

## **AR Haptic Training Simulation for Femoral** Palpation and Needle Insertion Tim R Coles

ISTITUTO ITALIANC DI TECNOLOGIA



- Users real hand interacting with virtual patient
- Force of skin deformation
- In-vivo measured force data
- Tactile femoral pulsing
- Look and feel of users fingertips on virtual patients deformable skin

## Needle Simulates

- Users real hand holding a real needle hub
- Force of needle insertion
- In-vivo measured force data
- Accurate look and feel of needle hub (real hub used)
- Virtual needle shaft which accurately mimics the hubs movement
- Blood flow from needle
- Gravity compensation

This augmented reality approach for training of the Seldinger technique places the trainees real hands in co-location with a visio-haptic virtual patient. In-vivo measured force and tactile feedback is conveyed to the trainee through three modified commercially available force feedback devices and a custom made tactile end effector. Visual feedback is displayed on an LCD screen and uses two cameras to display the hands and their shadows. Supervised by N.W. John (Bangor) and D.G. Caldwell (IIT). Medical partner D. A Gould (Royal Liverpool University)







## further information can be found at www.timcoles.info