The University Of Sheffield.

Automatic Control and Systems Engineering

The Department of Automatic Control & Systems Engineering
is pleased to announce the following seminar:

Application of Nonlinear Complex Systems in Musculoskeletal System Modelling

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The University of Sheffield

Wednesday, 2 December 2015 at 14:00
LT2, The Diamond

Abstract

The multiscale modelling of human musculoskeletal system poses great challenges due to complex interactions across different scales, partially observable states, nonlinearity, and uncertainty. The EPSRC frontier project -- MultiSim -- aims to develop a computational platform for the management of musculoskeletal disorders, such as fractures due to osteoporosis, through *in silico* subject-specific modelling of human lower body. The framework of musculoskeletal system includes computational models at molecule, cell, tissue, organ and environment levels and their interactions. The nonlinear complex systems techniques are applied to tackle the issues within the framework such as the linking between different scales, partially observable states, and nonlinearity. This seminar will present two case studies within the framework: a) surrogate modelling of human bone, specifically femoral head biomechanics and b) proxy measurement: the prediction of ground reaction force (GRF) from wearable sensor recordings.

Biography

Dr Lingzhong Guo is a lecturer in the Department of Automatic Control and Systems Engineering at the University of Sheffield. Before appointed as a Lecturer, he worked as a research associate at the Centre for Signal Processing and Complex Systems in the Department of Automatic Control and Systems Engineering after obtaining his PhD degree in Control Engineering from Bristol Robotics Laboratory (BRL). His research mainly focuses on the modelling, identification and analysis of complex nonlinear systems, particularly infinite dimensional nonlinear dynamical systems and its application. Currently he is a member of Insigneo Institute for *in silico* Medicine and working on the EPSRC frontier project -- MultiSim -- responsible for application of nonlinear complex systems techniques in musculoskeletal system modelling.