

Alexis Langlois-Rémillard

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Krijgslaan 281, S9
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Research interests

Algebra, mathematical physics, representation theory of algebras, diagrammatic algebras, cellular algebras, Lie (super)algebras, Dunkl operators and Temperley-Lieb algebras.

Education

- 2019-
exp. **Ph. D. in Mathematics**, Universiteit Gent
2023 Thesis subject: *Algebraic realization of Dunkl operators*
2023 Advisors: Profs Joris Van der Jeugt and Hendrik De Bie
- 2017-
2019 **M. Sc. in Mathematics**, Université de Montréal
2019 Thesis: *Sur la structure cellulaire et la théorie de la représentation des algèbres de Temperley-Lieb à couture*
Advisor: Prof. Yvan Saint-Aubin
- 2014-
2017 **B.Sc in Mathematics**, Université de Montréal
2017 *Excellence mention*

Scholarships

- 2019-2023 **FRQNT¹** Doctoral Research Scholarship (\$ 84 000)
2019-2022 **FWO²** EOS PRIMA PhD scholarship (€ 96 000)
2017-2018 Alexander-Graham-Bell **NSERC³** Master's award (\$ 17 500)
2017-2019 **FRQNT** Master's award (\$ 30 000)
Summer 2016 Undergraduate Research Award, **NSERC** and **FRQNT** (\$ 7 625)
Summer 2015 Undergraduate Research Award, **NSERC** (\$ 5 625)

Academic work experience

- 2016-2018 **Teaching Assistant** at Université de Montréal (in French)
Discrete Mathematics, Analysis 1 and Fundamental Mathematics
Animation of exercises sessions for 20-60 students classrooms, office hours for students, invigilated and corrected exams.
- Summer 2016 **NSERC Research internship** with Prof. Yvan Saint-Aubin at UdeM
- Summer 2015 **NSERC Research internship** with Prof. Matilde Lalín at UdeM

Publications and preprints

Articles

(preprint) De Bie, H., Langlois-Rémillard, A., Oste, R., and Van der Jeugt, Joris (2020) Finite-dimensional representations of the symmetry algebra of the dihedral Dunkl-Dirac operator. 46p. [arxiv:2010.03381](https://arxiv.org/abs/2010.03381)

Langlois-Rémillard, A. and Saint-Aubin, Y. (2020) The representation theory of seam algebras. SciPost Physics 8, 019. 34p. <https://doi.org/10.21468/SciPostPhys.8.2.019>

Proceedings

(preprint) Langlois-Rémillard, A. (2020) Deforming algebras with anti-involution via twisted associativity. *Submitted as contribution for the proceedings of the International Conference on Stochastic Processes and Algebraic Structures, Västerås 2019*, 21p. [arXiv:2106.01855](https://arxiv.org/abs/2106.01855)

¹Fonds de Recherche du Québec – Nature et Technologies (Québec Research Funds on Natural Sciences)

²Fonds Wetenschappelijk Onderzoek – Vlaanderen (The Research Foundations – Flanders)

³National Science and Engineering Research Council of Canada

Langlois-Rémillard, A. and Oste, R. (2020) An Exceptional Symmetry Algebra for the 3D Dirac-Dunkl Operator. In: Dobrev V. (ed) Lie Theory and its Applications in Physics. LT Varna 2019. Springer Proceedings in Mathematics & Statistics, vol 335. Springer Singapore. pp 399–405 [doi:10.1007/978-981-15-7775-8_30](https://doi.org/10.1007/978-981-15-7775-8_30) [arXiv:2009.13904](https://arxiv.org/abs/2009.13904)

Popularization work

Boutet, V., Godin, J. and Langlois-Rémillard, A. (2017) Excursion typographique : La matrice des fontes. *Accromath*, 12, pp. 26–29. <http://accromath.uqam.ca/archives/>

Talks and Workshop

Invited seminar talks:

- May 2021 **EOS meeting**, online *Finite-dimensional representations of the 3D dihedral Dunkl-Dirac symmetry algebra*
- November 2018 **Seminar: representation theory of algebras**, Université de Sherbrooke *Idempotence, cellularité et algèbres diagrammatiques*
- October 2018 **Mathematical physics seminar**, Université de Montréal *Roots of unity and the representation theory of boundary seam algebras*

Workshop:

- June 2018 **Canadian Mathematical Society Summer Meeting**, Fredericton *Atelier d'enseignement actif* (with Marie-Andrée B. Langlois)

Contributed seminar and conference talks:

- April 2021 **Clifford research seminar**, Universiteit Gent, Online *Generalizing the Deligne category, Khovanov's and Sazdanovic's approach*
- December 2020 **CMS Winter meeting**, Canada, online *The symmetry algebra of the Dunkl-Dirac operator: the dihedral cases*
- March 2020 **Clifford research seminar**, Universiteit Gent *The symmetry algebra of the 3D dihedral Dunkl-Dirac equation.*
- November 2019 **SPAS**, Västerås *Cellular structure of seam algebras and avenues for deformations*
- June 2019 **Clifford research seminar**, Universiteit Gent *Representation theory and cellular structure of seam algebras*
- December 2018 **Séminaire étudiant en mathématique**, Université de Montréal *Colorier une carte, une approche par dessin*
- September 2018 **XXXth Meeting on representation theory of algebras**, Sherbrooke *Cellular structure of boundary seam Temperley-Lieb algebras*
- June 2018 **Canadian Mathematical Society Summer Meeting**, Fredericton *Bratteli and the morphisms of boundary seam algebras*
- May 2018 **XXI^e Colloque ISM**, Université Sherbrooke *Bratteli et les morphismes (semi-)simples de Temperley-Lieb*

Popularization talks:

- September 2020 **Club mathématique**, Université de Montréal *Des pentagones aux heptagones, une infinité de différences*
- November 2018 **Club mathématique**, Université de Montréal *Huit dames pour un échiquier*
- July 2018 **Camp mathématique de l'AMQ**, Dawson College, Montréal *Le carréoussel du géomètre*

Leadership and implication

Conference organizer

- 2019 **SAMARI**. One day conference on possibilities after graduation in mathematics. *Co-initiator and co-organizer*
- 2016-2018 **Seminars in Undergraduate Mathematics in Montréal**. Annual provincial undergraduate weekend conference. *President for 2016-2017 and member of the organizing committee in 2018*
- 2018 **SAPHARI**. One day conference on possibilities after graduation in physics. *Organizer of the mathematics session*
- 2017 **Canadian Undergraduate Mathematics Conference** Annual national undergraduate week conference. *President for the Montréal 2017 edition*

Session and seminars organizer

- 2017-2018 **AARMS-STUDC student poster session**. Co-organizer for 2018 CMS Summer Meeting, University of New-Brunswick, Fredericton and 2017 CMS Winter Meeting, University of Waterloo, Waterloo.
- 2017-2018 **Séminaire étudiant en mathématique**, Université de Montréal
- 2015-2017 **Club mathématique**, Université de Montréal

Community service

- 2020- **Reviewer** for zbMath.
- 2016-2019 **Student committee** of the Canadian Mathematical Society. *Committee member*: involved in the French translation of general activities and in the edition of French articles in the annual publication *Notes from the Margin*.
- 2017-2019 **AECSMS**: Graduate mathematics and statistic students association in Université de Montréal. *President* (2018-2019) and *Treasurer* (2017-2018).
- 2014-2019 Students representative on the **mathematics and statistic departmental assembly** at Université de Montréal: 2014-2016 for undergraduate and 2018-2019 for graduate students.

Popularization

- 2016-2018 **Institut des sciences mathématiques**. I created an activity on tatami tiling in 2016 for the *MathFest* and co-created the activity *Le carrérouel du géomètre* for the festival *Eureka!* 2018 at the Science center of Montréal.
- 2018-2019 **L'Axiomatique**. *Corrector-in-chief and writer* for a mathematics student journal at Université de Montréal.
- 2015-2017 **JÉMUM**. *Co-created and co-edited* a student mathematical journal to showcase summer research by undergraduate students.

Languages

- Français** : Native language
- English**: Fluent
- Nederlands**: Proficient (B2 CEFRL 2021-05)

Other Interests and Activities

- Chess** I am a Canadian and Québécois expert and play with the KGSRL chess club.
- Lifeguard** I taught swimming lessons and was a lifeguard and a swimming teacher from 2011 to 2016 and a lifeguard instructor from 2013 to 2016. I received a Commonwealth service citation for my volunteer work in 2015 and 2014.