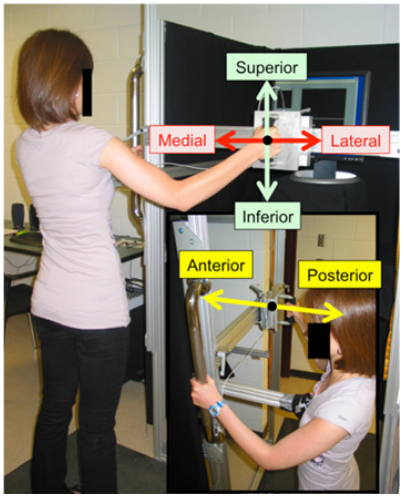
USCAR
UNITED STATES COUNCIL FOR AUTOMOTIVE RESEARCH LLC

Ergonomic Task Force

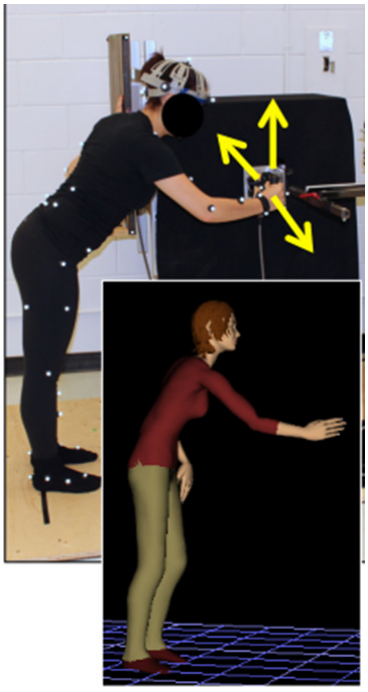
Improving Automotive Manufacturing Design and Ergonomics Through Work Simulation and Digital Human Modelling

Automotive Partnership Canada and
Department of Kinesiology, McMaster University

This three year ergonomic research project (2012-2014) is conducted by the researchers at the McMaster University, Dr. Jim R. Potvin, Dr. Peter J. Keir and Dr. Jim L. Lyons. It is highly leveraged by funding from Automotive Partnership Canada (APC), which is an industrial partner of the USCAR Ergonomic Task Force that funds collaborative R&D activities that will benefit the entire Canadian automotive industry.

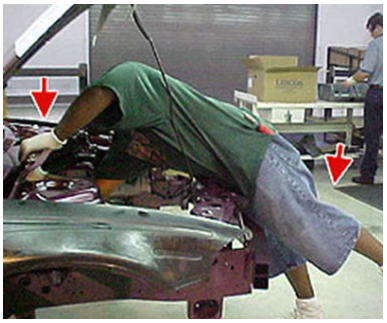


The goals of this project are to advance the science of digital human models (DHMs) and quantitative ergonomic assessment tools leading to enhances efficiency and accuracy of engineering and safety risk assessments in the virtual manufacturing field to reduce injuries. Three area of focus are: (1) assess and optimize the validity of estimating musculoskeletal tissue load demands, and associated injury risk, using simulated work tasks, (2) further develop the biofidelity of the DHMs imbedded in the virtual environments, and (3) assess the degree to which actual human behaviours can be predicted by ergonomic models generated through virtual work simulations.



This project consists of eight research projects, which were determined by the USCAR Ergo Task Force and reflect industry needs in the area of ergonomics. These include:

1) Plant survey leaning and external bracing behaviours
2) Development of a novel manual arm strength prediction software package
3) Develop and validate software to predict the risk of carpal tunnel syndrome
4) Biomechanical assessment of worker leaning and/or bracing in simulated lab tasks
5) Assessment of whole body postures for exertions with constrained reaches
6) Computer modeling of the musculoskeletal structures of the shoulder
7) Modelling the effects of fatigue on shoulder mechanics and injury risk during work
8) Predicting fatigue accumulation during the complex intermittent tasks often required on assembly lines.



This research will directly impact global ergonomic and automotive manufacturing processes by contributing to a reduction in workplace musculoskeletal disorders and an improvement in the efficiency of the manufacturing design, process, validation and launch cycle.