1096-VG-2308 **Benjamin Allen**, **Yulia Dementieva**, **Ruben Medeiros**, **Christopher Paoletti** and **Christine Sample*** (samplec@emmanuel.edu), Emmanuel College, 400 The Fenway, Boston, MA 02115. *Asymmetric population structure alters the molecular clock.* Preliminary report.

Neutral substitution occurs when mutations that offer no advantage or disadvantage become fixed in a population by random chance. Under simple models of evolution, the rate of neutral substitution at the population level equals the rate of neutral mutation at the individual level, regardless of the population size. These results support the "molecular clock" hypothesis that evolutionary time can be measured by counting genetic substitutions. We use a graph-theoretic model to investigate the effects of spatial population structure on the molecular clock rate C, defined as the expected number of neutral mutations arising within a single generation that ultimately go to fixation. We obtain the novel result that asymmetric population structures can alter the molecular clock rate. In particular, if birth rates are constant over all individual sites, the molecular clock rate is less than or equal to that of a well-mixed population, with equality if and only if death rates are also constant over sites. On the other hand, if there are no constraints on birth or death rates, the molecular clock rate can be greater than the baseline (well-mixed population) value. Thus the constancy of the molecular clock is not as general as previously thought. (Received September 17, 2013)