SURGICAL SIMULATION

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MINI SYMPOSIUM PROPOSAL

Keywords: *Computer-Based Surgical Simulation, Surgical Simulator*

The aim of this mini symposium is to bring together researchers from computational mechanics, computer graphics and medicine, to address the challenges arising in computer-based surgical simulation.

Surgical training is a key stage of a surgeon's education, and is traditionally done by a "master-apprentice" relationship where the trainee learns a surgical procedure by repeating steps performed by the master after watching him. However, this traditional method of teaching in surgery has severe shortcomings: patient safety, working hour regulations, cost and ethical issues. To overcome such difficulties in surgeon training and yet meet the need for more highly-qualified surgeons, an advanced surgical training system has a key role to play. A surgical simulator is an integrated system combining computer simulation and multimedia content to generate a virtual environment representing specific organs and operation procedures, allowing training away from the operating theatre.

Despite the increasing adoption of virtual simulation in early stage resident training as well as continuing certification of competence, surgical simulation is far from meeting its full potential. Surgical simulators, even the latest models, are often regarded by surgeons as oversimplified, providing cartoon-like visual feedback, and lacking "feeling". The main failures of existing techniques are due to: oversimplified geometry, unjustified material models, incomplete mechanics, and limited coverage of surgery skills.

The mini symposium welcome all innovative research work that will help to address the above challenges associated with surgical simulation. The scope coves, but not limited to, real-time simulation, realistic constitutive models for human tissues, geometric modelling and visualization technologies, image registration, finite element methods, particle-based methods, boundary element methods, and high-fidelity human-computer interaction technologies etc.