Abstract:

Physics-based simulation is one of the most important approaches to achieve "realism" for many real-time computer graphics applications such as computer games. In this talk, I will introduce the basic theory behind physics-based elastic deformation, its computational approaches, and the main challenges. Then I will introduce our latest work of an efficient and robust framework for simulating 3D elastic deformation of soft objects based on domain decomposition and subspace model reduction. The soft objects are decomposed into multiple domains, and the dynamic ordinary differential equations are linearized domain-wise and projected into a carefully-designed local subspace. The domain coupling is fully satisfied in these subspace without any artifact. The comparison with the other state-of-the-art approaches on multi-domain subspace deformation will be further discussed.

About the Speaker:

Xiaohu Guo is an associate professor of computer science at the University of Texas at Dallas. He received the PhD degree in computer science from the State University of New York at Stony Brook in 2006. His research interests include computer graphics, animation and visualization, with an emphasis on geometric, and physics-based modeling. His current researches at UT-Dallas include: spectral geometric analysis, deformable models, centroidal Voronoi tessellation, mesh generation, GPU algorithms, 3D and 4D medical image analysis, etc. He received the NSF CAREER Award in 2012.