

**KS11 - Ruy Ribeiro (Los Alamos National Laboratory - USA)**

***HIV Epidemiology and the Impact of Nonsterilizing Vaccines***

**Abstract:**

**Human immunodeficiency virus (HIV) is the cause of the most severe pandemic that the world has ever seen. In 2005, there were 40 million people living with this infection and 2.8 million people died, the vast majority in the 15-49 age group. Altogether, acquired immunodeficiency syndrome (AIDS), a condition that follows from HIV infection and leaves the host unable to fight infectious challenges, has resulted in over 25 million deaths worldwide. Unfortunately, the spread of this disease continues at a fast pace, and the best hope for any successful intervention is the development of a vaccine against this virus. However, studies and trials of HIV vaccines in animal models suggest that it is difficult to induce complete protection from infection ('sterilizing immunity'), and it may only be possible to reduce viral load and to slow or prevent disease progression following infection. What would be the effect of such vaccine on the spread of the epidemic? We have developed an age-structured epidemiological model of the effects of a disease modifying HIV vaccine that incorporates intra host dynamics of infection (transmission rate and host mortality that depend on viral load), the possible evolution and transmission of vaccine escape mutant virus, a finite duration of vaccine protection, and possible changes in sexual behavior. Using this model we investigate the long-term outcome of a disease modifying vaccine and utilize uncertainty analysis to quantify the effects of our lack of precise knowledge of various parameters.**