ABSTRACT: For autonomous robots to operate in the open, dynamically changing world, they will need to be able to learn a robust set of interacting skills. This talk begins by introducing "Overlapping Layered Learning" as a novel hierarchical machine learning paradigm for learning such interacting skills in simulation. While learning in simulation is appealing because it avoids the prohibitive sample cost of learning in the real world, unfortunately policies learned in simulation often fail when applied on physical robots. This talk then introduces "Grounded Simulation Learning" to address this problem by algorithmically altering the simulator to better match the real world, and connects this new algorithm to a theoretical analysis of off-policy evaluation in reinforcement learning. Overlapping Layered Learning was the key deciding factor in UT Austin Villa's RoboCup robot soccer 3D simulation league championship, and Grounded Simulation Learning has led to the fastest known stable walk on a widely used humanoid robot.

BIO: Dr. Peter Stone is the David Bruton, Jr. Centennial Professor and Associate Chair of Computer Science, as well as Chair of the Robotics Portfolio Program, at the University of Texas at Austin. In 2013 he was awarded the University of Texas System Regents' Outstanding Teaching Award and in 2014 he was inducted into the UT Austin Academy of Distinguished Teachers, earning him the title of University Distinguished Teaching Professor. Professor Stone's research interests in Artificial Intelligence include machine learning (especially reinforcement learning), multiagent systems, robotics, and e-commerce. Professor Stone received his Ph.D in Computer Science in 1998 from Carnegie Mellon University. From 1999 to 2002 he was a Senior Technical Staff Member in the Artificial Intelligence Principles Research Department at AT&T Labs - Research. He is an Alfred P. Sloan Research Fellow, Guggenheim Fellow, AAAI Fellow, Fulbright Scholar, and 2004 ONR Young Investigator. In 2003, he won an NSF CAREER award for his proposed long term research on learning agents in dynamic, collaborative, and adversarial multiagent environments, in 2007 he received the prestigious IJCAI Computers and Thought Award, given biannually to the top AI researcher under the age of 35, and in 2016 he was awarded the ACM/SIGAI Autonomous Agents Research Award.