# Pat Lank

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## PERSONAL

- Born on October 7th, 1993
- Citizenship: United States

## RESEARCH INTERESTS

Algebraic geometry, (non)commutative algebra, triangulated categories

## POSITIONS

- **Università degli Studi di Milano** Fall 2024 — Present
  - Postdoctoral researcher
  - Supervisor: Amnon Neeman
- **Simons-Laufer Mathematical Sciences Institute** April 2024
  - Research associate

## EDUCATION

- **University of South Carolina** January 2021 to May 2024
  - Phd in Mathematics
  - Advisor: Matthew Ballard
- **University of New Mexico** August 2017 to December 2020
  - M.Sc. in Mathematics
  - Advisor: Alexandru Buium
- **University of Massachusetts in Lowell** August 2015 to August 2017
  - B.Sc. in Mathematics

## RESEARCH

- "Compact approximation and descent for algebraic stacks"
  - joint with Jack Hall, Fei Peng, Alicia Lamarche
  - *in preparation*
- "Zariski descent for singularity categories"
  - joint with Timothy De Deyn, Kabeer Manali Rahul
  - *in preparation*
- "Compact objects detect big generators for weak approximable triangulated categories"
  - joint with Timothy De Deyn, Kabeer Manali Rahul
  - *in preparation*
- "Regular locus and singularity categories for noncommutative algebras over schemes"
  - joint with Timothy De Deyn, Kabeer Manali Rahul
  - *in preparation*
- "Integral transforms on singularity categories for Noetherian schemes"
  - joint with Uttaran Dutta, Kabeer Manali Rahul
  - `arXiv version`

- "Derived characterizations for rational pairs à la Schwede-Takagi and Kollár-Kovács"
  - joint with Peter McDonald, Sridhar Venkatesh
  - `arXiv version`
- "Descent and generation for noncommutative coherent algebras over schemes"
  - joint with Timothy De Deyn, Kabeer Manali Rahul
  - `arXiv version`
- "Classification and nonexistence for t-structures on derived categories of schemes"
  - joint with Alexander Clark, Kabeer Manali Rahul, Chris J. Parker
  - `arXiv version`
- "Approximability and Rouquier dimension for noncommuative algebras over schemes"
  - joint with Timothy De Deyn, Kabeer Manali Rahul
  - `arXiv version`
- *Triangulated characterizations of singularities*
  - joint with Sridhar Venkatesh
  - `arXiv version`
  - accepted to Nagoya Math. J.
- "Closedness of the singular locus and generation for derived categories"
  - joint with Souvik Dey
  - `arXiv version`
- "Dévissage for generation in derived categories"
  - joint with Souvik Dey
  - `arXiv version`
- *Approximation by perfect complexes detects Rouquier dimension*
  - joint with Noah Olander
  - `arXiv version`
  - accepted to Mosc. Math. J.
- "A note on generation and descent for derived categories of noncommutative schemes"
  - joint with Anirban Bhaduri, Souvik Dey
  - `arXiv version`
- *Descent conditions for generation in derived categories*
  - `arXiv version`
  - `J. Pure Appl. Algebra` (2024)
- "Strong generation for module categories"
  - joint with Souvik Dey, Ryo Takahashi
  - `arXiv version`
- "High Frobenius pushforwards generate the bounded derived category"
  - joint with Matthew Ballard, Srikanth Iyengar, Alapan Mukhopadhyay, Josh Pollitz
  - `arXiv version`
- *Generation and dimension for derived categories*
  - PhD thesis, 2024

## INVITED TALKS

- Algebraic geometry seminar, University of Glasgow — March 2025
- Algebra seminar, Charles University (Univerzita Karlova) — February 2025
- Topology seminar, Universität Hamburg — January 2025

- Algebraic geometry northeastern section (AGNES), Dartmouth University — November 2024
- Algebraic geometry seminar, Purdue Uiversity — October 2024
- AMS special session, Howard University — April 2024
- COMA/NAG, Simons-Laufer Mathematical Sciences Institute — March 2024
- AMS contributed paper session, Joint mathematics meetings — January 2024
- Algebraic geometry seminar, University of Georgia — October 2023
- Syzygies and mirror symmetry workshop, American Institute of Mathematics — September 2023
- New directions in group theory and triangulated categories — May 2023
- Georgia algebraic geometry symposium, University of Georgia — May 2023
- Categorical methods in moduli theory, University of Pennsylvania — April 2023
- AMS special session, Spring Central Sectional — April 2023
- AMS special session, Southeast Sectional — March 2023
- Algebraic geometry seminar, University of Utah — September 2022
- Algebraic geometry and singularity theory workshop, University of Washington — June 2022
- Commutative algebra regional expository seminar — April 2022
- Algebraic geometry and commutative algebra seminar, University of South Carolina — February 2022
- Commutative algebra regional expository seminar — October 2021
- Algebraic geometry number theory seminar, University of South Carolina — March 2021
- Algebra and geometry seminar, University of New Mexico — November 2019
- Algebra and geometry seminar, University of New Mexico — December 2018
- Women in mathematics in New England (WIMIN 2016), Smith College — September 2016
- MAA mortheast spring section meeting, University of New England — June 2016

## ORGANIZATION

- Algebraic geometry seminar, Università degli Studi di Milano — Spring 2025
- Derived categories and noncommutative enthusiasts online seminar — January 2025 to present
- JMM, Special session on derived categories, arithmetic and geometry — January 2024
- Graduate colloquium, University of South Carolina — Fall 2021 to Spring 2023
- AGCA seminar, University of South Carolina — Fall 2021 to Spring 2023

## GRANTS

- AMS graduate student sectional travel grant — Spring 2023

## AWARDS

- Outstanding graduate student award in mathematics at University of South Carolina — Spring 2024
- Teaching award from Student Disability Resource Center at University of South Carolina — Fall 2023

## REFEREE & REVIEW

- Rend. Sem. Mat. Univ. Padova, zbMATH Open

## SERVICE

- Math 111 textbook committee for University of South Carolina — Spring 2024
- Math tutoring Ccnter coordinator — Summer 2023
- Graduate student panel committee — Summer 2021, Spring 2022
- Proctor for UNM PNM state wide mathematics exam — Fall 2017, Spring 2019
- City-wide concert and fundraiser, Nashua NH Soup Kitchen — Fall 2011

## TEACHING

### University of South Carolina

**Instructor of Record**

- MATH 241 - Calculus III — Summer 2021, Summer 2022
- MATH 174 - Discrete structures for computer science — Spring 2023
- MATH 122 - Business calculus — Spring 2021, Spring 2022, Spring 2024
- MATH 115 - Precalculus — Fall 2021
- MATH 111 - Basic college mathematics — Fall 2021 (overload), Fall 2022
- MATH 111i - Intensive basic college mathematics — Fall 2023

### University of New Mexico

**Instructor of Record**

- MATH 180 - Calculus I — Summer 2020
- MATH 121 - College algebra — Fall 2017
- MATH 101, 102, 103 - Intermediate algebra part I, II, III — Fall 2018

**Graduate Teaching Assistant**

- MATH 521 - Abstract algebra — Spring 2020
- MATH 327 - Discrete structures — Spring 2019
- MATH 322 - Modern algebra — Spring 2019
- MATH 321 - Linear algebra with applications — Fall 2019
- Math 319 - Number theory — Spring 2020