1142-13-84 **Ian M Aberbach*** (aberbachi@missouri.edu), MO , and **Parangama Sarkar**. *Frobenius Betti numbers and syzygies of finite length modules.* Preliminary report.

Let (R, m) be a local (Noetherian) ring of dimension d and M a finite length R-module. De Stefani, Huneke, and Núñez-Betancourt explored two questions about the properties of resolutions of M. Q 1: in char $p > 0$, what vanishing conditions on the Frobenius Betti numbers (FBn) force $pd\ M < \infty$? Q 2: if $pd\ M = \infty$, do $d + 2$nd or higher syzygies have infinite length?

For Q 1, they showed, under restrictive hypotheses, that $d + 1$ consecutive vanishing FBn forces $pd\ M < \infty$. When $d = 1$ and R is CM then one vanishing FBn suffices. We show that these results hold in general, i.e., $d + 1$ consecutive vanishing FBn force $pd\ M < \infty$, and, under the hypothesis that R is CM, d consecutive vanishing FBn suffice.

For Q 2, they obtain very interesting results when $d = 1$. No third syzygy of M can have finite length. Their main tool is, if $d = 1$, to show, if the syzygy has a finite length, then it is an alternating sum of lengths of Tors. We are able to prove this fact for rings of arbitrary dimension, which allows us to show that if $d = 2$, no third syzygy of M can be finite length! We also show Q 2 holds if the socle dimension of $H^0_m(R)$ is large relative to the rest of the module, generalizing the case of Buchsbaum rings. (Received August 29, 2018)