

# Foster Tom

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## Curriculum Vitæ

2-246a MIT, Cambridge, MA

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## Academic Positions

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

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## 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

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## Publications

### Submitted

2025        **The chromatic symmetric function of graphs glued at a single vertex**  
(with Aarush Vailaya)

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

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### 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**

	<b>Horizontal-strip LLT polynomials</b>
2023	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
	<b>A combinatorial Schur expansion of triangle-free horizontal-strip LLT polynomials</b>
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)
	<b>Classifying the near-equality of ribbon Schur functions</b>
2019	Canadian Discrete and Algorithmic Mathematics Conference (CanaDAM)
2018	UC Berkeley Combinatorics Seminar
2017	UBC Graduate Student Seminar
	<b>Necessary conditions for Schur maximality</b> (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

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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

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

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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

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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

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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

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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