

SMU Department of Mechanical Engineering
SEMINAR

**“Computational Techniques and Hardware Materials
for Advancing the Development of Facially Expressive
Humanoid Robots”**

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Friday, March 9, 2012
3:00 p.m. – 4:00 p.m.
Location: Huitt-Zollars Pavilion

Abstract: Modern mechanical engineering attempts to close the gap between machine like systems and biological systems through a relatively new area of research called humanoids. Based on their resemblance, humanoids could be classified as machine-like and human-like robots. Humanoids development really cross boundaries of disciplines and even raises the philosophical question whether the progress in the area affects human beings adversely or favorably which might often be debatable. For us, we are more concerned on how to recreate all the behavior, action, capability and appearance of human to the machine-like robot for better human-robot interactions. A few prominent researchers across the globe tossed the problem and addressed various aspects by developing prototypes. A fundamental question still remains in various aspects to fully realize these systems. In this presentation, the speaker will discuss the current state of the art humanoid robots development, their application and benefit to the society, and a new technique of designing humanoid robots with facial expressions using a graphical technique called GFEAD (Graphical Facial expression Analysis and Design). The state of the art artificial muscles technologies based on smart materials that are suitable for the design and development of humanoid robots will be briefly discussed. The speaker will focus on how the actuation technology is the most critical factor and affect the achievable degree of freedom, and demonstrate a shape memory actuator based baby humanoid robot that became the highest degree of freedom in small scale.

Bio: Yonas Tadesse is an assistant professor at the Mechanical Engineering Department, Eric Johnson School of Computer Science and Engineering, The University of Texas at Dallas (UTD). He received his PhD in mechanical engineering in 2009 from Virginia Tech. He worked as postdoctoral fellow and research associate at Virginia Tech. He holds a master degree from Indian institute of Technology Bombay and Bachelor degree from Addis Ababa University in 2005 and 2000 respectively. His research interests include Humanoid robotics, emerging applications of smart materials, sensors, and actuators, mechatronic system, multimodal energy harvesting, modeling, controls and biomimetics. He is a member of IEEE, RAS, ASME, SPIE, NSBE and ACS.