Talks Since Initial Appointment

○ *The Homotopy Lie Algebra of a Tor-Independent Tensor Product*   November 2021
Syracuse Algebra Seminar, Syracuse New York

Abstract: *In this talk, we will investigate a pair of Tor-independent quotients of a local ring and the relation to their tensor product through the lens of a homological tool inspired by rational homotopy theory called the homotopy Lie algebra. Namely, we will see that the homotopy Lie algebra of the tensor product is the pullback along the canonical maps induced by the quotient homomorphisms in a variety of cases. We will explore the consequences of this result, with applications to homology theories, the structure of certain Tor algebras, and an equality relating the Poincare series of the common residue field of the local rings to that of their tensor product.*

○ *Quasi-Polynomail Growth of Betti Sequences*   April 2021
Syracuse Algebra Seminar, Syracuse NY (Virtual)

Abstract: *It is known that the Betti numbers for any finitely generated module over a local complete intersection ring grow on the order of a polynomial. Further, it can be shown that, for large enough degree, there are two polynomials of interest: one explicitly giving the even Betti numbers and one giving the odd Betti numbers. The aim of this talk is to show a bound on the discrepancy of these two polynomials for every finitely generated module over a complete intersection with respect to an invariant of the ring called its "quadratic codimension". This is joint work with Lucho Avramov and Mark Walker.*

○ *Growth of Betti Sequences over a Complete Intersection*   February 2021
Algebra and Number Theory Seminar, Texas Tech University, Lubbock, Texas (Virtual)

Abstract: *It is known that the Betti numbers for any finitely generated module over a local complete intersection ring grow on the order of a polynomial. Further, it can be shown that, for large enough degree, there are two polynomials of interest: one explicitly giving the even Betti numbers and one giving the odd Betti numbers. The aim of this talk is to show a bound on the discrepancy of these two polynomials for every finitely generated module over a complete intersection with respect to an invariant of the ring called its "quadratic codimension". This is joint work with Lucho Avramov and Mark Walker.*

○ *Quasipolynomial Growth of Betti Sequences over Complete Intersection Rings*   October 2020
AMS Sectional meeting, Special Session on Commutative Algebra and Connections to Algebraic Geometry and Combinatorics (Virtual)

Abstract: *Let Q be a regular local ring and I an ideal generated by a regular sequence of c elements in the square of the maximal ideal. It is known that over the complete intersection $R = Q/I$ that any finitely generated module M has Betti numbers eventually given by quasi-polynomial of degree less than c . That is, there are integer-valued polynomial functions p_+^M and p_-^M with the same leading term such that $\beta_{2i}^R(M) = p_+^M(2i)$ and $\beta_{2i+1}^R(M) = p_-^M(2i+1)$ for*

sufficiently large i. We will show that if q is the height of the ideal generated by the quadratic initial forms of I in the associated graded ring of Q, then the degree of $p_+^M - p_-^M$ is less than $c - q - 1$.

- *Quasipolynomial Growth of Betti Sequences*   May 2020
  Zoom Special Session on DG Methods in Commutative Algebra and Representation Theory, Virtual Conference.

  Abstract: *Let Q be a regular local ring and I an ideal generated by a regular sequence of c elements in the square of the maximal ideal. It is known that over the complete intersection $R = Q/I$ that any finitely generated module M has Betti numbers eventually given by quasi-polynomial of degree less than c . That is, there are integer-valued polynomial functions p_+^M and p_-^M with the same leading term such that $\beta_{2i}^R(M) = p_+^M(2i)$ and $\beta_{2i+1}^R(M) = p_-^M(2i+1)$ for sufficiently large i. We will show that if q is the height of the ideal generated by the quadratic initial forms of I in the associated graded ring of Q, then the degree of $p_+^M - p_-^M$ is less than $c - q - 1$.*

- *Quasipolynomial Growth of Betti Sequences over Complete Intersections*   March 2020
  AMS Sectional meeting, special session on Homological Methods in Commutative Algebra, Medford, Massachusetts
  Canceled due to global pandemic

- *Growth of Betti Sequences and the Homotopy Lie Algebra*   November 2019
  University of Texas at Arlington Algebra Seminar, Arlington, Texas.

  Abstract: *It is known that the Betti numbers for any finitely generated module over a local complete intersection ring grow on the order of a polynomial. Further, it can be shown that, for large enough degree, there are two polynomials of interest: one explicitly giving the even Betti numbers and one giving the odd Betti numbers. The aim of this talk is to show a bound on the discrepancy of these two polynomials for every finitely generated module over a complete intersection with respect to an invariant of the ring called its "quadratic codimension". We will also make use of a homological tool called the homotopy Lie algebra. This is joint work with Lucho Avramov and Mark Walker.*

- *Growth of Betti Sequences over a Complete Intersection*   October 2019
  Route 81 Mathematics Conference, Kingston, Ontario, Canada.

  Abstract: *It is known that the Betti numbers for any finitely generated module over a local complete intersection ring grow on the order of a polynomial. Further, it can be shown that, for large enough degree, there are two polynomials of interest: one explicitly giving the even Betti numbers and one giving the odd Betti numbers. The aim of this talk is to show a bound on the discrepancy of these two polynomials for every finitely generated module over a complete intersection with respect to an invariant of the ring called its "quadratic codimension". This is joint work with Lucho Avramov and Mark Walker.*