Wine & Cheese Talks

Thursday 13 July

20:00–20:15 **Mina Bigdeli** (MSRI)
Extending monomial ideals with linear presentation or linear resolution

Abstract: Given a monomial ideal I with linear presentation or linear resolution, does there exist a monomial $u \notin I$ such that $I + (u)$ has the same property?

20:15–20:30 **Rebecca R.G.** (Syracuse University)
Test ideals for all characteristics

Abstract: We define the test ideal of a general closure operation, an example of which is a tight closure test ideal. When the closure operation satisfies a certain set of axioms given by Geoffrey Dietz, these test ideals share some of the basic properties of tight closure test ideals and multiplier ideals. Now that big Cohen-Macaulay modules are known to exist in all characteristics, suitable closure operations exist over all local domains, and the corresponding test ideals may provide a useful framework for studying singularities. This work is joint with Felipe Perez.

20:30–20:45 **Parangama Sarkar** (Chennai Mathematical Institute)
Local cohomology of multi-Rees algebras, joint reduction numbers and product of complete ideals

Abstract: We find conditions on the local cohomology modules of multi-Rees algebras of admissible filtrations which enable us to predict joint reduction numbers. As a consequence we are able to prove a generalization of a result of Reid-Roberts-Vitulli in the setting of analytically unramified local rings for completeness of power products of complete ideals.

20:45–21:00 **Dipankar Ghosh** (Chennai Mathematical Institute)
Vanishing of (co)homology over deformations of Cohen–Macaulay local rings of minimal multiplicity

Abstract: Let R be a d-dimensional Cohen–Macaulay (CM) local ring of minimal multiplicity. Set $S := R/(\mathbf{f})$, where $\mathbf{f} := f_1, \ldots, f_c$ is an R-regular sequence. Suppose M and N are maximal CM S-modules. It is shown that if $\mathrm{Ext}_S^i(M, N) = 0$ for some $(d + c + 1)$ consecutive values of $i \geq 2$, then $\mathrm{Ext}_S^i(M, N) = 0$ for all $i \geq 1$. Moreover, if this holds true, then either $\mathrm{projdim}_R(M)$ or $\mathrm{injdim}_R(N)$ is finite. In addition, a counterpart of this result for Tor-modules is provided. Furthermore, we give a number of necessary and sufficient conditions for a CM local ring of minimal multiplicity to be regular or Gorenstein. These conditions are based on vanishing of certain Exts or Tors involving homomorphic images of syzygy modules of the residue field.

21:00–21:15 **Mengyuan Zhang** (University of California Berkeley)
The geometry of eigen-configuration of tensors

Abstract: Eigenvectors of tensors are generalizations of eigenvectors of matrices. We use liaison to study the geometry of eigen-configurations in the plane.

21:15–21:30 **Shreedevi Kalyani Masuti** (University of Genova)
On symbolic Rees algebras of certain monomial curves

Abstract: In this talk we will discuss my recent work with Clare D'Cruz where we gave an affirmative answer to Goto's question on symbolic Rees algebra.

21:30–21:45 **Janet Page** (University of Illinois at Chicago)
The Frobenius Complexity of Hibi Rings

Abstract: We discuss some results on the Frobenius complexity of Hibi rings, which measures the non-finite generation of their rings of Frobenius operators.

21:45–22:00 **Sara Saeedi Madani** (Amirkabir University of Technology)
Cut polytopes and algebras

Abstract: Motivated by conjectures due to Sturmfels and Sullivant, we discuss some properties of the polytopal algebra associated to the cut polytope of a graph, called cut algebra. This talk is based on a joint work with Tim Römer

22:00–22:15 **Christopher Eur** (University of California Berkeley)
Complete Intersections with given Hilbert polynomial

Abstract: The Hilbert polynomial of a homogeneous complete intersection is determined by the degrees of the generators of the defining ideal. The degrees of the generators are not, in general, determined by the Hilbert polynomial — but sometimes they are. When?

22:15–22:30 **David Corwin** (Massachusetts Institute of Technology)
Cohen–Macaulayness of S_n-invariant subspace arrangements

Abstract: Given a partition $\lambda = (\lambda_1, \lambda_2, ...)$ of n, consider the subspace E_λ of $\mathbb{A}^n$ where the first λ_1 coordinates are equal, the next λ_2 coordinates are equal, etc. Letting X_λ denote the union of translates of E_λ by the action of S_n, we consider the question of whether X_λ is Cohen–Macaulay (CM). In certain cases, methods coming from representation theory of Cherednik algebras can be used to show that this variety is CM. We discuss work, joint with A. Brookner, P. Etingof, and S. Sam, which proves that this variety is non-CM in many other cases, using methods from commutative algebra. We also make conjectures based on the principle that whenever there is no representation-theoretic reason, the variety should be non-CM.