Justin Lyle

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EMPLOYMENT

Auburn University Fall 2024-
Postdoctoral Fellow/Instructor

Simons Laufer Mathematical Sciences Institute Spring 2024
Postdoctoral Fellow

University of Arkansas 2020-2023
Visiting Assistant Professor

EDUCATION

Ph.D. Mathematics 2015-2020
University of Kansas
Advisor: Hailong Dao
Thesis: Homological Properties of Structures in Commutative Algebra and Algebraic Combinatorics

M.A. Mathematics 2013-2015
Wake Forest University
Advisor: Frank Moore
Thesis: Noncommutative Complete Isolated Singularities

B.S. Mathematics (magna cum laude) 2009-2013
Berry College

PUBLISHED AND ACCEPTED WORKS

[1] J. Lyle, S. Maitra, Annihilators of (co)homology and their influence on the trace ideal, Journal of Algebra (2026), https://www.sciencedirect.com/science/article/pii/S002186932600445X.

[2] L. Ferraro, J. Lyle, The derived depth formula for modules of finite quasi-projective dimension, Bulletin of the London Math Society (2026), https://londmathsoc.onlinelibrary.wiley.com/doi/10.1112/blms.70491.

[3] J. Lyle, Endomorphism algebras over commutative rings and torsion in self tensor products, Acta Mathematica Vietnamica (2026), https://link.springer.com/article/10.1007/s40306-026-00625-8.

[4] E. Celikbas, O. Celikbas, J. Lyle, R. Takahashi, Y. Yao, On a generalization of Ulrich modules and its applications, Tohoku Mathematical Journal (2024), https://arxiv.org/abs/2308.06606.

[5] J. Lyle, J. Montaño, K. Sather-Wagstaff, Exterior powers and Tor-persistence, Journal of Pure and Applied Algebra (2022), https://www.sciencedirect.com/science/article/pii/S0022404921002310

[6] B. Holmes, J. Lyle, Rank selection and depth conditions for balanced simplicial complexes, Electronic Journal of Combinatorics (2021), https://www.combinatorics.org/ojs/index.php/eljc/article/view/v28i2p28.

[7] J. Lyle, J. Montaño, Extremal growth of Betti numbers and trivial vanishing of (co)homology, Transactions of the American Mathematical Society, Volume 373 (2020), pp. 7937-7958. https://www.ams.org/journals/tran/0000-000-00/S0002-9947-2020-08189-6/

[8] T. Kobayashi, J. Lyle, R. Takahashi, On the number of indecomposable Cohen–Macaulay modules which are not locally free on the punctured spectrum, Journal of Pure and Applied Algebra, Volume 224 (2020) no. 7. https://www.sciencedirect.com/science/article/pii/S0022404920300086

[9] H. Dao, J. Doolittle, J. Lyle, Minimal Cohen-Macaulay simplicial complexes, SIAM J. Discrete Math. (2020), 34(3), 1602-1608. (7 pages) https://epubs.siam.org/doi/abs/10.1137/19M1275164

[10] H. Dao, J. Doolittle, K. Duna, B. Goeckner, B. Holmes, J. Lyle, Higher nerves of simplicial complexes, Algebraic Combinatorics, Volume 2 (2019) no. 5, pp. 803-813. https://alco.centre-mersenne.org/item/ALCO_2019__2_5_803_0

[11] H. Dao, M. Eghbali, J. Lyle, Hom and Ext, revisited, Journal of Algebra, Volume 571 (2019), pp. 75-93. https://doi.org/10.1016/j.jalgebra.2018.12.006.

PREPRINTS AND SUBMITTED WORKS

[1] L. Ferraro, J. Lyle, On End-semidualizing modules, preprint (2026), in preparation.

[2] J. Lyle, The residue field as an infinite syzygy, preprint (2026), in preparation.

[3] J. Lyle, On the totally acyclic condition and the Auslander-Reiten Conjecture, preprint (2026).

[4] J. Lyle, S. Nasseh, A counterexample to the localization problem for AB rings, preprint (2026), https://arxiv.org/abs/2609.00754.

[5] H. Lindo, J. Lyle, S. Maitra, Trace ideals of syzygies, preprint (2026), https://arxiv.org/abs/2609.00707.

[6] M. Brown, J. Lyle, Derived complete intersections and polynomial growth of Betti numbers over dg-algebras, preprint (2026), https://arxiv.org/abs/2605.11105.

[7] S. Dey, J. Lyle, Centers of endomorphism rings and reflexivity, preprint (2025), https://arxiv.org/abs/2510.02210.

[8] L. Winther Christensen, A. Kekkou, J. Lyle, Z. Nason, A. Soto Levins, G-levels of perfect complexes and a Bass formula for levels, preprint (2025), https://arxiv.org/abs/2507.10486

[9] K. Kimura, J. Lyle, A. Soto Levins, On the depth of tensor products over Cohen-Macaulay rings, preprint (2025), https://arxiv.org/abs/2505.00441.

[10] J. Lyle, P. Mantero, Ordinary and symbolic powers of matroids via polarization, preprint (2025), https://arxiv.org/abs/2505.17398.

[11] J. Lyle, Generalized trace submodules and centers of endomorphism rings, preprint (2023), https://arxiv.org/abs/2311.00220.

[12] K. Kimura, J. Lyle, Y. Otake, R. Takahashi, On the vanishing of Ext modules over a local unique factorization domain with an isolated singularity, preprint (2023), https://arxiv.org/abs/2310.16599.

TEACHING

Auburn University

- Math 1120 (Precalculus Algebra), Spring 2026
- Math 1617 (Honors Calculus I), Fall 2025
- Math 1680 (Calculus with Business), Fall 2024, Fall 2026

University of Arkansas

- Math 3083 (Linear Algebra), Spring 2023
- Math 2043 (Survey of Calculus), Fall 2021, Spring 2022, Fall 2022
- Math 2564 (Calculus II), Fall 2020, Spring 2021

University of Kansas

- Math 126 (Calculus II), Recitation Instructor, Spring 2019
- Math 104 (Precalculus), Instructor, Fall 2016, Fall 2018
- Math 115 (Applied Calculus), Instructor, Fall 2017, Spring 2018
- Math 127 (Calculus III), Recitation Instructor, Spring 2017

Wake Forest

- Math 121 (Linear Algebra), Teaching Assistant, Spring 2015
- Math 117 (Discrete Mathematics), Teaching Assistant, Fall 2014
- Math 113 (Multivariable Calculus), Teaching Assistant, Spring 2014
- Math 111 (Calculus I), Teaching Assistant, Fall 2013

AWARDS

Paul F. Conrad Scholarship University of Kansas
2019
Awarded annually to one or two mathematics graduate students for academic merit

Chancellor's Fellowship University of Kansas
2015-2020

Department Summer Research Scholarship University of Kansas
2015-2019

Outstanding Graduate Student Award Wake Forest
2014

Barton Mathematics Award Berry College
2013

INVITED TALKS

AMS Spring Southeastern Sectional Meeting March 2026
Savannah, GA
"Annihilators of (co)homology and their influence on the trace ideal"

AMS Fall Central Sectional Meeting October 2025
St. Louis, MO
"On the Depth of Tensor Products Over Cohen-Macaulay Rings"

Syracuse University Algebra Seminar April 2025
Syracuse, NY
"Vanishing of Tor and Depth of Tensor Products Over Cohen-Macaulay Rings"

UT Rio Grande Valley Algebra and Number Theory Seminar April 2025
Edinburgh, TX
"Vanishing of Tor and Depth of Tensor Products Over Cohen-Macaulay Rings"

Commutative Algebra in the South (CATS) April 2025

Atlanta, GA

"Vanishing of Tor and Depth of Tensor Products Over Cohen-Macaulay Rings"

Joint Math Meetings January 2025

Seattle, WA

"On the Vanishing of Tor and Depth of Tensor Products"

AMS Spring Southeastern Sectional Meeting May 2024

San Francisco, CA

"Counterexamples for Several Open Problems on the Vanishing of Ext and Tor"

AMS Spring Southeastern Sectional Meeting May 2024

San Francisco, CA

"Generalized Trace Submodules and Endomorphism Rings"

SLMath Commutative Algebra Seminar March 2024

Berkeley, CA

"Counterexamples for Several Open Problems on the Vanishing of Ext and Tor"

Joint Math Meetings January 2024

San Francisco, CA

"Endomorphism Algebras Over Commutative Rings and Torsion in Tensor Products"

University of Utah Commutative Algebra Seminar November 2023

Salt Lake City, UT

"Counterexamples for Several Open Problems on the Vanishing of Ext and Tor"

AMS Spring Southeastern Sectional Meeting March 2023

Cincinnati, OH

"Symbolic Powers of Squarefree Monomial Ideals, Revisited"

AMS Spring Southeastern Sectional Meeting March 2023

Atlanta, GA

"Stable Theory for Complexes and the Auslander-Reiten Conjecture"

West Virginia University Algebra Seminar November 2022

Virtual Session

"Stable Theory for Complexes and the Auslander-Reiten Conjecture"

Auburn University Algebra Seminar November 2022

Auburn, AL

"Stable Theory for Complexes and the Auslander-Reiten Conjecture"

OK State Combinatorics and Commutative Algebra Seminar April 2022

Virtual Session

"Symbolic Powers of Squarefree Monomial Ideals, Revisited"

University of Michigan Commutative Algebra Seminar April 2022

Virtual Session

"Generalizations of Ulrich Modules and Rigdity Theorems"

Clemson University Algebra and Discrete Math Seminar November 2021

Virtual Session

"Recent progress on the Auslander-Reiten and Huneke-Weigand Conjectures"

Iowa State University Commutative Algebra Seminar April 2021

Virtual Session

"Constructions in Combinatorial Commutative Algebra, Old and New"

AMS Special Session on Commutative Algebra April 2021

Virtual Session

"Rank Selection and Depth Conditions for Squarefree Monomial Ideals"

Wake Forest University Colloquium March 2021

Virtual Session

"Constructions in Combinatorial Commutative Algebra, Old and New"

AMS Special Session on Homological Methods in Algebra October 2020

Virtual Session

"Tor-persistence and related conjectures"

AMS Special Session on Commutative Algebra April 2020

Virtual Session

"Maximal Cohen-Macaulay modules that are not locally free on the punctured spectrum"

University of Nebraska, Lincoln Commutative Algebra Seminar March 2020
Lincoln, NE
"Extremal growth of Betti numbers and rigidity of (co)homology"

University of Nebraska, Lincoln Commutative Algebra Seminar March 2020
Lincoln, NE
"Maximal Cohen-Macaulay modules that are not locally free on the punctured spectrum"

Purdue Commutative Algebra Seminar October 2019
West Lafayette, IN
"Generalizations of Ulrich Modules and Rigidity Theorems"

AMS Special Session on Homological and Characteristic p > 0 Methods in Commutative Algebra September 2019
Madison, WI
"Generalizations of Ulrich Modules and Rigidity Theorems"

KUMUNU Jr. March 2019
University of Nebraska, Lincoln NE
"Cohen-Macaulay Rings of Finite CM_+-Representation Type"

AMS Special Session on Commutative and Combinatorial Algebra March 2019
Auburn University, Auburn AL
"Cohen-Macaulay Rings of Finite CM_+-Representation Type"

AMS Special Session on Commutative Algebra November 2018
University of Arkansas, Fayetteville AR
"c-Ulrich Modules"

AMS Special Session on Multiplicities and Volumes: An Interplay Among Algebra, Combinatorics, and Geometry October 2018
Ann Arbor, MI
"c-Ulrich Modules"

KUMUNU Jr. April 2018
University of Nebraska, Lincoln NE
"Hom and Ext, Revisited"

SERVICE

- Co-organizer of the 2027 iteration of the CATS (Commutative Algebra in the South) conference.
- Co-organizer of Special Session on "Topics in Commutative Algebra" at the AMS Spring 2026 Central Sectional Meeting.
- Auburn Math Carnival Exhibitor at the Destination STEM Expo, 2025: An expo for 6th-9th grade students in the Auburn community aimed at fostering interest in STEM fields.
- Co-organizer of the Career Development Series at SLMath, 2024
- Co-organizer of the Commutative Algebra Seminar at the University of Arkansas, 2020-2023.
- Co-creator and Co-organizer of CARES, 2020-2022: CARES is a regional seminar series uniting Arkansas, Kansas, Missouri, Nebraska, and Oklahoma State, and which focuses on expository talks given by graduate students. I served, along with Alessandra Costantini and Kyle Maddox, as a global advisor and organizer to the local organizers, who are senior graduate students at their respective institutions.
- Referee for:
  - Rocky Mountain J. Math
  - European Journal of Combinatorics
  - Communications in Algebra
  - AMS Graduate Series in Math
  - Journal of the Mathematical Society of Japan

- Bulletin of the London Mathematical Society
- Proceedings of the AMS
- Journal of Algebra and its Applications
- Journal of Commutative Algebra
- Journal of Algebra
- International Math Research Notices
- Journal of Pure and Applied Algebra
- Proceedings of the Edinburgh Mathematical Society