

Department of Mathematics
Loyola Marymount University
Joshua.Hallam@lmu.edu
<https://jhallam.lmu.build/>

EDUCATION

Michigan State University, East Lansing, MI
Ph.D., Mathematics, May 2015
Advisor: Bruce Sagan
Dissertation: Quotient Posets and the Characteristic Polynomial

Illinois State University, Normal, IL
M.S., Biomathematics 2009
Masters Thesis: Genetic Algorithms with Shrinking Population Size
B.S., Mathematics 2007

ACADEMIC POSITIONS

Loyola Marymount University, Department of Mathematics, Los Angeles, CA
August 2018–Present
Assistant Professor

Wake Forest University, Department of Mathematics, Winston-Salem, NC
July 2015–July 2018
Teacher-Scholar Postdoctoral Fellow
Research Advisor: Sarah Mason

PAPERS AND PREPRINTS

1. Factoring the Characteristic Polynomial of a Lattice (with B. Sagan) *Journal of Combinatorial Theory, Series A*, **136**, 39–63 (2015)
2. Combinatorial Hopf Algebras of Simplicial Complexes (with C. Benedetti and J. Machacek) *SIAM Journal on Discrete Mathematics*, **30**, 3 1737–1757 (2016)
3. Applications of Quotient Posets *Discrete Mathematics*, **340**, 4, 800–810 (2017)
4. Dual Immaculate Quasisymmetric Functions Expand Positively into Young Quasisymmetric Schur Functions (with E. Allen and S. Mason) *Journal of Combinatorial Theory, Series A*, **157**, 70–108 (2018)
5. Increasing Spanning Forests in Graphs and Simplicial Complexes (with J. Martin and B. Sagan), *European Journal of Combinatorics*, **76**, 178–198 (2019)
6. The Noncrossing Bond Poset of a Graph (with C. M. Farmer and C. Smyth), *Electronic Journal of Combinatorics*, **27** 41 pages, (2020)
7. The Whitney Duals of a Graded Poset (with R. S. González D’León) *Journal of Combinatorial Theory, Series A*, **177**, 41 pages (2021)
8. Gorenstein Braid Cones and Crepant Resolutions (with J. Machacek), *accepted in Discrete & Computational Geometry* arXiv:2112.15308 (2023)
9. Whitney Twins, Whitney Duals, and Operadic Partition Posets (with R. S. González D’León and Yeison A. Quiceno D) arXiv:2307.07480 (2023)

REFEREED CONFERENCE PROCEEDINGS

1. Factorization of the Characteristic Polynomial of a Lattice using Quotient Posets (with B. Sagan) 26th International Conference on Formal Power Series and Algebraic Combinatorics. *DMTCS Proceedings* (2014)
2. Combinatorial Hopf Algebras of Simplicial Complexes (with C. Benedetti and J. Machacek) 27th International Conference on Formal Power Series and Algebraic Combinatorics. *DMTCS Proceedings* (2015)
3. Dual Immaculate Quasisymmetric Functions Expand Positively into Young Quasisymmetric Schur Functions (with E. Allen and S. Mason) 28th International Conference on Formal Power Series and Algebraic Combinatorics. *DMTCS Proceedings* (2016)
4. Whitney Duals of Geometric Lattices (with R. S. González D'León) 29th International Conference on Formal Power Series and Algebraic Combinatorics. *Séminaire Lotharingien de Combinatoire* (2017)
5. Whitney Labelings and 0-Hecke Algebra Actions on Graded Posets (with R. S. González D'León) 30th International Conference on Formal Power Series and Algebraic Combinatorics. *Séminaire Lotharingien de Combinatoire* (2018)
6. The Noncrossing Bond Poset of a Graph (with C. M. Farmer) 31st International Conference on Formal Power Series and Algebraic Combinatorics. *Séminaire Lotharingien de Combinatoire* (2019)

PRESENTATIONS

2023

Discrete Math Seminar (virtual) at Illinois Institute of Technology

Algebra, Number Theory, Combinatorics and Geometry Seminar (virtual) at University of North Carolina at Greensboro, March 2023

2022

Algebra and Combinatorics Seminar, Loyola University Chicago, November 2022

Combinatorics Seminar at University of Southern California, October 2022

Southern California Discrete Mathematics Symposium 2022, Claremont McKenna College, April 2022

2021

The Art of Mathematics (podcast), May 2021

2020

Mathematics Colloquium (virtual) at California State University Long Beach, November 2020

Algebra, Number Theory, Combinatorics, and Geometry Seminar (virtual) at University of North Carolina at Greensboro, November 2020

Combinatorics Seminar (virtual), Michigan State University, October 2020

Southern California Discrete Mathematics Symposium 2020, University of Southern California, January 2020.

2019

Formal Power Series and Algebraic Combinatorics 2019, Ljubljana, Slovenia July 2019

Southern California Discrete Mathematics Symposium 2019, Claremont McKenna College, May 2019

Algebra, Number Theory, and Combinatorics Seminar at University of North Carolina Greensboro, March 2019

Combinatorics seminar at University of Southern California, February 2019

2018

MAA Session on Arts and Mathematics: The Interface, Joint Mathematics Meeting, January 2018

SIAM Conference on Discrete Mathematics, Minisymposium on the Combinatorics of Partially Ordered Sets, June 2018

SIAM Conference on Discrete Mathematics, Minisymposium on Graph Polynomials, June 2018

Combinatorics seminar at University of California San Diego, October 2018

2017

Applied Algebra Seminar at York University, November 2017

Algebra, Number Theory, and Combinatorics Seminar at University of North Carolina Greensboro, October 2017

Algebra and Combinatorics seminar at North Carolina State University, October 2017

Special Session on Polynomials in enumerative, algebraic, and geometric combinatorics, AMS Spring Sectional Meeting, Buffalo, NY, September 2017

Formal Power Series and Algebraic Combinatorics 2017, London, England, July 2017

MAA Session on Discrete Mathematics in the Undergraduate Curriculum - Ideas and Innovations for Teaching, Joint Mathematics Meeting, January 2017

2016

Formal Power Series and Algebraic Combinatorics 2016, Vancouver, British Columbia, July 2016

Meeting on Algebraic Geometry for Applications, Clemson University, April 2016

Special Session on The Combinatorics of Symmetric Functions, Southeastern Spring AMS Sectional Meeting, March 2016

2015

Discrete CATS seminar at University of Kentucky, November 2015

Special Session on Hopf Algebraic Combinatorics, Central Fall AMS Sectional Meeting, October 2015

Special Session on Enumerative Combinatorics and Graph Theoretic Applications, Central Fall AMS Sectional Meeting, October 2015

Central Michigan University Algebra and Combinatorics Seminar, April 2015

Graduate Student Combinatorics Conference 2015, University of Kentucky, March 2015

Special Session on Algebraic Combinatorics, Central Spring AMS Sectional Meeting, March 2015

Colloquium, Albion College, February 2015

Algebra and Combinatorics Seminar, Loyola University Chicago, February 2015

Special Session on Enumerative Combinatorics, Joint Mathematics Meeting, January 2015

2014

University of Kansas Combinatorics Seminar, October 2014

York University Applied Algebra Seminar, September 2014

Tenth Annual Graduate Student Combinatorics Conference, Auburn University, April 2014

Bijjective and Algebraic Combinatorics: In honor of Bruce Sagan's 60th birthday, University of Florida, March 2014

First Lake Michigan Workshop on Combinatorics and Graph Theory, Western Michigan University, March 2014

STUDENTS MENTORED

Loyola Marymount University

Miliano Mikol (McNair Scholar and Summer Opportunities for Advanced Research recipient, Summer 2020-Spring 2021)

Project Name: Tight Forests and the Chromatic Polynomial

Presented work at: 2020 UCLA National McNair Conference

Alex Abrams (Summer Opportunities for Advanced Research recipient, Spring 2021-present):

Project Name: The Shi Arrangement and Pointed Partitions

Presented work at: Seaver College's 50th Anniversary Celebration and LMU's Undergraduate Symposium 2023

Rachel Meilak (Undergraduate Thesis Advisor, Fall 2022-Spring 2023):

Project Name: Math and Magic: A de Bruijn Card Trick

Presented work at: LMU's Undergraduate Symposium 2023 and LMU's Mathematics Department

Anna Salam (Undergraduate Thesis Advisor, Fall 2022-Spring 2023):

Project Name: Parking Function Labeling of the Noncrossing Bond Poset

Presented work at: LMU's Undergraduate Symposium 2023 and LMU's Mathematics Department

Brian Macdonald (Summer Undergraduate Research Program recipient, Summer 2023)

Project Name: Enumerative Aspects of the Lattice of Flats of a Graph

Presented work at: Seaver Summer Research Community Poster Session

Jake Soldera (Summer Undergraduate Research Program recipient, Summer 2023)

Presented work at: Seaver Summer Research Community Poster Session

Project Name: Enumerative Aspects of the Lattice of Flats of a Graph

Wake Forest University

C. Matthew Farmer (Masters Student Thesis Advisor, 2017–2018)

Project Name: Edge Labelings on the Partially Ordered Set of Non-Crossing Bonds

Presented work at: Wake Forest University Mathematics Department

Shuya Mao (Undergraduate Research and Creative Activities recipient, Summer 2017)

Project Name: Perfect Elimination Orders of Simplicial Complexes

Presented work at: Wake Forest University Undergraduate Research Day

Yuechen Qi (Undergraduate Research and Creative Activities recipient, Summer 2017)
Project Name: Counting Forests with Certain Patterns and Their Relationship to Coloring
Presented work at: Wake Forest University Undergraduate Research Day

TEACHING EXPERIENCE

Loyola Marymount University	2018–Present
<i>Applied Statistics</i> (2 sections)	
<i>Advanced Linear Algebra</i> (2 sections)	
<i>Calculus I</i> (3 sections)	
<i>Calculus III</i> (2 sections)	
<i>Combinatorics of Posets</i> (independent study)	
<i>Differential Equations</i> (2 sections)	
<i>Discrete Methods</i> (3 sections)	
<i>Introduction to Methods of Proof</i> (4 sections)	
<i>Linear Algebra</i> (2 sections)	
<i>Mathematics for Elementary Teachers I</i> (1 section)	
<i>Mathematics for Elementary Teachers II</i> (1 section)	
<i>The Mathematics of Card Tricks and Games</i> (independent study)	
<i>Real Analysis</i> (1 section)	
Wake Forest University	2015–2018
<i>Calculus II</i> (2 sections)	
<i>Discrete Mathematics</i> (5 sections)	
<i>Elementary Probability and Statistics</i> (2 sections)	
<i>Graph Theory</i> (1 section)	
<i>Introduction to Combinatorics</i> (1 section)	
<i>Special Topics in Combinatorics: Generating Functions</i> (1 section)	
Michigan State University	2009–2015
<i>Applied Calculus</i> (1 section)	
<i>Applied Calculus II</i> (1 section)	
<i>Calculus I</i> (1 section)	
<i>Elementary Mathematics for Teachers I</i> (5 sections)	
<i>Elementary Mathematics for Teachers II</i> (3 sections)	
<i>Multivariable Calculus</i> (1 section)	
<i>Foundations of Higher Mathematics</i> (Co-taught with Dr. Sharon Senk)	

SERVICE

Loyola Marymount University

Mathematics Club Faculty Advisor (Fall 2018-Spring 2023)

McNair Scholars Summer Research Mentor (Summer 2020)

Member of Calculus Sequence Textbook Committee at Loyola Marymount University (Spring 2019, Spring 2023)

Member of Mathematics Sophomore Scholarship Committee (Spring 2020, Spring 2021, Spring 2022, Spring 2023)

Member of University Core Curriculum Committees area sub-committee Foundations and Quantitative Literacy (2020)

Member of Equipment and Computing Committee for Seaver College (Spring 2022)

Member of Sabbatical Review Committee (Fall 2022)

Member of University Core Curriculum Committee (Spring 2023)

Conducted peer teaching evaluation (Spring 2023)

Wake Forest University

Presenter at STEM @ Wake, a program for high school students interested in STEM fields

Organizer of Wake Forest University Combinatorics Seminar

Member of Undergraduate Curriculum Committee at Wake Forest University

Volunteer test grader for Mathcounts competition at Wake Forest University

Michigan State University

Michigan State University's Mathematics Learning Center Supervisor

Organizer of Student Combinatorics Seminar at Michigan State University

Professional Service

- Masters thesis committee member for Yeison Augusto Quiceno Durán at Universidad Nacional de Colombia sede Medellín (summer 2020)
- Undergraduate thesis committee member for Andrés Molina Giraldo at Pontificia Universidad Javeriana (summer 2023)
- Referee for the following mathematics journals.

Algebraic Combinatorics

Australasian Journal of Combinatorics

Discrete Mathematics

Electronic Journal of Combinatorics

European Journal of Combinatorics

Involve

Journal of Combinatorial Theory Series A

Proceedings of Formal Power Series and Algebraic Combinatorics