

Foster Tom

Curriculum Vitæ

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Academic Positions

2022-2025 **Massachusetts Institute of Technology**
Postdoctoral Instructor, Mathematics

Education

2018-2022 **University of California, Berkeley**
Ph.D., Mathematics, Supervised by Mark Haiman, Received May 2022

2016-2018 **University of British Columbia**
M.Sc., Mathematics, Supervised by Stephanie van Willigenburg

2012-2016 **University of British Columbia**
B.Sc., Honours Mathematics

Publications

Submitted

- 2024 [Adjacent cycle-chains are \$e\$ -positive](#)
(with Aarush Vailaya)
- 2024 [On \$e\$ -positivity of trees and connected partitions](#)
- 2024 [Chromatic symmetric functions and change of basis](#)
(with Bruce Sagan)

Accepted

- 2025 [A signed \$e\$ -expansion of the chromatic quasisymmetric function](#)
Combinatorial Theory

Appeared

- 2023 [A horizontal-strip LLT polynomial is determined by its weighted graph](#)
Combinatorial Theory, Vol. 3, No. 3.
- 2021 [A combinatorial Schur expansion of triangle-free horizontal-strip LLT polynomials](#)
Combinatorial Theory, Vol. 1, No. 14.
- 2020 [Classifying the near-equality of ribbon Schur functions](#)
European Journal of Combinatorics, Vol. 90, 103197.
- 2019 [The number of rational points of hyperelliptic curves over subsets of finite fields](#)
(with Kristina Nelson, József Solymosi, and Ching Wong)
Involve, a Journal of Mathematics, Vol. 12, No.5, pp.755–765.
- 2018 [Necessary conditions for Schur maximality](#)
(with Stephanie van Willigenburg)
Electronic Journal of Combinatorics, Vol. 25, P2.30.

Refereed Conference

- 2025 **On e -positivity of trees and connected partitions**
- 2024 **A signed e -expansion of the chromatic symmetric function and some new e -positive graphs**
Séminaire Lotharingien de Combinatoire 91B.48 (2024)
- 2023 **Horizontal-strip LLT polynomials**
Séminaire Lotharingien de Combinatoire 89B.40 (2023)
- 2021 **A combinatorial Schur expansion of triangle-free horizontal-strip LLT polynomials**
Séminaire Lotharingien de Combinatoire 85B.18 (2021)
- 2018 **Schur-positivity of equitable ribbons**
(with Stephanie van Willigenburg)
Séminaire Lotharingien de Combinatoire 80B.18 (2018)

Presentations

Invited Conference

- 2025 **Graphs missing a connected partition**
Canadian Discrete and Algorithmic Mathematics Conference (CanADAM)
- 2025 **A signed e -expansion of the chromatic quasisymmetric function**
Combinatorics on flag varieties and related topics 2025
- 2024 **Chromatic symmetric functions and change of basis**
Conference on Enumerative and Algebraic Combinatorics
- 2022 **Horizontal-strip LLT polynomials**
Banff International Research Station Workshop
- 2022 **AMS Spring 2022 Western Sectional Meeting**

Contributed

- 2024 **On e -positivity of the chromatic symmetric function**
University of Washington Combinatorics Seminar
- 2024 **Dartmouth Combinatorics Seminar**
- 2024 **Richard P. Stanley Seminar in Combinatorics**
- 2024 **A signed e -expansion of the chromatic quasisymmetric function**
Algebraic Combinatorics Virtual Expedition (AlCoVE)
- 2024 **Formal Power Series and Algebraic Combinatorics Conference (FPSAC)**
- 2024 **Beijing Institute of Technology Seminar**
- 2024 **Brandeis Combinatorics Seminar**
- 2024 **UC Berkeley Combinatorics Seminar**
- 2024 **UBC Discrete Math Seminar**
- 2023 **Illinois Institute of Technology Discrete Applied Math Seminar**
- 2023 **Horizontal-strip LLT polynomials**
Formal Power Series and Algebraic Combinatorics Conference (FPSAC)
- 2023 **MIT-Harvard-MSR Combinatorics Seminar**
- 2021 **Rocky Mountain Algebraic Combinatorics Seminar**
- 2021 **UC Davis Algebraic Combinatorics Seminar**
- 2021 **Waterloo Algebraic and Enumerative Combinatorics Seminar**

A combinatorial Schur expansion of triangle-free horizontal-strip LLT polynomials
2021 Formal Power Series and Algebraic Combinatorics Conference (FPSAC)
2021 Algebraic Combinatorics Virtual Expedition (AlCoVE)
2021 Canadian Discrete and Algorithmic Mathematics Conference (CanaDAM)
2021 UC Berkeley Combinatorics seminar
2021 York University Applied Algebra seminar
2021 Graduate Online Combinatorics Colloquium (GOCC)

Classifying the near-equality of ribbon Schur functions
2019 Canadian Discrete and Algorithmic Mathematics Conference (CanaDAM)
2018 UC Berkeley Combinatorics Seminar
2017 UBC Graduate Student Seminar

Necessary conditions for Schur maximality (with Stephanie van Willigenburg)
2018 Formal Power Series and Algebraic Combinatorics Conference (FPSAC)
2017 UBC Discrete Math Seminar
2016 Canadian Undergraduate Mathematics Conference

Conference Organization

2025 AlCoVE: an Algebraic Combinatorics Virtual Expedition
(with Laura Colmenarejo, Maria Gillespie, Oliver Pechenik, Liam Solus, and Lorenzo Vecchi)
2021 41st Bay Area Discrete Math Day, UC Berkeley
(with Jessica De Silva, Chris Eur, Max Hlavacek, Isabelle Shankar, and Mariel Supina)

Seminar Organization

2020 Shuffle Combinatorics Reading Seminar
(with Sylvie Corteel and Nicolle Gonzalez)

Mentorship

2025 MIT PRIMES (Program for Research in Mathematics, Engineering and Science)
(Student: Emma Li)
2024 MIT PRIMES (Program for Research in Mathematics, Engineering and Science)
(Student: Aarush Vailaya)

I received a George Lusztig mentorship award for this work.

Academic Service

I have refereed 13 articles for publication in peer-reviewed mathematics journals, including *Combinatorial Theory*, *Discrete Mathematics*, *Discussiones Mathematicae Graph Theory*, *The Electronic Journal of Combinatorics*, and *SIAM Journal on Discrete Mathematics*.

Selected Awards

2025 George Lusztig Mentorship Award
2021 Math Department Summer Grant
2021 James H. Simons Fellowship

2018-2021	Natural Sciences and Engineering Research Council of Canada Postgraduate Scholarship- Doctoral
2018	Faculty of Science Graduate Prize
2017	Stanley M Grant Scholarship in Mathematics
2016	Wendy Fan Memorial Scholarship
2016	Faculty of Science Graduate Award
2016	Dr. R. D. James Medal in Mathematics
2015	R.O.T.T.O.W. Scholarship
2015	Reginald Palliser-Wilson Scholarship
2015	Ron Riddell and Roy Douglas Memorial Scholarship in Mathematics
2013-2015	Trek Excellence Scholarship for Continuing Students
2015	W H MacInnes Scholarship in Physics and Mathematics

Teaching

2025	18.204: Undergraduate Seminar in Discrete Mathematics
2024	18.204: Undergraduate Seminar in Discrete Mathematics
2024	18.03: Differential Equations
2023	18.204: Undergraduate Seminar in Discrete Mathematics
2023	18.03: Differential Equations
2022	18.01A/18.02A: Calculus
2022	Math 113: Introduction to Abstract Algebra
2021	Math 1B: Calculus II
2021	Math N16A: Calculus I
2020	Math 1B: Calculus II
2020	Math N16A: Calculus I
2020	Math 1B: Calculus II
2019	Math 1A: Calculus I
2019	Math N16B: Calculus II
2019	Math 1B: Calculus II
2018	Math 1A: Calculus I