

## Digital Human Modeling and Simulation for Engineering and Spine Biomechanics

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**Abstract:** Digital human modeling and simulation plays an important role in product design, prototyping, manufacturing, sports biomechanics, and other areas. It reduces the number of design iterations and increases the safety and design quality of products. In this talk, I will first briefly review the state of art of digital human models, then I will summarize research projects carried out in my research lab. The first area is human-centric engineering by investigating the optimization-based digital human models to assist design and engineering, slips and falls, among others. The second area is healthcare engineering by developing novel predictive models to predict the optimal surgery procedures in lumber spine surgery. The third one is a recently finished project on patient fall study in hospitals.

**Speaker Bio:** Dr. James Yang is SAE Fellow, Fulbright Scholar, Associate Chair, Associate Professor and Director of Human-Centric Design Research Lab, Department of Mechanical Engineering, Texas Tech University, Lubbock, Texas, USA. He received his BS and MS degrees in Automotive Engineering from Jilin University, and a Ph.D. degree in Mechanical Engineering from the University of Iowa. Dr. Yang was a faculty member at the Department of Automotive Engineering, Tsinghua University, Beijing and a Research Engineer at the Center for Computer Aided Design, the University of Iowa. Dr. Yang is the recipient of various national and international awards. Dr. Yang's research has funded by NSF, NIOSH, NPSF, NASA, DOE, US Natick Soldier Center, TACOM, USCARS (GM, Ford, and Chrysler), Caterpillar Inc., Honda R&D North Americas, and other private sectors. Dr. Yang's research interests include physics-based human modeling and simulation, bio-inspired systems, ergonomics, biomechanics, healthcare engineering, tire modeling and vehicle dynamics, and robotic and mechanical systems.