1116-55-2262 **Gregory Henselman*** (grh@seas.upenn.edu). *A Morse-theoretic algorithm to compute persistent homology, with generators.*

We introduce two Morse-theoretic methods for memory-efficient computation of persistent homology on a filtered clique complex. The first utilizes a notion of 'ghost' simplex to remove top-dimensional cells dynamically during construction of the input space; the second appeals to an algebraic interpretation of the Morse boundary operator to recover, in a memory-efficient fashion, barcode representatives in the unreduced complex via row operations. Experiments with random, geometric, and empirical data suggest that, for complexes with large cliques, the reduction approach may decrease the number of cells stored in memory by several orders of magnitude, while the memory requirement of storing generators remains approximately linear in the rank of the top-dimensional boundary operator. (Received September 22, 2015)