

EMİNE YILDIRIM

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EDUCATION

Ph.D. in Mathematics,
Université du Québec à Montréal, Canada. August 2015–May 2018
Advisor : Hugh Thomas

MSc. in Mathematics,
Abant İzzet Baysal University, Turkey. February 2010–June 2011
Advisor : Tahire Özen Öztürk

BSc. in Mathematics,
Abant İzzet Baysal University, Turkey. September 2006–January 2010

WORK EXPERIENCE

Research Fellow
University of Leeds, UK October 2022–present

INI-Simons Postdoctoral Fellow
Isaac Newton Institute; University of Cambridge October 2021–September 2022

Coleman Postdoctoral Fellow
Queen's University, Canada July 2018–June 2021

Teaching Assistant
University of New Brunswick, Canada January 2014–August 2015

Lecturer
İstanbul Arel University, Turkey September 2012–December 2013

PAPERS

C. Paquette, J. D. Rock, and E. Yıldırım, *Representations of thread quivers*, in preparation.

K. Baur, L. Bittmann, E. Gunawan, and G. Todorov, *Infinite friezes of affine type D*, arXiv:2407.11232.

I. Le and E. Yıldırım, *Cluster Categorification of Rank 2 Webs*, arXiv:2402.14501.

A. Felikson, P. Tumarkin and E. Yıldırım, *Polytopal realizations of non-crystallographic associahedra*, arXiv:2401.08285.

E. Kantarcı Oğuz and E. Yildirim, *Cluster Expansions: T-walks, Labeled Posets and Matrix Calculations*, arXiv:2211.08011.

R. Marczinzik, H. Thomas, and E. Yildirim, *On the interaction of the Coxeter transformation and the Rowmotion bijection*, arXiv:2201.04446, *accepted to Journal of Combinatorial Algebra*, DOI 10.4171/JCA/101.

C. Paquette and E. Yildirim, *A Completion of Discrete Cluster Categories of type A*, Transactions of the London Mathematical Society (2021), 8(1), 35–64.

V. Bazier-Matte, N. Chapelier-Laget, G. Douville, K. Mousavand, H. Thomas, and E. Yildirim, *ABHY associahedra and Newton polytopes of F -polynomials for cluster algebras of simply laced finite type*. Journal of the London Mathematical Society (2) 2024, 109 (1), Paper No. e12817, 27.

V. Bazier-Matte, G. Douville, A. Garver, R. Patrias, H. Thomas, and E. Yildirim, *Leading Terms of SL_3 Web Invariants*, International Mathematics Research Notices, (2020), rnaa110.

T. Brüstle, G. Douville, K. Mousavand, H. Thomas, and E. Yildirim, *On the combinatorics of gentle algebras*, Canadian Journal of Mathematics (2020), 72(6), 1551-1580.

E. Yildirim, *Coxeter transformation on cominusculer posets*. Algebra and Representation Theory (2019), 22(3), 699-722.

T. Özen and E. Yildirim, *\mathcal{X} -Injective and \mathcal{X} -Projective Complexes*. Bulletin of Iranian Mathematical Society (2016), 42(5), 1221-1235.

OTHER

K. Baur and E. Yildirim, *Cluster Algebras*, Encyclopedia of Mathematical Physics 2nd edition, book title: Reference Module in Materials Science and Materials Engineering, 2023.

AWARDS/ GRANTS

- London Mathematical Society Scheme 5: ‘Collaborations with Developing Countries’ grant.
- International Congress of Mathematicians 2022 travel grant (award not used since the conference moved to online).
- Invitation/Fund to Hausdorff Junior Trimester Program on “New Trends in Representation Theory” (award declined due to COVID-19/travel restrictions).
- Queen’s University Post-Doctoral Travel Award, 2018.
- Institute des Science du Mathématiques (ISM) Scholarships for Outstanding PhD Candidates, 2018.
- ISM Travel Grant, 2018.
- ISM Graduate Scholarships at UQAM. 2016, 2017, 2018.
- Tuition Exemption Scholarships at UQAM from 2015 to 2018.
- Graduate Scholarship from Prime Ministerial Office in Turkey. 2010-2011.

- Undergraduate Scholarship from Prime Ministerial Office in Turkey. 2006-2010.

ORGANIZING

I am/was a co-organizer of the following conference and seminars.

- Algebra seminars, University of Leeds, February 2023 - June 2024.
- CLAN (Clusters and their Applications in the North), UK, since January 2024.
- The Advances in Representation Theory of Algebras IX, Queen's University, June 2023.
- Cluster algebras and Representation Theory Seminars at Isaac Newton Institute, September-December 2021.
- Virtual Advances in Representation Theory of Algebras 2021 - Online Conference in Honor of Andrzej Skowroński, May 17-May 28 2021.
- Algebra & Geometry Working Seminars, Queen's University at the math department, 2020-2021.
- Geometry and Representation Theory Seminars, Queen's University at the math department, 2019-2020.
- Quantum Groups Learning Seminars, Queen's University at the math department, 2019-2020.

TEACHING

University of Leeds, United Kingdom:

- (Advanced) Commutative Rings and Algebraic Geometry

I was the module leader of this second semester course in 2024 where I was responsible for every aspect of the teaching as in my vector calculus class. The class size was about 36 students (a mix of undergraduates and master students).

- Projects in Mathematics

This is a year long course for students to carry out independent research. I co-supervised 5 students for different projects in the research area of "*Friezes*."

Queen's University, Kingston, Canada:

- Vector Calculus in the Fall semesters of 2018; 2019; 2020.

The class size was about 150 students in 2018 and 2019 and the online course in 2020 had about 275 students. I was the only instructor, thus the coordinator, of this course each semester and I was responsible for every aspect of the teaching including preparing and giving lectures, assigning homeworks, preparing exams and coordinating with teaching assistants for grading of the exams.

- Rings and Fields in the Winter semester 2019.

This was a coordinated course and I was responsible from preparing and giving lectures for my section which had about 55 students. I was also responsible for preparing weekly quizzes for my section and organizing weekly tutorial sessions with the teaching assistant.

- Linear Algebra for the Winter semester 2020; 2021.

This was a coordinated course and I had about 120 students in 2020 and 135 students in the online course in 2021. I was the coordinator of the online course in 2021 and was responsible for every aspect of the teaching.

University of New Brunswick, Fredericton, Canada:

- From January 2014 to June 2015, I worked as a teaching assistant for introductory calculus classes. I was responsible for preparing exercises and grading. I conducted problem solving sessions for two hours every week.
- In addition, I worked as a tutor at the Math Help Center helping students in their homeworks and questions related to math courses.

İstanbul Arel University, İstanbul, Türkiye:

- From September 2012 to December 2013, I was a full time lecturer. I taught introductory calculus classes in English to first and second year engineering students. I had around six sections each semester and each section included around 25 students. I was responsible from every aspect of teaching; preparing and giving lectures, assigning and grading homeworks, preparing and grading exams.

SUPERVISING

- İlknur Öztürk, *Root Systems and Reflection Groups*, summer 2023, Directed Reading Program Türkiye.
- Temi Abbass, *Triangulations and Friezes in three dimensions*, summer 2022, In2Research Program at the University of Cambridge.
- Zeliha Sevgi, *Quiver Representations*, summer 2022, Directed Reading Program Türkiye.
- Aysel Şahin, *Conway-Coxeter Friezes and related combinatorics*, summer 2021, Directed Reading Program Türkiye.
- Elifnaz Gülsen, *Quiver representations and their interaction with algebra and combinatorics*, one semester in 2019, Directed Reading Program Queen's University.
- Molly Liu, *Cluster algebras and combinatorics*, one semester in 2019, Directed Reading Program Queen's University.

ACTIVITIES

I am/was a

- co-leader at the workshop “Women in Noncommutative Algebra and Representation Theory 4”, Banff International Research Station, March 23 – 28, 2025.
- mentor in Directed Reading Program Türkiye in the summer of 2021, 2022 & 2023.
- mentor in Cambridge for 3 female undergraduate students in 2022.
- volunteer in the Mathematics Festival in Istanbul, 14-15 May 2022.
- host in the In2Science Program for 6 high school students at the University of Leeds between 7-11 August 2023.
- host In2Stem Program for 4 high school students at the University of Leeds between 5-9 August 2024.
- co-founder of the Maths Support Platform which provided academic resources, support and mentoring in math for undergraduate students who were affected by the major earthquake of February 2023 in Türkiye.

PRESENTATIONS

- Thread quivers, Women in Representation Theory: quivers, mutations, and beyond, Bielefeld University, September 2024.
- *From Triangulations to Friezes and Cluster Algebras*, Mathematics Department Seminar at Yeditepe University, May 2024 (online).
- *Thread quivers*, Pure Maths Seminar at Lancaster University, May 2024.
- *Exploring Combinatorial Windmills across Algebraic Landscape*, Algebra and Number Theory seminar at the University College Dublin, April 2024.
- *Matrix computation of cluster expansions*, Continued Fractions and SL_2 -tilings, Durham University, March 2024.
- *Why the Return to Pictures in Algebra?*, Pure maths colloquium, University of Sheffield, March 2024.
- *Cluster Expansion via matrices*, Cluster Algebra and Its Applications, Oberwolfach, January 2024.
- *Webs and $Gr(3,n)$* , Arbeitsgemeinschaft: Cluster Algebras, Oberwolfach, October 2023.
- *Friz Desenlerinin Cebirsel Yorumu*, 35. National Mathematics Symposium, Trakya University, Turkey, September 2023.
- *Friezes*, Combinatorial Representation Theory in Leeds, University of Leeds, July 2023.
- *Growth of frieze patterns*, Cluster Structures in the North 2023, University of Central Lancashire, Preston, June 2023.
- *Cluster Expansions via matrices*, Combinatorial aspects of Representation Theory, Norwegian Academy of Sciences and Letters in Oslo, March 2023.
- *Computing Cluster Expansions via matrices*, Glasgow Algebra and Number Theory seminar, University of Glasgow, March 2023.
- *Cluster Expansion via matrices*, Aarhus Homological Algebra Seminar, Aarhus University, February 2023.
- *Categories from Poset Quivers*, Algebra seminar, University of Manchester, December 2022.
- *Poset Quivers*, Algebra seminar, University of Leeds, October 2022.
- *Poset Quivers*, Geometric and combinatorial methods in homological algebra, Aarhus University, July 2022.
- *Cluster-tilting subcategories*, Bridges between representation theory and algebraic geometry: Singularities, friezes and cluster categories, University of Leeds, May 2022.
- Cluster categories: classical, discrete and beyond, Algebra seminar, University of Bath, May 2022.
- What is a connection between cluster algebras and friezes?; with Emily Gunawan, The Banff International Research Station, April 2022.
- *Periodic actions*, Bilkent Algebra Seminar, February 2022 (online).

- *Periodic actions on distributive lattices and counterparts in algebra*, FD Seminar, November 2021 (online).
- *Cluster structures*, New developments in Representation Theory arising from Cluster Algebras, Isaac Newton Institute, September 2021 (online).
- *The manifestations of Rowmotion in Representation Theory of Algebras*, Summer School of Algebraic Combinatorics, June 2021 (online).
- *Composition of the rowmotion and the Coxeter transformation*, Virtual Advances in Representation Theory of Algebras, May 2021 (online).
- *Webs and Modules*, TRAC Online Seminars, University of Sherbrooke, April 2021 (online).
- *Generalized Associahedra*, Algebra Seminar, University of Leeds, March 2021 (online).
- *Tilting theory and Quiver mutation*, LPA Seminars, Turkey, February 2021 (online).
- *Discrete cluster categories of type A and beyond*, Flash Talks in Representation Theory, NTNU, January 2021 (online).
- *The orbits of the Coxeter Transformation and Rowmotion for cominuscul posets*, Dynamical Algebraic Combinatorics, Banff International Research Station, October 2020 (online).
- *Graphs and Combinatorics in Representation Theory of Algebras.*, Queen's University Colloquium, October 2020 (online).
- *Associahedra and Quiver Representations*, Gebze Technical University, October 2020 (online).
- *The Coxeter Transformation and Rowmotion for cominuscul posets*, Kentucky Discrete Math Seminar, September 2020 (online).
- *Cluster categories*, Uluslararası Cebirsel Geometri Neşesi, 2020 (online).
- *Cluster categories capturing combinatorics of infinite cluster variables*, Algebra Seminar, University of Sherbrooke, Quebec, February 2020.
- *The Coxeter Transformation and Promotion*, Algebra Seminar, University of Toronto, Toronto, January 2020.
- *A completion of discrete cluster categories of type A*, Seventh Conference on Geometric Methods in Representation Theory, University of Missouri, Columbia, November 2019.
- *Rowmotion and Coxeter transformation*, Applied Algebra Seminar, York University, Toronto, September 2019.
- *A slight extension of discrete cluster categories*, Cluster Algebras and Quiver Representations, Centre de Recherches Mathématiques (CRM), August 2019.
- *Cluster categories for an infinite rank cluster algebra*, Summer Day of Representation Theory of Algebras, Université de Sherbrooke-Bishop's University, QC, July 2019.
- *The bounded derived category for cominuscul posets*, Maurice Auslander Distinguished Lectures and International Conference, Woods Hole, MA, April 2019.

- *The Web Basis and Preprojective Algebras*, American Mathematical Society Sectional Meeting, Hartford, CT, April 2019.
- *Associahedra and Newton Polytopes of F-Polynomials*, Cluster structures in geometry, physics, combinatorics and representation theory, Jerusalem, December 2018.
- *The bounded derived category for cominuscule posets*, Algebra seminar, Queen's University, Kingston, ON, September 2018.
- *Generalized Associahedra and Newton polytopes of F-polynomials*, Algebra seminar, Carleton University, Ottawa, ON, September 2018.
- *Associahedra via quiver representations*, Canadian Mathematical Society Summer Meeting, Fredericton, NB, June 2018.
- *The periodicity of the Coxeter transformation*, The XXI^e Colloque panquébécois des étudiants de l'Institut des Sciences mathématiques (ISM), Université de Sherbrooke, QC, May 2018.
- *The Coxeter transformation on cominuscule posets*, Séminaire de combinatoire, Université du Québec à Montréal, LaCIM, QC, February 2018.
- *The Coxeter transformation on cominuscule posets*, Department seminar, Mimar Sinan University, Istanbul, December 2017.
- *The Coxeter transformation on grid posets*, Department seminar, Istanbul Technical University, Istanbul, December 2017.
- *Cluster Monomials in Web Basis*, Algebra seminar, University of Sherbrooke, QC, November 2017.
- *Cluster Monomials in Web Basis*, Cluster algebras seminar, University of Connecticut, CT, November 2017.
- *Coxeter transformation on cominuscule posets*, Cluster algebras seminar, University of Connecticut, CT, October 2017.
- *Coxeter transformation on cominuscule posets*, Combinatoric seminar, University of Minnesota, MN, September 2017.
- *Auslander-Reiten translation on cominuscule posets*, Advances in Representation Theory of Algebras VI: Geometry and Homology (ARTA), Luminy, September 2017.
- *Periodic behavior of Auslander-Reiten translation*, The Mathematical Congress of the Americas (MCA), Montreal, QC, July 2017.
- *On the combinatorics of gentle algebras*, XXVIIIth Meeting on Representation Theory of Algebras, Sherbrooke, QC, September 2016.
- *Coxeter transformation of the poset of order ideals in a grid*, International Conference on Representations of Algebras, Syracuse, NY August 2016.
- *Cluster Algebras*, Graduate Seminars, University of New Brunswick, NB, April 2015.
- *Two dimensional Yetter-Drinfeld modules over $U_q(sl_2)$ are trivial*, Hopf Algebras in (Co)Action workshop, NB, June 2014.

- *Monomial ideals of path algebras*, Research Seminars, University of New Brunswick, NB, March 2014.

Research Visits

- Charles Paquette, Queen's University, 26 May - 26 June 2023.
- Esther Banaian, Aarhus University, 14-18 February 2023.
- Léa Bittmann, University of Edinburgh, 29 November - 1 December 2022.
- Anna Felikson and Pavel Tumarkin, Durham University, 15-18 July 2022.
- Alastair King, University of Bath, 3-5 May 2022.
- Ana Garcia Elsener, University of Glasgow, 9-12 April 2021.
- Ibrahim Assem, University of Sherbrooke, 30 June - 6 July 2019.
- Ralf Schiffler, University of Connecticut, 29 October - 3 November 2017.

CONFERENCES ATTENDED

- Women in Representation Theory: quivers, mutations, and beyond, Bielefeld University, September 2024.
- Clusters and their Applications in the North (CLAN), University of Central Lancashire, Preston, June 2024.
- Continued Fractions and SL_2 tilings, Durham University, March 2024.
- Clusters and their Applications in the North (CLAN), University of Glasgow, February 2024.
- Cluster Algebra and Its Applications, Oberwolfach, January 2024.
- Current Trends in Representation Theory, Cluster Algebras and Geometry, Centre International de Rencontres Mathématiques (CIRM), Luminy, November 2023.
- Combinatorial Representation Theory in Leeds, University of Leeds, July 2023.
- Functor Categories, Model Theory, and Constructive Category Theory, University of Málaga, July 2023.
- Cluster Structures in the North 2023, University of Central Lancashire, Preston, June 2023.
- Advances in Representation Theory of Algebras IX, Queen's University, Kingston, June 2023.
- Combinatorial aspects of Representation Theory, Norwegian Academy of Sciences and Letters in Oslo, March 2023.
- Geometric and combinatorial methods in homological algebra, Aarhus University, July 2022.
- Bridges between representation theory and algebraic geometry: Singularities, friezes and cluster categories, University of Leeds, May 2022.
- Counting conjectures and beyond, The Isaac Newton Institute, Cambridge, May 2022.
- ARTIN meeting, the University of Manchester, March 2022.

- Representation Theory and Geometry, Queen's University - RMC, February 2022 (online).
- Combinatorial Algebra meets Algebraic Combinatorics, 19th Annual Meeting, The Fields Institute, January 2022 (online).
- Dynamical Algebraic Combinatorics, Banff International Research Station (BIRS), November 2021 (online).
- New developments in representation theory arising from cluster algebras, Isaac Newton Institute, September 2021 (online).
- Summer School of Algebraic Combinatorics, June 2021 (online).
- Virtual ARTA 2021 - Online Conference in Honor of Andrzej Skowroński, May 2021 (online).
- Additive categories between algebra and functional analysis, March 2021 (online).
- Flash Talks in Representation Theory, NTNU, January 2021 & 2023 (online).
- Dynamical Algebraic Combinatorics, BIRS, October 2020 (online).
- Winter School "Connections between representation theory and geometry", Hausdorff Research Institute for Mathematics, October 2020 (online).
- Meeting on Representation Theory of Algebras – Corona Edition, Sherbrooke, QC, September 2020 (online).
- Categorifications in Representation Theory, September 2020 (online).
- Cluster Algebras 2020 (online).
- McKay correspondence, mutation and related topics, Kavli IPMU, August 2020 (online).
- Dimers in Combinatorics and Cluster Algebras, University of Michigan, August, 2020 (online).
- Seventh Conference on Geometric Methods in Representation Theory, University of Missouri, Columbia, November 2019.
- The 29th Annual Route 81 Conference on Commutative Algebra and Algebraic Geometry, Kingston, ON, October 2019.
- The XXXIst Meeting on Representation Theory of Algebras, Sherbrooke, QC, September 2019.
- Quiver Varieties and Representation Theory, Centre de Recherches Mathématiques (CRM), Montreal, QC, August 2019.
- Maurice Auslander Distinguished Lectures and International Conference, Woods Hole, Massachusetts, MA, April 2019.
- American Mathematical Society Sectional Meeting, Hartford, CT, April 2019.
- Cluster structures in geometry, physics, combinatorics and representation theory, Jerusalem, December 2018.
- The 28th Annual Route 81 Conference on Commutative Algebra and Algebraic Geometry, Syracuse, September 2018.

- The XXXth Meeting on Representation Theory of Algebras, Sherbrooke, QC, September 2018.
- Canadian Mathematical Society Summer Meeting, Fredericton, NB, June 2018.
- The XIX^e Colloque panquébécois des étudiants de l'ISM, Université de Sherbrooke, QC, May 2018.
- Cluster Algebras: Twenty Years On, Centre International de Rencontres Mathématiques (CIRM), Luminy, 2018.
- Combinatorial Algebra meets Algebraic Combinatorics, 15th Annual Meeting, Hamilton, ON, January 2018.
- The XXIXth Meeting on Representation Theory of Algebras, Sherbrooke, QC, September 2017.
- Advances in Representation Theory of Algebras VI: Geometry and Homology (ARTA), CIRM, Luminy, 2017.
- The Mathematical Congress of the Americas (MCA), Montreal, QC, July 2017.
- Maurice Auslander Distinguished Lectures and International Conference, Woods Hole, MA, April 2017.
- Combinatorial Algebra meets Algebraic Combinatorics, Fourteenth Annual Meeting, Montreal, QC, January 2017.
- The XXVIIIth Meeting on Representation Theory of Algebras, Sherbrooke, QC, September 2016.
- International Conference on Representations of Algebras, Syracuse, NY, August 2016.
- The XIX^e Colloque panquébécois des étudiants de l'ISM, QC, May 2016.
- Maurice Auslander Distinguished Lectures and International Conference, Woods Hole, MA, April 2016.
- Canadian Mathematical Society Winter Meeting, Montreal, QC, December 2015.
- The XXVIIth Meeting on Representation Theory of Algebras, Sherbrooke, QC, September 2015.
- Maurice Auslander Distinguished Lectures and International Conference, Woods Hole, MA, April 2015.
- Fall Eastern Sectional Meeting Dalhousie University, Halifax, NS, October 2014.

WORKSHOPS ATTENDED

- Arbeitsgemeinschaft: Cluster Algebras, Oberwolfach, October 2023.
- Mutations in Representation Theory of Algebras, University of Isfahan, May 2023 (online).
- Masterclass: Cluster Algebras and Representation Theory, University of Copenhagen, November 2022.
- Women in Noncommutative Algebra and Representation Theory 3, The Banff International Research Station, April 2022 (online).
- Cluster Algebras and Representation Theory, Semester-Program at the Isaac Newton Institute, Sept-Dec 2021, Cambridge, UK.

- Introductory Workshop: Group Representation Theory and Applications, Mathematical Sciences Research Institute, Berkeley, February 2018.
- Connections for Women: Group Representation Theory and Applications, Mathematical Sciences Research Institute, Berkeley, CA February 2018.
- School and Workshop: Algebraic and Geometric Combinatorics of Reflection Groups, Montreal, QC, June 2017.
- Sage Days 86, UQAM, Montreal, QC, April 2017.
- Workshop on Representations of Algebras, Syracuse, NY, August, 2016.
- Positive Grassmannians, CRM, Montreal, QC, July 2015.
- Cluster algebras, Poisson Structure, Networks and Integrable Systems, CRM, Montreal, QC, July 2015.
- Hopf Algebras in (Co)Action, Fredericton, NB, June 2014.
- Noncommutative Geometry and Quantum Groups, Bahçeşehir University, Istanbul, September 2014.
- Path Algebras and Homology, Bahçeşehir University, Istanbul, January 2013.

SKILLS

Languages: Turkish (native), English (fluent), French (intermediate).

Software: SAGE, GAP, PYTHON, R, JUPYTER.

Art: Painting, Photography.