ABSTRACT: Creating realistic virtual humans has traditionally been considered a research problem in Computer Animation primarily for entertainment applications. With the recent breakthrough in collaborative robots and deep reinforcement learning, accurately modeling human movements and behaviors has become a common challenge faced by researchers in robotics, artificial intelligence, as well as Computer Animation. In this talk, I will focus on two different yet highly relevant problems: how to teach robots to move like humans and how to teach robots to interact with humans. While Computer Animation research has shown that it is possible to teach a virtual human to mimic human athletes’ movements, transferring such complex controllers to robot hardware in the real world is perhaps even more challenging than learning the controllers themselves. In this talk, I will focus on two strategies to transfer highly dynamic skills from character animation to robots: teaching robots basic self-preservation motor skills and developing data-driven algorithms on transfer learning between simulation and the real world. The second part of the talk will focus on robotic assistance with dressing, which is a prominent activities of daily living (ADLs) most commonly requested by older adults. To safely train a robot to physically interact with humans, one can design a generative model of human motion based on prior knowledge or recorded motion data. Although this approach has been successful in Computer Animation, such as generating locomotion, designing procedures for a loosely defined task, such as “being dressed”, is likely to be biased to the specific data or assumptions. I will describe a new approach to modeling human motion without being biased toward specific situations presented in the dataset.

BIO: C. Karen Liu is an associate professor in School of Interactive Computing at Georgia Tech. She received her Ph.D. degree in Computer Science from the University of Washington. Liu's research interests are in computer graphics and robotics, including physics-based animation, character animation, optimal control, reinforcement learning, and computational biomechanics. She developed computational approaches to modeling realistic and natural human movements, learning complex control policies for humanoids and assistive robots, and advancing fundamental numerical simulation and optimal control algorithms. The algorithms and software developed in her lab have fostered interdisciplinary collaboration with researchers in robotics, computer graphics, mechanical engineering, biomechanics, neuroscience, and biology. Liu received a National Science Foundation CAREER Award, an Alfred P. Sloan Fellowship, and was named Young Innovators Under 35 by Technology Review. In 2012, Liu received the ACM SIGGRAPH Significant New Researcher Award for her contribution in the field of computer graphics.