

Samuel Leblanc

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Education

Queen's University <i>M.Sc. in Mathematics</i> Research project: Cluster characters, cluster categories, and representation theory Supervisors: Ivan Dimitrov , Charles Paquette , and David Wehlau	2025 - 2027
Université de Sherbrooke <i>B.Sc. in Mathematics</i>	2022 - 2025

Research Interests

Representation theory, cluster algebras, homological algebra, topological data analysis, machine learning.

Papers

- Brüstle, T., Desrochers, J., Leblanc S., *Generalized Rank via Minimal Subposet*. [arXiv:2510.10837](#) [🔗](#) (2025)
- Armenta, M., Leblanc, S., *Batalin-Vilkovisky structure on Hochschild cohomology with coefficients in the dual algebra*. [arXiv:1810.13023](#) [🔗](#) (2025)
- Leblanc, S., Rasolomanana, A., Armenta, M., *Hidden Activations Are Not Enough: A General Approach to Neural Network Predictions*. [arXiv:2409.13163](#) [🔗](#) (2024)

Student Papers

- Baril, L., Leblanc, S., *Multiplicité de la représentation indicatrice*. Submitted in: [Cahiers mathématiques de l'Université de Sherbrooke](#) [🔗](#) (2025)
Supervisor: [Thomas Brüstle](#)
- Leblanc, S., *Dégénération des représentations de carquois de type A_3 à deux puits*. To appear in: [Cahiers mathématiques de l'Université de Sherbrooke](#) [🔗](#) (2024)
Supervisors: [Emily Cliff](#) and [Shiping Liu](#)
- Leblanc, S., *Transformations de cercles orientés tangents sur la sphère de Riemann*. Submitted in: [Cahiers mathématiques de l'Université de Sherbrooke](#) [🔗](#) (2023)
Supervisor: [Jean-Philippe Burelle](#)

Posters

- Leblanc, S., *Multiplicity of the Interval Module*. [AARMS-CMS Student Poster Session \(CMS Summer Meeting\)](#) [🔗](#) (2025)
Collaborators: Laurianne Baril and Justin Desrochers. Supervisor: [Thomas Brüstle](#).
- Desrochers, J., Leblanc, S., *Kernel of the Rank Invariant*. [Summer Research School, Applications of Representation Theory in Topological Data Analysis and Geometric Invariant Theory](#) [🔗](#) (2024)

Teaching

Teaching Assistant

Méthodes quantitatives en communication marketing (MQG301) <i>École de gestion, Université de Sherbrooke</i>	Winter 2025
Calcul vectoriel (MAT298) <i>Département de mathématiques, Université de Sherbrooke</i>	Fall 2024
Statistique appliquée à la gestion (MQG222) <i>École de gestion, Université de Sherbrooke</i>	Summer 2024

Statistique appliquée à la gestion (MQG222)

École de gestion, Université de Sherbrooke

Winter 2024

Grader

Algebraic Structures (MTHE 217)

Smith Engineering, Queen's University

Fall 2025

Calculus I (APSC 171)

Smith Engineering, Queen's University

Fall 2025

Differential and Integral Calculus (MATH 121)

Department of Mathematics and Statistics, Queen's University

Fall 2025

Mathématiques discrètes (MAT120)

Département de mathématiques, Université de Sherbrooke

Fall 2024

Tutor

Mathematics, 10th grade

Volunteering with [Le Diplôme avant la Médaille](#)

2023 - 2024

Algèbre linéaire et géométrie vectorielle (MAT902)

Université de Sherbrooke

Summer 2023

Biomécanique humaine (KIN325)

Université de Sherbrooke

Winter 2023

Software

knowledgematrix

 GitHub

- A Python library for implementing neural networks and computing their associated *knowledge matrices* (i.e., N_V (Lemma 7.4) in [this paper](#) and $M(W, f)(x)$ in [this paper](#)).
- Tools: Python

simple_adversarial_detection

 GitHub

- Very simple version of the code used for the experiments in the paper Hidden Activations Are Not Enough: A General Approach to Neural Networks Predictions. [arXiv:2409.13163](#)
- Tools: Python

upperhalfplane

 GitHub

- Visualize the action of $\mathrm{PSL}(2, \mathbb{R})$ on the upper half plane (Poincaré half plane model) interactively. [samueleblanc.com/software/upperhalfplane](#)
- Tools: CindyJS, JavaScript, HTML, CSS

riemannsphere

 GitHub



- Visualize the action of $\mathrm{PSL}(2, \mathbb{C})$, i.e., Möbius transformations, and $\mathrm{PSP}(4, \mathbb{R})$ on the Riemann sphere interactively. [samueleblanc.com/software/riemannsphere](#)
Supervisor: [Jean-Philippe Burelle](#).
- Tools: CindyJS, JavaScript, HTML, CSS

MatTalX

 GitHub

- Chrome Extension and Firefox Add-on that allow the user to convert LaTeX commands into plain text, enabling them to write symbols anywhere. [https://mattalx.org](#)
- Tools: JavaScript, HTML, CSS, Bash

Talks

1. *Generalized Rank in Generalized Linear Algebra* (November 12, 2025)
Grad Seminar, Department of Mathematics and Statistics, Queen's University
2. *Analyse topologique de données* (February 13, 2025)
Club mathématiques de l'Université de Sherbrooke
3. *La propagation avant en tant que matrice* (November 14, 2024) 
Club mathématiques de l'Université de Sherbrooke
4. *Visualisation de transformations sur la sphère de Riemann* (March 21, 2024) 
Club mathématiques de l'Université de Sherbrooke
5. *Théorie des représentations des réseaux de neurones* (October 5, 2023)
Club mathématiques de l'Université de Sherbrooke

Academic Activities

35th RTA Meeting

Fall 2025

Attended the 35th Meeting on the Representation Theory of Algebras and Related Topics at the Université de Sherbrooke (Sherbrooke, QC). October 23 to 25, 2025.

Route 81 Conference

Fall 2025

Attended the Route 81 Conference at Queen's University (Kingston, ON). September 27, 2025.

Canadian Mathematical Society (CMS) Meeting

Summer 2025

Attended the 2025 CMS Summer Meeting at the Université Laval (Québec, QC). June 7 to 9, 2025.

34th RTA Meeting

Fall 2024

Attended the 34th Meeting on the Representation Theory of Algebras and Related Topics at the Université de Sherbrooke (Sherbrooke, QC). October 4 and 5, 2024.

Research School

Summer 2024

Attended the Summer Research School: Applications of Representation Theory in Topological Data Analysis and Geometric Invariant Theory, at the UQAM (Montréal, QC). June 3 to 7, 2024.

Introduction to Research (MAT523): Topological Data Analysis

Winter 2024

Optional course. *Département de mathématiques, Université de Sherbrooke*
Supervisor: [Thomas Brüstle](#)

Reading group in category theory

Winter 2024

Participated in weekly meeting with graduate students as well as undergraduates students. Gave several talks about the week's readings.

BIRS Workshop

Winter 2024

Assisted (online) to the BIRS Workshop: Representation Theory and Topological Data Analysis. April 8 to 11, 2024.

Research internship: Representation Theory of Quivers

Summer 2023

Département de mathématiques, Université de Sherbrooke
Supervisors: [Emily Cliff](#) and [Shiping Liu](#)

Experimental Mathematics Lab (MAT001): Projective Geometry

Winter 2023

Course taken beyond B.Sc. requirements. *Département de mathématiques, Université de Sherbrooke*
Supervisor: [Jean-Philippe Burelle](#)

Languages

French (native), English (advanced).