

Michigan State University
Science at the Edge
Engineering Seminar

April 6, 2018

11:30 a.m., Room 1400 Biomedical and Physical Sciences Building

Refreshments served at 11:15 a.m.

Sangbae Kim

Biomimetic Robotics Lab

Massachusetts Institute of Technology

MIT Cheetah Robot: A New Design Paradigm for Physical Interaction

Abstract

Recent technological advances in legged robots are opening up a new era of mobile robotics. In particular, legged robots have a great potential to help disaster situations or elderly care services. Whereas manufacturing robots are designed for maximum stiffness, allowing for accurate and rapid position tracking without contact, mobile robots have a different set of hardware/software design requirements including dynamic physical interactions with environments. Events such as the Fukushima power plant explosion highlight the need for robots that can traverse various terrains and perform dynamic physical tasks in unpredictable environments, where robots need to possess compliance that allows for impact mitigation as well as high force capability. The talk will discuss the new mobile robot design paradigm focusing on the actuator characteristics and the impulse planning algorithms. As a successful embodiment of such paradigm, the talk will introduce the constituent technologies of the MIT Cheetah. Currently, the MIT cheetah is capable of running up to 13mph with an efficiency rivaling animals and capable of jumping over an 18-inch-high obstacle autonomously.

Bio

Prof. Sangbae Kim, is the director of the Biomimetic Robotics Laboratory and an Associate Professor of Mechanical Engineering at MIT. His research focuses on the bio-inspired robot design by extracting principles from animals. Kim's achievements on bio-inspired robot development include the world's first directional adhesive inspired from gecko lizards, and a climbing robot, Stickybot, that utilizes the directional adhesives to climb smooth surfaces featured in TIME's best inventions in 2006. Recent achievement includes the development of the MIT Cheetah capable of stable outdoor running up to 13mph and autonomous jumping over an obstacles at an efficiency of animals. This achievement was covered by more than 300 media articles. He is a recipient of best paper award from International Conference on Robotics and Automation (2007), King-Sun Fu Memorial Transactions on Robotics (2008) and IEEE/ASME transactions on mechatronics (2016), DARPA Young Faculty Award (2013), NSF CAREER award (2014), and Ruth and Joel Spira Award for Distinguished Teaching (2015).

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Persons with disabilities have the right to request and receive reasonable accommodation. Please call the Department of Chemical Engineering and Materials Science at 355-5135 at least one day prior to the seminar; requests received after this date will be met when possible.