

# GEORGE H. SEELINGER—CV

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## RESEARCH INTERESTS

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Algebraic combinatorics: symmetric functions, Schubert calculus, Macdonald polynomials

## EDUCATION

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### Doctor of Philosophy, Mathematics

University of Virginia, Charlottesville, Virginia

*Advisor: Jennifer Morse*

*May 2021*

Dissertation title: *K-theoretic Catalan functions*

### Master of Science, Mathematics

Loyola University Chicago, Chicago, Illinois

*August 2015*

### Bachelor of Science, summa cum laude

Loyola University Chicago, Chicago, Illinois

*Major: Mathematics and Computer Science*

*May 2015*

*Interdisciplinary Honors*

## PUBLICATIONS

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### A proof of the Extended Delta Conjecture

arxiv:2102.08815

*Joint with J. Blasiak, M. Haiman, J. Morse, and A. Pun*

- Preprint available on arXiv.org

### A shuffle theorem for paths under any line

arxiv:2102.07931

*Joint with J. Blasiak, M. Haiman, J. Morse, and A. Pun*

- Preprint available on arXiv.org

### K-theoretic Catalan functions

arxiv:2010.01759

*Joint with Jonah Blasiak and Jennifer Morse*

- Submitted (2020). Preprint available on arXiv.org.

### Canonical idempotents of multiplicity-free families of algebras

arxiv:1606.08900

*Joint with Stephen Doty and Aaron Lauve*

- L'Enseignement Mathématique, **64** (2018) 23–63.

## RESEARCH TALKS

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### University of Virginia Algebra Seminar

April 5, 2021

*University of Virginia*

- Title: *K-theoretic Catalan functions*

### LACIM Seminar

March 19, 2021

*Université du Québec à Montréal*

- Title: *K-theoretic Catalan functions*

### Junior Mathematician Research Archive

December 1, 2020

- Title: *K-theoretic Catalan functions*

### Philadelphia Area Combinatorics and Algebraic Geometry Seminar

February 6, 2020

*University of Pennsylvania*

- Title: *K-theoretic Catalan functions*

**Garsiafest 90: Future Directions in Algebraic Combinatorics**

June 18, 2019

*The Scripps Seaside Forum, San Diego, CA. Lightning Talk*

- Title: *Raising operators in Schubert calculus*

**Mid-Atlantic Algebra, Combinatorics, and Geometry Workshop**

May 4, 2019

*Drexel University. Poster*

- Title: *K-theoretic Catalan functions*

**Sage Days 65**

June 11, 2015

*Loyola University Chicago*

- Title: *Orthogonal idempotents in semisimple Brauer algebras*

## EXPOSITORY TALKS

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**University of Virginia Representation Theory Reading Seminar**

2016 – 2020

*Seminar talks on various topics; selected titles listed*

- $k$ -Schur functions as Schubert representatives for the affine Grassmannian Spring 2020
- Introduction to the affine Grassmannian Spring 2020
- Chern class computations, flag manifolds, and the Grassmannian Spring 2019
- Schur- $Q$  functions and related combinatorics Fall 2018
- Applications of the Jacobson-Morozov Theorem Fall 2017
- The principal, subregular, and minimal nilpotent orbits Fall 2016

**University of Virginia Integrable Probability and Combinatorics Seminar**

2019

*Seminar talks on various topics*

- Multispecies ASEP and nonsymmetric Macdonald polynomials Fall 2019
- A  $q$ -analogue of de Finetti's theorem Spring 2019
- Extreme characters of  $U(\infty)$  Spring 2019

**Undergraduate Math Club**

*University of Virginia*

- A Window into Symmetric Function Theory March 2, 2021
- Generating functions: a mathematical link October 2, 2018

## TEACHING EXPERIENCE

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**Instructor of Record**

University of Virginia

- MATH 1310: Calculus I (flipped classroom) Fall 2019
- MATH 1220: Survey of Calculus II Spring 2018
- MATH 1210: Survey of Calculus I Fall 2017

## HONORS, AWARDS, AND FELLOWSHIPS

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- Dorothy M. Batten Jefferson Fellowship, 2016–2021, by the Jefferson Scholars Foundation, UVa
- Phi Beta Kappa Honor Society, inducted May 7, 2015
- Alpha Sigma Nu Honor Society, inducted October 14, 2014

## SERVICE AND OUTREACH

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### Department

- **Member and Webmaster, Association for Women in Mathematics** Fall 2018–Spring 2021  
*Help maintain the UVa AWM chapter's website and developed a blog for other members to post content.*
- **Mentor, Directed Reading Program at University of Virginia** Fall, 2018  
*Guided my undergraduate DRP mentee, Dylan Hunt, through a machine learning textbook and helped him prepare for a presentation at UVa's Math Club.*
- **UVa Math Ambassador** Fall 2017– Spring 2019  
*UVa's Mathematics outreach program to Albemarle County and Charlottesville city schools.*
- **Panelist, Prospective Graduate Student Open House** Spring 2018

### Professional

- **TA for ICERM Workshop session on Affine Schubert Calculus** February 3, 2021
- **Organizing committee, Mid-Atlantic Algebra, Geometry, and Combinatorics Workshop** Spring, 2020  
*Cancelled due to Covid-19*
- **Contributor, SageMath (Open-Source Computer Algebra Software)** 2013, 2015, 2018

### University

- **Jefferson Scholar Selection Weekend Seminar Planner and Leader, Jefferson Scholars Foundation, UVa** Spring 2020  
*Cancelled due to Covid-19*
- **Jefferson Scholar Selection Weekend Seminar Planner, Jefferson Scholars Foundation, UVa** Spring 2019
- **Panelist, Institute for Leadership and Citizenship Graduate School Panel Jefferson Scholars Foundation, UVa** Summer 2018
- **Member, Sujack Teaching Award Committee, Loyola University Chicago** Spring 2015

## MATHEMATICAL SOFTWARE CONTRIBUTIONS

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### Contributions to SageMath

<http://sagemath.org>

- Implementation of Young's Raising Operators (ticket #26939) Fall 2018
- Implement Jucys-Murphys elements for Brauer algebra (ticket #18798) Summer 2015
- Major improvement to usability of diagram algebras (tickets #18707,18720,18762) Summer 2015
- Initial implementation of diagram algebras (ticket #14234) Spring 2013

### $k$ -Combinat for Sage

[https://github.com/MareoRaft/k\\_combinat\\_for\\_sage/](https://github.com/MareoRaft/k_combinat_for_sage/)

- Maintain and improve code relating to Catalan functions

## CONFERENCES ATTENDED

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- ICERM Introductory Workshop: Combinatorial Algebraic Geometry February 1–5, 2021
- Hilbert schemes, categorification, and combinatorics, UC Davis June 19–23, 2019
- Garsiafest, Scripps Seaside Forum, San Diego, CA June 17–20, 2019
- Algebra, Geometry and Combinatorics Day, Loyola University Chicago May 25, 2019
- Mid-Atlantic Algebra, Geometry, and Combinatorics (MAAGC) Workshop, Drexel University May 3–4, 2019
- Triangle Lectures in Combinatorics, Wake Forest University March 30, 2019
- Combinatorics and beyond: the many facets of Sergey Fomin's mathematics, University of Michigan November 8–11, 2018

- Workshop on Representation Theory, Combinatorics, and Geometry, University of Virginia October 19–21, 2018
- Women’s Intellectual Network Research Symposium, University of Virginia September 15, 2018
- Joint Mathematics Meetings, San Diego, CA January 10–13, 2018
- AMS Fall Central Sectional Meeting, Loyola University Chicago October 2–4, 2015
- Sage Days 65, Loyola University Chicago June 8–12, 2015
- AMS Spring Western Sectional Meeting, University of Colorado Boulder April 13–14, 2013
- Sage-Combinat Days 40, Institute for Mathematics and its Applications at University of Minnesota July 9–13, 2012
- Sage Days 38, Centre de Recherches Mathématique, Montreal May 7–11, 2012

## TECHNICAL STRENGTHS

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<b>Computer Languages</b>	Proficiency with: Python, Sage, Java and Scala.
	Experience with: Mathematica, R and C/C++.
<b>Languages</b>	Fluent: English
	Elementary Proficiency: French, Italian