

# Bioengineering Seminar

By Faculty Candidate:

**Qi Wei, Ph.D.**

*Department of Physiology, Northwestern University*

## **Computational Biomechanics for Subject-specific Simulation**

Subject-specific biomechanical simulation has played an important role in improving our knowledge of human movement and advancing treatment of movement disorders. In this talk, I will present our efforts in developing novel computational models of eye movement biomechanics and musculoskeletal biomechanics.

Contributions of the peripheral ocular plant in accomplishing complex eye movement are under debate. To understand its functions in both normal and pathological conditions, a realistic computational model is needed. I will present the first three-dimensional biomechanical model of the orbit that can simulate the dynamics of ocular motility interactively. The model incorporates anatomical and physiological characteristics of the orbital plant and implements the recently discovered extra-ocular pulley theory. Extra-ocular muscle geometries reconstructed from MRI can be integrated for patient-specific simulation. We are especially motivated to use this model to investigate strabismus caused by pulley abnormalities and to explore effective surgical treatment. I will also describe our work on musculoskeletal simulation. Strand-based biomechanical models have been developed to understand muscle actions of the rat hind limb, an important animal model for investigating spinal cord injury and other movement disorders.

Wednesday, March 21st, 2012

11:00AM-12:00PM, Room 3507

Nguyen Engineering Building


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### **BIOGRAPHY**

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Qi Wei is a postdoctoral fellow in the Department of Physiology in the Feinberg School of Medicine at Northwestern University. She received her Ph.D. from Rutgers University in 2010 and her M.Sc. degree from The University of British Columbia in 2004, both in Computer Science.

She had earned her B.E. degree in Computer Engineering from Beijing Institute of Technology. Her research is focused on biomechanical modeling and simulation, eye movement, and biomedical imaging.



*For any questions please contact Claudia Borke at [cborke@gmu.edu](mailto:cborke@gmu.edu), (703) 993-4190*