Amal Mattoo

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EDUCATION

Columbia University September 2021 – May 2026
Mathematics Ph.D Student. NSF Graduate Research Fellow. Advisor: Johan de Jong.

Harvard University August 2017 – May 2021
A.B. in Mathematics, S.M in Computer Science.
Thesis: *Saturation of the Newton Polytopes of Type A and D Cluster Variables*. Advisor: Lauren Williams.

PUBLICATIONS AND PREPRINTS

Non-smoothness of Moduli Spaces of Curves on Hypersurfaces, with Matthew Hase-Liu, (2024), arXiv: 2412.04618.

A Counterexample to a Question on Grothendieck Groups of Schemes, (2023), arXiv:2311.12254.

Saturation of Newton Polytopes of Type A and D Cluster Variables, with Melissa Sherman-Bennett, published in *Combinatorial Theory*, 2 (2) (2022), #6, arXiv: 2012.07500.

Virtual Complete Intersections in $\mathbb{P}^1 \times \mathbb{P}^1$, with Jiyang Gao, Yutong Li, and Michael C. Loper, published in the *Journal of Pure and Applied Algebra*, 2021-01, Vol.225 (1), p.106473, arXiv:1905.09991.

Finding Euler Characteristics of Hilbert Schemes using Colored Young Diagrams, with Shelby P. Cox, published in the *Minnesota Journal of Undergraduate Mathematics*, Volume 5 (2019 – 2020 Academic Year).

PRESENTATIONS

"A Counterexample to a Question on Grothendieck Groups of Schemes," 5-minute research talk at *Algebraic Geometry Northeastern Series* at Dartmouth, November 8-10, 2024.

"Saturation of Newton Polytopes of Cluster Variables from Surfaces," received honorable mention at *MAA Student Poster Session* in the *Joint Mathematics Meetings*, January 6-9, 2021.

"Virtual Complete Intersections in $\mathbb{P}^1 \times \mathbb{P}^1$" with Yutong Li, *AMS Contributed Paper Session on Commutative Algebra* in the *Joint Mathematics Meetings,* Baltimore, January 16-19, 2019.

"Euler characteristic of Hilbert schemes via colored Young diagrams," with Shelby P. Cox, *Special Session on Research in Mathematics by Undergraduates* in the *Joint Mathematics Meetings*, Atlanta, January 4-7, 2017.

AWARDS

National Science Foundation Graduate Research Fellowship, 2021.

Phi Beta Kappa, Senior 48, 2020. Awarded to forty-eight Harvard College seniors on the basis of coursework.

Navid Saheb Kashaf Mathematics/Physics prize, 2020. Awarded to a student in Eliot House, Harvard College.

ORGANIZATION AND LEADERSHIP

Directed Reading Program September 2023 – Present
Mentor and Organizer

- Mentored undergraduate reading projects on topics such as algebraic geometry and algorithms.

Semi-orthogonal Decompositions Learning Seminar January 2025 – May 2025
Organization/Speaker

- Organized Columbia's Spring 2025 learning seminar on semi-orthogonal decompositions

Infinity Categories Learning Seminar January 2022 – May 2022
Organization/Speaker

- Organized and gave weekly talks for Columbia's Spring 2022 learning seminar on infinity categories

Math Online Reading Program for High-schoolers (MORPH) May 2020 – August 2020
Co-Founder and Mentor

- Designed and led a summer math program for 50 students selected from over 400 applicants
- Mentored three students in Topology, gave weekly lectures from Point-set to Algebraic Topology

SKILLS

Technical: Python, Java, C, C++ JavaScript, HTML, SQL, Mathematica, R, Stata
Languages: Hindi/Urdu (fluent), Chinese (proficient)