SIMBIOS DEMOS

Speeding up MD (2 demos)

courtesy of Mark Friedrichs & Sam Flores

OpenSim: Neuromuscular Biomechanics

Scott Delp and OpenSim Team

Simbios - Physics-based Simulation of Biological Structures

Molecular Dynamics

- Solves Newton's equations of motion for atoms and molecules
- Dynamics often forms the link between structure and function
- Problem: for large systems it's really slow!

Two ways to speed up

1. Use open OpenMM to speed up calculations via hardware acceleration (using GPUs)

   ~300x speed up

and / or

2. Use Simbody™ to reduce number of degrees of freedom calculations and increase the size of time steps

OpenSim

Patient-Specific Musculoskeletal Models and Dynamic Simulations of Movement

Developed by Scott Delp and the OpenSim Development Team

OpenSim Demo

We will show you how to:

- Interact with and modify musculoskeletal models
- Generate and compare forward dynamics simulations—modeling body movement given certain muscle excitation patterns