

## **Building patient specific computer models of musculoskeletal systems to support orthopaedic surgeons**

Dr. Pankaj Pankaj  
University of Edinburgh, UK  
Email: [Pankaj@ed.ac.uk](mailto:Pankaj@ed.ac.uk)



Computer models based on the finite element (FE) methods are being extensively used in the field of biomechanics. While much of this research focuses on the basic science, there is now a strong move towards employing modelling in the clinic and using patient specific models. This presentation draws upon the experience of the presenter's research group to examine what modelling can and cannot do.

The presentation considers briefly the input information required by an FE analysis from the patient specific modelling perspective. It is proposed that the requirements of input quality and patient specificity are determined by the output sought from the FE analysis i.e. many of the questions can be answered well with approximate input data. The examples considered to illustrate this include revision hip replacement with impaction grafting; knee replacement; and fracture fixation using external fixators.

### **Short Biosketch**

Dr Pankaj is a reader at the School of Engineering, The University of Edinburgh. He obtained his first degree in civil Engineering from IIT Delhi and PhD in numerical methods from University of Wales Swansea. Prior to moving to Edinburgh, Dr Pankaj was at IIT Roorkee in India.

Dr Pankaj's research has been in the area of nonlinear computational structural and solid mechanics using finite element techniques. He has developed new constitutive models and finite element algorithms. One of the major successful application areas of my expertise is computational biomechanics. He developed and leads the orthopaedic engineering research group at Edinburgh that comprises around 15 researchers.

His other research areas include modelling of concrete structures subjected to elevated temperatures and earthquakes.