

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
 PhD in Mathematics, Advisor: Brendon Rhoades

2020 - 2024

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

2016 - 2020

EMPLOYMENT

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

2024 - 2026

RESEARCH INTERESTS

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

PREPRINTS

- [1] *A positive combinatorial formula for the double Edelman–Greene coefficients*, with Chou, C.
 Preprint [arXiv:2512.12185](https://arxiv.org/abs/2512.12185)
- [2] *Grothendieck positivity for normal square root crystals*, with Marberg, E. & Tong, K.H.
 Preprint [arXiv:2501.16640](https://arxiv.org/abs/2501.16640)
- [3] *Tableau formula for vexillary double Edelman–Greene coefficients*,
 with Gregory, A. & Hamaker, Z. Preprint [arXiv:2412.20615](https://arxiv.org/abs/2412.20615); In revision, Selecta Mathematica
- [4] *Lascoux expansion of Lascoux times stable Grothendieck*, with Orelowitz, G.
 Preprint [arXiv:2312.01647](https://arxiv.org/abs/2312.01647); In revision, Combinatorial Theory.

PUBLICATIONS

- [5] *Embedding bumpless pipedreams as Bruhat chains*.
 International Mathematics Research Notices (2025).
- [6] *Marked bumpless pipedreams and compatible pairs*, with Huang, D. & Shimozono, M.
 Combinatorial Theory (Accepted).
- [7] *Connection between Schubert polynomials and top Lascoux polynomials*.
 Algebraic Combinatorics (2025).
- [8] *Grothendieck polynomials of inverse fireworks permutations*, with Chou, C.
 European Journal of Combinatorics (2025).
- [9] *Constructing a Gröbner basis of Griffin's ideal*. Mathematische Zeitschrift (2024).
- [10] *Constructing maximal pipedreams of double Grothendieck polynomials*, with Chou, C.
 The Electronic Journal of Combinatorics (2024).

- [11] *A row analogue of Hecke column insertion*, with Huang, D. & Shimozono, M. *Combinatorial Theory* (2024).
- [12] *A Bijection between K-Kohnert Diagrams and Reverse Set-Valued Tableaux*, with Pan, J. *The Electronic Journal of Combinatorics* (2023).
- [13] *Top-degree components of Grothendieck and Lascoux polynomials*, with Pan, J. *Algebraic Combinatorics* (2023).
- [14] *Set-valued tableaux rule for Lascoux polynomials*. *Combinatorial Theory* (2023).
- [15] *Grothendieck to Lascoux expansions*, with Shimozono, M. *Transactions of the American Mathematical Society* (2023).
- [16] *Harmonic bases for generalized coinvariant algebras*, with Rhoades, B. & Zhao, Z. *The Electronic Journal of Combinatorics* (2020).
- CONFERENCE PROCEEDINGS**
- [17] *Marked bumpless pipedreams and compatible pairs*, with Huang, D. & Shimozono, M. *Proceedings of the 37th Conference on Formal Power Series and Algebraic Combinatorics*, extended abstract of [6].
- [18] *Analogues of two classical pipedream results on bumpless pipedreams*. *Proceedings of the 36th Conference on Formal Power Series and Algebraic Combinatorics*, extended abstract of [5].
- [19] *Grothendieck to Lascoux expansions*, with Shimozono, M. *Proceedings of the 34th Conference on Formal Power Series and Algebraic Combinatorics*, extended abstract of [15].
- [20] *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 [16].

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.