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MEC 2014 - topic: Outreach and Careers in BME

On presenting aspects of computational biomechanics to the non-specialists

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Computational investigations have acquired an important role in development of treatments and devices involving biomechanics. Accordingly, at the institute of Medical and Biological Engineering in Leeds (iMBE), attempts are made to enhance the way these are conveyed to the non-specialist.

In keeping with the experience of public engagement within iMBE, a new tool was developed to communicate the computational modelling aspects of the institute's research. It combines the complex transition from clinical or pre-clinical image data to biomechanical models with a user friendly environment on a touch-screen application. This tool aims to increase the awareness on how 3D simulations can help to understand disease conditions and contribute to the development of novel treatment methodologies. It also aims to familiarise non-experts with the different steps involved in developing a patient-specific computational model and to introduce 3D image processing to the public. The available biomechanical models provide examples of the diverse aspects of how computer models can contribute to medical research and clinical practice.

Technically, the tool consists of a code combining python libraries (www.python.org) and VTK (www.vtk.org) that outputs 3D image data and model results into interactive widgets. Using finger-tip control, the users are able to navigate through medical images and models, examine them from any direction, zoom in and out, and cut-through them to appreciate their full constituents.

Over the past year, this tool has been used not only in local and national science fairs but also served to demonstrate the importance of computational models to patient events, student applicants and lab demonstrations. It has generated a real interest among visitors and led them to engage further within the iMBE stalls during fairs. In particular, it has interested younger generations who are used to touch-screen technology, and older people who are curious about the possibility to journey through 3D medical images.

The tool was initially designed with a single application demonstrating most computational research aspects of iMBE. Since then it has been extended to particular aspects such as spine and bone microstructure. It is thus created as a flexible, portable, resource for the institute's public engagement strategy.