

Burcroff, Amanda - CV

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EMPLOYMENT	MIT – <i>NSF and MIT School of Science Dean’s Postdoctoral Fellow, sponsored by Alex Postnikov</i> University of California - Davis – <i>UC President’s Postdoctoral Fellow, sponsored by Eugene Gorsky</i>	Sep 2025 – July 2025 – Aug 2025
EDUCATION	Harvard University – <i>PhD in Mathematics advised by Lauren Williams</i> Durham University – <i>Research MSc in mathematics supervised by Pavel Tumarkin</i> University of Cambridge – <i>MASt in Pure Mathematics through the Part III Mathematics program</i> University of Michigan – <i>B.S. degree in Honors Mathematics, minor in Computer Science</i> – <i>two terms with Budapest Semesters in Mathematics</i>	Sep 2021 – May 2025 Sep 2020 – Sep 2021 Sep 2019 - Jun 2020 Sep 2015 - May 2019
HONORS AND AWARDS	NSF Mathematical Sciences Postdoctoral Research Fellowship MIT School of Science Dean’s Postdoctoral Fellowship UC President’s Postdoctoral Fellowship Euan Squires Memorial Prize, <i>Durham University</i> NSF Graduate Research Fellowship British Marshall Scholarship Jack Kent Cooke Graduate Fellowship St John’s College Benefactors’ Scholarship, <i>University of Cambridge</i> Wirt and Mary Cornwell Prize in Mathematics, <i>University of Michigan</i> Evelyn O. Bychinsky Award, <i>University of Michigan</i> Jack Kent Cooke National Undergraduate Scholarship Sidney J. Shipman Scholarship, <i>University of Michigan</i> Fischler Memorial Scholarship, <i>University of Michigan</i> N.R. Copeland Scholarship, <i>University of Michigan</i>	2025 2025 2025 2021 2019 2019 2019 2019 2018 2017 2015 2015 2015 2015
PUBLISHED PAPERS	12. Higher q -continued fractions. To appear in the <i>European Journal of Combinatorics</i> , 2025. With Nicholas Ovenhouse, Ralf Schiffler, and Sylvester W. Zhang. arXiv:2408.06902 11. Scattering diagrams, tight gradings, and generalized positivity. <i>Proceedings of the National Academy of Sciences</i> , 122 (18), e2422893122, 2025. With Kyungyong Lee and Lang Mou. ◦ FPSAC Extended Abstract, <i>Séminaire Lotharingien de Combinatoire</i> , 93B , #33, 2025. 10. Quasiperiods of magic labeling quasipolynomials. <i>Australasian Journal of Combinatorics</i> , 92 (2), pg 382–398, 2025. With Margaret Bayer, Tyrrell B. McAllister, and Leilani Pai. 9. On Dyck path expansion formulas for rank 2 cluster variables. <i>Algebraic Combinatorics</i> , 7 (2), pg 529–553, 2024.	

8. Near classification of compact hyperbolic Coxeter d -polytopes with $d + 4$ facets and related dimension bounds.
European Journal of Combinatorics, **120**, 103957, 2024.
 ◦ FPSAC Extended Abstract, *Séminaire Lotharingien de Combinatoire*, **89B**, #26, 2023.
7. Unimodality and monotonic portions of certain domination polynomials.
Discrete Mathematics, **346**(9), 113508, 2023. With Grace O'Brien.
6. Sets arising as minimal additive complements in the integers.
Journal of Number Theory, **247**, pg 15–34, 2023. With Noah Luntzlara.
5. Domination parameters of the unitary Cayley graph of $\mathbb{Z}/n\mathbb{Z}$.
Discussiones Mathematicae Graph Theory, **43**(1), pg 95–114, 2023.
4. Tightness of domination inequalities for direct product graphs.
Discrete Mathematics, **344**(9), 112495, 2021.
3. Pattern-avoiding permutation powers.
Discrete Mathematics, **343**(11), 112017, 2020. With Colin Defant.
2. Generalized Lyndon factorizations of infinite words.
Theoretical Computer Science, **809**, pg 30–38, 2020. With Eric Winsor.
1. (k, λ) -anti-powers and other patterns in words.
The Electronic Journal of Combinatorics, **25**:#4.41, 2018.

PREPRINTS

4. Positivity of generalized cluster scattering diagrams.
 arXiv:2503.03719, 2025. With Kyungyong Lee and Lang Mou.
3. Broken lines and compatible pairs for rank 2 quantum cluster algebras.
 arXiv:2404.14369, 2024. With Kyungyong Lee.
2. On faces and Hilbert bases of Kostka cones. arXiv:2310.11437, 2023.
1. Realizable standard Young tableaux. arXiv:2302.09194, 2023. With Igor Araujo, Alexander E. Black, Yibo Gao, Robert A. Krueger, and Alex McDonough.

TEACHING & MENTORSHIP

Math Department Bok Pedagogy Fellow	2024 - 2025
Teaching Fellow for Math 300: Teaching Undergraduate Mathematics	Fall 2024
Teaching Fellow for Math 21B: Linear Algebra & Differential Eqns	Spring 2024
Advisor for the Duluth Combinatorics REU	Summers 2020-2022
Researcher in the Duluth Combinatorics REU	Summer 2018
Researcher in the University of Chicago Math REU	Summer 2017
Course Assistant for six classes at the University of Michigan	2015 - 2019

Referee for: Journal of the London Mathematical Society, Combinatorial Theory, European Journal of Combinatorics, Electronic Journal of Combinatorics, Discrete Mathematics, Journal of Integer Sequences, Discrete Applied Mathematics, Involve, Rose–Hulman Undergraduate Math Journal

TALKS

- *A Combinatorial Formula for Rank 2 Scattering Diagrams* - Invited talk at FPSAC 2025 in Sapporo, Japan (July 22, 2025)
- *Generalized Cluster Algebra Positivity and Applications* - Invited talk in the Combinatorial Representation Theory session at the CMS Summer Meeting (May 8, 2025)
- *Positivity for Generalized Cluster Algebras* - Invited talk at the Notre Dame Discrete Math Seminar (May 8, 2025)

- *Generalized positivity for cluster scattering diagrams* - Contributed talk at the Maurice Auslander Distinguished Lectures and International Conference in Woods Hole, MA (April 26, 2025)
- *Combining Combinatorics and Mirror Symmetry in Cluster Algebra Positivity* - Invited talk at the University of Liverpool “Selected Topics in Mathematics” seminar (April 10, 2025)
- *Higher q -Continued Fractions* - Invited talk at the AMS Eastern Sectional in the Special Session on Geometric and Algebraic Combinatorics (April 6, 2025)
- *Positivity for Generalized Cluster Algebras* - Invited talk at the AMS Southeastern Sectional in the Special Session on Cluster Algebras and Mutation (March 8, 2025)
- *Scattering Diagram Combinatorics and Generalized Positivity* - Invited talk for the University of Michigan Combinatorics Seminar (December 6, 2024)
- *Cluster Scattering Diagrams and Generalized Positivity* - Short talk and poster for the “New developments in representation theory of algebras” conference at OIST, Okinawa, Japan (November 28, 2024)
- *Scattering Diagrams and Generalized Positivity* - Invited talk for the Combinatorics and Representation Theory Seminar at the Korea Institute for Advanced Study (November 8, 2024)
- *Broken Lines and Compatible Pairs for Rank 2 Quantum Cluster Algebras* - Talk at the AMS Western Sectional in the Special Session on Non-commutative Birational Geometry, Cluster Structures and Canonical Bases (October 28, 2024)
- *Scattering Diagram Combinatorics and Generalized Positivity* - Poster at the New Trends in Geometry, Combinatorics, and Mathematical Physics Conference celebrating Vladimir Fock and Valentin Ovsienko (October 21, 2024)
- *Scattering Diagram Combinatorics and Positivity for Generalized Cluster Algebras* - Invited talk at the Harvard–MIT Combinatorics Seminar (October 2, 2024)
- *Broken Lines and Compatible Pairs for Rank 2 Cluster Algebras* - Invited talk at the University of Minnesota - Twin Cities Combinatorics Seminar (September 20, 2024)
- *Cluster Algebras and Scattering Diagrams: A Rank Two Haiku* - Invited talk at the University of Minnesota - Twin Cities Student Combinatorics Seminar (September 19, 2024)
- *Broken Lines and Compatible Pairs for Rank 2 Quantum Cluster Algebras* - Contributed talk at the Maurice Auslander Distinguished Lectures and International Conference in Woods Hole, MA (April 27, 2024)
- *Connecting Combinatorial Interpretations of Cluster Coefficients* - PechaKucha lightning talk at the MIT-Harvard Combinatorics Seminar (March 27, 2024)
- *Broken Lines and Compatible Pairs for Rank 2 Cluster Algebras* - Contributed talk at CombinaTexas 2024 (March 23, 2024)
- *Cluster Algebras and Teichmüller Theory* - Invited talk at the Harvard Dynamics, Geometry and Moduli Spaces Seminar (March 20, 2024)
- *Dyck Path Expansion Formulas for Rank 2 Cluster Algebras* - Invited talk at the University of Connecticut Algebra Seminar (November 1, 2023)

- *Faces and Hilbert Bases of Kostka Polytopes* - Invited talk at the Brandeis Combinatorics Seminar (October 24, 2023)
- *Compact Hyperbolic Coxeter d -Polytopes with $d + 4$ Facets and Related Dimension Bounds* - Selected talk at FPSAC 2023 in Davis, California (July 20, 2023)
- *Dyck Path Expansion Formulas for Rank 2 Cluster Algebras* - Contributed talk at the Maurice Auslander Distinguished Lectures and International Conference in Woods Hole, MA (April 28, 2023)
- *Realizable Standard Young Tableaux* - Invited talk at the MIT-Harvard-MSR Combinatorics Seminar (April 5, 2023)
- *Hyperbolic Zoology* - Talk for the Harvard Trivial Notions graduate seminar (February 27, 2023)
- *Dyck Path Expansion Formulas for Rank 2 Cluster Algebras* - Invited talk for the combinatorics seminar at L'Institut de Recherche en Informatique Fondamentale (December 8, 2022)
- *Frieze Your Brain* - Talk for the Harvard Trivial Notions graduate seminar (March 1, 2022)
- *Thinking Outside the Polygon: Frieze Patterns* - Invited talk for the University of Michigan Math Club (October 15, 2020)
- *The RSK Correspondence and Pattern-Avoiding Powers* - Contributed talk for the Cambridge Part III Seminar Series (December 6, 2019)
- *Generalized Lyndon Factorizations of Infinite Words* - Contributed talk at the 12th International Conference on Words at Loughborough University (September 10, 2019)

SERVICE

Organizer for the Harvard Real Representations Group	2021 – 2025
Graduate rep for the Harvard Math Community Committee	2022 – 2024
Mentor for the Harvard Math Includes Program	2021 – 2024
IAS Women and Mathematics Graduate Ambassador	2022 – 2023
Research mentor for the MIT PRIMES high school program	2022 – 2023
Research mentor for the Cambridge Girls' Angle Math Club	Winter 2022
Assistant for 'Intro to Proofs' at the Michigan Math Corps	Summer 2020
Virtual session leader for the Michigan and DC Math Circles	Winter 2020
Volunteer instructor for the Cambridge STIMULUS program	Fall 2019
Tutor at the Budapest Semesters in Mathematics Program	Winter 2018
Volunteer instructor for the Wolverine Pathways Program	Fall 2017
Organizer of the annual MMATHS high school competition at UMich	2017 – 2019
Vice President of the UMich Women in Mathematics Club	2016 – 2019
Co-President of the UMich Society of Undergraduate Math Students	2016 – 2019
Volunteer instructor at the Michigan Math Circle	2015 – 2019