

TIANYUAN XU

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EMPLOYMENT

- 08/2019–present Burnett Meyer Instructor, University of Colorado Boulder
(Mentor: Richard Green)
- 08/2017–07/2019 Coleman Postdoctoral Fellow, Queen’s University
(Mentor: Ivan Dimitrov, David Wehlau)

EDUCATION

- 06/2017 Ph.D. in Mathematics, University of Oregon
(Advisor: Victor Ostrik)
- 01/2014 M.S. in Mathematics, University of Oregon
- 05/2011 B.A. in Mathematics, Reed College

RESEARCH INTERESTS

Representation theory and algebraic combinatorics, with emphases on Kazhdan–Lusztig theory, diagrammatic categories, and quiver representations.

PAPERS

Published:

- [1] *Classification of Coxeter groups with finitely many elements of a -value 2*, with Richard Green. *Algebraic Combinatorics*, Volume 3, no.2, 2020.
- [2] *On the subregular J -rings of Coxeter systems*. *Algebras and Representation Theory*, Volume 22, Issue 6, 2019.
- [3] *Sandpiles and dominos*, with Laura Florescu, Daniela Morar, David Perkinson and Nick Salter. *The Electronic Journal of Combinatorics*, Volume 22 (1), 2015.
- [4] *A note on the critical group of a line graph*, with David Perkinson and Nick Salter. *The Electronic Journal of Combinatorics*, Volume 18 (1), 2011.

Submitted:

- [5] *Subregular J -rings of Coxeter systems via quiver path algebras*, with Ivan Dimitrov, Charles Paquette and David Wehlau.
- [6] *Kazhdan–Lusztig cells of \mathfrak{a} -value 2 in $\mathfrak{a}(2)$ -finite Coxeter groups*, with Richard Green.

Other Work:

- [7] *Graph partitions and free resolutions of toppling ideals*. Reed College Undergraduate Thesis, 2011.

MATHEMATICAL SOFTWARE*SageMath:*

- [1] *Efficient algorithm to compute products in the C' -basis of an Iwahori-Hecke algebra*, with Chase Meadors. SageTrac ticket #32352.
- [2] *Enumeration and manipulation of fully commutative elements in Coxeter groups*, with Chase Meadors. SageTrac ticket #30243.

AWARDS

- 06/2018 Postdoctoral Fellow Travel Award, Queen's University
- 01/2017 Johnson Travel Fellowship, University of Oregon

CONFERENCE AND SEMINAR PRESENTATIONS*Invited Research Talks:*

- 02/2022 Colloquium. Metropolitan State University of Denver (scheduled).
- 11/2021 Representation Theory Seminar. Okinawa Institute of Science and Technology (online, scheduled).
- 06/2021 The 25 Ontario Combinatorics Workshop. Online.
- 05/2021 AMS Western Sectional Meeting, special session on “Categorical and Combinatorial Methods in Representation Theory and Related Topics”. Online.
- 03/2021 Colloquium. Reed College (online).
- 09/2020 Sherbrooke Meeting on Representation Theory of Algebras. Université de Sherbrooke (online).
- 01/2020 Combinatorics Seminar. University of California, San Diego.
- 01/2020 AMS–MAA Joint Mathematics Meetings, special session on “Interactions between Combinatorics, Representation Theory, and Coding Theory”. Denver, Colorado.

- 11/2019 AMS Western Sectional Meeting, special session on “Geometry and Representation Theory of Quantum Algebras and Related Topics”. University of California, Riverside.
- 10/2019 Algebraic Lie Theory Seminar. University of Colorado Boulder.
- 09/2019 Rocky Mountain Algebraic Combinatorics Seminar. Colorado State University.
- 07/2019 Combinatorics Seminar. LaCIM, Université du Québec à Montréal.
- 03/2019 Joint Algebra Seminar. University of Ottawa/Carleton University.
- 11/2018 Applied Algebra Seminar. York University.
- 10/2018 Colloquium. Queen’s University.
- 09/2018 Geometry and Representation Theory Seminar. Queen’s University.
- 07/2018 Ottawa–Lyon–Sao Paulo Workshop on Representation Theory. Carleton University.
- 06/2018 Canadian Mathematical Society Summer Meeting, special session on “Representation Theory of Algebras and Related Topics”. University of New Brunswick.
- 01/2018 Fifteenth Annual Meeting of “Combinatorial Algebra Meets Algebraic Combinatorics”. McMaster University.
- 09/2017 Geometry and Representation Theory Seminar. Queen’s University.
- 10/2016 AMS Central Sectional Meeting, special session on “Combinatorial Representation Theory”. University of St. Thomas.
- 04/2016 MAA Pacific Northwest Sectional Meeting, special session on “Algebra and Number Theory”. Oregon State University.
- 04/2011 Northwest Undergraduate Mathematics Symposium. Reed College.
- 09/2010 Colloquium. Reed College.

Posters and Contributed Talks:

- 03/2017 Southwest Local Algebra Meeting. University of New Mexico. (poster)
- 01/2017 AMS-MAA Joint Mathematics Meetings. Atlanta, Georgia. (contributed talk)
- 06/2016 The Second US–Mexico Conference on Representation Theory, Categorification, and Noncommutative Algebra. University of Southern California. (poster)
- 04/2016 AMS Western Sectional Meeting. University of Utah. (contributed talk)
- 02/2016 Southwest Local Algebra Meeting. Texas State University. (poster)

Other Presentations:

- 2018 Math Club, Queen’s University. Expository talk “Knot invariants, by pulling strings” aimed at undergraduate audience.
- 2011-17 A total of 10 talks at the University of Oregon, including 5 talks at the Student Algebra Seminar, 3 talks at the Graduate Notions Seminar, and 2 talks at the Undergraduate Teaching Seminar.

CONFERENCE AND SEMINAR CO-ORGANIZED

- [1] Eighth Edition of Advances in Representation Theory of Algebras. Queen's University, 06/2023.
- [2] Special Edition of Advances in Representation Theory of Algebras. Online, 05/2021.
- [3] Special session on "Diagrammatic and Combinatorial Methods in Representation Theory". AMS Western Sectional Meeting for Spring 2021, 05/2021.
- [4] Algebraic Lie Theory Seminar. University of Colorado Boulder, 08/2019–present.
- [5] Putnam Exam Seminar. Queen's University, 09/2018–12/2018.
- [6] Geometry and Representation Theory Seminar. Queen's University, 09/2017–06/2019.
- [7] Student Algebra Seminar. University of Oregon, 09/2015–06/2017.

REFeree EXPERIENCE

Refereed for *Experimental Mathematics*, *Mathematical Reviews*, *Proceedings of the American Mathematical Society*, *Science China Mathematics*, and *zbMATH Open*.

TEACHING EXPERIENCE

Taught the following courses as the Instructor of Record; in addition, served as Teaching Assistant at the University of Oregon for Introduction to Statistics in Spring 2012 and for Discrete Mathematics in Fall 2015 and Fall 2013.

University of Colorado Boulder, 09/2019–present:

- Introduction to Lie Algebras (graduate level). Fall 2020.
- Independent Study on Crystal Bases (graduate level). Spring 2020.
- Independent Study on Group Theory (undergraduate level). Fall 2020, Spring 2021.
- Undergraduate Honors Thesis. Fall 2020, Spring 2021, Fall 2021.
- Abstract Algebra II. Spring 2021.
- Abstract Algebra I. Fall 2019.
- Linear Algebra for Math Majors. Spring 2020. Fall 2021.
- Linear Algebra for Non-Math Majors. Spring 2021, Fall 2019.

Queen's University, 08/2017–07/2019:

- Group Theory. Fall 2017.
- Ordinary Differential Equations. Winter 2018, Fall 2018, Winter 2019.

University of Oregon, 09/2011–06/2017:

Linear Algebra. Winter 2016, Winter 2017.
Calculus III. Spring 2014, Spring 2015, Fall 2016, Spring 2017.
Calculus II. Winter 2013, Spring 2013.
Calculus I. Summer 2012.
Calculus for Business and Social Sciences. Summer 2015.
Graph Theory. Summer 2014.
College Algebra II. Winter 2014.
College Algebra I. Fall 2011, Winter 2012, Fall 2012, Fall 2014.

MENTORING ACTIVITIES*University of Colorado Boulder:*

- [1] Honors Thesis, 09/2021–present
Currently supervising the Honors Thesis in Mathematics of Theodore Gonzales.
- [2] Honors Thesis, 09/2020–05/2021
Supervised the Honors Thesis in Mathematics of Thomas Magnuson, who graduated *magna cum laude*.
- [3] Summer Research Program, 05/2020–08/2020
Mentored Rachel Castro, Joel Courtney, Chase Meadors, Natalie Schoenals and Thomas Magnuson in the project “Fully Commutative Kazhdan–Lusztig Cells in Coxeter Groups”.
Developed source code that is now officially included in the SageMath software.
- [4] Experimental Mathematics Lab, 01/2020–05/2020
Mentored Natalie Schoenals, Saurabh Totey and Wei Qu in the project “Implementing Fully Commutative Elements of Coxeter Groups in SageMath”.

Queen’s University:

- [5] Summer Research Program, 05/2021–08/2021 (online)
Co-supervised Andrew Buchanan and Olivia Grace on the project “Representations of Free Products of Certain Algebras”, via the Undergraduate Student Research Award (USRA) program supported by the Natural Science and Engineering Research Council of Canada (NSERC).
- [6] Putnam Exam Coach, 09/2018–12/2018
Co-organized the Putnam Exam Seminar and coached the university Putnam team for 2018. The team placed 45th out of all participating universities in North America.
- [7] Summer Research Program, 05/2018–08/2018
Co-supervised Sean Monahan on the project “The Cartan Determinant Conjecture”, via the USRA program supported by the NSERC.

University of Oregon:

- [8] Undergraduate Reading Program, 09/2016–06/2017
Mentored Anna Gladstone and Jonathan Wood on the project “Combinatorics of Coxeter groups” via the Undergraduate Reading Program hosted by the Association for Women in Mathematics. The project led to a poster presentation by the students at the mathematics department.
- [9] Honors Thesis, 03/2016–06/2016
Served as Second Reader for Jonathan Wood’s Honors Thesis in Mathematics.

COMMITTEE SERVICE

- [1] Comprehensive Exam Committee. University of Colorado Boulder. 04/2021–present
Served on the mathematics comprehensive exam committee of graduate students Hunter Davenport, Chris Eblen and Justin Willson.
- [2] Diversity Committee. University of Colorado Boulder. 08/2020–present
Co-organized workshop “Effective Bystander Skills” for graduate students and post-doctoral fellows in the mathematics department and workshops “Recognizing and Interrupting Sexism”, “Managing Difficult Classroom Dynamics” for the department.
- [3] Undergraduate Mentoring Committee (co-chair). University of Oregon. 09/2016–06/2017.
Co-organized the Undergraduate Reading Program for the University of Oregon Chapter of the Association for Women in Mathematics. Paired undergraduate participants with graduate student mentors; organized poster session with ten presentations.
- [4] Distinguished Speaker Series Committee. University of Oregon. 09/2015–06/2016.
Helped invite two speakers for the speaker series hosted by the University of Oregon chapter of the Association of Women in Mathematics; co-organized speaker reception.
- [5] Counseling committee. Lane Education District, Oregon. 07/2013–08/2013.
Advised middle and high school teachers from Lane County, Oregon in the “Mastering Mathematical Logic & Literary” program; helped develop lesson plans.
- [6] Exam Committee. University of Oregon. 05/2012.
Designed and graded exams for the Oregon Invitational Mathematics Tournament, a competition for high school students from Oregon.
- [7] Counseling committee. Lane Education District, Oregon. 07/2012.
Advised middle and high school teachers from Eugene, Oregon in the workshop “Common Core State Standards in Mathematics”; helped develop lesson plans.
- [8] Logistics committee. Reed College. 04/2011.
Assisted with registration and reception for the Northwest Undergraduate Mathematics Symposium, a one-day conference with 76 participants.