Publicacions més rellevants de la línia de recerca:

Àlgebres d'explosió (blow-up algebras): propietats aritmètiques, uniformitat i comportament asimptòtic

Referència: Colomé-Nin, G. and Elias, J. Bigraded structures and the depth of blow-up algebras. *Proc. Roy. Soc. Edinburgh Sect. A* , **136(6)** (2006), pp. 1175–1194.

Abstract: Let R be a Cohen-Macaulay local ring, and let $I \subset R$ be an ideal with minimal reduction J. In this paper we attach to the pair (I, J) a non-standard bigraded module $\Sigma^{I,J}$. The study of the bigraded Hilbert function of $\Sigma^{I,J}$ allows us to prove an improved version of Wang's conjecture and a weak version of Sally's conjecture, both on the depth of the associated graded ring $\mathrm{gr}_I(R)$. The module $\Sigma^{I,J}$ can be considered as a refinement of the Sally module introduced previously by Vasconcelos.

Referència: Cortadellas, T. and Zarzuela S. On the structure of the fiber cone of ideals with analytic spread one. *J. Algebra*, **317(2)** (2007), pp. 759–785.

Abstract: For a given a local ring $(A, \mathfrak{m})$, we study the fiber cone of ideals in A with analytic spread one. In this case, the fiber cone has a structure as a module over its Noether normalization which is a polynomial ring in one variable over the residue field. One may then apply the structure theorem for modules over a principal domain to get a complete description of the fiber cone as a module. We analyze this structure in order to study and characterize in terms of the ideal itself the arithmetical properties and other numerical invariants of the fiber cone as multiplicity, reduction number or Castelnuovo-Mumford regularity.

Referència: Muiños, F. and Planas-Vilanova, F. On the injectivity of blowing-up ring morphisms. *J. Algebra*, **320(8)** (2008), pp. 3365-3380.

Abstract: Let $I = (x_1, ..., x_r)$ be a finitely generated ideal in a commutative ring R and let $n \geq 2$ be an integer. Let $\alpha_{I,n} : \mathcal{S}^n(I) \to I^n$ be the canonical morphism from the n-th symmetric power of I onto the n-th power of I. Recently Tchernev asked for when $\alpha_{I,n}$ being an isomorphism implies that $\alpha_{I,p}$ is an isomorphism for each $2 \leq p \leq n$. We give an affirmative answer provided that the

ideal $J = (x_1, ..., x_{r-1})$ verifies that $\alpha_{J,p} : \mathcal{S}^p(J) \rightarrow J^p$ is an isomorphism for all $2 \leq p \leq n$. In addition, for every $n \geq 2$, we give an example of an ideal I such that $\alpha_{I,p}$ is an isomorphism for all $p \geq n+1$ and $\alpha_{I,n}$ is not.