1078-16-212 **Alexander A Young*** (aayoung@math.ucsd.edu), Department of Mathematics, 9500 Gilman Drive #0112, La Jolla, CA 92093-0112. *The growths of algebras: Examinations of several outstanding problems.*

The *growth* is an important invariant of a finitely generated group or affine algebra, and has been the subject of renewed interest. This talk will explore two questions in particular: what types of growth are possible for a nil algebra, and what types are possible for algebras that are Jacobson radical? There are three distinct general categories of group and algebra growth: polynomial, intermediate, and exponential. For algebras, the first category can be stratified by their Gelfand-Kirillov dimension, a non-negative number. Golod and Shafarevich where the first to prove the existence of nil affine algebras that are not finite-dimensional. Later, T. H. Lenagan and Agata Smoktunowicz and the presenter put forth a paper proving the existence of such algebras with any GK-dimension ≥ 3, provided the base field is countable. In another paper, Jason Bell and the presenter proved that for any uncountable field, and any intermediate growth function, there exists an affine, nil, infinite dimensional algebra with growth bounded above by this function. In another paper put forward, Agata Smoktunowicz and the presenter proved the existence of Jacobson Radical algebras that have quadratic growth, which is the smallest possible non-linear growth category. (Received December 08, 2011)