962-11-814 **Carl Pomerance*** (carlp@lucent.com), Bell Labs - Lucent Technologies, 600 Mountain Avenue, Murray Hill, NJ 07974. *Towards an Artin conjecture for composites.* Preliminary report.

The strong form of Artin's famous conjecture on primitive roots is that if integer a is not -1 nor a square, then there is a positive proportion of prime numbers which have a as primitive root. Hooley has proved this conditional on the GRH. We export the concept of primitive root to composite moduli as follows: a is a "primitive root" for n if a is coprime to n and the multiplicative order of a modulo n is the maximum of all multiplicative orders modulo n. Let $\mathcal{R}(a)$ denote the set of such numbers n. It is tempting to conjecture that if a lies outside some small exceptional set, then the set $\mathcal{R}(a)$ has positive asymptotic density. However, Shuguang Li has shown this is not true: each set $\mathcal{R}(a)$ has lower density 0. Li conjectured though that for a outside a small and explicit exceptional set, $\mathcal{R}(a)$ has positive upper density. In this talk I discuss an approach for Li's conjecture that is conditional on the GRH. (Received September 26, 2000)