Kinematics and kinetics assessment of multi-segment spinal column: Estimation and compensation of motion capture errors
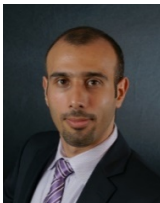
Hossein Rouhani, Ph.D., P.Eng.

Assistant Professor, Department of Mechanical Engineering, University of Alberta, Edmonton, Alberta, Canada

ABSTRACT:

In-vivo measurement and interpretation of inter-vertebral angles and moments are important for clinical evaluations and developing injury prevention and rehabilitation strategies. Motion assessment of the human spinal column using linked-segment models can enable estimation of inter-vertebral angles and moments. However, the application of conventionally used multi-body dynamics measurement and analysis approaches for multi-segment spinal column is prone to experimental errors because of inaccuracies in (i) kinematic measurements associated with soft tissue artifacts and (ii) estimating individual-specific body segment parameters. This seminar proposes modeling approaches to estimate the propagation of these experimental errors into the calculated inter-vertebral angles and moments, and presents the inter-vertebral angles and moments during multi-directional trunk bending after compensate for these errors.

SHORT BIO:

Hossein Rouhani is an assistant professor in the Department of Mechanical Engineering at the University of Alberta since July 2015. He received a PhD degree in Biotechnology and Bioengineering from the Swiss Federal Institute of Technology in Lausanne (EPFL) in 2010 where he was a postdoctoral fellow in 2011. Dr. Rouhani was then a Postdoctoral Fellow in the Institute of Biomaterials and Biomedical Engineering at the University of Toronto from 2012 to 2015. Dr. Rouhani's fields of research are musculoskeletal biomechanics, biomedical instrumentation design, and development of wearable neuro-rehabilitative technologies. Within his translational research program, Dr. Rouhani has had several collaborative research projects with university hospitals, such as University Hospital of Lausanne, Toronto Rehabilitation Institute, and Glenrose Rehabilitation Hospital. Dr. Rouhani is a recipient of two postdoctoral fellowship awards from the Swiss National Science Foundation, an associate editor of IEEE Canadian Journal of Electrical and Computer Engineering, and an author of 37 journal papers.

DATE AND PLACE OF THE SEMINAR:

Monday, April 29th, 2019 at 15:00. Duration: 1 hour
Escola Tècnica Superior d'Enginyeria Industrial de Barcelona (ETSEIB), UPC
Diagonal 647, 08028 Barcelona
Aula CREB (4.13), 4th floor