Kaveh Mousavand

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Employment

Okinawa Institute of Science and Technology (OIST) **Japan**
** Staff Scientist in Representation Theory & Algebraic Combinatorics* *(July 2025-Now)*

Okinawa Institute of Science and Technology (OIST) **Japan**
** Postdoctoral Scholar in Representation Theory & Algebraic Combinatorics(July 2023-June 2025)*

Queen's University **Canada**
**Coleman Postdoctoral Fellow in Department of Mathematics & Statistics (July 2020-June 2023)*

Research Interests

Representation Theory of Algebras, Combinatorics & Cluster Algebras, Topological Data Analysis.

PhD Studies

- **Doctoral studies at Université du Québec à Montréal** **Canada**
  Ph.D. dissertation: τ-tilting finiteness of minimal representation-infinite algebras *2015-2020*
  Ph.D. Advisor: Prof. Hugh Thomas
  I started my PhD studies at University of New Brunswick and then moved to UQAM, after my advisor, Prof. Thomas, accepted a new position and moved to Montréal.

Publications

1. (with S. Asai, O. Iyama, C. Paquette), *Left modular and extremal lattices through brick-directed algebras* (To appear in Proc. of the 38th Conf. on Formal Power Series and Algebraic Combinatorics – 2026).
2. (with C. Paquette), *Hom-Orthogonal modules and brick-Brauer-Thrall conjectures*, J. of Algebra, **686** (2026), 650-676.
3. (with M. Kulkarni, J. Matherne, D. J. Rock), *A continuous associahedron of type A*, Math. Z. **312**, 9 (2026).
4. (with C. Paquette), *Biserial algebras and generic bricks*, Math. Z., **310**, 64 (2025).
5. (with V. Bazier-Matte, N. Chapelier-Laget, G. Douville, H. Thomas, E. Yıldırım), *ABHY associahedra and Newton polytopes of F-ploynomials for cluster algebras of simply laced finite type*, J. Lond. Math. Soc. (2), **109** (2024), no. 1.
6. *τ-tilting finiteness of biserial algebras*, Algebr. Represent. Theory, **26** (2023), no. 6, 2485–2522.
7. (with C. Paquette), *Minimal τ-tilting infinite algebras*, Nagoya Math. J. **249** (2023), 221–238.
8. *τ-tilting finiteness of non-distributive algebras and their module varieties*, J. Algebra, **608** (2022), 673–690.

9. (with T. Brüstle, G. Douville, H. Thomas, E. Yıldırım), *On the combinatorics of gentle algebras*, Canad. J. Math. **72** (2020), no. 6, 1551–1580.
10. (with A. Garver, T. McConville), *A categorification of biclosed sets of strings*, J. Algebra, **546** (2020), 390–431.
11. (with D. Kucerovsky and A. Sarraf), *On some properties of Toeplitz matrices*, Cogent Math. **3** (2016), Art. ID 1154705.

Preprints:

12. (with C. Paquette), *Brick infinite algebras admit infinitely many non-τ-rigid bricks* (arXiv:2606.27063).
13. (with S. Asai, O. Iyama, C. Paquette), *Left modularity and extremality for (some) infinite lattices* (arXiv:2604.20947).
14. (with M. Deaconu, C. Paquette), *Infinite string bricks and Sturmian words over some gentle algebras* (arXiv:2510.22377).
15. (with C. Paquette), *On the bricks (Schur representations) of finite dimensional algebras* (arXiv:2508.11789).
16. (with S. Asai, O. Iyama, C. Paquette), *Brick-splitting torsion pairs and left modular Lattices* (arXiv:2506.13602).
17. (with C. Paquette), *Geometric interactions between bricks and τ-rigidity* (arXiv:2311.14863).

Applet development:

18. FDB Applet: A non-profit self-contained applet for exploring finite-dimensional gentle algebras defined by quivers with relations (available upon request).

Grants & Awards

- Fields Institute Elliott-Yui Distinguished Visitor (EYDV) Fellowship (2026).
- Tomlinson Fellowship, Visiting Scholar Funding Allocation, Bishop's University, Canada (2025-26).
- SHINKA Grant, Partnership with University of Tokyo: Prof. O. Iyama and Dr. S. Asai (2025).
- KAKENHI Early Career Research Grant (2024-27).
- Queen's University Professional Development Award (2022).
- Mitacs Globalink Research Award (2019).
- Scholarship for outstanding PhD candidates, Institute des Science du Mathématiques (2018).
- Bourse de stage international du FRQNT (2017).
- Bourse d'excellence, Institute des Science du Mathématiques (2016, 2017).

Research Visits (longer than 1 month)

- Queen's University, Kingston, Canada (2 months: Oct-Nov of 2026).
- Laboratoire d'Algèbre, de Combinatoire et d'Informatique Mathématique (LACIM), Montréal, Canada (2.5 months: March-May of 2026).
- Bishop's University, Sherbrooke, Canada (2 months: Sept-Oct of 2025).
- Bielefeld Representation Theory Group, Bielefeld, Germany (1.5 months: Oct-Nov of 2023).
- Institut Henri Poincaré (IHP), Paris, France (3 months: Jan-March of 2020).
- University of Paris-Sud, France (3 months: Sept-Nov of 2019).
- Massachusetts Institute of Technology (MIT), MA, US (4 months: Feb-May of 2017).
- Banach Center, Warsaw (IMPAN), Poland (3 months: Sept-Nov of 2016).

Selected presentations (Only at Conferences & Workshops in the past 5 years)

1. "*Lattice of torsion classes and (generalized) left modularity and extremality*", International Conference on Representations of Algebras (ICRA 22), Grenoble, France (July 2026).
2. "*Directedness of indecomposables, bricks, and spread (interval) modules*", Topological Data Analysis and Representation Theory 2026, Tohoku University, Japan (February 2026)*[*Invited Speaker*].
3. "*Recent developments on brick-Brauer-Thrall conjectures*", Quivers in Representation Theory, Chennai Mathematical Institute, India (December 2025)*[*Invited Speaker*].
4. "*Brick-directed algebras and their applications*", Program on Combinatorics, Geometry, and Representation Theory, ICTS Bangalore, India (November 2025).
5. "*Minimal brick-infinite tame algebras*", 35th Meeting on the Rep. Theory of Algebras & Related Topics (Conference in honor of Thomas Brüstle), Sherbrooke, Canada (Oct 2025)*[*Invited Speaker*].
6. "*Endomorphism algebra of modules and their modern applications*", Representation Theory of Lie Algebras, Shenzhen International Center for Mathematics, China (May 2025)*[*Invited Speaker*].
7. "*Hom-orthogonal modules and brick-Brauer-Thrall conjectures*", Perspectives in Tilting Theory and Related Topics, RIMS, Kyoto, Japan (Feb 2025)*[*Invited Speaker*].
8. "*Hom-orthogonal modules, bricks and representation varieties*", Topological Data Analysis and Representation Theory, Kobe, Japan (Feb 2025)*[*Invited Speaker*].
9. "*Bricks and hom-orthogonal modules*", Autumn meeting of Mathematical Society of Japan, Osaka, Japan (Sept 2024).
10. "*brick-Brauer-Thrall conjectures and some applications*", International Conference on Representations of Algebras (ICRA 21), Shanghai, China (Aug 2024).
11. "*New realizations & generalizations of locally representation-directed algebras*", International Workshop on Homological Approximation Theory and Applications, Hangzhou, China (July 2024)*[*Invited Speaker*].
12. "*A (τ-)tilting counterpart of cluster algebras of minimal infinite type*", Advances in Cluster Algebras, Nagoya University, Japan (March 2024)*[*Invited Speaker*].
13. "*Distribution of bricks and one-parameter families of stable modules*", McKay correspondence, Tilting theory and related topics, Kavli IPMU, Japan (Dec 2023)*[*Invited Speaker*].
14. "*The 2nd brick-Brauer-Thrall conjecture & a torus action on varieties*", Silting in Representation Theory, Singularities and Noncommutative Geometry, Oaxaca, Mexico (Sept 2023).
15. "*A combinatorial account of τ-tilting finiteness*", Spring School in Algebra and Representation Theory, University of Kent in Canterbury (April 2023).
16. "*Algebraic and combinatorial treatments of g-vector fans*", Combinatorial Algebra meets Algebraic Combinatorics, Waterloo, Canada (Jan 2023).
17. "*Biserial algebras and generic bricks*", Advances in Representation Theory of Algebras (ATRA VIII), Toruń, Poland (Sept 2022)*[*Invited Speaker*].
18. "*Distribution of Schur representations of finite dimensional algebras*", Non-commutative algebras, representation theory and special functions, Special program at CRM, Montreal (May 2022)*[*Invited Speaker*].
19. "*Distribution of bricks over tame algebras (Brick discrete vs. Brick continuous)*", Representations of Algebras and Related Combinatorics, Special Session of AMS meeting (March 2022).
20. "*Classification of minimal τ-tilting infinite biserial algebras*", Homological Methods in Representation Theory (Conference in honor of Lidia Angeleri Hügel), Germany (Oct 2021).

21. "*A modern analogue of the 2nd Brauer-Thrall conjecture*", Combinatorics and Representation Theory in Lausanne, Switzerland (Sept 2021).
22. "*Moduli spaces of quiver representations and an open conjecture*", Mathematical Conngress of Americas– Special session on Moduli Spaces in Algebraic Geometry and Applications (July 2021).
23. "*Distribution of bricks over minimal representation infinite algebras*", Advances in Representation Theory of Algebras – ATRA VII (May 2021)*[*Invited Speaker*].
24. "*Minimal τ-tilting infinite algebras and new conjectures*", 4th International Colloquium on representation of algebras and its applications, Bogota, Colombia (Nov 2020)*[*Invited Speaker*].

Seminars Talks (only after 2023)

LACIM (May 2026), Waterloo (May 2026), Sherbrooke (March 2026), Regina (March 2026), Queen's (September 2025), Carleton-Ottawa (January 2025), LACIM (January 2025), Sherbrooke (January 2025), Nantong (July 2024), Tokyo-Nagoya (December 2023), OIST (December 2023), Bielefeld (October 2023), Verona (May 2023), York (January 2023).

Organizing Duties:

Thematic Program Organization

- (Leading organizer) of the 7-week Thematic Program "*TDA PARTI - Topological Data Analysis, Persistence And Representation Theory Intertwined*", Okinawa Institute of Science and Technology (OIST), Japan, June 23-August 9, 2025.
  The interdisciplinary thematic program with over 70 in-person participants. The program contained 5 Minicourses, 13 Expository presentations and 3 Colloquium talks, many discussion sessions, and a 4-day Symposium (July 22-25).

Conferences & Workshops Organization:

- (Leading organizer) of J-PEAKS Workshop "*IMPRINT: Interface of Multiparameter Persistence and Representation Theory Interleaved with New Topics*, Okinawa, Japan, Feb. 1-5, 2027.
- Co-organizer of "*Spectrums in Representation Theory of Algebras and Related Topics*", Osaka Central Advanced Mathematical Institute, Japan, Dec. 16–19, 2025.
- (Leading organizer) of "*Workshop on bricks and endofinite representations*", Bielefeld, Germany, March. 3-5, 2025.
- (Leading organizer) of "*Autumn Research School & Conference: New Developments in Representation Theory of Algebras*", Okinawa, Japan, Nov. 18-30, 2024.
- (Leading organizer) of "*Spring Workshop on Representation Theory of Algebras*", Okinawa, Japan, April 22-26, 2024.
- (Local co-organizer) of the conference "*Advances in Representation Theory of Algebras IX*", Kingston, Canada, June 12-16, 2023.
- (Leading organizer) of the scientific session on "*Representation theory of algebras*" at Canadian Mathematical Society, Toronto, Canada, Dec. 3-5, 2022.
- Co-organizer of the conference "*Representation Theory and Geometry*", Feb. 14-16, 2022 [Online].
- Co-organizer of the "Poster Session" in Canadian Mathematical Society Winter Meeting, Toronto, Canada, Dec. 6-9, 2019.

Research Schools Organization:

- (Leading organizer) of the CIRM Research School on "*GRAPE: Geometric Representation theory in multipArameter PErsistence*",CIRM Research School, Luminy, France, June 7-11, 2027.
- Co-organizer of "*Winter School on Large Modules and Endofiniteness*", Stuttgart, Germany, Feb. 24-28, 2025.
- (Leading organizer) of the ISM Discovery School on "*Applications of Representation Theory in Topological Data Analysis & Geometric Invariant Theory*", Montréal, Canada, June 3-7, 2024.
- Co-organizer of the ISM Discovery School on "*Mutations: from cluster algebras to representation theory*", Montréal, Canada, July 4-8, 2022.

Working Groups & Seminars Organization:

- Founder and organizer of "Reading group on Machine Learning", Queen's University, 2022-23.
- Organizer of the "Algebra and Geometry Seminar" at Queen's University, Canada, 2021-23.
- Co-founder and co-organizer of "LaCIM Representation Theory Working Group", UQAM, 2015-19.
- Co-organizer of "Algebra Reading Group", University of New Brunswick, 2014-15.

Teaching Experience (only at the university level)

Advanced Mini-courses (at different institutes):
The target audience for these advanced topics courses was other researchers in Representation Theory of Algebras, Algebraic Combinatorics, and related domains.

- *On second brick-Brauer-Thrall conjecture and related problems* [Mini-course, Remotely]
  Topics course, consisting of three lectures (August 20-22, 2024), remotely hosted by IPM - Institute for Research in Fundamental Sciences, Isfahan, Iran.
- *On Combinatorics of gentle algebras* [Mini-course, in-person]
  Topics course, consisting of six lectures (February 2024), at Institute of Science and Technology (OIST), Japan.
- *On minimal (τ-)tilting infinite algebras* [Mini-course, Remotely]
  Topics course, consisting of six lectures (June 14-16, 2021), coordinated with Dr. Charles Paquette, remotely hosted by IPM - Institute for Research in Fundamental Sciences, Isfahan, Iran.

Undergraduate courses (at Queen's University, Canada):

- *Linear Algebra II* [100 students– In-person], Winter 2023.
- *Group Theory* [40 students– In-person], Fall 2022.
- *Introduction to Linear Algebra* [150 students– In-person], Winter 2022.
- *Vector Calculus* [135 students– Hybrid], Fall 2021.
- *Differential and Integral Calculus* [one of the 3 coordinators, 1,300 students– Remotely], Winter 2020.
- *Vector Analysis* [80 students– Remotely], Fall 2020.

Teaching Assistance (at University of New Brunswick, Canada):

- Calculus for Management Science, Winter 2015.
- Introduction to Calculus II, Fall 2015.
- Introduction to Calculus I, Fall & Winter 2014.
- Multivariable Calculus for Engineers, Winter 2013.

Services

- Reviewer and Referee in several journals of Mathematics (2020 - now).
- Member of the advisory committee for graduate course arrangement and minicourses at Okinawa Institute of Science and Technology (June 2025 - Now)
- Vice-President of Postdoctoral Scholars (Unit 2 of PSAC) at Queen's University, Kingston, ON, Canada (August 2022- March 2023).
- Reader in the Major Admission Awards Committee at Queen's University, Kingston, ON, Canada (2022 and 2023).
- Representative of Postdoctoral Scholars in the Postdoctoral Advisory Committee, Queen's University, Kingston, ON, Canada (July 2022 - June 23).
- Committee Member of Studc – Canadian Mathematical Society Student Committee (Sept. 2017 - April 2020).
- Representative of Graduate Students in Teaching Excellence and Policy Committee, University of New Brunswick, Fredericton, NB, Canada (April 2014 - April 2015).

References (In alphabetical order)

* For Research Capacity:

- Prof. Thomas Brüstle (Université de Sherbrooke, Canada)
  Email address: thomas.brustle@usherbrooke.ca
- Prof. Osamu Iyama (University of Tokyo, Japan)
  Email address: iyama@ms.u-tokyo.ac.jp
- Prof. Charles Paquette (Royal Military College, Canada)
  Email address: charles.paquette@rmc.ca
- Prof. Hugh Thomas (Université du Québec à Montréal, Canada)
  Email address: hugh.ross.thomas@gmail.com

* For Teaching & Professional Capacity:

- Dr. Ping Li (Queen's University, Canada)
  Email address: pingli@queensu.ca
- Prof. Ram Murty (Queen's University, Canada)
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