Distinguished Lecture Series

EECS COLLOQUIUM

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Wednesday
March 17
4:00 - 5:00 pm

306 Soda Hall
Hewlett-Packard
Auditorium

Optimal Human Motion

Karen Liu

Assistant Professor, Computer Science, Georgia Tech.

Abstract

Creating truly agile and responsive virtual humans in a physically simulated world has been a longstanding challenge in computer animation. Underlying human motion is the coordinated operation of 206 bones, more than 600 muscles, and countless tendons and ligaments. My research focuses on simulate and model this complex system by leveraging principles from biomechanics, motion capture data, control theory, machine learning and numerical optimization.

In this talk, I will present a set of computational models that enable scientists, engineers, and artists to simulate and design natural human motion. How do we decode motion data to extract hidden information such as control mechanisms and styles of the subject? How do we use minimal amount of motion data to enhance the accuracy of existing biomechanical models and further expand our understanding of human body? How do we design abstract models of motion that best leverage existing optimization or machine learning algorithms? I will describe how we answer these fundamental questions by formulating appropriate optimal control problems. Furthermore, I will describe the applications of these methods in scientific and engineering disciplines beyond the field of computer graphics.

Biography

Karen Liu is Assistant Professor in the School of Interactive Computing at Georgia Tech and a member of the Graphics Lab. Formerly she was Assistant Professor at the University of Southern California. Her Ph.D. (2005) and M.S. (2001) are from the University of Washington. Her research interests are computer graphics and animation, including physics-based animation, character animation, numerical methods, robotics and computational biomechanics; her Ph.D. thesis focused on designing a generative model for human natural motion. She is the holder of an Alfred P. Sloan Fellowship for 2010-11, and a holder of the NSF Faculty Early Career Development grant (2007-11). In 2007 she was one of Technology Review's "Young Innovators Under 35."

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