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## Computational Mathematics Seminar Series

## Mathematical Modeling for HIV-1 Gag Protein Trafficking and Assembly

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Johnston Hall 338  
September 13, 2011 - 03:30 pm**Abstract:**

The group-specific antigen (Gag) protein is encoded by human immunodeficiency virus type 1 (HIV-1), which causes the Acquired Immuno Deficiency Syndrome (AIDS). A better understanding of the mechanisms of trafficking and assembly of the HIV-1 Gag proteins inside the infected host cells will be undoubtedly helpful for developing new drugs for treatment of HIV. In this talk, we will present a mathematical model for HIV-1 Gag protein trafficking that accounts for both active transport on microtubules and diffusion in cytoplasm. The convection-diffusion equation can be efficiently solved using characteristic finite element methods. Our in silico results are in good agreement with the in vitro experimental data for several cell lines. We shall also discuss math models for Gag multimerization inside cytoplasm and on cell membrane. The mechanism for kinesin-based viral egress will be examined to illustrate the stochastic features of protein trafficking. This is a joint work with Chaoping Chen, Roberto Munoz-Alicea, Simon Tavener at ColoState and Qing Nie at UC Irvine.

**Speaker's Bio:**

Jiangguo (James) Liu earned his Ph.D. in Mathematics in 2001 from University of South Carolina. He joined the Math Department at Colorado State University as an Assistant Professor after spending three and half years as a postdoc at Texas A&M University. He is spending this semester as a Visiting Associate Professor at LSU. His current research interests are numerical methods for partial differential equations and their applications in porous media flow and intracell protein trafficking.

**Refreshments will be served.****This lecture has a reception.**