ALESSANDRA FRABETTI – CURRICULUM VITAE – 2023

Civil status: Alessandra Frabetti, born in 1967, italian, married, 1 son.

Address: Institut Camille Jordan,
Université de Lyon 1,
43, bd. du 11 novembre 1918,
69622 Villeurbanne

tel.: ++33 (0)4 72 44 79 31
fax: ++33 (0)4 72 43 16 87
e-mail: frabetti@math.univ-lyon1.fr
http://math.univ-lyon1.fr/~frabetti

Positions:

since 2001: Associate professor at Lyon University, Department of Mathematics, France.

2000–2001: FNRS researcher at Lausanne University, Switzerland.

1998–2000: CNRS researcher (TMR Marie Curie) at I.R.M.A. Strasbourg, France.

1998 (6 months): Researcher at Ancona University, Italy.

1997–1998: CNR researcher at I.R.M.A. Strasbourg, France.

Ph.D. thesis: *(Co)homology of dialgebras*, under the supervision of J.-L. Loday (IRMA Strasbourg), defended in 1997 at Roma University "La Sapienza" (president C. Procesi), Italy.

Administration:

Local: Hiring committees in Maths, Lyon 2004–2008 and 2022, Angers 2016, Calais 2018, Poitiers 2019, Mulhouse 2020, Dijon 2022 and 2023.

Math Department, Lyon University: member of the research committee 2005–2007, students tutor 2016-2018, member of the departement council since 2022.

Institut Camille Jordan, Lyon University: member of the scientific committee 2007–2010 and since 2021.

Lyon University: director of the 1st year school in Mathematics and Computer Science 2021–2023.

National: National University Council (CNU), committee member 2003–2007, board assessor 2007–2010.

National Research Agency (ANR), committee member 2014-2016.

National Institut of Mathematics (INSMI-CNRS), member of the scientific committee (CSI) 2019–2023.

Teaching:

Undergraduate: Lectures and exercices in algebra, analysis and geometry at Lyon University since 2001.

Master: Exercices of geometry for M1, at Lyon University since 2004.

Advanced lectures for M2 on "Feynman diagrams, trees and series" (2006), "Differential geometry for Yang-Mills and gravitational fields" (2010), "Introduction to quantum field theory" (2024).

Supervision: 3 students of Master 2nd year (N. Avrain 2006, N. Marie 2009, F. Lahoub 2010).

4 students of Master 1st year (L. Tabbara 2008, A. Yayla 2019, B. Erdogan 2021, C. Diochon 2022).

3 students of Licence (F. Novembre 2016, R. Carrot 2017, T. Fernándes Pra Baldi 2023)

Teachers training: Training to hiring examination for high-school teachers in mathematics, Bologna (Italy), 1999.

Research:

Subject: Algebraic and geometric methods in QFT; renormalization Hopf algebras; proalgebraic loops; groupoids.

Advanced lectures: 5 lectures in specialized schools on "Hopf algebras and renormalization" (Villa de Leyva, Colombia, 2007), "Basic quantum field theory for mathematicians" (Luxembourg, 2009), "Combinatorial Hopf algebras and operads" (Córdoba, Argentina, 2011), "Hopf-Fock model for quantum field theory" (La Habana, Cuba, 2017), "Hopf algebras and quantum field theory" (Buenos Aires, Argentina, 2019).

Talks: – 40 invitations to conferences or special schools as a plenary speaker (Göttingen, Toulouse, ESI Vienna, Perimeter Institut, Buenos Aires, Ottawa, Potsdam, Mendoza, Chern Inst. Nankai, Luxembourg, Cargèse, MPI Bonn and Leipzig, Villa de Leyva, Medellin, ESI Vienna, Vanderbilt, Banff, CIRM, Moscow, Montreal, Strasbourg).

– 5 "colloquium" talks (Jussieu, DESY Hambourg, Dublin, Dijon, Mulhouse)

– over 50 talks in seminars or working groups since 1995 (Québec, Dublin, Shanghai, DESY Hamburg, CPHT Polytech., Roma 1, Roma 2, Jussieu, Paris 13, Clermont, Nice, Bochum, MSRI, Fields Inst., Strasbourg).

Meetings org.: 8 international meetings since 2000 (in Lyon, MPI Leipzig, IHES, Perugia, Ancona).

8 national meetings, seminars or working groups since 1997.

Referee: for 7 journals of mathematics and 3 journals of physics.

Defenses: 4 Ph.D. (D. Harrivel 2005, J. Leray 2017, C. Valcu 2019, I. Lehbab 2023) and 1 Habilitation (S. Giraudo 2017).

Grants: ANR AHBE 2006–2008, dir. F. Patras (Nice).

ANR HopfCombOp 2006–2009, dir. J.-Y. Thibon (Marne la Vallée).

GDR Renormalization 2010–2022, dir. S. Paycha, D. Manchon (Clermont-Ferrand), F. Patras (Nice).

COFECUB Exchange program Saõ Paulo - France, 2016–2017

Publications:

In preparation:

18. *Spectral triples and 2-gauge fields* (with R. Iseppi).

17. *Field theory on configuration spaces* (with O.Kravchenko and L. Ryvkin).

16. *Direct connections on jet groupoids* (with S. Azzali, Y. Boutaïb and S. Paycha).

Peer reviewed papers on algebraic methods in quantum field theory:

15. *Loop of formal diffeomorphisms and Faà di Bruno coloop bialgebra* (with I. Shestakov), Adv. Math. **351** (2019) 495-569.

14. *Five interpretations of the Faà di Bruno's formula* (with D. Manchon), Proceedings of the Conference on "Dyson-Schwinger Equations and Faà di Bruno Hopf Algebras in Physics and Combinatorics", IRMA Lectures in Mathematics and Theoretical Physics Vol. 21, European Mathematical Society, 2015.

13. *Combinatorial Hopf algebras from renormalization* (with Ch. Brouder and F. Menous), J. of Algebraic Combinatorics **32** (2010) 557-578.

12. *From quantum electrodynamics to Tamari posets of trees* (with F. Chapoton), Proceedings of the Conference on "Combinatorics and Physics", MPIM Bonn (Germany), december 2006 and march 2007; Cont. Mathematics **539**, AMS, 2011.

11. *Renormalization Hopf algebras and combinatorial groups*, Proceedings of the Summer School "Geometric and topological methods for quantum field theory", Villa de Leyva (Colombia), juillet 2007; Cambridge University Press, 2010.

10. *Groups of tree-expanded formal series*, J. of Algebra **319** (2008) 377-413.

9. *Non-commutative Hopf algebra of formal diffeomorphisms* (with Ch. Brouder and Ch. Krattenthaler), Adv. in Math. **200** n. 2 (2006) 479–524.

8. *Quantum field theory and Hopf algebra cohomology* (with Ch. Brouder, B. Fauser and R. Oeckl) , J. Phys. A **37** (2004) 5895-5927.

7. *QED Hopf algebra on planar binary trees* (with Ch. Brouder), J. of Alg. **267** (2003) 298-322.

6. *Renormalization of QED with trees* (with Ch. Brouder), Eur. Phys. J. C, **19** (2001) 715-741.

Peer reviewed papers on Leibniz algebras and dialgebras:

5. *On Leibniz cohomology of vector fields* (with F. Wagemann), Ann. Global Anal. Geom. **21** (2002) 177-190.

4. *Dialgebra (co)homology with coefficients*, in "Dialgebras and related Operads", Springer Lect. N. Math. 1763, 2001.

3. *Simplicial properties of the set of planar binary trees*, J. Alg. Comb., **13** (2001) 41-65.

2. *Leibniz homology of dialgebras of matrices*, J. Pure Appl. Alg., **129** (1998) 123-141.

1. *Dialgebra homology of associative algebras*, Note aux C. R. Acad. Sci. Paris, **t. 325** (1997) 135-140.

Proceedings without peer review:

7. *Noncommutative version of Borcherds' approach to quantum field theory* (with Ch. Brouder and V.N. Dang), PoS - Proceedings of Science, SISSA, 2015. Frontiers of Fundamental Physics 14 (FFP14) **224** (2016) n.134.

6. *Groupes de séries et renormalisation des champs quantiques*, Publ. Femmes et Mathématiques **7** (2003) 39-52.

5. *Trees and renormalization of QED*, Proceedings des IVes Renc. Math. de Glanon - "Algèbre et géométrie. Application à la physique", juillet 2000, RMGIV (2001) 25-36.

4. *Leibniz algebras and dialgebras*, Proceedings de "Young Algebra Seminar 1998/1999", Publ. Università di Roma II - Tor Vergata, n. 25 (1999) 15-30.

3. *Leibniz homology, relationship with Poisson manifolds, Gelfand-Fuchs cohomology and dialgebras*, Proceedings des IIes Renc. Math. de Glanon - "Algèbre et géométrie. Application à la physique", juin 1998, RMGII (1999) 25-37.

2. *(Co)omologia delle Dialgebre*, Bollettino U.M.I. **8** 1-A Suppl. (1998) 35-38.

1. *Homologie des digèbres*, Proceedings du colloque "Topologie Algébrique", Matagne-la-petite, novembre 1996, (1997) 1-11.

As an editor:

1. *Special Issue dedicated to the proceedings of the conference "Physics and Mathematics"* held at IHES, november 2005 (with S. Paycha), Lett. Math. Phys. **78** vol.3 (2006).