Dominique Manchon
CNRS researcher (Chargé de Recherches)

Curriculum Vitae *(updated September 2016)*

Born May 10th 1962, Petit-Quevilly (France).
Married, 3 children (born in 1991, 1992 and 1995).
Home address: Les Fontêtes, 63230 St Ours les Roches.

Institution:
Laboratoire de mathématiques - UMR 6620
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Academic cursus:

1980-1982: classes préparatoires (1st and 2nd year Undergraduate), lycée P. Corneille, Rouen.

september 1982 (ending up October 1986): Entering Ecole Normale Supérieure de St Cloud. This school moved a couple of years afterwards and is now Ecole Normale Supérieure de Lyon.

June 1983: licence (3rd year Undergraduate) and maîtrise (Master 1st year) of pure mathematics (option "Algebra and Geometry"), Université Paris Sud-Orsay.

1983-1984: DEA (Master 2nd year) of pure mathematics option "Lie groups", Université Paris VII-Denis Diderot. Master memoir on the Borel-Weil theorem (advisor: Martin Andler).

July 1985: Agrégation de Mathématiques (a national competition for Mathematics professorship in high schools. Rank: 23rd).

1985-1986: First year of PhD. Advisor: Martin Andler.

October 1986-December 1987: Ancien Normalien Doctorant (temporary position) Université de Strasbourg. First year Undergraduate teaching.

December 1987-September 1989: national (civil) service in Strasbourg, "Boutique de Sciences" (diffusion of scientific knowledge, setting up of the Minitel site "Interro-Sciences". Minitel was a kind of french precursory of the net...), and then in the association "Vie et Avenir" (dedicated to ecology and environment protection).

September 29th 1989: PhD defence. "Formule de Weyl pour les groupes de Lie nilpotents" (Weyl formula for nilpotent Lie groups), Paris VII, under advice of Martin Andler. *Committee*: M. Andler, M. Duflo, B. Helffer, G. Schiffmann.

Habilitation:

April 23rd 1998: Habilitation à Diriger les Recherches. "Théorie spectrale et représentations unitaires" (spectral theory and unitary representations). *Committee*: M. Andler, J-Ph. Anker, D. Arnal, A. Bouaziz, J-L. Clerc, M. Rosso. *Referees*: M. Andler, D. Müller and M. Rosso.

Carreer at CNRS:

October 1st 1989: entering CNRS (Centre National de la Recherche Scientifique) as Chargé de Recherches, Laboratoire d'Analyse Globale, Nancy (now Institut Elie Cartan - UMR 7502, Université de Lorraine).

September 1st 2002: joining Laboratoire de Mathématiques at Université Blaise Pascal, Clermont-Ferrand (UMR 6620).

Teaching activities: Although there is no teaching duty in CNRS, I have given the following lectures:

1991: Master lectures (20 hours) on geometric quantisation (after B. Kostant).

1995: Master lectures (32 hours) on Poisson structures: Poisson and symplectic geometry, symplectic groupoids, Lie-Poisson groups and Lie bialgebras.

1999: Master lectures (32 hours): Around the Duflo isomorphism.

2001-2002: Master lectures (28 hours): on Poisson structures.

2004-2005: Master lectures (15 hours): on Poisson structures. Also some first year Undergraduate teaching.

2006-2007: first year Undergraduate teaching.

2012-2013: lectures on signal processing for a sound engeneering degree (20 hours).

Participation to, and organisation of events:

March 31st and April 1st 1995: organisation with Ch. Torossian of a conference in Nancy on Dunkl operators. Speakers: J-Ph. Anker, O. Babelon, G. Heckman, T. Koornwinder, D. Manchon (Rational Dunkl operators and Bessel systems), A-L. Mortajine, Ch. Torossian, J-F. Van Diejen.

1996: Organisation of a workshop in Nancy on Poisson structures, after A. Weinstein, j.-H. Lu and P. Xu. Conference to conclude the workshop, May 9th, 10th and 11th. Speakers: F. Bidegain, V. Chloup, P. Dazord, J-P. Dufour, F. Joly, C. Roger, G. Rousseau.

Participation to the European network TMR "Harmonic Analysis" (ruled by J-Ph. Anker, T. Carbery, P. Sjögren). Talks at conferences in Varenna (Italy) in 1997 and Zakopane (Poland) in 2001 organised in this framework.

May 1999: One week in Kiel (Germany), invited by Detlef Müller.

2003-2004: Organisation of a workshop on Poisson structures in Clermont-Ferrand, with Thierry Lambre.

March 8-12th 2004: Organisation with D. Arnal of a conference on deformation quantisation and elliptic algebras, spported by CNRS, GDR SG-MAT. *Speakers*: G. Halbout, B. Keller, A. Odesskii, P-A. Gié, I. Heckenberger, Ph. Leroux, M-A. Lledo, M. Pevzner, B. Shoikhet.

December 2004: Organisation with Th. Lambre of a conference on Poisson algebra and geometry. Clermont-Lyon days of Mathematics and Physics. *Speakers*: A. Alekseev, J. Alev, N. Bel Baraka, B. Fresse, B. Fu, Ph. Monnier, R. Pujol, Ch. Torossian.

March 2006: Organisation with S. Paycha of a conference on twisted K-theory and Gerbes, Clermont-Lyon days of Mathematics and Physics. *Speakers:* C. Laurent-Gengoux, V. Mathai, J. Mickelsson, R. Nest, H. Oyono-Oyono, J-L. Tu.

October 23-24th 2008: Organisation of the conference "Méthodes numériques et algèbres de Hopf d'arbres" (Numerical methods and Hopf algebras of trees) in Clermont-Ferrand. *Speakers*: D. Calaque, F. Chapoton, Ph. Chartier, K. Ebrahimi-Fard, E. Hairer, D. Manchon, H. Munthe-Kaas, A. Murua, G. Vilmart.

October 14-15th 2010: Organisation of the conference "Feynman graphs in Physics, Combinatorics, Algebra and Category theory " in Clermont-Ferrand, supported by CNRS (GDR "Renormalisation"), and ANR (Agence Nationale de la Recherche, projet "Modunombres"). *Speakers*: E. Burgunder, J. Kock, D. Kreimer, J-C. Novelli, J-Y. Thibon, W. Van Suijlekom.

June 27th-July 1st 2011: Co-organisation of the conference "Dyson-Schwinger equations and Faà di Bruno Hopf algebras" in Strasbourg, supported by CNRS, GDR "Renormalisation" (with Dorothea Bahns, Kurusch Ebrahimi-Fard, Frédéric Fauvet and Martin Bordemann). The proceedings have been issued by European Mathematical Society.

January 6-10th 2014: Co-organisation of the conference "regards sur la gravité quantique" (aspects of quantum gravity) in Clermont-Ferrand (with Chr. Brouder and F. Vignes-Tourneret).

February 8-12th 2016: Organisation with S. Paycha of the conference "Paths to, from and in renormalisation", supported by DFG and CNRS GDR Renormalisation, Potsdam (Germany).

October 12-14th 2016: Organisation with F. Fauvet of the conference "Stokes phenomenon, Resurgence and Physics" in Strasbourg, supported by CNRS GDR Renormalisation.

Talks in international conferences: Copenhagen 1990, Tuczno (Poland) 1993, Colloques Solstice d'Hiver Paris (January 1994) and Versailles (December 1996), Varenna (Italy) 1997, Rencontres Mathématiques de Glanon (1997 and 1998), Zakopane (Poland) January 2001, Marseille-Luminy (Sept. 2004), Tunis (Congrès Panafricain de Mathématiques, Sept. 2005), Max Planck Institut (Bonn), December 2006 and March 2007, IHP (Paris), March 2007, Boston University (June 2008), Cargèse (March 2009), Erwin Schrdinger Institut (April 2009), Kerkennah (Tunisia, November 2009), Madrid (May 2010), Sousse (Tunisia, Dcember 2011), Copenhagen (May 2013), Hammamet (Tunisia, December 2013), Marseille-Luminy (December 2014), Monastir (Tunisia, December 2015), Rosendal (Abelsymposiet, Norway, August 16-19th 2016).

Lectures in an international context: Series of 4 lectures on deformation quantisation after M. Kontsevich, Séminaire Sud-Rhodanien de Géométrie, Marseille-Luminy, December 1999.

Lectures on Hopf algebras and renormalisation, after Connes and Kreimer, Bogota (Columbia), supported by Universidad de Los Andes and Universidad La Nacional, December 2-6 th 2002.

Lectures on Hopf algebras and renormalisation, after Connes and Kreimer), Caracas (Universidad Central de Venezuela), supported by projet PREFALC, July 2006.

Series of 4 lectures on Hopf algebras, rooted trees and renormalisation, Vienna (Erwin Schrdinger Institut), March 2009.

Series of 4 lectures on Hopf algebras, Feynman graphs and and renormalisation, Copenhagen, May 2013.

Lectures on combinatorial Hopf algebras and renormalisation (10 hours), ICMAT Madrid, June-July 2016.

Lectures on combinatorial Hopf algebras and renormalisation (20 hours), Gabes (Tunisa), December 2016.

Conferences in seminars in France: Nancy, Strasbourg, Metz, Reims, Orsay, Lyon, Paris VII, Brest, Clermont-Ferrand, Angers, Cachan, Bruxelles, Paris-Nord, IHES, Toulouse...

Participation to PhD committees: about ten PhD committees, several as a referee: Metz, Dijon, Clermont-Ferrand, Poitiers, Monastir (Tunisia), Tlemcen (Algeria), Reims, Marne la Vallée, Paris 6.

Habilitation committees: M. Masmoudi, Metz (18 decembre 2001), L. Foissy, Reims (20 novembre 2009), L. Poinsot, Paris-Nord (8 novembre 2011), M.-A. Coppo, Nice (June 21st 2016).

PhD advising:

From September 2002: Bérenger Aubin, defense of the PhD on November 2nd 2006. "Opérateurs Fourier-intégraux sur les espaces de représentations, formule asymptotique de Weyl" (Fourier-Integral operators on representation spaces, Weyl asymptotic formula). *Committee*: Jean-Yves Charbonnel (referee), Bernard Helffer (President), Dominique Manchon, Sylvie Paycha. Second referee, Henrik Stetkaer.

From September 2008: Abdellatif Saidi, codirection with Monastir University (Tunisia). Supported by Campus France, Partenariat Hubert Curien Utique 09G1502. Defense on December 17th 2011. "Algèbres de Hopf d'arbres et structures pré-Lie" (Hopf algebras of trees and pre-Lie structures). *Committee:* Didier Arnal, Frédéric Chapoton (referee), Dominique Manchon, Boujemaa Agrebaoui (referee), Leila Ben Abdelghani, Slaim Ben Farah (President), Mohamed Selmi (co-advisor).

From October 2011: Mohamed Bel Haj Mohamed, codirection with Monastir University (Tunisia). Supported by Campus France, Partenariat Hubert Curien Utique 12G1502. Defense on November 29th 2014. "Renormalisation dans les algèbres de Hopf graduées connexes" (Renormalisation in connected graded Hopf algebras). *Committee*: Loïc Foissy (referee), Michael Heusener, Dominique Manchon, Boujemaa Agrebaoui (referee), Lotfi Kamoun (President), Mohamed Selmi (co-advisor).

From October 2011: Franck Gautier-Baudhuit. Co-advisor: Jean-Marie Lescure. The PhD work deals with spectral theory and representations of nilpotent Lie groups. The defense is programmed for the beginning of 2017. This student parallely works as Professor of Mathematics in high school, so that achieving a PhD can take longer than the usual 3 years.

From October 2012, Mahdi J. Hasan al Kaabi (co-advisor: Frédéric Patras). Defense on September 28th 2015. "Bases monomiales dans les algèbres pré-Lie libres et applications" (monomial bases in free pre-Lie algebras and applications). *Committee*: Loïc Foissy (referee), Michael Heusener, Jean-Christophe Novelli (referee), Dominique Manchon, Frédéric Patras (co-advisor), Jean-Yves Thibon.

Edition:

Co-edition, with Thierry Lambre and Jacques Alev, of a special volume of Annales de l'Université Blaise Pascal (volume 13 numéro 2, July 2006) on Poisson algebra and geometry, following the December 2004 conference.

Research organisation, diffusion of knowledge:

October 1998- June 2002: organising the Harmonic Analysis seminar in Nancy.

May 2000-June 2002: co-organising (with M. Henkel and J. Unterberger) and interdisciplinary workshop in Mathematics and Physics.

2001-2003: responsible on the French side of a French-Tunisian project CNRS-DGRST with Sfax University. This project continued up to 2015 with another support: *Partenariats Hubert Curien "Utique"* ruled by Campus France, and involved several universities in France (Clermont-Ferrand, Metz, Dijon) and Tunisia (Sfax, Monastir, Sousse).

From October 2010: co-organising the seminar Géométrie, Algèbre, Algèbres d'Opérateurs (Geometry, Algebra, Operator Algebras) in Clermont-Ferrand.

2010-2014: elected member of a university committee (UFR "Sciences et Technologies").

From 2012: organising the yearly workshop CARMA ("Combinatoire Algébrique, Résurgence, Moules et Application" −Algebraic Combinatorics, Resurgence, Moulds and Applications−) in Besse near Clermont-Ferrand.

2012-2013: ruling the Norwegian-French project "Aurora" on the French side ("Partenariat Hubert Curien", supported by Campus France). The most important event organized in this context was a workshop at NTNU in Trondheim in December 2012, which lead to several joint research publications.

From September 2015: participating to "Maths en Jeans", initiating high school students to mathematical research.

From December 2015: organising "les Mercredis de la Science" (the Science Wednesdays) in Clermont-Ferrand. These are conferences occurring once a month on various scientific topics, aimed towards a broad non-expert audience.

Complete list of publications

Published or to be published research articles:

[1] Formule de Weyl pour les groupes de Lie nilpotents, *J. f.d. Reine u. Angew. Math.* **418**, 77-129 (1991).

[2] Calcul symbolique sur les groupes de Lie nilpotents et applications, *J. Funct. Anal.* **102** (2), 206-251 (1991).

[3] Weyl symbolic calculus on any Lie group, *Acta Appl. Math.* **30**, 159-186 (1993).

[4] Operateurs pseudo-differentiels et representations unitaires des groupes de Lie, *Bull. Soc. Math. France* **123**, 117-138 (1995).

[5] Opérateurs aux differences finies, calcul pseudo-différentiel et représentations des groupes de Lie (with M. Andler), *J. Geom. Phys.***27**, 1-29 (1998).

[6] L'algèbre de Hopf bitensorielle, *Comm. Alg.* **25** (5), 1537-1551 (1997).

[7] Distributions à support compact et représentations unitaires, *J. Lie Theory* **9**, 403-424 (1999).

[8] Front d'onde et propagation des singularités pour un vecteur-distribution, *Coll. Math.* **81** (2), 161-191 (1999).

[9] Une remarque sur l'exponentielle-étoile, *Rencontres Math. de Glanon* (1997).

[10] Choix des signes pour la formalité de M. Kontsevich (with D. Arnal and M. Masmoudi), *Pacific J. Math.* **203**, No1, 23-66 (2002).

[11] Poisson bracket, deformed bracket and gauge group actions in Kontsevich deformation quantization, *Lett. Math. Phys.* **52**, 301-310 (2000).

[12] On quantization of quadratic Poisson structures (with M. Masmoudi and A. Roux), *Commun. Math. Phys.* **225**, 121-130 (2002).

[13] Cohomologie tangente et cup-produit pour la quantification de Kontsevich (with Ch. Torossian), *Annales de l'Université Blaise Pascal* **10**, 75-106 (2003).

[14] Orbites coadjointes et variétés caractéristiques (with A. Baklouti and S. Dhieb), *J. Geom. Phys.* **54**, 1-41 (2005).

[15] Birkhoff type decompositions and the Baker-Campbell-Hausdorff recursion (with K. Ebrahimi-Fard and Li Guo), *Comm. Math. Phys.* **267**, 821-845 (2006).

[16] Shuffle relations for regularised integrals of symbols (with S. Paycha), *Comm. Math. Phys.* **270**, 13-51 (2007).

[17] On matrix differential equations in the Hopf algebra of renormalization (with K. Ebrahimi-Fard), *Adv. Theor. Math. Phys.* **10** No 6, 879-913 (2006).

[18] A Magnus- and Fer- type formula in dendriform algebras (with K. Ebrahimi-Fard), *Found. Comput. Math.* **9** (3), 295-316 (2009).

[19] New identities in dendriform algebras (with K. Ebrahimi-Fard and F. Patras), *J. of Algebra* **320**, 708-727 (2008).

[20] A Bohnenblust-Spitzer identity for noncommutative Rota-Baxter algebras solves Bogoliubov's counterterm recursion (with K. Ebrahimi-Fard and F. Patras), *J. Noncommutative Geometry* **3**, Issue 2, 181-222 (2009).

[21] Confluence of singularities of a differential equation: a Lie algebra contraction approach (with M. B. Zahaf), *Int. J. of Math. Analysis*, Online Edition, **3** No. 1-4, 23-40 (2009).

[22] Dendriform equations (with K. Ebrahimi-Fard), *Journal of Algebra* **322**, 4053-4079 (2009).

[23] Two interacting Hopf algebras of trees (with D. Calaque and K. Ebrahimi-Fard), *Advances in Applied Mathematics* **47**, No2, 282-308 (2011).

[24] Nested sums of symbols and renormalised multiple zeta values (with S. Paycha), *Int. Math. Res. Papers* **2010** issue 24, 4628-4697 (2010).

[25] Lois pré-Lie en interaction (with A. Saidi), *Comm. Alg.* **9** No 10, 3662-3680 (2011).

[26] Twisted dendriform algebras and the pre-Lie Magnus expansion (with K. Ebrahimi-Fard), *J. Pure and Appl. Alg.* **215** No11, 2615-2627 (2011).

[27] On bialgebras and Hopf algebras of oriented graphs, *Confluentes Math.* **04**, Issue No. 1 (2012).

[28] On an extension of Knuth's rotation correspondence to reduced planar trees (with K. Ebrahimi-Fard), *J. of Noncommutative Geometry* **8**, 303-320 (2014).

[29] The Magnus expansion, trees and Knuth's rotation correspondence (with K. Ebrahimi-Fard), *Foundations of Computational Mathematics* **14**, 1-25 (2014).

[30] The tridendriform structure of a Magnus expansion (with K. Ebrahimi-Fard), *Disc. and Cont. Dynamical Systems* **34** No 3, 1021-1040 (2014).

[31] Bialgebras of specified graphs and external structures (with M. Belhaj Mohamed), *Annales Henri Poincaré série D*, **1** No3, 307-335 (2014).

[32] A combinatorial non-commutative Hopf algebra of graphs (with G. Duchamp, L. Foissy, N. H. Nghia and A. Tanasa), *Discr. Math. And Theor. Computer Science* **16** No1, 355-370 (2014).

[33] Noncommutative Bell polynomials, quasideterminants and incidence Hopf algebras (with K. Ebrahimi-Fard and A. Lundervold), *Int. J. of Algebra and Computation* **24** No. 05, 671-705 (2014).

[34] On Euler's decomposition formula for qMZVs (with J. Castillo-Medina and K. Ebrahimi-Fard), *Ramanujan J. Mathematics* **37**, 365-389 (2015).

[35] Unfolding the double shuffle structure of q-multiple zeta values (with J. Castillo-Medina and K. Ebrahimi-Fard), *Bull. Austr. Math. Soc.* **91** No3, 368-388 (2015).

[36] Duality and (q)multiple zeta values (with K. Ebrahimi-Fard and J. Singer), *Adv. Math.* **298**, 254-285 (2016).

[37] The Hopf algebra of (q)multiple polylogarithms with non-positive arguments (with K. Ebrahimi-Fard and J. Singer), *Int. Math. Res. Notices* **2016**, Vol. 17, 41 pages (2016).

[38] Renormalisation of q-regularised multiple zeta values (with K. Ebrahimi-Fard and J. Singer), *Lett. Math. Phys.* (to appear).

[39] Rooted trees, non-rooted trees and Hamiltonian B-series (with G. Bogfjellmo and Ch. Curry), *Num. Math.* (to appear).

[40] Doubling bialgebras of rooted trees (with M. Belhaj Mohamed), *Lett. Math. Phys.* (to appear).

[41] The Hopf algebra of finite topologies and mould composition (with F. Fauvet and L. Foissy), *Ann. Inst. Fourier* (to appear).

Survey articles and proceedings:

[42] Bogota lectures on Hopf algebras, from basics to applications to renormalization, *Comptes-rendus des Rencontres mathématiques de Glanon* 2001 (published in 2003).

[43] Hopf algebras in renormalisation, *Encyclopaedia of Mathematics* (to appear).

[44] Hopf algebras and renormalisation, *Handbook of algebra*, Vol. **5** (M. Hazewinkel ed.), 365-427 (2008).

[45] The combinatorics of Bogoliubov's recursion in renormalization (with K. Ebrahimi-Fard), *IRMA Lect. Notes in Math. And Theor. Phys.* **15**, CIRM 2006 workshop "Renormalization and Galois Theory", (A. Connes, F. Fauvet, J.-P. Ramis eds.), 179-207 (2009).

[46] Renormalised multiple zeta values which respect quasi-shuffle relations, *Contemp. Math.* **539**, Workshop "Renormalization", MPIM Bonn, 15-16 dec. 2006, Org. K. Ebrahimi-Fard, M. Marcolli (2011).

[47] Connected filtered Hopf algebras and renormalization, in "Motives, Quantum Field Theory and Pseudo-differential operators", *Clay Math. Institute proc.* Vol. **12**, A. Carey, D. Ellwood, S. Paycha, S. Rosenberg eds. (2010).

[48] Quelques aspects combinatoires de la renormalisation, *Gazette des Mathématiciens 119* (January 2009).

[49] A deformation approach of the Kirillov map for exponential Lie groups (with A. Baklouti and S. Dhieb), Adv. Pure and Appl. Math. **2**, Congrès tuniso-japonais de Kerkennah, 421-443 (2011).

[50] A short survey on pre-Lie algebras, *E. Schrödinger Institut Lectures in Math. Phys.*, Eur. Math. Soc, A. Carey Ed. (2011).

[51] Algebraic Background for numerical methods, control theory and renormalization, *Proc. Combinatorics and Control*, Benasque (2010).

[52] Quelques propriétés et applications des arbres enracinés, in "Des mathématiques en Auvergne: histoire, progrès, interactions", t. 1, *Revue d'Auvergne*, 303-314 (2014).

[53] Five interpretations of Faà di Bruno's formula (with A. Frabetti), *IRMA Lect. In Math. And Theor. Phys.* Vol. *21*, K. Ebrahimi-Fard and F. Fauvet eds, 91-148 Europ. Math. Soc. (2015).

Submitted or forthcoming articles:

[54] Annulateurs et déformations (with A. Baklouti and S. Dhieb).

[55] About the convolution of distributions on groupoids (with J.-M. Lescure and S. Vassout), submitted.

[56] Renormalisation group for multiple zeta values (with K. Ebrahimi-Fard and J. Singer), submitted.

[57] The operad of finite posets (with F. Fauvet and L. Foissy), submitted.

[58] A comodule-bialgebra structure for word-series substitution and mould composition (with K. Ebrahimi-Fard and F. Fauvet).

[59] Operads with non-local partial compositions (with E. Burgunder, F. Fauvet and L. Foissy).

[60] Non-freeness of operadic pre-Lie algebras (with E. Burgunder and B. Delcroix-Oger).

Preprints:

[61] Stokes' formulae on classical symbol valued forms and applications (with Y. Maeda and S. Paycha).

[62] New kinds of deformed Bessel functions (with M. B. Zahaf).