



# NIMBioS

National Institute for Mathematical  
and Biological Synthesis



## NIMBioS Interdisciplinary Seminar

3:30 p.m.\*, Tuesday, September 24, 2013

**Dr. Shi Chen**

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### **“Understanding individual, temporal, and spatial heterogeneity in directly and indirectly transmitted disease systems in cattle”**

Heterogeneity, such as individual, temporal, and spatial variability, substantially influences disease dynamics in cattle. However, current studies still lack comprehensive understanding and quantitative characterization on this issue. Our study starts from investigating spatial heterogeneity associated with both environmental pathogen concentration and host-environment contact variability in an indirectly transmitted disease system. Then we investigate real contact network in animal population at high spatial and temporal resolution, and link the observed highly dynamic contact network with directly transmitted disease system to highlight the importance of the change in network structure and individual rank. We will also model the interaction between the indirectly and directly transmitted pathways of pathogens and understand how the coupling of these two pathways may alter disease dynamics. Finally, we propose some precautions for misuse and misinterpretation of heterogeneity in disease systems.

**Location: Room 105 at NIMBioS, Claxton Education Bldg, 1122 Volunteer Blvd.**

*\*Join us for refreshments at 3 p.m.*

For more information about this and other NIMBioS Seminars, visit <http://www.nimbios.org/seminars>

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