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**Adam Van Tuyl\*** (vantuyl@math.mcmaster.ca), Department of Mathematics and Sciences, McMaster University, Hamilton, Ontario L8S 4L8, Canada. *Revisiting a conjecture of Villarreal on Cohen-Macaulay graphs*. Preliminary report.

This year marks the 25th anniversary of the publication of R. Villarreal's paper *Cohen-Macaulay Graphs* (manuscripta math. 1990). It was in this paper that the definition of an edge ideal was first introduced. In this talk I will focus on a conjecture about Cohen-Macaulay graphs that appeared in this paper and discuss its current status. Precisely, let  $I(G)$  be the edge ideal of a graph  $G$  in a polynomial ring  $R = k[x_1, \dots, x_n]$ , and suppose that  $R/I(G)$  is a Cohen-Macaulay ring. Villarreal conjectured that there is a vertex  $x$  such that  $R/I(G \setminus x)$  was also Cohen-Macaulay. In fact, it was conjectured that the set of all vertices with this property forms a dominating set of  $G$ . It has been known for awhile that this conjecture is false. I'll present some new counter-examples. I will also present some evidence that the conjectures may still hold if we assume the stronger condition that the simplicial complex associated to  $I(G)$  via the Stanley-Reisner correspondence is a vertex decomposable simplicial complex. This talk is based upon joint work with K.N. Vander Meulen (Redeemer) and J. Baker, an NSERC USRA student. (Received July 15, 2015)