# Christian Léonard

## Short vitae

81-84 PhD thesis. Advisor: Michel Métivier (Ecole Polytechnique). Université Paris-Sud Orsay, (1984).
84-85 Postdoc position: Université de Montréal, Canada (December 83 - June 84); Carleton University, Ottawa, Canada (July 84 - April 85).
85-92 Assistant professor (maître de conférences) of mathematics at Université Paris-Sud Orsay.
91 Thèse de doctorat d'état. Université Paris-Sud Orsay, (1991).
92-now Professor (professeur) of mathematics at Université Paris Nanterre.

Research teams:
84 Département de mathématiques et de statistique, Université de Montréal, Canada
84-85 School of Mathematics and Statistics, Carleton University, Ottawa, Canada
85-95 Equipe de probabilités et statistique du département de mathématiques d'Orsay (Paris-Sud).
96-08 CMAP (Ecole Polytechnique), associate member.
11 Ceremade (Université Dauphine), CNRS temporary position.
95-now Modal'X (Paris Nanterre).

## Talks and invitations (recent)

German Probability and Statistic Days, Dresden, 2020
Stochastic differential geometry and mathematical physics, Rennes, 2020
Oberwolfach Workshop ``Variational Methods for Evolution". Oberwolfach, 2020
Workshop ``Optimal Transportation and Applications", Pisa, 2020
"Variational Analysis and Optimization", Erice, July 2021
Institut für Mathematik der Universität Potsdam, 2019
Casa, Eindhoven University of Technology (TU/e), Eindhoven, 2019
Grupo de Fisica Matematica, University of Lisbon, 2019
Ecole Polytechnique, CMAP. 2019

## PhD students

98-01 Jamal Najim, "Grandes déviations pour des mesures empiriques" (Large deviations for empirical measures).

08-12 Rüdiger Murr, "Processus réciproques avec des sauts" (Reciprocal processes with jumps). Co-supervision with Sylvie Roelly (Potsdam Universität).

14-17 Luigia Ripani, "Inégalités fonctionnelles et interpolations entropiques" (Functional inequalities and entropic interpolations). Co-supervision with Ivan Gentil (U. Lyon2).

14-17 Luca Tamanini, "Dynamique du transport optimal dans un cadre non-lisse" (Dynamics of the optimal transport in a non-smooth setting). Co-supervision with Nicola Gigli (Sissa, Trieste).

# Publications


P. Cattiaux, G. Conforti, I. Gentil and C. Léonard. *Time reversal of diffusion processes under a finite entropy condition.* Annales de l'Institut Henri Poincaré Probab. Statist.59(4), 1844-1881, (2023)

C. Léonard. *Feynman-Kac formula under a finite entropy condition*. Probability Theory and Related Fields 184, 1029-1091, (2022)

G. Conforti and C. Léonard. *Time reversal of Markov processes with jumps under a finite entropy condition.* Stochastic Processes and their Applications 144, 85-124, (2022)

J. Backhoff, G. Conforti, I. Gentil, C. Léonard. *The mean field Schrödinger problem: ergodic behavior, entropy estimates and functional inequalities*. Probability Theory and Related Fields. 178, 475–530 (2020)

M. Arnaudon, A.B. Cruzeiro, C. Léonard, J.-C. Zambrini. *An entropic interpolation problem for incompressible viscid fluids*. Annales de l'Institut Henri Poincaré Probab. Statist. 56(3), 2211-2235, (2020)

I. Gentil, C. Léonard, L. Ripani and L.Tamanini. *An entropic interpolation proof of the HWI inequality*. Stochastic Processes and their Applications. 130(2), 907-923 (2020)

I. Gentil, C. Léonard and L. Ripani. *Dynamical aspects of generalized Schrödinger problem via Otto calculus - A heuristic point of view*. Revista Matemática Iberoamericana , online version, 36(4), 1071–1112 (2020)

C. Léonard. *On the convexity of the entropy along entropic interpolations*. In: Measure Theory in Non-Smooth Spaces, (ed. N. Gigli), Partial Differential Equations and Measure Theory. De Gruyter Open, June 2017, 195-242.

G. Conforti and C. Léonard. *Reciprocal classes of random walks on graphs*. Stoch. Proc. Appl., 27(6), 1870-1896, (2017).

I. Gentil, C. Léonard and L. Ripani. *About the analogy between optimal transport and minimal entropy.* Ann. Fac. Toulouse, Série 6, Vol.26 (3), 569-600 (2017).

C. Léonard. *Lazy random walks and optimal transport on graphs*, Ann. Probab., 44(3), (2016), 1864-1915.

C. Léonard. *Some geometric consequences of the Schrödinger problem*. Geometric Science of Information. Proceedings of the Second International Conference, GSI 2015. Lecture Notes in Computer Science, Vol. 9389 (2015), pp. 60-68.

G. Conforti, C. Léonard, R. Murr and S. Roelly. *Bridges of Markov counting processes. Reciprocal classes and duality formulas*. Electr. Comm. Probab., Vol. 20, Article 18, (2015), 12 pp.

C. Léonard, S. Roelly and J.-C. Zambrini. *Reciprocal processes. A measure-theoretical point of view*, Probability Surveys 2014, Vol. 11, 237-269.
M. Klein, C. Léonard and E. Rosenberger. *Agmon-type estimates for a class of jump processes*, Math. Nachr. 287, No. 17–18, 2021–2039 (2014).

C. Léonard. *Some properties of path measures*, Séminaire de probabilités 46. Lecture Notes in Mathematics 2123 (2014), pp 207-230.

E. Boissard, N. Gozlan, J. Lehec, C. Léonard, G. Menz, A. Schlichting. *Some recent developments in functional inequalities*. Journées MAS 2012. ESAIM: Proc. 44, 338-354 (2014).

M. Beiglböck, C. Léonard and W. Schachermayer. *On the duality for the Monge-Kantorovich transport problem*, London Mathematical Society Lecture Notes Series, 413, (2014).

C. Léonard. *A survey of the Schrödinger problem and some of its connections with optimal transport*, Discrete Contin. Dyn. Syst. A, 2014, 34(4): 1533-1574.

M. Beiglböck, C. Léonard and W. Schachermayer. *A general duality theorem for the Monge-Kantorovich transport problem,* Studia Math. 209 (2012), 151-16.

M. Beiglböck, C. Léonard and W. Schachermayer. *A generalized dual maximizer for the Monge-Kantorovich transport problem*, ESAIM P&S, 2012 (16), 306-323.

C. Léonard. *Girsanov theory under a finite entropy condition*. Séminaire de probabilités, vol. 44. Lecture Notes in Mathematics 2046, Springer-Verlag, 2012, 429-465.

C. Léonard. *From the Schrödinger problem to the Monge-Kantorovich problem*. J. Funct. Anal, 2012, 262: 1879–1920.

C. Léonard. *A saddle-point approach to the Monge-Kantorovich optimal transport problem*. ESAIM COCV, July 2011, 17 : pp 682-704.

C. Léonard. *Entropic projections and dominating points*. ESAIM P&S, 14, December 2010, 343-381.

N. Gozlan and C. Léonard. *Transport inequalities. A survey*. Markov Processes and Related Fields, 16, 2010, 635-736.

C. Léonard and J-C. Zambrini. *A probabilistic deformation of calculus of variations with constraints*, Seminar on stochastic analysis, random fields and applications, VI. (Ascona, 2008). Progress in Probability, vol. 63, 177-189. (Birkhaüser), 2010.

C. Léonard. *Convex minimization problems with weak constraint qualifications*. Journal of Convex Analysis, 17 (1), 2010, 321-348.

A. Guillin, C. Léonard, L. Wu and N. Yao. *Transportation-information inequalities for Markov processes*. Probability Theory and Related Fields, 2009, 144:669–695.

C. Léonard. *Minimization of entropy functionals,* J. Math. Anal. Appl. 346, 2008, 183–204.

N. Gozlan and C. Léonard. *A large deviation approach to some transportation cost inequalities*. Probability Theory and Related Fields. Vol. 139, 2007, 235-283.

C. Léonard. *Minimizers of energy functionals under not very integrable constraints*. Journal of Convex Analysis. 10 (1), 2003, 63-88.

S. Boucheron, F. Gamboa and C. Léonard. *Bins and balls : Large deviations of the empirical occupancy process*. The Annals of Applied Probability. 12, 2002, 607-636.

C. Léonard and J. Najim. *An extension of Sanov's theorem. Application to the Gibbs conditioning principle.* Bernoulli. Vol.8(6), 2002, 721-743.

C. Léonard. *Minimizers of energy functionals*. Acta Math. Hungar. 93 (4), 2001, 281-325.

C. Léonard. *Convex conjugates of integral functionals*. Acta Math. Hungar. 93 (4), 2001, 253-280.

C. Léonard. *Minimization of energy functionals applied to some inverse problems*. J. App. Math. Optim. 44, 2001, 273-297.

C. Léonard. *Some results about entropic projections*, in "Stochastic Analysis and Mathematical Physics ", Birkhäuser, Progress in Probability, Vol. 50, (2001).

C. Léonard. *Large deviations for Poisson random measures and processes with independent increments*. Stochastic Processes and their Applications. 85, (2000), 93-121.

P. Cattiaux, C. Léonard. *Minimization of the Kullback information for some Markov processes*, Séminaire de Probabilité XXX, Lecture Notes in Mathematics 1626, (1996), 288-311.

P. Cattiaux, C. Léonard. *Large deviations and Nelson processes*, Forum Math. 7 (1995), 95-115.

C. Kipnis, C. Léonard. *Grandes déviations pour un système hydrodynamique asymétrique de particules indépendantes*, Ann. Inst. Henri Poincaré, (In Memoriam C. Kipnis), Vol. 31, No 1, (1995), 223-248.

C. Léonard. *Large deviations for particle systems associated with spatially homogeneous Boltzmann type equations*, Prob. Th. Rel. Fields, Vol. 101, No 1, (1995), 1-44.

C. Léonard. *Large deviations for long range interacting particle systems with jumps*, Ann. Inst. Henri Poincaré, Vol. 31, No 2, (1995), 289-323.

P. Cattiaux, C. Léonard. *Minimization of the Kullback information of diffusion processe*s, Ann. Inst. Henri Poincaré, Vol. 30, No 1, (1994), 83-132.

C. Léonard. *Large deviations and Boltzmann equation*, in CRM Proceedings and Lecture Notes, "Measure-Valued Processes, Stochastic Partial Differential Equations, and Interacting Systems", Ed: D. A. Dawson, Montréal, (1994), 165-174.

C. Léonard. *Some epidemic systems are long range interacting particle systems*, in Stochastic processes in epidemic theory. Lecture Notes in Biomathematics, n°86, (1990), 170-183.

C. Léonard. *Large deviations and law of large numbers for a mean field type interacting particle system*. Stoch. Proc. and their Appl., Vol.25, No 2, (1987), 215-235.

C. Léonard. *Une loi des grands nombres pour des systèmes de diffusion avec interaction et à coefficients non bornés*, Ann. Inst. Henri Poincaré, Vol. 22, No 2, (1986), 237-262.