1092-92-19 **Maia Martcheva*** (maia@ufl.edu), Department of Mathematics, 358 Little Hall, Gainesville, FL 32611, and **Xue-Zhi Li** (xzli66@126.com), Department of Mathematics, Xinyang Normal University, Xinyang, 464000, Peoples Rep of China. *Competitive Exclusion in a Infection-Age Structured Model with Environmental Transmission.*

It has been shown in the past that for the most basic multi-strain ordinary differential equation (ODE) model of SIR-type a competitive exclusion principle holds. The competitive exclusion principle means that the strain with the largest reproduction number persists but eliminates all other strains with suboptimal reproduction numbers. In this talk, we extend the competitive exclusion principle to a multi-strain age-since-infection structured model of SIR/SI-type. We also include environmental transmission for each of the pathogens. Using Lyapunov functional, we are able to establish global stability of the disease-free equilibrium if all reproduction numbers are smaller or equal to one. If $\mathcal{R}_j$, the reproduction number of strain j is larger than one, then a single-strain equilibrium, corresponding to strain j exists. This single strain equilibrium is always locally stable whenever it exists. If $\mathcal{R}_1 > 1$ is the maximal reproduction number, using a Lyapunov functional, we establish that the corresponding single-strain equilibrium $\mathcal{E}_1$ is globally stable. That is, strain one eliminates all other strains, independently of their reproduction numbers as long as they are smaller than $\mathcal{R}_1$. (Received June 15, 2013)