1124-92-410 **Nargesalsadat Dorratoltaj*** (nargesd@vt.edu), 8 Museum Way, Cambridge, MA 02141, and **Stanca Ciupe**, **Ryan Nikin-Beers**, **Stephen Eubank**, **Pierre Pellegrino**, **Ian Williams**, **Persephone Borrow** and **Kaja Abbas**. *Viral and Immune System Dynamics of HIV-1, CD4+ T Cells and Macrophages during Acute, Clinically Latent and Late Phases of HIV Infection.*

The objective is to analyze the dynamics of HIV, CD4+ T cells and macrophages during the acute, clinically latent and late phases of HIV infection to predict their dynamics in treatment naive HIV-infected individuals. While the viral-host dynamics of HIV and CD4+ T cells are well studied, our understanding of the role macrophages in HIV progression to AIDS is limited. This study incorporates the macrophage dynamics and studies their role during all stages of HIV infection. We develop a deterministic mathematical model of virus-host dynamics that incorporates the HIV, CD4+ T cell and macrophage populations. We calibrate the model against longitudinal clinical data from a cohort of 39 treatment naive HIV-infected individuals. Based on model calibration to rapidly-progressing patient cohort, we infer that the mean HIV progression timeline from time of infection to AIDS stage is 5.75 years. The model predicts that the peak in viral load during acute HIV infection is due to virus production by infected CD4+ T cells, while during the latent and late phases of HIV, infected macrophages dominate the overall viral production. This leads to the conclusion that macrophage-induced virus production is the driver of HIV progression from asymptomatic phase to AIDS in infected individuals. (Received September 13, 2016)