

Pat Lank

University of South Carolina
Department of Mathematics

Email: <mailto:plankmathematics@gmail.com>
URL: <https://patlank.com>

Personal

Born on October 7th, 1993

Citizenship: United States

Research interests

My research interests are primarily in algebraic geometry and commutative algebra. In particular, I am interested in questions and ideas regarding derived categories, nonzero characteristic, and singularity theory. Lately, this includes understanding the structure of the derived category of bounded complexes of coherent sheaves of a variety over a field of prime characteristic.

Education

P.h.D. Mathematics, University of South Carolina, USA 2020 to present, Dissertation Adviser: Dr. Matthew Ballard

M.S. Mathematics, University of New Mexico, USA 2017 to 2020, Thesis Advisor: Dr. Alexandru Buium

B.S. Mathematics, University of Massachusetts in Lowell, USA, 2015 to 2017

Awards

AMS Graduate Student Sectional Travel Grant for the South Sectional Meeting March 2023, Georgia Institute of Technology, Atlanta, GA

Research & Publications

In preparation

"High Frobenius pushforwards generate the bounded derived category" joint with Matthew Ballard, Srikanth Iyengar, Alapan Mukhopadhyay, and Josh Pollitz

Invited talks

"Generation of derived categories in prime characteristic", AMS Special Session on Interactions between Noncommutative Ring Theory and Algebraic Geometry, Spring Central Sectional, April 2023

"Invariants for derived categories in prime characteristic", AMS Special Session on Recent Developments in Commutative Algebra, Southeast Sectional, March 2023

"Frobenius pushforwards generate the bounded derived category", Graduate Colloquium, University of South Carolina, Spring 2023

"Generation of derived categories in prime characteristic", Algebraic Geometry seminar, University of Utah, September 2022

"Generation of derived categories in prime characteristic", Algebraic Geometry & Singularity theory workshop, University of Washington, June 2022

" F -thick varieties: A Survey", University of South Carolina, Algebraic Geometry & Commutative Algebra Seminar, February 2022

"Line Bundle-valued Quadratic Forms", University of South Carolina, Algebraic Geometry Number Theory Seminar, March 2021

"Riemannian Curvature For Schemes", University of South Carolina, October 2020

"Algebraic Psuedo-Riemannian Geometry", Algebra & Geometry Seminar November 2019, University of New Mexico

"Higher Weakly Enriched Categories" Algebra & Geometry Seminar November and December, 2018, University of New Mexico

"On An algebraic & Geometric Connection Of The Beal Conjecture", Women in Mathematics in New England (WIMIN 2016) at Smith College, MA in September 2016.

"On A Geometric Connection Of The Beal Conjecture & Arithmetic Topology", MAA Northeast Spring Section Meeting in June, 2016 at University of New England, ME.

Expository talks

"Singularity theory via pairs", University of South Carolina, Algebraic Geometry & Commutative Algebra Seminar, Spring 2023

"Affine quotients and Stability", University of South Carolina, Algebraic Geometry & Commutative Algebra Seminar, Fall 2022

"Differentiability", University of South Carolina, Lie Groups Seminar, Summer 2022

"Dimension for derived categories", University of South Carolina, Algebraic Geometry & Commutative Algebra Seminar, April 2022

"Generation and dimension for derived categories", Commutative Algebra Regional Expository Seminar, April 2022

"Generation in derived categories", University of South Carolina, Algebraic Geometry & Commutative Algebra Seminar, March 2022

"Singularity categories in birational geometry", University of South Carolina, Algebraic Geometry & Commutative Algebra Seminar, October 2021

"Regularity in prime characteristic via Kunz", Commutative Algebra Regional Expository Seminar, October 2021

"Techniques in prime characteristic", University of South Carolina, Algebraic Geometry & Commutative Algebra Seminar, October 2021

"Classification of irreducible representation for rigid motions", University of South Carolina, Representation Theory Seminar, July 2021

"Characters of Induced Representation's in Characteristic Zero", University of South Carolina, Representation Theory Seminar, June 2021

Funded workshps & conferences within last two years

AMS Special Session on Recent Developments in Commutative Algebra, Southeast Sectional, March 2023

Derived categories, moduli spaces, and Hyperkähler varieties, University of Michigan, August 2022

Algebraic Geometry & Singularity theory workshop, University of Washington, June 2022

Academic Employment

University of South Carolina

Instructor of Record

MATH 174 - Discrete structures for computer science - Spring 2023

MATH 111 - Basic College Mathematics, Fall 2022

MATH 241 - Calculus III, Summer 2022

MATH 122 - Business Calculus, University of South Carolina, Spring 2022

MATH 111 - Basic College Mathematics, Fall 2021 (Overload)

MATH 115 - Precalculus, Fall 2021

MATH 241 - Calculus III, Summer 2021

MATH 122 - Business Calculus, University of South Carolina, Spring 2021

University of New Mexico

Instructor of Record

MATH 180 - Calculus I, University of New Mexico, Summer 2020

MATH 101, 102, 103 - Intermediate Algebra Part I, II, III, University of New Mexico, Fall 2018

MATH 121 - College Algebra, University of New Mexico, Fall 2017

Graduate Teaching Assistant

Math 319, 521 - Number theory, Abstract Algebra II, University of New Mexico, Spring 2020

MATH 321 - Linear Algebra W/ Applications, University of New Mexico, Fall 2019

MATH 321, 322, 327 - Linear Algebra, Modern Algebra, and Discrete Structures, University of New Mexico, Spring 2019

Organization

Organizer for Graduate Colloquium, University of South Carolina, Fall 2022 to Spring 2023

Organizer for Algebraic Geometry & Commutative Algebra Seminar, University of South Carolina, Fall 2021 to present

Co-organizer for Graduate Student Seminar, University of South Carolina, Spring 2021

Organizer for Graduate Student Seminar, University of South Carolina, Fall 2021

Volunteer Work

Proctoring Exams for UNM PNM State Wide Mathematics Exam, Spring 2019

New Mexico State Wide Mathematics Exam, Fall 2017

Hosted & Organized A City-wide Concert & Fundraiser, Nashua NH Soup Kitchen, Fall 2011

City of Nashua, NH - Helped senior citizens with small projects, yard work, etc. -Summer 2011