

# Departmental Colloquium

**Dr. Tailei Zhang**  
**Chang'an University, China**

**Friday, March 1, 2019**  
**1:00pm, HH-3017**

## **Mathematical Modeling and Analysis of the Transmission Dynamics of HIV/AIDS Epidemics**

### **Abstract:**

In this talk, we will introduce two HIV/AIDS epidemic models. By the epidemic characteristics of HIV/AIDS in Yunnan Province of China, the population is divided into two groups: injecting drug users (IDUs) and sexual immoral populations (SIP). The conditions and thresholds for the existence of four equilibria are established. In the simulations, parameters are chosen to fit as much as possible prevalence data publicly available for Yunnan. Our results show that controlling the size of high-risk people is a very effective control measure. For better understanding the HIV/AIDS transmission trend in Yunnan province, we improve the above HIV/AIDS model to an HIV/AIDS epidemic model with 12 compartments. The total population is divided into four subgroups: injecting drug users (IDUs), female sex workers (FSWs), clients of FSWs (C) and men who have sex with men (MSM). Due to behavioral change, susceptible people will move into the other susceptible groups. The simulations indicate that Yunnan will have about 140,000 HIV positives, 18,000 AIDS cases unless there are any stronger or more effective control measures by the end of 2015. Sexual transmission is the main mode from 2006-2015. The HIV prevalence rate among men who have sex with men continues to increase more quickly.