

# LEANDRO VENDRAMIN

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## EDUCATION

- 2010 — PhD in Mathematics – FCEN, Universidad de Buenos Aires, Argentina. Thesis: Nichols algebras over non-abelian groups. Advisor: Matías Graña
- 2004 — *Licenciado en Cs. Matemáticas* – FCEN, Universidad de Buenos Aires, Argentina

## POSITIONS

- Associate Professor, Vrije Universiteit Brussel, Belgium. From 2/2021
- Visiting Assistant Professor of Mathematics, NYU–Shanghai, China. From 2019 to 2021
- *Profesor Adjunto* (Assistant/Associate Professor), FCEN, UBA, from 5/2014
- *Investigador Independiente* (Associate professor), CONICET, from 2012
- Regular Associate of the Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy, from 01/2012 to 01/2018

## TEACHING

### From 2014, Instructor

From 2014, Instructor: Advanced linear algebra, Calculus 2, Numerical analysis for biology, Differential geometry, Advanced mathematics for physics, Advanced group theory, Non-commutative algebra, Knot theory, Non-commutative ring theory, Curves and surfaces, History of mathematics, Abstract algebra.

### From 2002 to 2014, (Under)graduate Teaching Assistant

Precalculus, Calculus 1 and 2, Basic linear algebra, Advanced linear algebra, Introduction to mathematical analysis, Advanced calculus, Introduction to numerical analysis, Mathematical analysis for biology, Numerical analysis for biology, Advanced mathematics for physics, Abstract algebra (groups, rings, modules).

## PUBLICATIONS

1. S. Ramírez, L. Vendramin. Decomposition theorems for involutive solutions to the Yang-Baxter equation, preprint
2. Ö. Akgün, M. Mereb, L. Vendramin. Enumeration of set-theoretic solutions to the Yang-Baxter equation, preprint
3. V. Lebed, L. Vendramin. Reflection equation as a tool for studying solutions to the Yang-Baxter equation. Accepted for publication in J. Algebra
4. E. Jespers, L. Kubat, A. Van Antwerpen, L. Vendramin. Radical and weight of skew braces and their applications to structure groups of solutions of the Yang-Baxter equation, Accepted for publication in Adv. Math.

5. E. Jespers, L. Kubat, A. Van Antwerpen, L. Vendramin. Factorization of skew braces. *Math. Ann.* 375 (2019), no. 3-4, 1649–1663
6. E. Acri, R. Lutowski, L. Vendramin. Retractability of solutions to the Yang-Baxter equation and  $p$ -nilpotency of skew braces. *Internat. J. Algebra Comput.* 30 (2020), no. 1, 91–115
7. A. Smoktunowicz, L. Vendramin, R. Weston. Combinatorial solutions to the reflection equation. *J. Algebra* 549 (2020) 268–290
8. F. Cedó, A. Smoktunowicz, L. Vendramin. Skew left braces of nilpotent type. *Proc. Lond. Math. Soc.* (3) 118 (2019), no. 6, 1367–1392
9. I. Heckenbeger, L. Vendramin. PBW deformations of a Fomin-Kirillov algebra and other examples. *Algebr. Represent. Theory* 22 (2019), no. 6, 1513–1532
10. L. Vendramin. Problems on skew left braces. *Adv. Group Theory Appl.* 7 (2019), 15–37
11. A. Konovalov, A. Smoktunowicz, L. Vendramin. On skew braces and their ideals. *Exp. Math.* 30 (2021), no. 1, 95–104
12. V. Lebed, L. Vendramin. On structure groups of set-theoretic solutions to the Yang-Baxter equation. *Proc. Edinb. Math. Soc.* (2) 62 (2019), no. 3, 683–717
13. J. A. Guccione, J. J. Guccione, L. Vendramin. Set-theoretical solutions of the Yang-Baxter equation in symmetric categories. *Comm. Algebra* 46 (2018), no. 7, 2811–2845
14. A. Smoktunowicz, L. Vendramin. On skew braces (with an appendix by N. Byott). *J. Comb. Algebra* 2 (2018), no. 1, 47–86
15. D. Bachiller, F. Cedó, L. Vendramin. A characterization of multipermutation solutions of the Yang-Baxter equation. *Publ. Mat.* 62 (2018), no. 2, 641–649
16. A. García Iglesias, L. Vendramin. An explicit description of the second cohomology group of a quandle. *Math. Z.* 286 (2017), no. 3-4, 1041–1063
17. L. Guarnieri, L. Vendramin. Skew braces and the Yang-Baxter equation. *Math. Comp.* 86 (2017), no. 307, 2519–2534
18. I. Heckenberger, L. Vendramin. The classification of Nichols algebras with finite root system of rank two. *J. Eur. Math. Soc. (JEMS)* 19 (2017), no. 7, 1977–2017
19. I. Angiono, C. Galindo, L. Vendramin. Hopf braces and Yang-Baxter operators. *Proc. Amer. Math. Soc.* 145 (2017), no. 5, 1981–1995
20. I. Heckenberger, L. Vendramin. A classification of Nichols algebras of semi-simple Yetter-Drinfeld modules over non-abelian groups. *J. Eur. Math. Soc. (JEMS)* 19 (2017), no. 2, 299–356
21. V. Lebed, L. Vendramin. Homology of left non-degenerate set-theoretic solutions to the Yang-Baxter equation. *Adv. Math.* 304 (2017), 1219–1261
22. V. Lebed, L. Vendramin. Cohomology and extensions of braces. *Pacific J. Math.* 284 (2016), no. 1, 191–212
23. E. Clark, M. Saito, L. Vendramin. Quandle coloring and cocycle invariants of composite knots and abelian extensions. *J. Knot Theory Ramifications* 25 (2016), no. 5, 1650024, 34 pp.
24. L. Vendramin. Doubly transitive groups and cyclic quandles. *J. Math. Soc. Japan* 69 (2017), no. 3, 1051–1057

25. L. Vendramin. Extensions of set-theoretic solutions of the Yang-Baxter equation and a conjecture of Gateva-Ivanova. *J. Pure Appl. Alg.* 220 (2016), no. 5, 1681-2076
26. I. Heckenberger, A. Lochmann, L. Vendramin. Nichols algebras with many cubic relations. *Trans. Amer. Math. Soc.* 367 (2015), 6315–6356
27. I. Heckenberger, L. Vendramin. Nichols algebras over groups with finite root system of rank two III. *J. Algebra* 422 (2015), 223–256
28. J. Dong, S. Natale, L. Vendramin. Frobenius property for fusion categories of small integral dimension. *J. Algebra Appl.* 14 (2015), no. 2, 1550011 (17 pages)
29. I. Heckenberger, L. Vendramin. Nichols algebras over groups with finite root system of rank two II. *J. Group Theory* 17 (2014), no. 6, 1009–1034
30. L. Vendramin. Nichols algebras associated to the transpositions of the symmetric group are twist-equivalent. *Proc. Amer. Math. Soc.* 140 (2012), no. 11, 3715-3723
31. L. Vendramin. On the classification of quandles of low order. *J. Knot Theory Ramifications* 21 (2012), no. 9, 1250088
32. I. Heckenberger, A. Lochmann, L. Vendramin. Braided racks, Hurwitz orbits and Nichols algebras with many cubic relations. *Transform. Groups* 17 (2012), no. 1, 157-194
33. M. Graña, I. Heckenberger, L. Vendramin. Nichols algebras of group type with many quadratic relations. *Adv. Math.* 227 (2011) 1956-1989
34. N. Andruskiewitsch, F. Fantino, M. Graña, L. Vendramin. Pointed Hopf algebras over sporadic simple groups. *J. Algebra* 325 (1) (2011) 305-320
35. N. Andruskiewitsch, F. Fantino, M. Graña, L. Vendramin. The logbook of Pointed Hopf algebras over sporadic simple groups. *J. Algebra* 325 (1) (2011) 282-304
36. N. Andruskiewitsch, F. Fantino, M. Graña, L. Vendramin. Finite-dimensional pointed Hopf algebras with alternating groups are trivial. *Ann. Mat. Pura Appl.* (4) 190 (2011), no. 2, 225-245
37. N. Andruskiewitsch, F. Fantino, M. Graña, L. Vendramin. Pointed Hopf algebras over some sporadic simple groups. *C. R. Math. Acad. Sci. Paris* 348 (2010) 605-608
38. M. Graña, S. Freyre, L. Vendramin. On Nichols algebras over  $\mathrm{PSL}(2, q)$  and  $\mathrm{PGL}(2, q)$ . *J. Algebra Appl.*, Vol. 9, No. 2 (2010) 195–208
39. M. Graña, S. Freyre, L. Vendramin. On Nichols algebras over  $\mathrm{SL}(2, \mathbb{F}_q)$  and  $\mathrm{GL}(2, \mathbb{F}_q)$ . *J. Math. Phys.* 48, 123513 (2007) (11 pages)

## Proceedings

40. E. Jespers, V. Lebed, W. Rump, L. Vendramin. Mini-Workshop: Algebraic Tools for Solving the Yang–Baxter Equation. *Oberwolfach Rep.* 16 (2020), no. 4, 3207–3242
41. L. Vendramin. Fomin-Kirillov algebras. Nichols algebras and Weyl groupoids, *Oberwolfach Rep.* 9 (2013), no. 4, 2889–2891
42. F. Fantino, L. Vendramin. On twisted conjugacy classes of type D in sporadic simple groups. *Hopf Algebras and Tensor Categories, Contemp. Math.* 585 (2013) 247-259
43. N. Andruskiewitsch, F. Fantino, G. García, L. Vendramin. On Nichols algebras associated to simple racks. *Algebras and Applications, Contemp. Math* 537 (2011) 31-56

44. N. Andruskiewitsch, F. Fantino, G. García, L. Vendramin. On twisted homogeneous racks of type D. The Humboldt Kolleg Colloquium on Hopf Algebras, Quantum Groups and Tensor Categories, Rev. Un. Mat. Argentina, 51 2(2010) 1-16

## SELECTED TALKS

- New developments in the theory of radical rings. Pure Maths Colloquium, University of St Andrews, St Andrews, UK, 1/8/2019
- On the clasification of Nichols algebras. MAXIMALS Seminar, University of Edinburgh, Edinburgh, UK, 23/7/2019
- Skew braces and the Yang-Baxter equation. Groups, rings and associated structures. Spa, Belgium, 10/6/2019–15/6/2019
- Radical rings, braces and the Yang-Baxter equation. Algebra seminar, Exeter, UK, 1/2/2018
- Nichols algebras. Seminario de álgebra, Universidad autónoma de Barcelona, Spain, 19/12/2017
- Set-theoretical solutions of the Yang-Baxter equation. Algebra seminar, University of St Andrews, St Andrews, UK, 14/12/2017
- Skew braces. Groups, rings and the Yang-Baxter equation. Spa, Belgium, 18/6/2017–24/6/2017
- Set-theoretical solutions of the Yang-Baxter equation. MIT, Massachusetts, USA, 19/4/2017
- The combinatorics of the Yang-Baxter equation. MAXIMALS Seminar, University of Edinburgh, Edinburgh, UK, 28/3/2017
- Nichols algebras. Algebra Seminar, Warsaw University, Poland, 4/4/2017
- Set-theoretical solutions of the Yang-Baxter equation Algebra Seminar, Warsaw University, Poland, 6/4/2017
- Nichols algebras and applications. Dublin Mathematics Colloquium, Geometry Seminar, Trinity College, Dublin, UK, 15/03/2017
- Set-theoretical solutions of the Yang-Baxter equation. Séminaire Quantique, Strasbourg, France, 6/2/2017
- Set-theoretical solutions of the Yang-Baxter equation. Seminario de álgebra, Universidad autónoma de Barcelona, Spain, 23/1/2017
- The combinatorics of the Yang-Baxter equation. Oberseminare am IAZ, Stuttgart, Germany, 18/1/2017
- Nichols algebras. XXI Coloquio Latinoamericano de Álgebra, Buenos Aires, Argentina, 25/7/2016–29/7/2016
- The combinatorics of the Yang-Baxter equation. Mathematische Gesellschaft in Göttingen, Göttingen, Germany, 23/12/2016
- The classification of Nichols alegbras. Humboldt Kolleg. Colloquium on Algebras and Representations – Quantum 2016, Córdoba, Argentina, 29/2/2016–4/3/2016
- Nichols algebras over non-abelian groups. Nichols Algebras and Their Interactions with Lie Theory, Hopf Algebras and Tensor Categories, Banff, Canada, 6/9/2015–11/9/2015
- Nichols algebras over non-abelian groups. Coloquio Latinoamericano de Álgebra, Lima, Perú, 8/12/2014–12/12/2014
- Introducción al álgebra con GAP (mini-course, 8 hours), Universidad de Chile, Santiago de Chile, 25/11/2014–29/11/2014

- The classification of Nichols algebras (mini-course, 6 hours). Summer school on Conformal Field Theories and Nichols algebras, Rauischholzhausen, Germany, 25/08/2014- 29/08/2014
- Introducción a la teoría combinatoria de nudos (mini-course, 3 hours). EIENA VII, Córdoba, Argentina, 4/08/2014-8/08/2014
- Nichols algebras. Seminario de álgebra, Universidad de Talca, Talca, Chile, 09/10/2014
- Nichols algebras and Weyl groupoids of rank two. Colóquio de Álgebra e Representações — Quantum 2014, Santa Maria, Brazil, 22/3/2014
- Doubly transitive groups and cyclic quandles. Università di Ferrara, Ferrara, Italy, 26/02/2014
- Nichols algebras and a combinatorial model for Schubert calculus. ICTP, Trieste, Italy, 11/02/2014
- Fomin-Kirillov algebras. Nichols algebras and Weyl groupoids, Oberwolfach, Germany, 2/10/2012
- Nichols algebras. Séminaire Lotharingien de Combinatoire 69, Strobl, Austria, 10/09/2012
- About the classification of finite-dimensional pointed Hopf algebras. Groups, Rings, Lie and Hopf Algebras. III, Deer Lake, Canada, 13/08/2012
- Nichols algebras and Weyl groupoids of rank two. Oberseminar Kombinatorik und Algebra, Philipps Universität, Marburg, Germany, 31/01/2012
- Introduction to cluster algebras. Forschungsseminar Mathematische Physik, Philipps Universität, Marburg, Germany, 27/11/2012
- Nichols algebras and quadratic relations. Seminario de álgebra, Universidad de Almería, Almería, Spain, 21/09/2012
- Nichols algebras and quadratic relations. Atlantic Algebra Center, Memorial University, St. John's, Canada, 1/08/2012
- Nichols algebras and quadratic relations. Hamburg Universität, Hamburg, Germany, 3/07/2012
- An introduction to Nichols algebras. Hamburg Universität, Hamburg, Germany, 2/07/2012
- Nichols algebras and Schubert Calculus. Forschungsseminar Mathematische Physik, Philipps Universität, Marburg, Germany, 8/05/2012
- Pointed Hopf algebras over non-abelian groups. RWTH Aachen University, Aachen, Germany, 25/01/2010
- Quandles and knot invariants. Forschungsseminar Mathematische Physik, Philipps Universität, Marburg, Germany, 19/01/2010
- Nichols algebras over non-abelian groups. XVIII Congreso Latinoamericano de Álgebra. Sao Pedro, Brazil, 08/2009
- A GAP package for racks and Nichols algebras. Advanced School and Conference on Knot Theory. ICTP, Trieste, Italy, 05/2009
- Pointed Hopf algebras over the sporadic simple groups. First Debrún Workshop on computational algebra. National University of Ireland, Galway, Ireland, 07/2008

## SOFTWARE

- YangBaxter, GAP package for computations related to the Yang–Baxter equation (with A. Konovalov) <http://gap-packages.github.io/YangBaxter/>
- Rig, GAP package for computations related to racks and their cohomologies (with M. Graña) <http://github.com/vendramin/rig>

- Sarna, Software written in Python for the computation of the Weyl groupoid of a diagonal braiding. (with M. Graña and I. Heckenberger) <http://github.com/vendramin/sarna>

## **PRIZES AND FELLOWSHIPS**

- Argentinian Academy of Sciences, Young Researcher Award 2016
- ERC Advanced Grant 320974 Fellowship, 2017 (with A. Smoktunowicz)
- Alexander von Humboldt Fellowship, 2012–2013 (with I. Heckenberger)
- DAAD Short-term Postdoctoral Fellowship, 2011
- CONICET Postdoctoral Fellowship, 2010–2012
- DAAD Short-term Fellowship, 2009
- CONICET PhD Fellowship, 2005–2010

## **CONFERENCES AND SYMPOSIA ORGANIZED**

- Oberwolfach Mini-Workshop (1946a): Algebraic Tools for Solving the Yang–Baxter Equation. Organizers: E. Jespers, V. Lebed, W. Rump, L. Vendramin. Oberwolfach, Germany. November 10–16, 2019
- Workshop on Quantum Symmetries. ICTP-SAIFR, São Paulo, Brazil. October 16–18, 2019

## **REFEREING ACTIVITY**

Advances in Mathematics, Advances in Applied Clifford Algebras, Annals of Combinatorics, Boletín de la Sociedad Matemática Mexicana, Communications in Algebra, Communications in Contemporary Mathematics, Forum Mathematicum, International Journal of Mathematics, International Journal of Algebra and Computation, New York Journal of Mathematics, ISAAC 2012 and 2018, Journal of Algebraic Combinatorics, Journal of Algebra, Journal of Algebra and its Applications, Journal of Combinatorial Theory A, Journal of Group Theory, Journal of Pure and Applied Algebra, manuscripta mathematica, Publicacions Matemàtiques, Proceedings AMS, Proceedings of the Edinburgh Mathematical Society, Publicacions Matemàtiques, Revista Matemática Iberoamericana, Revista Matemática Complutense, Transformation Groups, Transactions AMS, Mathematische Nachrichten, SIGMA.

## **MENTORING**

### **PhD students**

- Emiliano Acri (with Conicet fellowship 2018–2023)
- Santiago Ramírez (with Conicet fellowship 2019–2024)

### **Postdocs**

- Marco Bonatto (with Conicet fellowship 2019–2020)