Cristian Vay

Curriculum Vitae

Facultad de Matemática, Astronomía y Física
Universidad Nacional de Córdoba
X5000HUA, Córdoba, Argentina
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Current position

2017– **Adjunct Researcher**, *CIEM–CONICET*, Argentina.
Center of Research and Studies in Mathematics of Córdoba –
National Scientific and Technical Research Council

2015– **Adjunct Professor**, *FaMAF–UNC*, Argentina.
Faculty of Mathematics, Astronomy and Physics –
National University of Córdoba

Education

2012–2014 **Post-doctoral**, *FaMAF – UNC*, Argentina.

2007–2012 **PhD in Mathematics**, *FaMAF – UNC*, Argentina.
Advisor: Prof. PhD Nicolás Andruskiewitsch
Thesis: Contributions to the classification of Hopf algebras

2010–2011 **Sandwich PhD**, *University of Antwerp*, Belgium.
Advisor: Fred Van Oystaeyen

2002–2007 **Licenciado en Matemáticas**, *FaMAF – UNC*, Argentina.
Undergraduate degree in Mathematics
Average of qualifications: 9.56 (from 1 to 10, 1 being the lowest, 10 the highest)

Publications & preprints

(21) **Linkage principle for small quantum groups**, *Adv. Math. 475 (2025) 110347*, arXiv:2310.00103.
C. Vay

(20) **Koszul duality for Coxeter groups**, *Ann. Represent. Theory 1 (2024), No. 3, 335-374*, arXiv:2303.08267.
S. Riche, C. Vay

(19) **The Green ring of a family of copointed Hopf algebras**, *Rev. Un. Mat. Argentina 68 (2025), no. 1, 23-48*, arXiv:2210.04943.
C. Vay

(18) **Simple modules of small quantum groups at dihedral groups**, *Doc. Math. 29 (2024), no. 1, 1-38*, arXiv:2012.09323.
G. A. García, C. Vay

(17) **On the Hopf algebra structure of the Lusztig quantum divided power algebras**, *Annales Mathématiques Blaise Pascal, 27 (2020), no. 2, 131-157*, arXiv:2005.08342.
N. Andruskiewitsch, I. Angiono, C. Vay

(16) **On Hopf algebras with triangular decomposition**, *Contemp. Math. 728 (2019)*, arXiv:1808.03799.
C. Vay

(15) **Mixed perverse sheaves on flag varieties of Coxeter groups**, *Canadian J. Math. 72 (2020), no. 1, 1-55*, arXiv:1802.07651.
P. Achar, S. Riche and C. Vay

(14) **On the representation theory of the Drinfeld double of the Fomin-Kirillov algebra** $\mathcal{FK}_3$, *Algebr. Represent. Theory. 22 (2019), no. 6, 1399–1426*, arXiv:1707.02091.
B. Pogorelsky and C. Vay

(13) **Copointed Hopf algebras over** $\mathbb{S}_4$, *J. Pure Appl. Algebra 222 (2018), no. 9, 2784–2809*, arXiv:1706.06624.
A. García I. and C. Vay

(12) **On projective modules over finite quantum groups**, *Transf. Groups 24 (2019), no. 1, 279–299*, arXiv:1612.09220.
C. Vay

(11) **Explicit coproduct formulas for quantum group of the type** G_2, *J. Algebra 500 (2018), 103–116*, arXiv:1510.02820.
V. Kharchenko and C. Vay

(10) **Acerca de las álgebras de Fomin–Kirillov**, *Actas Congr. "Dr. Antonio A. R. Monteiro" (2015), 43–54*, Univ. Nac. del Sur, Bahía Blanca.
C. Vay

(9) **The cohomology ring of the 12-dimensional Fomin-Kirillov algebra**, *Adv. Math. 291 (2016) 584–620*, arXiv:1404.5101.
D. Stefan and C. Vay

(8) **Verma and simple modules for quantum groups at non-abelian groups**, *Adv. Math. 301 (2016) 423–457*, arXiv:1409.0438.
B. Pogorelsky and C. Vay

(7) **Representations of copointed Hopf algebras arising from the tetrahedron rack**, *Ann. Univ. Ferrara Sez. VII Sci. Mat. 60 (2014), no. 2, 407–427*, arXiv:1309.4697.
B. Pogorelsky and C. Vay

(6) **Finite-dimensional pointed or copointed Hopf algebras over affine racks**, *J. Algebra 397 (2014), 379–406*, arXiv:1204.5807.
A. García I. and C. Vay

(5) **Lifting via cocycle deformation**, *J. Pure Appl. Algebra 218 (2014), no. 4, 684–703*, arXiv:1212.5279.
N. Andruskiewitsch, I. Angiono, A. García I., A. Masuoka and C. Vay

(4) **From Hopf algebras to tensor categories**, *Conformal Field Theories and Tensor Categories (2014), Yi-Zhu Huang et al. editors, Mathematical Lectures from Peking University, Springer*, arXiv:1204.5807.
N. Andruskiewitsch, I. Angiono, A. García I., B. Torrecilla and C. Vay

(3) **On a family of Hopf algebras of dimension 72**, *Bull. Belg. Math. Soc. Simon Stevin 19 (2012), no. 3, 415–443*, arXiv:1105.0394.
N. Andruskiewitsch and C. Vay

(2) **Finite dimensional Hopf algebras over the dual group algebra of the symmetric group in three letters**, *Commun. Algebra 39 (2011), no. 12, 4507–4517*, arXiv:1010.5953.
N. Andruskiewitsch and C. Vay

(1) **Hopf algebras of dimension 16**, *Algebr. Represent. Theory. 13 (2010), no. 4, 383–405*, arXiv:0712.0405.
G. A. García and C. Vay

Work experience

2014 – 2017   **Assistant Researcher**, *CIEM–CONICET*, Argentina.

Teaching experience

2015 –   **Adjunct Professor**, *FaMAF–UNC*, Argentina.

2007 – 2014   **Assistant Professor**, *FaMAF–UNC*, Argentina.

2004 – 2007   **Student assistant in teaching**, *FaMAF–UNC*, Argentina.

Visitor Professor

2019   **Universidad Nacional de La Plata**, Argentina.
"Representations of algebras with triangular decomposition". Short course. 1 week.

2017   **U. F. de Rio Grande do Sul**, Brasil.
"An introduction to the category $\mathcal{O}$ of representation of semisimple Lie algebra". Short course. 2 weeks.

2015   **U. F. do Santa Maria**, Brasil.
"Algebraic Number Theory". Short course. 2 weeks.

2013   **U. F. do Santa Maria**, Brasil.
"Braided Hopf algebras". Short course. 2 weeks.

PhD Students & Postdocs

2023 – 2024   **Constanza Rodolfo**, *PhD fellowship CONICET*, FaMAF–UNC, unfinished.

2023 – 2024   **Emiliano Campagnolo**, *Post-doctoral fellowship CONICET*, FaMAF–UNC.

Fellowships

Study

2022   **Research in Pairs**, *CIMPA-ICTP*, France-Italy, 3 months.

2017 – 2018   **Research fellowship for young scientist**, *CONICET*, Argentina.

2012 – 2014   **Post-doctoral fellowship**, *CONICET*, Argentina.

2010 – 2011   **Erasmus Mundus PhD fellowship**, *University of Antwerp*, Belgium.

2007 – 2012   **PhD fellowship**, *CONICET*, Argentina.

2005 – 2006   **Academic Excellence Scholarship**, *UNC*, Argentina.

Research

2017 – 2018   **PICT-2016-3957**, *FONCyT*, MinCyT, Argentina.

Organizing congress

2019   **Encuentro Nacional de Álgebra (elENA)**, FONCYT.

2019   **Encuentro Nacional de Álgebra (elENA)**, SECYT, UNC.

Attend congress

2024   **Oberwolfach Foundation Fellows**, *Mathematisches Forschungsinstitut Oberwolfach*.

2019   **Programa Viajes al exterior**, SECYT, UNC.

2018   **International Congress of Mathematicians**, *Rio de Janeiro*, Brasil.

2017   **Mathematical Congress of the Americas**, *American Mathematical Society*, USA.

2017   **Future Directions in Representation Theory**, *University of Sydney*, Australia.

Award

2007   **Diploma with "Honors's Mention"**, *University Prize*, UNC, Argentina.

Research stay

2022   **Laboratoire de Mathématiques Blaise Pascal**, France.
Prof. PhD. Simon Riche. CIMPA-ICTP. 3 months.

2019   **Instituto de Matemáticas de la Universidad de Sevilla**, Spain.
Prof. PhD. Luis Narváez. Parcially supported by IMUS. 6 months.

2018   **University of Bucharest**, Romania.
Prof. PhD. Dragos Stefan. Supported by U. of B. 1 week.

2017   **Laboratoire de Mathématiques Blaise Pascal**, France.
Prof. PhD. Simon Riche. Supported by CONICET. 1 year.

2017   **U. F. de Rio Grande do Sul**, Brasil.
Prof. PhD. Barbara Pogorelsky. Supported by Programa ESCALA Docente de la Asociación de Universidades del Grupo Montevideo. 2 weeks.

2015   **University of Antwerp**, Belgium.
Prof. PhD. Dr. Fred Van Oystaeyen and Prof. PhD. Yinhuo Zhang. Supported by Programme of Scientific-Technological Cooperation MINCYT–FWO. 1 month.

2014   **Universidad Nacional Autónoma de México**, México.
Prof. PhD. Vladislav Khartchenko. Supported by Programme Apoyo a Proyectos de Investigación e Innovación Tecnológica (UNAM). 2 weeks.

2014   **Universidade of São Paulo**, Brasil.
Prof. PhD. Vyacheslav Futorny. Supported by Programme MathAmSud. 2 weeks.

2012   **U. F. de Rio Grande do Sul**, Brasil.
Prof. PhD. Barbara Pogorelsky. Supported by UFRGS. 2 weeks.

Presentations in scientific meetings

Congresses

2024 **XXIV Coloquio Latinoamericano de Álgebra**, Chile.
"Linkage principle for small quantumg groups".

2024 **LXXIII UMA**, Argentina.
"Técnicas y herramientas en el estudio de representaciones".

2024 **Mini-Workshop: Bridging Number Theory and Nichols Algebras via Deformations**, *Oberwolfach*, Alemania.
"Linkage principle for small quantum groups".

2023 **Workshop Hopf algebras and Tensor Categories**, *Marburg*, Germany.
"Linkage principle for Drinfeld doubles of finite dimensional Nichols algebras of diagonal type".

2021 **LXX UMA**, Argentina (virtual).
"The simple characters of the dihedral quantum groups". Annual Argentinean Mathematical Society scientific meeting

2021 **Mathematical Congress of the Americas**, Argentina (virtual).
"Mixed perverse sheaves on ag varieties of Coxeter groups".

2021 **Mini-Workshop: Non-semisimple Tensor Categories and Their Semisimplification**, *Oberwolfach*, Germany (virtual).
"Simple modules of small quantum groups at dihedral groups".

2020 **Workshop: Hopf Algebras and Tensor Categories**, *Hamburg*, Germany (virtual).
"Symmetries on modules over Drinfeld doubles".

2019 **Workshop on Quantum Symmetries**, *São Paulo*, Brazil.
"Symmetries on modules over Drinfeld doubles".

2019 **Rings, modules and Hopf algebras**, *Almeria*, España.
"Mixed perverse sheaves on flag varieties of Coxeter groups".

2018 **International Congress of Mathematicians**, *Rio de Janeiro*, Brasil.
"Mixed perverse sheaves on flag varieties of Coxeter groups" (short communication).

2018 **Workshop Tensor categories, Hopf algebras and quantum groups**, *Marburg*, Germany.
"On the representation theory of a quantum group attached to the Fomin-Kirillov algebra $\mathcal{FK}_3$".

2017 **Mathematical Congress of the Americas**, *Montréal*, Canada.
"On projective modules over finite quantum groups".

2017 **Colloquium on Algebra and Representations – Quantum 2017**, *Talca*, Chile.
"On projective modules over finite quantum groups".

2016 **Workshop $q^{\frac{1}{2}}$**, *Universidad de Chile*, Santiago de Chile, Chile.
"2-Kac-Moody algebras".

2016 **Colloquium on Algebras and Representations – Quantum 2016**, *Humboldt Kolleg*, Córdoba, Argentina.
"Verma and simple modules for quantum groups at non-abelian groups".

2015 **XIII "Dr. Antonio A. R. Monteiro" Congress**, *Bahía Blanca*, Argentina.
"About the Fomin–Kirillov algebras". Invited speaker.

2014 **Colloquium on Algebra and Representations – Quantum 2014**, *Santa Maria*, Brasil.
"Cohomology ring of the smallest Nichols algebra over a non-abelian group".

2013 **LXII UMA**, *Rosario*, Argentina.
"Representations of copointed Hopf algebras". Annual Argentinean Mathematical Society scientific meeting

2013 **Colloquium on Algebra and Representations – Quantum 2013**, *Tucumán*, Argentina.
"Nichols algebras".

2012 **IV Congreso Latinoamericano de Matemíicos**, *Córdoba*, Argentina.
"Liftings of Nichols algebras over a group algebra or its dual".

2012 **Colloquium on Algebra and Representations – Quantum 2012**, *Mendoza*, Argentina.
"Representations of copointed Hopf algebras over $\mathbb{S}_3$".

2011 **XXI Encuentro Rioplatense de Álgebra y Geometría Algebráica**, *Montevideo*, Uruguay.
"Hopf algebras with coradical $\mathbf{k}^{\mathbb{S}_3}$".

2011 **LX UMA**, *Tucumán*, Argentina.
"Hopf algebras with coradical $\mathbf{k}^{\mathbb{S}_3}$".

2008 **LVII UMA**, *Mendoza*, Argentina.
"Hopf algebras of dimension 16".

2008 **Colloquium on Hopf Algebras and Applications**, *Córdoba*, Argentina.
"Hopf algebras of dimension 16".

Seminars

2023 **Seminario del grupo de Teoría de Lie**, *FaMAF – UNC*, Argentina.
"El anillo de Green de una familia de álgebras de Hopf".

2022 **Séminaire GAAO**, *Laboratoire de Mathématiques Blaise Pascal*, France.
"On the representation theory of certain Drinfeld doubles".

2020 **Seminario del grupo de Teoría de Lie**, *FaMAF – UNC*, Argentina.
"Fórmula de Weyl para módulos simples típicos de grupos cuánticos generalizados".

2019 **Seminario de Álgebra, Universidad de Sevilla**, España.
"Hopfological algebra".

2019 **Seminario de Álgebra, Universidad de Sevilla**, España.
"Acerca de la teoría de representaciones de las álgebras de Hopf (I,II)".

2019 **Instituto de Matemática de la Universidad de Sevilla**, Spain.
"Álgebras de Hopf para todas y todos".

2018 **Seminario del grupo de Teoría de Lie**, *FaMAF – UNC*, Argentina.
"Haces perversos en el lenguaje de categorías diagramáticas".

2017 **Séminaire GAAO**, *Laboratoire de Mathématiques Blaise Pascal*, France.
"On projective modules over finite quantum groups".

2017 **Seminario del grupo de Teoría de Lie**, *FaMAF – UNC*, Argentina.
"Acerca de la Reciprocidad BGG".

2015 **Antwerp Algebra Seminar**, *University of Antwerpen*, Belgium.
"Representations of non-pointed quantum groups".

2015 **Seminar of the Algebra group**, *University of Hasselt*, Belgium.
"The cohomology ring of the 12-dimensional Fomin-Kirillov algebra".

2014 **Seminar of Lie and Jordan Algebras and their Representations**, *Universidade of São Paulo*, Brasil.
"The cohomology of the smallest Nichols algebra over a nonabelian group".

2012 **Seminar of the Algebra group**, *U. F. do Porto Alegre*, Brasil.
"Nichols algebras attached to racks".

2010 **Antwerp Algebra Seminar**, *University of Antwerpen*, Belgium.
"Nichols algebras".

Posters

2019 **Aspects of Higher Representation Theory**, *Vrije Universiteit Brussel*, Bélgica.
"Mixed perverse sheaves on flag varieties of Coxeter groups".

2017 **Future Directions in Representation Theory**, *University of Sydney*, Australia.
"Mixed perverse sheaves on flag varieties of Coxeter groups".

Scientific meetings organized

Congresses

2020 **Colloquium on Algebra and Representations – Quantum 20**, *Córdoba*, Argentina.

2018 **Colloquium on Algebra and Representations – Quantum 60**, *Córdoba*, Argentina.

2015 **Colloquium on Algebra and Representations – Quantum 2015**, *Córdoba*, Argentina.

Seminars

2022, 2021, 2016, 2015 **Seminar of the Lie Theory group**, *FaMAF – UNC*, Argentina.

Other

2019 **Session "Hopf Algebras and Tensor Categories"**, *CLA XXIII*, México.

2016 **Mathematics day**, *FaMAF – UNC*, Argentina.

Scientific meetings attended

- Non-commutative shapes. Bélgica. 2022.
- Colloquium on Algebra and Representation Theory, 2009, 2012-17.
- I Encuentro conjunto de SOMACHI–UMA, Valparaiso, Chile, 2016.
- II-IV National meeting of Algebra (elENA). Sierras de Córdoba. 2004, 2006, 2008.
- LIV-LVI, LVIII UMA, 2004-2006, 2008.

- VIII Congress Dr. Antonio Monteiro. Bahía Blanca. 2005.
- II Encuentro de Geometría Diferencial (EGEO). Sierras de Córdoba. 2005.
- CIMPA Research School 2006: Homological methods and representations of non-commutative algebras. Mar del Plata. 2006.
- Colloquium on Hopf Algebras and Applications. Córdoba. 2008.
- Homologie des algèbres: structures et applications (C.I.R.M.). France. 2008.
- Colloq. Hopf Algebras, Quantum Groups and Tensor Categories. Córdoba. 2009.

Referee/Reviewer

- J. Noncommutative Geom (1)
- J. Algebra (6)
- SIGMA (1)
- Israel J. Math. (1)
- Hacet. J. Math. Stat. (1)
- São Paulo J. Math. Sci. (1)
- Quantum Topology (1)
- J. Algebr. Comb. (1)
- J. Algebra Appl. (4)
- Acta Math. Sin. (1)
- Algebr. Represent. Theory (1)
- MathSciNet (49)
- Universitas Scientiarum (1)
- Revista de la UMA (2)
- Comm. Algebra (1)
- J. Math. Phys. (2)
- Korean J. Math. (1)
- J. of Taibah University for Science (1)
- J. Pure Appl. Algebra (1)
- Sel. Math. New Ser. (1)
- Internat. J. Algebra Comput. (1)
- Trans. Am. Math. Soc. (1)
- zbMATH (10)

Languages

- Spanish
- English