: Postdoctoral Fellow, Applied Probability Chair (Professor Gérard Ben Arous), Swiss Federal Institute of Technology in Lausanne

## EDUCATION

- 2001: PhD in mathematics, Ecole Normale Supérieure Cachan
- 1994-1998: Ecole Normale Supérieure Paris, rue d’Ulm, Master in Mathematics
- 1998: Ecole Normale Supérieure Cachan, Graduate Course in “Mathematics and artificial intelligence”
- 1995-1996: Internship at the Molecular Genetics Laboratory at the CNRS in Gif/s/Yvette

## HONOURS, AWARDS and GRANTS

- Shanghai Thousand Talents Foreign Expert Award, CNY 750,000, 2019
- NSFC Grant (Principal Investigator), CNY 450,000, 2017
- ANR/SNF Grant MALIN (Principal Investigator), € 456,389 (ANR, french side) and CHF 302,044 (SNF, swiss side), 2016
- Leverhulme Prize 2006, £ 70,000
- CASE EPSRC Grant for New Academics 2007
- Annals Prize 2009 (Institut Henri Poincaré)

## **SUPERVISION of GRADUATE STUDENTS and POSTDOCS**

- Shuo Qin, 2022- (currently at Courant Institute in New York)
- Bary Pradelski, Interacting networks in economics and finance, 2012-15, in co-supervision with P. Young in economics, Oxford : currently "Chargé de Recherches" at CNRS, France
- Daniel Kious, Random processes and social networks dynamics, 2011-14 : currently Lecturer at the University of Bath, United Kingdom
- Nathan Korda, Learning in Three Classic Bandit Strategies, 2007-2011 : currently post-doc in the University of Oxford
- Yilei Hu, Essays on Random Processes with Reinforcement, 2006-2011 : currently Strategist (Executive Director) at Goldman Sachs in Hong-Kong, China
- Aline Kurtzmann, post-doc on a Swiss National Fund for Scientific Research Grant, 2007-08: currently tenured Assistant Professor in Nancy, France

## **ORGANIZATION of CONFERENCES**

- Co-organizer of American Institute of Mathematics (AIM) workshop on Self-interacting processes, supersymmetry, and Bayesian statistics, San Jose, September 23-27, 2019
- Co-organizer of the Singapore-Abu Dhabi-Shanghai-India Probability Meeting, Singapore, 27-29 May 2019
- Organizer of a parallel session at the 12th International Vilnius Conference on Probability Theory and Mathematical Statistics, Vilnius, Lithuania, July 2 - 6, 2018
- Co-organizer, with Nina Gantert, Alejandro Ramírez, Christophe Sabot and Balint Tóth, of a Workshop on "Random walks with memory" at CIRM, Luminy, May 2017
- Organizer of a parallel session at the Conference "Stochastic Processes and Applications", Oxford, July 2015
- Co-organizer, with B. Hambly and L. Saloff-Coste, of the "Durham Symposium on Random Walks", 2 to 12 July 2007, London Mathematical Society and EPSRC, UK
- Co-organizer of the "Journées de Probabilités 2003", Toulouse

## COORDINATION of GRANT PROJECTS

- Principal coordinator of the ANR/FNS (“Agence Nationale de la Recherche”) french-swiss project MALIN on Interacting Random Walks, 2016, which gathers overall 40 researchers over four teams, one for Switzerland, and three for France (Paris, Lyon, Marseille), including Benaïm, Bertoin, Bolthausen, Derrida, Fournier, Hu, Majumdar, Mountford, Sabot, Schapira, Shi, Sznitman, Werner.

## SELECTED INVITED LECTURES

- Técnico Lisbon, Probability and Stochastic Analysis Seminar, 9 February 2021
- AI Industry-university-research innovation alliance of Chinese Academy of Sciences, 24 August 2020
- Annals of Applied Probability Board Meeting Conference, 8 January 2021
- American Institute of Mathematics workshop, San José, 24 September 2019
- Kansai Probability Seminar, RIMS, Kyoto, 22 February 2019
- Hong-Kong Probability Seminar, 5 October 2018
- Scaling Limits in Models of Statistical Mechanics, Oberwolfach, 9 - 15 September 2018
- Strongly Correlated Random Interacting Processes, Oberwolfach, 28 January - 3 February 2018
- British Workshop on Laplacians, Walks and Condensation, on the occasion of Michiel van den Berg’s 65th birthday, 3-7 July 2017
- Statistical mechanics, random planar geometry and interacting random walks, Lyons, June 6-9, 2017
- Institute for Advanced Studies, Princeton, Special Mathematical Physics Seminar, 24 January 2017
- International Conference on Moving Interfaces and Related Phenomena in Mathematics and Physics, Shanghai, March 31-April 2, 2017
- Large Scale Stochastic Dynamics, Oberwolfach, 13-19 November 2016
- New Developments in Processes with Reinforcement, Bristol, 1-5 February 2016
- Inhomogeneous Random Systems, Institut Henri Poincaré, 26-27 January 2016
- Stochastics and interactions, on the occasion of Bálint Tóth’s 60th birthday, Budapest, 21-24 July 2015
- Laplacians, Random Walks, Bose Gas, Quantum Spin Systems, Bristol, 15-19 September 2014
- School and Workshop on Random Interacting Systems, Bath, 23-27 June 2014
- Trimestre Institut Henri Poincaré ”Random Walks and Asymptotic Geometry of Groups”, 19 February 2014
- Random Walks: Crossroads and Perspectives, Budapest, June 2013
- Mathematics and Physics of Disordered Systems, Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, September 2012.

- Ergonum Workshop, INRIA Sophia-Antipolis, June 2012.
- Random Walks and Random Media, MSRI, Berkeley, May 2012.
- EPSRC Symposium Workshop on Disordered Media, Warwick, September 2011
- Statistics and Modeling for Complex Data, Ecole des Ponts Paris, June, 2011
- ESF-Eurandom Mathematics Conference on Combinatorics and Analysis in Spatial Probability, Eindhoven, December 2010
- Stochastic Approximation Workshop, Bristol, September 2010
- Random Geometries, Bath, September 2009
- European Meeting of Statisticians, session on “Random Walks with Interactions”, Toulouse, July 2009
- Workshop on Random Walks in Random Environments, Pacific Institute for the Mathematical Sciences, Vancouver, June 2009
- Workshop on Learning Theory and Approximation, Oberwolfach, June 2008
- Workshop on Random Walks, Particle Systems and Random Media, Santiago de Chile, January 2008
- Workshop on “non-classical interacting random walks”, Oberwolfach, May 2007
- 59th British Mathematical Colloquium, splinter group on Probability Theory, Swansea, April 2007
- Workshop on non-classical random walks, Oberwolfach, March 2007
- Workshop on Random Media at the Banff International Research Station (BIRS), Canada, November 2006
- Workshop ”Self-Interacting Random Walks”, Eurandom, Eindhoven, Pays-Bas, March 2006
- First joint Canada-France meeting of the mathematical sciences, symposium on stochastic analysis, Toulouse, 12-15 July 2004
- Oberwolfach, Mini-symposium on “random walks in random environment”, May 2002

## MINICOURSES

- Minicourse on self-interacting random walks, UK Easter Probability Meeting, Random Dynamics and Other Recent Developments, 2018
- Minicourse on dynamics of signaling games and social networks, Roscoff Summer School, ANR Mathematics and economics, June 2017
- Séminaire Hypatie, Lyon, April 2011
- Minicourse on reinforced random walk, Aussois Spring School, June 2009
- Minicourse on self-interacting processes, CMI Marseille, January 2006

## LONG-TERM SCIENTIFIC VISITS

- von Neumann Professorship, Technical University Munich, Spring 2020
- Toyota Technological Institute at Chicago (TTI-C), invited by Stephen Smale, March-May 2005
- Invited research position, University of Neuchâtel, 2004-05

## EDITORIAL ACTIVITIES

- 2019- : Associate Editor, Annals of Applied Probability
- Referee for the Journal of the European Mathematical Society, Annals of Probability, Probability Theory and Related Fields, Annales de l'Institut H. Poincaré, Electronic Journal of Probability, Electronic Communications in Probability, Stochastic Processes and Applications, Kybernetika, Applied Probability Trust, Journal of Theoretical Probability, Games and Economic Behavior, IEEE Transactions on Information Theory, Journal of Statistical Physics, Stochastic Partial Differential Equations: Analysis and Computations.

## TEACHING

- 2016/17, 2017/18, 2018/19: Honors Ordinary Differential Equations (Winter) and Ordinary Differential Equations (Spring), NYU Shanghai
- 2015/16: Working group on “Random walks, random interacements and the gaussian free field”, Ecole Normale Supérieure, Paris. This is an introduction to research for the master students in ENS: each week, one of them presents a research article on the topic in a 1 1/2 hour talk, after having discussed it with me.
- 2013/14: Working group on “Strategic learning and evolutionary dynamics”, Oxford
- 2012/13: Graduate lectures on the Gaussian Free Field, Oxford
- 2008/10: Part B Lectures on “Martingales through measure theory”, Oxford
- 2005/06, 2007/08 and 2012/13 (Taught Course Centre, videoconference at the Universities of Bath, Bristol, Imperial College, Oxford and Warwick): Graduate Lectures “Self-interaction and learning in random structures”, Oxford

- 2003: Graduate Lectures on stochastic algorithms, Toulouse
- 2005-14 (except during leave): Tutorials on Part A Linear Algebra, Analysis, Topology, Integration, Number Theory, Groups, Rings and Fields, Calculus of variations, Multivariable calculus, and Moderations Linear Algebra and Analysis, St Hugh's and St Catherine's Colleges, Oxford
- 2005-14 (except during leave): Intercollegiate classes on "Martingales through measure theory", Oxford
- 2001/02, EPFL: Probability 1st years
- 1998-2000: Tutorial teacher in Animath, for students preparing for the International Olympiads in Mathematics
- 1995/97: Undergraduate teaching in mathematics, Lycée Stanislas, Paris

## **SEARCH COMMITTEES**

- 2018-: Chairman of Non-Tenure Track Hiring Committee in Mathematics, NYU Shanghai
- 2018-: Member of the Tenure Track Hiring Committee in Mathematics, NYU Shanghai
- Member of the Search Committee for (tenure-track) Assistant Professorship, Université Paris-Nord, Villetaneuse, May 2016
- Member of the Search Committee for (tenure-track) Assistant Professorship, Université Paris-Dauphine, May 2015
- Member of the Search Committee for (tenure-track) Assistant Professorship, Bordeaux, May 2011

## **DEPARTMENTAL/TEACHING ADMINISTRATION**

- 2018-: Area Head ( $\approx$  Department Chair) in Mathematics, NYU Shanghai
- Senior Mathematics Tutor at St Catherine's College, Oxford, 2005/06 and 2006/07
- College advisor for Graduate Students St Hugh's College, Oxford, 2005/2010

## **SUPERVISION of ESSAYS**

- 2020: Zijian Zhou (NYU Shanghai), Generalized central limit theorems and Lévy processes
- 2019: Hengyu Jin and Pengyun Ding (NYU Shanghai), stochastic processes and mathematical finance
- 2019: Yin Zhou (NYU Shanghai), graphical representations of lattice models
- 2018: Wanli Hong and Yuliang Shi (NYU Shanghai), percolation
- 2017: Jiaqi Xi (NYU Shanghai), optimisation of network formation with reinforcement learning
- 2017: Zijie Lu (NYU Shanghai), optimization by Markov Decision Processes
- 2015: Alexis Prévost (Ecole Normale Supérieure Paris), random walks in Dirichlet environment
- 2013: Alexandre Bordas (Ecole Normale Supérieure Cachan), dynamics of mean field games
- 2012: Lison Jacoboni (Ecole Normale Supérieure Cachan), Electrical networks, Gaussian Free Field and Cover Times
- 2010: Michael Kearns (University of Oxford), Learning and evolution in game theory
- 2008: Linus Mattauch (University of Oxford), Brownian Web (with A. Etheridge)
- 2003: Alain Camanès (Ecole Normale Supérieure Cachan), Statistical Learning

## **ASSESSMENT of 4th YEAR/GRADUATE STUDENTS**

- Referee on Line Le Goff's PhD thesis, "Spontaneous formation of paths: from ants to reinforced random walks" (supervisors: Olivier Raimond and Philippe Soulier), Université Paris Ouest - Nanterre La Défense, December 2014



- Referee on Laure Dumaz' PhD thesis, "Large deviations and self-interacting random processes" (supervisors: Balint Tóth and Wendelin Werner), Ecole Normale Supérieure and Université Paris XI, October 2012
- Referee on Alice Stahl's PhD thesis, "Probabilistic models of forest fires on infinite graphs" (supervisor: Xavier Bressaud), Institut de Mathématiques de Toulouse, October 2012
- Referee on Mario Bravo González' PhD thesis "Learning dynamics and evolution in game theory" (supervisor: Sylvain Sorin), Université Paris VI, September 2012
- Referee on Grégory Roth's PhD thesis "Stochastic Approximation Algorithms and set-valued differential inclusions" (supervisor: Michel Benaïm), Université de Neuchâtel, September 2011
- Referee on Laurent Tournier's PhD thesis "Contributions to the study of random walks in random environment" (supervisor: Christophe Sabot), Université Lyon 1, June 2010
- Co-assessor of transfer theses, Oxford: Xiao Duan, "Statistical inference for diffusion processes" (2006), Xu Changliang, "Large Deviation Principle for Backwards SPDEs" (2006), Heriberto Hernandez, "Dirichlet spaces and superadditive ergodic theorem" (2007), Stephen Buckley, "Random Walks on percolation clusters" (2009), Danyu Yang, "Extreme events on forced nonlinear systems and rough paths" (2010)
- 2010: Part C examiner of an essay, Oxford: "Construction and Integration of a Fractional Brownian Motion"

## PUBLICATIONS

- Random interlacements for vertex-reinforced jump processes, with F. Merkl and S. Rolles, to appear in the Annales de l'Institut Poincaré (2021)
- Fine mesh limit of the VRJP in dimension one and Bass-Burdzy flow, with T. Lupu and C. Sabot, Volume 177: 55-90 (2020).
- Inverting the coupling of the signed Gaussian free field with a loop soup, with T. Lupu and C. Sabot, Electronic Journal of Probability 24 (2019), Paper No. 70, 28pp.
- Convergence of vertex-reinforced jump processes to an extension of the supersymmetric hyperbolic nonlinear sigma model, with F. Merkl and S. W. W. Rolles, Probability Theory and Related Fields, Volume 173 3-4, 1349-1487 (2019).

- Explicit formula for the density of local times of Markov Jump Processes, with R. Huang, D. Kious and V. Sidoravicius, *Electron. Commun. Probab.* 23, no. 90, 1–7 (2018)
- The Vertex Reinforced Jump Process and a Random Schrödinger operator on finite graph, with C. Sabot and X. Zeng, available on <http://arxiv.org/abs/1507.04660>. *Annals of Probability*, Volume 45, Number 6A (2017), 3967-3986.
- Inverting Ray-Knight identity, with C. Sabot, *Probability Theory and Related Fields*, Volume 165 (2016), Issue 3-4, 559-580.
- Transience of Edge-reinforced random walks, with M. Disertori and C. Sabot, *Communications in Mathematical Physics* (2015), Vol. 339, No. 1, 121-148.
- Edge-reinforced random walk, vertex-reinforced jump process and the supersymmetric hyperbolic sigma model, with C. Sabot, *Journal of European Mathematical Society, European Mathematical Society* (2015), Vol. 17, No. 9, 2353-2378.
- Some dynamics of signaling games, with S. M. Huttegger, B. Skyrms and E. O. Wagner, *Proceedings of the National Academy of Sciences USA* (2014), Vol. 111, Supp. 3, 10873-10880.
- Online learning as stochastic approximation of the regularization paths: optimality and almost-sure convergence, with Y. Yao, *IEEE Transactions in Information Theory* (2014), Vol. 60, No. 9, 5716-5735.
- Diffusivity bounds for 1d Brownian polymers, with B. Tóth and B. Valkó, *Annals of Probability* (2012), Vol. 40, No. 2, 695-713.
- On ergodic two-armed bandits, with P. Vandekerkhove, *Annals of Applied Probability* (2012), Vol. 22, No. 2, 457-476.
- Dynamics of vertex-reinforced random walks, with M. Benaïm, *Annals of Probability* (2011), Vol. 39, No. 6, 2178-2223
- An asymptotic result for Brownian polymers, with T. Mountford, *Annales de l'Institut Henri Poincaré, Probabilités et Statistiques* (2008), Vol. 44, No.1, 29-46.  
Annales de l'Institut Henri Poincaré 2008 Prize.
- What is the difference between a square and a triangle? with V. Limic, *In and out of equilibrium 2. Series: Progress in Probability* (2008), Vol. 60, 481–496, Birkhäuser

- Attracting edge and strongly edge reinforced random walks, with V. Limic, *Annals of Probability* (2007), Vol. 35, No. 5, 1783-1806
- Vertex-reinforced random walk on  $\mathbb{Z}$  eventually gets stuck on five points, *Annals of Probability* (2004), Vol. 32, No.3B, 2650-2701
- Generalized urn models of evolutionary processes, with M. Benaïm and S. Schreiber, *Annals of Applied Probability* (2004), Vol. 14, No.3, 1455-1478
- When can the two-arm bandit algorithm be trusted?, with D. Lambertson and G. Pagès, *Annals of Applied Probability* (2004), Vol. 14, No.3, 1424-1454
- Pièges répulsifs, *Comptes rendus de l'Académie des Sciences* (2000), Vol. 330, Série I, p.125-130

## PREPRINTS

- Inverting Ray-Knight identity on the line, with T. Lupu and C. Sabot, available on <https://arxiv.org/abs/1910.06836>
- Reinforcement learning in social networks, with D. Kious, available on <http://arxiv.org/abs/1601.00667>.
- Reinforcement learning in signaling game, with Y. Hu and B. Skyrms, available on <http://arxiv.org/abs/1103.5818>.
- Localization of Reinforced Random Walks, available on <http://arxiv.org/abs/1103.5536>.