



Multiscale Modeling of Microcirculation and Beyond

**Thursday,
March 20, 2014,
3:30P.M.**

**Lower Level
Auditorium,
Geddes Hall**

Refreshments served
at 3:00 p.m. in the
Geddes Hall
Coffee House

Molecular mutations can lead to altered mechanical properties and malfunction of cells and tissues. However, it is a grand computational challenge to bridge the scales from molecules to cells and tissues. In this seminar, I will show examples of applying multiscale modeling to investigate problems in microcirculation, especially red blood cell (RBC) diseases, starting from the molecular scale. We considered the detailed molecular architectures of RBCs and predicted the bilayer-cytoskeletal interaction bond strength, which is crucial for understanding hereditary spherocytosis. Furthermore, we found that only mature sexual malaria-infected RBCs is transmittable because they can escape from the spleen clearance due to their low stiffness. This discovery may inspire new drug manipulations on malaria-infected RBC stiffness to disrupt malaria transmission. These findings have only become possible due to the multiscale modeling technique and the state-of-the-art understanding of molecular structures, and promise a new avenue to study the mechanics of biological systems and materials.



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If you are interested in meeting individually with Dr. Peng, please contact Linda at 631-5431.