

Tianyi Yu

CONTACT
INFORMATION

LACIM
Université du Québec à Montréal
Montréal, QC, Canada

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EDUCATION

University of California, San Diego, La Jolla, CA, USA 2020 - 2024
PhD in Mathematics, Advisor: **Brendon Rhoades**

University of California, San Diego, La Jolla, CA, USA 2016 - 2020
Bachelor of Science in Mathematics & Bachelor of Science in Computer Science

EMPLOYMENT

Laboratoire d'Algèbre, de Combinatoire et d'Informatique Mathématique,
Montréal, QC, Canada 2024 - 2026
CRM-ISM Postdoctoral Fellow,
Mentors: François Bergeron, Jake Levinson, Alejandro Morales, Hugh Thomas, and Franco Saliola

RESEARCH
INTERESTS

Algebraic combinatorics: Schubert calculus, Lascoux polynomials, Grothendieck polynomials, bumpless pipe dreams, crystal operators, coinvariant algebra.

PREPRINTS

- [1] *Grothendieck positivity for normal square root crystals*, with Marberg, E. & Tong, K.H.
Preprint [arXiv:2501.16640](https://arxiv.org/abs/2501.16640)
- [2] *Tableau formula for vexillary double Edelman–Greene coefficients*,
with Gregory, A. & Hamaker, Z. Preprint [arXiv:2412.20615](https://arxiv.org/abs/2412.20615)
- [3] *Marked bumpless pipedreams and compatible pairs*, with Huang, D. & Shimozono, M.
Preprint [arXiv:2407.18160](https://arxiv.org/abs/2407.18160)
- [4] *Embedding bumpless pipedreams as Bruhat chains*.
Preprint [arXiv:2407.05904](https://arxiv.org/abs/2407.05904)
- [5] *Lascoux expansion of Lascoux times stable Grothendieck*, with Orelowitz, G.
Preprint [arXiv:2312.01647](https://arxiv.org/abs/2312.01647)
- [6] *Connection between Schubert polynomials and top Lascoux polynomials*.
Preprint [arXiv:2306.04159](https://arxiv.org/abs/2306.04159)

PUBLICATIONS

- [7] *Grothendieck polynomials of inverse fireworks permutations*, with Chou, C.
European Journal of Combinatorics (2025).
- [8] *Constructing a Gröbner basis of Griffin's ideal*. *Mathematische Zeitschrift* (2024).
- [9] *Constructing maximal pipedreams of double Grothendieck polynomials*, with Chou, C.
The Electronic Journal of Combinatorics (2024).
- [10] *A row analogue of Hecke column insertion*, with Huang, D. & Shimozono, M.
Combinatorial Theory (2024).

- [11] *A Bijection between K-Kohnert Diagrams and Reverse Set-Valued Tableaux*, with Pan, J.
The Electronic Journal of Combinatorics (2023).
- [12] *Top-degree components of Grothendieck and Lascoux polynomials*, with Pan, J.
Algebraic Combinatorics (2023).
- [13] *Set-valued tableaux rule for Lascoux polynomials*. Combinatorial Theory (2023).
- [14] *Grothendieck to Lascoux expansions*, with Shimozono, M.
Transactions of the American Mathematical Society (2023).
- [15] *Harmonic bases for generalized coinvariant algebras*, with Rhoades, B. & Zhao, Z.
The Electronic Journal of Combinatorics (2020).

CONFERENCE
PROCEEDINGS

- [16] *Analogues of two classical pipedream results on bumpless pipedreams*.
Proceedings of the 36th Conference on Formal Power Series and Algebraic Combinatorics,
extended abstract of [4].
- [17] *Grothendieck to Lascoux expansions*, with Shimozono, M.
Proceedings of the 34th Conference on Formal Power Series and Algebraic Combinatorics,
extended abstract of [14].
- [18] *Harmonic bases for generalized coinvariant algebras*, with Rhoades, B. & Zhao, Z.
Proceedings of the 33rd Conference on Formal Power Series and Algebraic Combinatorics,
extended abstract of [15].

AWARDS AND
GRANTS

University of California, San Diego

- Selma and Robert Silagi Award for Undergraduate Excellence (5000 USD)

TALKS

An insertion algorithm for Schubert Cauchy identity via Pieri formula

- Geometry Seminar. Texas A&M University. College Station, TX. Mar. 2025
- Combinatorics Seminar. University of California, San Diego. La Jolla, CA. Mar. 2025

Grothendieck positivity for normal square root crystals

- AMS Sectional Meeting. University of Kansas. Lawrence, KS. Mar. 2025
- Richard P. Stanley Seminar in Combinatorics. Harvard University. Cambridge, MA. Feb. 2025
- Combinatorics Seminar. University of Florida. Gainesville, FL. Jan. 2025
- Combinatorics Seminar. Laboratoire d'Algèbre, de Combinatoire et d'Informatique Mathématique. Montréal, QC, Canada. Dec. 2024

K-theoretic analogue of Demazure crystal

- Hong Kong University of Science and Technology. Hong Kong, China. Sep. 2024

Three combinatorial formulas of Lascoux polynomials

- Sun Yat-sen University. Guangzhou, China. Aug. 2024
- Guangdong Technion-Israel Institute of Technology. Shantou, China. Aug. 2024

Embedding bumpless pipedreams as Bruhat chains

- Formal Power Series and Algebraic Combinatorics conference. Bochum, Germany. Jul. 2024
- Center for Combinatorics, Nankai University. Tianjin, China. Jul. 2024
- Beijing International Center for Mathematical Research. Beijing, China. Jul. 2024
- Combinatorics And Representation Theory Seminar. Seoul, Korea (via zoom). (invited) Apr. 2024
- Graduate Student Combinatorics Conference. Pittsburgh, PA. Mar. 2024
- The CAGE (Combinatorics, Algebra, and Geometry) Seminar. Philadelphia, PA. Mar. 2024
- Combinatorics Seminar. University of Southern California. Los Angeles, CA. (invited) Jan. 2024
- Combinatorial Algebra meets Algebraic Combinatorics. Montréal, QC, Canada. Jan. 2024

- Combinatorics Seminar. Laboratoire d'Algèbre, de Combinatoire et d'Informatique Mathématique. Montréal, QC, Canada. Dec. 2023
- Combinatorics Seminar. University of California, San Diego. La Jolla, CA. Nov. 2023
- Algebra Seminar. Virginia Polytechnic Institute and State University. Blacksburg, VA. Nov. 2023
- Combinatorics Seminar. University of Waterloo. Waterloo, ON, Canada. Sep. 2023
- Algebraic Combinatorics Seminar. Fields Institute. Toronto, ON, Canada. Sep. 2023

Pipedreams, bumpless pipedreams and Bruhat chains

- Schubert Seminar. Online. Nov. 2023

Top-degree components of Grothendieck and Lascoux polynomials

- Sichuan University. Chengdu, China (via zoom). (invited) Nov. 2024
- Combinatorics Seminar. University of Michigan. Ann Arbor, MI. (invited) Mar. 2023
- Graduate Student Combinatorics Conference. St. Louis, MO. Mar. 2023
- Combinatorics Seminar. University of California, San Diego. La Jolla, CA. Jan. 2023
- Combinatorics Seminar. University of California, Los Angeles. Los Angeles, CA. Nov. 2022

A row analogue of Hecke column insertion

- Combinatorics Seminar. University of Florida. Gainesville, FL. Nov. 2022
- Combinatorics Seminar. University of Minnesota. Minneapolis, MN. (invited) Sep. 2022
- Combinatorics Seminar. University of Illinois, Urbana-Champaign. Urbana, IL. Sep. 2022

Grothendieck to Lascoux expansions

- Combinatorics and Geometry Seminar. University of Washington. Seattle, WA. Apr. 2022
- Graduate Student Combinatorics Conference. San Diego, CA (via zoom). Mar. 2022
- Algebra & Combinatorics Seminar. North Carolina State University. Raleigh, NC. (invited) Nov. 2021
- Algebra Seminar. Virginia Polytechnic Institute and State University. Blacksburg, VA. Nov. 2021
- Combinatorics Seminar. University of California, San Diego. La Jolla, CA. Oct. 2021
- Combinatorics Seminar. University of Waterloo. Waterloo, ON, Canada (via zoom). (invited) Sep. 2021
- Combinatorics Seminar. University of Illinois, Urbana-Champaign. Urbana, IL. (invited) Sep. 2021
- Combinatorics Seminar. University of Minnesota. Minneapolis, MN. Sep. 2021

Harmonic bases for generalized coinvariant algebras

- Formal Power Series and Algebraic Combinatorics conference. Ramat-Gan, Israel (via zoom). Jan. 2022
- Combinatorics Seminar. University of California, San Diego. La Jolla, CA Jun. 2021

TEACHING EXPERIENCE

Department of Mathematics, UCSD

Teaching Assistant: Calculus, Mathematical Reasoning, Combinatorics, Algebraic Combinatorics.

Department of Computer Science and Engineering, UCSD

Teaching Assistant: Discrete Mathematics, Design and Analysis of Algorithms, Theory of Computability.