

# George H. Seelinger

## PERSONAL DATA

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CURRENT POSITION: NSF Postdoctoral Assistant Professor, **University of Michigan**  
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## POSITIONS HELD

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2023–present	NSF Postdoctoral Assistant Professor, <b>University of Michigan</b>
2021–2023	Postdoctoral Assistant Professor and Research Fellow, <b>University of Michigan</b>

## EDUCATION

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2021	<b>University of Virginia</b> , Department of Mathematics Ph.D., received May 2021. Dissertation: <i>K</i> -theoretic Catalan Functions Thesis Advisor: Prof. Jennifer Morse
2015	<b>Loyola University of Chicago</b> M.S. in Mathematics
2015	<b>Loyola University of Chicago</b> B.S., summa cum laude Major: Mathematics and Computer Science Interdisciplinary Honors

## PREPRINTS AND PUBLICATIONS

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- 2025 The nonsymmetric shuffle theorem (with J. Blasiak, M. Haiman, J. Morse, and A. Pun), **arxiv:2509.24040**.
- 2025 Flagged LLT polynomials, nonsymmetric plethysm, and nonsymmetric Macdonald polynomials (with J. Blasiak, M. Haiman, J. Morse, and A. Pun), **arxiv:2506.09015**.
- 2025 Dens, nests, and the Loehr-Warrington Conjecture (with J. Blasiak, M. Haiman, J. Morse, and A. Pun), **J. Amer. Math. Soc.**, Volume 38, Number 4.
- 2025 A raising operator formula for Macdonald polynomials (with J. Blasiak, M. Haiman, J. Morse, and A. Pun), **Forum of Mathematics, Sigma**, Volume 13, e47.
- 2024 LLT polynomials in the Schiffmann algebra (with J. Blasiak, M. Haiman, J. Morse, and A. Pun), **J. Reine Angew. Math. (Crelles Journal)**, Issue 811.
- 2023 A proof of the Extended Delta Conjecture (with J. Blasiak, M. Haiman, J. Morse, and A. Pun), **Forum of Mathematics, Pi**, Volume 11, e6.
- 2023 A shuffle theorem for paths under any line (with J. Blasiak, M. Haiman, J. Morse, and A. Pun), **Forum of Mathematics, Pi**, Volume 11, e5.
- 2022 *K*-theoretic Catalan functions (with Jonah Blasiak and Jennifer Morse), **Advances in Mathematics**, Volume 404, Part B.
- 2018 Canonical idempotents of multiplicity-free families of algebras (with Stephen Doty and Aaron Lauve), **L'Enseignement Mathématique**, 64, 23–63.

## CONFERENCE PROCEEDINGS

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- 2023 A Catalanimal formula for Macdonald polynomials (with J. Blasiak, M. Haiman, J. Morse, and A. Pun), **Séminaire Lotharingien de Combinatoire**, Issue 89B.

## HONORS AND AWARDS

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- 2024 B. Alan Taylor Outstanding Postdoctoral Teaching Award (University of Michigan).  
2024 Collaborate@ICERM (Brown University).  
2023–2026 NSF Mathematical Sciences Postdoctoral Research Fellowship (University of Michigan).  
2022–2023 AMS-Simons Travel Grant (University of Michigan).  
2016–2021 Dorothy M. Batten Jefferson Fellowship (Jefferson Scholars Foundation, University of Virginia).  
2015 Phi Beta Kappa Honor Society (Loyola University Chicago).  
2014 Alpha Sigma Nu Honor Society (Loyola University Chicago).

## TEACHING EXPERIENCE

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2021–Present	<b>University of Michigan</b>
Fall 2024	Math 565: Combinatorics and Graph Theory
Fall 2024	Math 115: Calculus I (flipped classroom)
Winter 2023	Math 566: Combinatorial Theory / Algebraic Combinatorics
Fall 2022	Math 215: Multivariable and Vector Calculus
Winter 2022	Math 417: Matrix Algebra
Fall 2021	Math 115: Calculus I (flipped classroom)
2017–2019	<b>University of Virginia</b>
Fall 2019	Math 1310: Calculus I (flipped classroom)
Spring 2018	Math 1220: Survey of Calculus II
Fall 2017	Math 1210: Survey of Calculus I

## STUDENT ADVISING AND MENTORING

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2024	Master's independent study / supervised research: Symmetric functions and affine combinatorics, (University of Michigan). Continued project in unofficial capacity through Summer 2025.
2023	Lab of Geometry Project Mentor, (University of Michigan). Continued project in unofficial capacity, resulting in publication in <i>Forum of Math, Sigma</i> .
2023	Undergraduate independent study: Representation theory of symmetric groups and symmetric functions, (University of Michigan).
2018	Mentor, Directed Reading Program, (University of Virginia). Theoretical foundations of Machine Learning.

## PROFESSIONAL SERVICES

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- 2025 Assistant Co-organizer, Machine Learning Seminar,  
(Institute for Computational and Experimental Research in Mathematics).  
2021–2025 Co-organizer, Algebraic Combinatorics Learning Seminar, (University of Michigan).  
2023–2024 Lab of Geometry Admissions Committee Member (University of Michigan).  
2023 Panelist, Grants Writing Panel (University of Michigan).  
2021–present Reviewer for: Algebraic Combinatorics, Compositio, Electronic Journal of Combinatorics,  
International Math Research Notices, Séminaire Lotharingien de Combinatoire,  
Transactions of the AMS.

- 2021 TA for ICERM Workshop session on Affine Schubert Calculus, (Brown University).
- 2018–2021 Member & Webmaster, UVa Association for Women in Mathematics, (University of Virginia).
- 2018 Panelist, Prospective Graduate Student Open House, (University of Virginia).
- 2013–2018 Contributor to SageMath, an open source computer algebra library.
- 2015 Sujack Teaching Award committee member, (Loyola University Chicago).

## OUTREACH ACTIVITY

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| 2024      | Walentas Scholar selection committee interviewer, (Jefferson Scholars Foundation, University of Virginia).  |
| 2019–2020 | Jefferson Scholar Selection Weekend Seminar Planner, (Jefferson Scholars Foundation, University of Virginia).   |
| 2017–2019 | Math Ambassador, (University of Virginia).<br>Mathematics outreach program to guest teach extra-curricular mathematics topics in Albemarle County and Charlottesville city schools. |
| 2018      | Panelist, Graduate School Panel,<br>Institute for Leadership and Citizenship, (Jefferson Scholars Foundation, University of Virginia).  |

## INVITED TALKS AND PRESENTATION

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| Sep 2025     | What is a Catalanimal? <i>What is...? Seminar</i> , (Institute for Computational and Experimental Research in Mathematics, Brown University).   |
| Jun 2025     | Perspectives on Catalanimals, Part I, <i>qt-Combinatorics in Algebra, Geometry and Topology in Cortona</i> , (Università di Pisa, Italy).   |
| May 2025     | Catalanivals, shuffle theorems, and Macdonald polynomials, <i>Modern Perspectives in Representation Theory</i> , (Sydney Mathematical Research Institute, Australia).                             |
| Feb 2025     | Raising operator formulas for Macdonald polynomials and other related families, <i>Algebra-Geometry-Combinatorics Seminar</i> , (University of Illinois).   |
| Jan 2025     | Raising operator formulas for Macdonald polynomials and other related families, <i>Combinatorics and Graph Theory Seminar</i> , (Michigan State University).                                      |
| Dec 2024     | A walk through the zoo of shuffle theorems, <i>Probability and Combinatorics Seminar</i> , (University of Pennsylvania).  |
| Jun–Jul 2024 | A raising operator formula for Macdonald polynomials, <i>Important Papers in Algebraic Combinatorics Seminar (IPAC)</i> , (Online).   |
| Feb 2024     | Raising operator formulas for Macdonald polynomials and other related families, <i>Applied Algebra Seminar</i> , (York University, Canada).   |
| Oct 2023     | A raising operator formula for Macdonald polynomials, <i>Seminar on Combinatorics, Lie Theory, and Topology</i> , (Università di Pisa, Italy).  |
| Oct 2023     | A raising operator formula for Macdonald polynomials via LLT polynomials in the elliptic Hall algebra, <i>Topology Algebra Combinatorics and Operators Seminar</i> , (Loyola University Chicago). |
| Sep 2023     | A raising operator formula for Macdonald polynomials via LLT polynomials in the Schiffmann algebra, <i>Mathematical Physics Seminar</i> , (Purdue University).                                    |
| Jul 2023     | A Catalanimal formula for Macdonald polynomials, <i>Formal Power Series and Algebraic Combinatorics (FPSAC)</i> , (University of California, Davis).  |
| Jun 2023     | $K$ -theoretic Catalan functions, <i>Canadian Mathematical Association Summer Meeting, Special session in equivariant Schubert calculus and beyond</i> , (University of Ottawa).                  |
| Mar 2023     | Dens, nests, and Catalanivals: a walk through the zoo of shuffle theorems, <i>Combinatorics Seminar</i> , (University of Michigan).   |
| Oct 2022     | Diagonal Harmonics and Shuffle Theorems, <i>Algebra Seminar</i> , (Illinois State University).  |

- Feb 2022 A raising operator formula for  $\nabla$  on an LLT polynomial, *Combinatorics Seminar*, (University of Michigan).
- Oct 2021 Diagonal harmonics and shuffle theorems, *Representation Theory Seminar*, (Okinawa Institute of Science and Technology, Japan).
- Apr 2021  $K$ -theoretic Catalan functions, *Algebra Seminar*, (University of Virginia).
- Mar 2021  $K$ -theoretic Catalan functions, *LACIM Seminar*, (Université du Québec à Montréal).
- Dec 2020  $K$ -theoretic Catalan functions, *Junior Mathematician Research Archive*, (Online).
- Feb 2020  $K$ -theoretic Catalan functions, *Philadelphia Area Combinatorics and Algebraic Geometry Seminar*, (University of Pennsylvania).
- Jun 2019 Lightning Talk: Raising operators in Schubert calculus, *Garsiafest 90: Future Directions in Algebraic Combinatorics*, (The Scripps Seaside Forum, San Diego, CA).
- May 2019 Poster:  $K$ -theoretic Catalan functions, *Mid-Atlantic Algebra, Combinatorics, and Geometry Workshop*, (Drexel University).
- Jun 2015 Orthogonal idempotents in semisimple Brauer algebras, *Sage Days 65*, (Loyola University Chicago).