Tianyi Yu

CONTACT INFORMATION	LACIM Université du Québec à Montréal Montréal, QC, Canada	*E-mail:* yu.tianyi@uqam.ca *Website:* https://tianyi-math.github.io/

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

[2] *Tableau formula for vexillary double Edelman–Greene coefficients*,
with Gregory, A. & Hamaker, Z. Preprint arXiv:2412.20615; In revision, Selecta Mathematica

[3] *Lascoux expansion of Lascoux times stable Grothendieck*, with Orelowitz, G.
Preprint arXiv:2312.01647; In revision, Combinatorial Theory.

PUBLICATIONS

[4] *Embedding bumpless pipedreams as Bruhat chains*.
International Mathematics Research Notices (2025).

[5] *Marked bumpless pipedreams and compatible pairs*, with Huang, D. & Shimozono, M.
Combinatorial Theory (Accepted).

[6] *Connection between Schubert polynomials and top Lascoux polynomials*.
Algebraic Combinatorics (2025).

[7] *Grothendieck polynomials of inverse fireworks permutations*, with 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] *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 [5].

[17] *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].

[18] *Grothendieck to Lascoux expansions*, with Shimozono, M.
Proceedings of the 34th Conference on Formal Power Series and Algebraic Combinatorics,
extended abstract of [14].

[19] *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.