



Assoc. Prof.  
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## Commutative Algebra: Theory of integral closure and multiplicity for modules

My research interests lie in the area of commutative algebra, homological algebra, combinatorics, and computational algebra. Among the topics I am particularly interested in are the theory of Buchsbaum-Rim multiplicity and integral closure for modules, and the ring structure of Rees algebra of modules. These are general notion of the classical one for ideals and relatively new topics in commutative algebra.

In recent years, I have been working on some basic problems concerning the Buchsbaum-Rim multiplicity and the asymptotic behavior of various invariants such as length, grade and associated primes associated to multigraded modules.

I am now interested in the theory of integrally closed modules over a two-dimensional regular local ring, and I am working on problems about constructing indecomposable integrally closed modules of higher rank, the theory of Buchsbaum-Rim coefficient of modules and the ring structure of Rees algebra of integrally closed modules.



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## Computational Algebra: Applications to mathematical and data sciences



I am also interested in computational aspects of commutative algebra and its applications to mathematical and data sciences. Recently, I have learned a few topics about applied aspects of algebra, especially algebraic statistics, with my students.

I will start to learn these topics and continue to study them with students towards applications to mathematical and data sciences. Among a number of topics, I am interested in computing Groebner basis of ideals and modules systematically appearing in polynomial models in statistics.