

The Digital Design Studio, Glasgow School of Art

Speckled Computing Open Day – Sept. 07

‘Specks, Motion Tracking and the Impact on Animation and Visualisation

Mark Milne

Digital Design Studio

Overview

Expertise

Skills

Visualisation

Future



The Digital Design Studio

- **Overview of the DDS**
- **Areas of Interest**
- **Motion tracking**
- **Animation**
- **Simulation and Training**
- **Education**
- **Physiotherapy – MAPS Project**
- **Sports Training**



The Digital Design Studio

- **GSA, the 2nd largest art and design community in the UK**
- **international reputation for fine art, design and architecture**
- **Digital Design Studio (DDS), established 1997**
- **postgraduate research and commercial centre, specialising in advanced 3D visualisation and human/computer interaction technologies**
- **Mackintosh House for an Art Lover, Bellahouston Park**



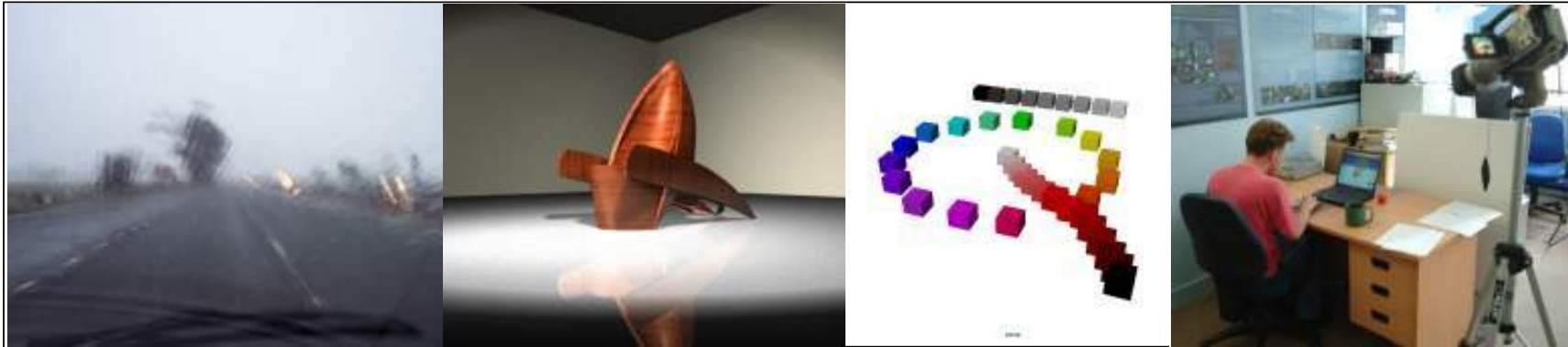
Notable DDS Accomplishments

- the largest GSA commercial research contract with the Ford Motor Company, Detroit
- the first EU Framework 6 contract – COHERENT
- the first Engineering and Physical Sciences Research Council (EPSRC) Grant - SCIFI 3D
- the first Knowledge Transfer Partnership (KTP) grant - Voice Technologies
- on the '*trusted list of experts*' for the Ministry of Defence



Education – Masters

- **two-year M.Phil. in 2D/3D Motion Graphics designed to enable graduates from a wide range of backgrounds to gain knowledge of advanced digital techniques. Employment success is high:**
 - Sony International
 - Nokia
 - Ragdoll Productions
 - Rockstar Games
 - DMA Design
 - Peugeot Citroen



Education – Ph.D.

- **growing number of Ph.D.s investigating aspects of advanced visualisation, haptics and gesture-based interaction**
- **current examples include:**
 - enhancement of human senses with the assistance of multipurpose virtual navigation interface in automotive head up display systems
 - pedagogical potential of 3D visualisation
 - bimanual combined 2D/3D interface for the design and review of MEMS (Micro Electrical Mechanical Systems)

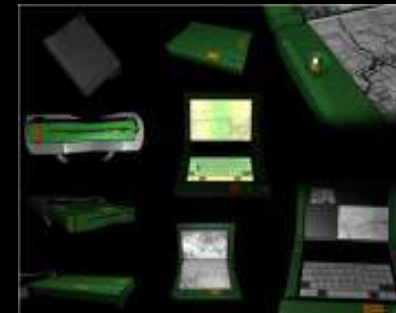
Expertise

The DDS provides:

- information visualisation
- product and urban visualisation
- human-computer interaction
- technology integration
- interactive internet applications

Core skills:

- 3D real-time visualisation, digital modelling and animation
- advanced projection systems
- haptic devices
- spatialised sound
- gesture recognition & machine vision
- speech recognition



Digital Animation

Digital Design Studio

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James Fisher
DEFENCE



System Animation

Digital Design Studio

Overview

Expertise

Skills

Shipbuilding

Future



Digital Design Studio

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Expertise

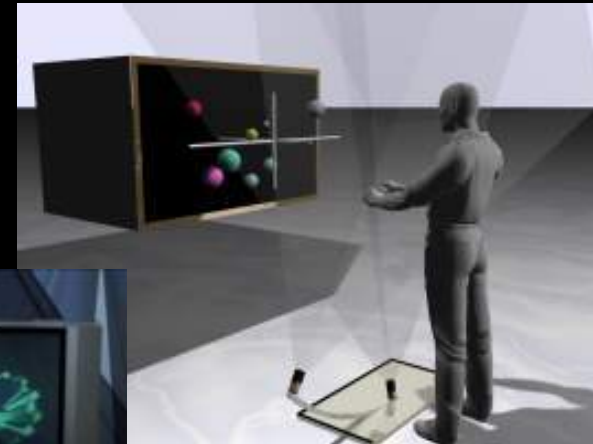
Skills

Shipbuilding

Future

Tools and techniques for real-time interaction

Gesture interaction and speech recognition



Gesture control is intuitive & can make gaming more fun and accessible

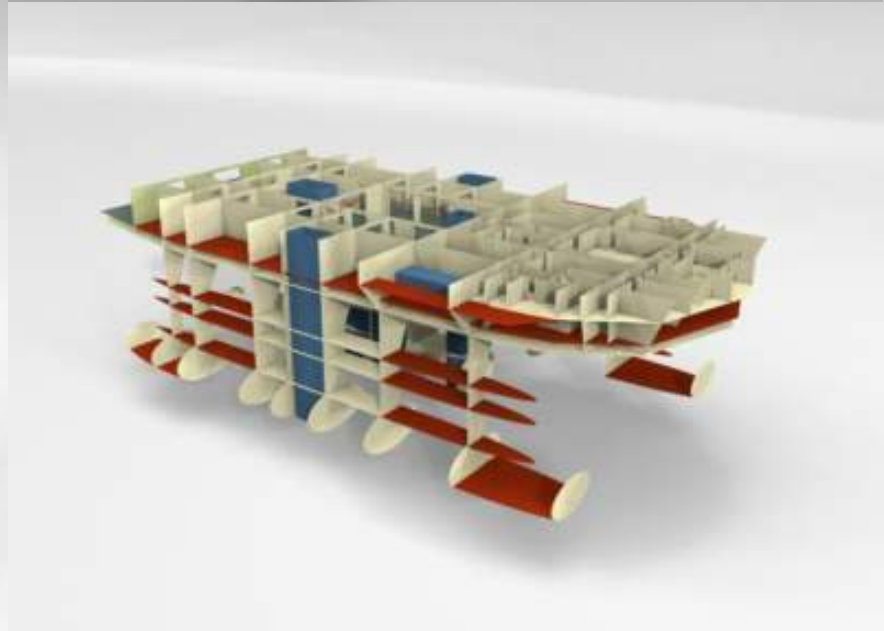
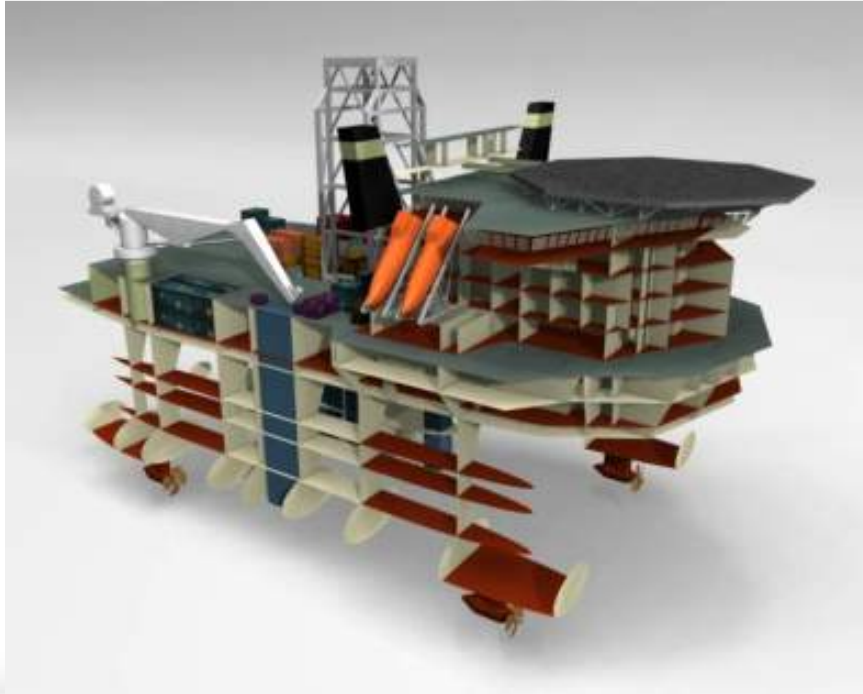
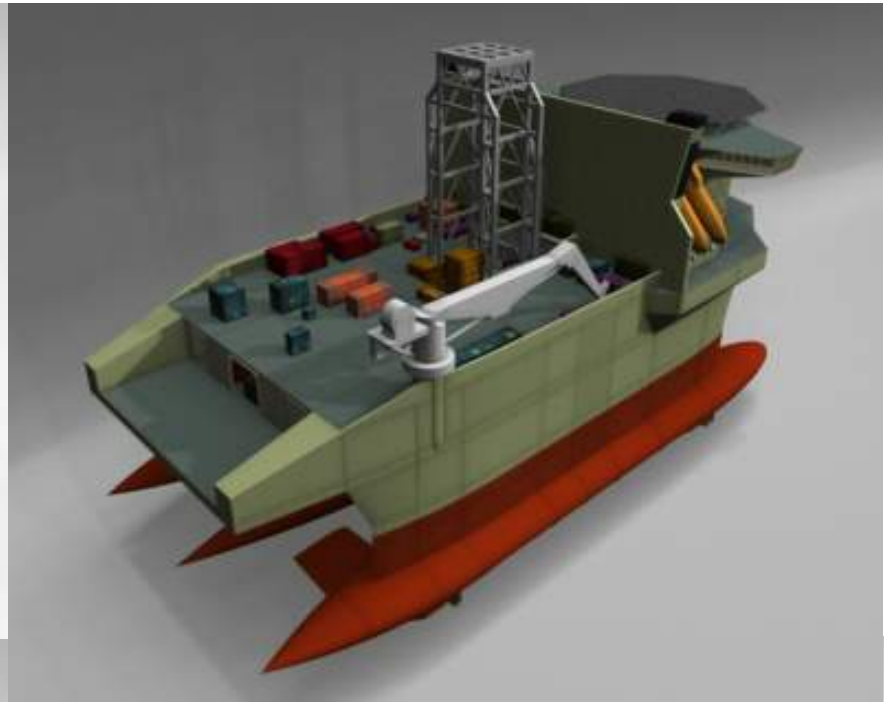


Real-time 3D interaction

Real-time 3D design inspection and evaluation

Move, scale, rotate





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Product visualisation and customer feedback

DIGITAL
DESIGN STUDIO
THE GLASGOW
SCHOOL OF ARTS
DELIVERING ADVANCED VISUALISATION
& REPLACEMENT REALITY



SCIFI
3D

Supporting Customer Information and Feedback Information





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Digital Prototyping

Digital Design Studio

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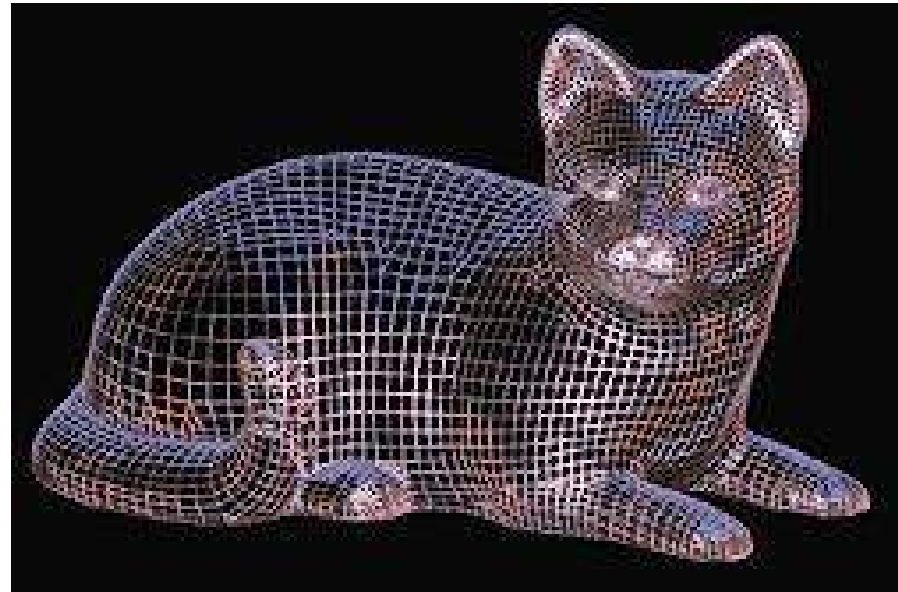
Future

Real-time design/product visualisation and digital prototyping



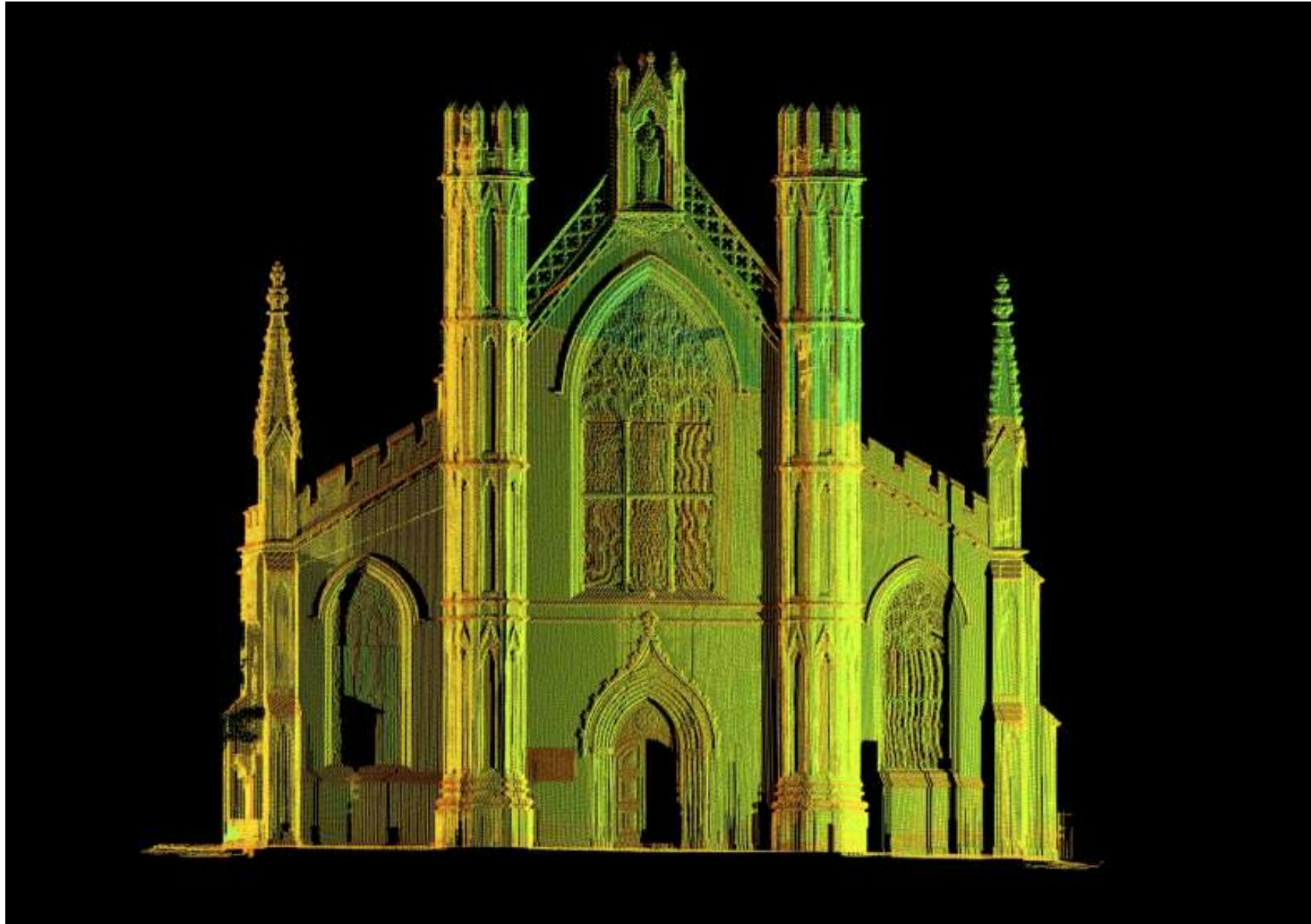
Real World to Digital Scanning Capability

Real world and the Digital world









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1938 British Empire Exhibition Project



1938 British Empire Exhibition Project





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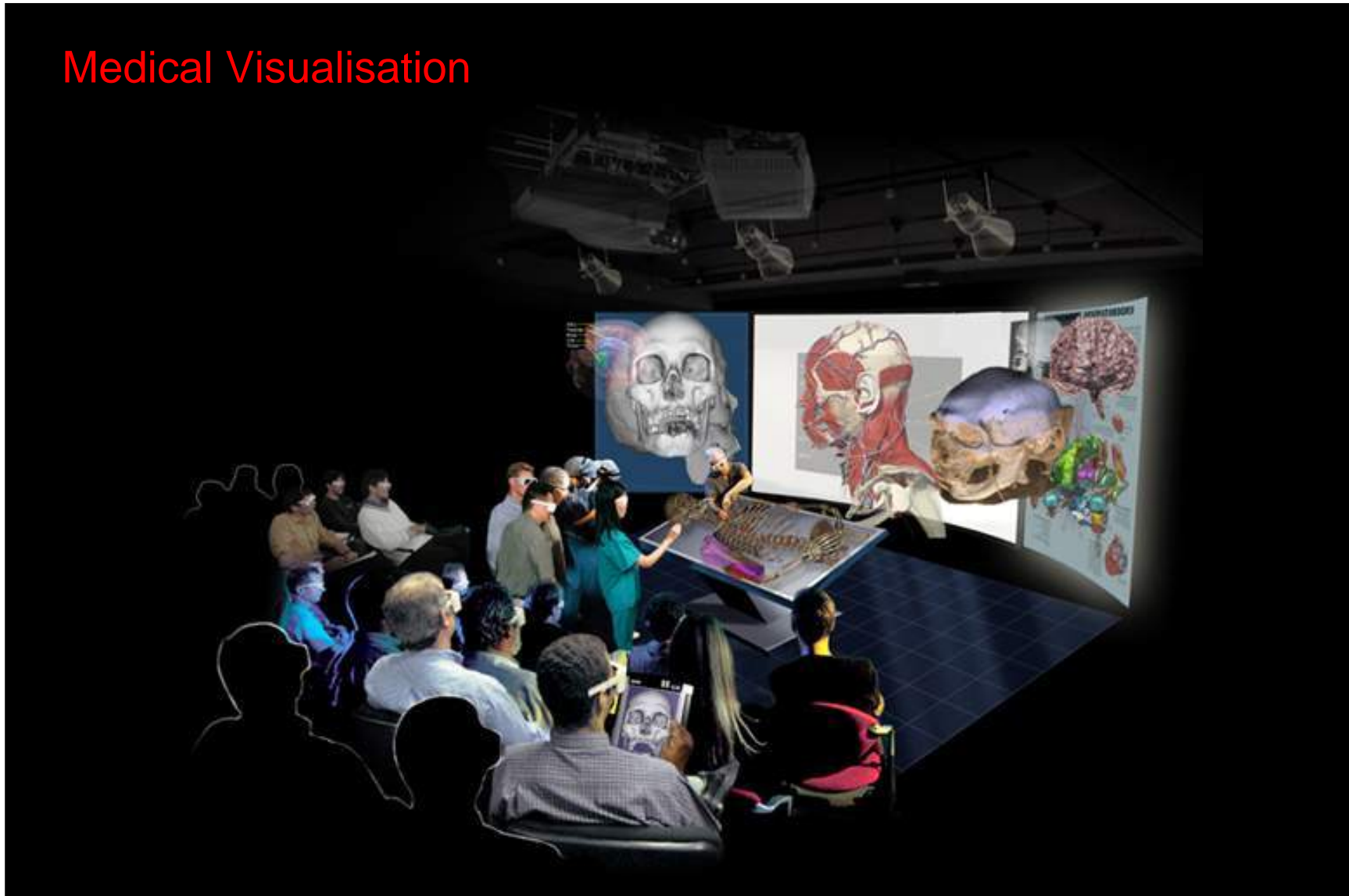
Skills

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Large Scale Immersive environments

Medical Visualisation



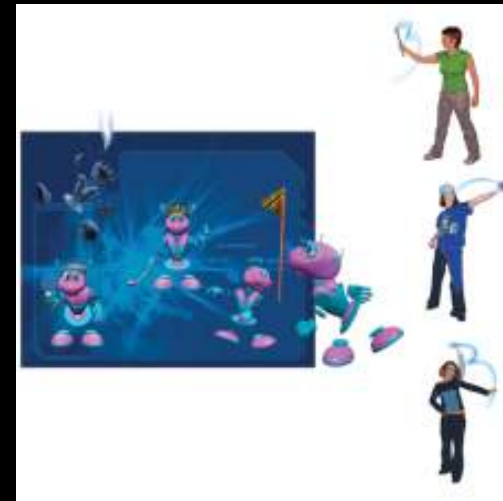
Why are Specks of interest to us?

- Human computer interaction
- Real time
- Immersive environments

- Capturing multi-limb motion in real time affords us opportunities to immerse the user in environments for use in the following:
- Training and development
 - Physiotherapy and Rehab
 - Sports training
 - Life critical/high risk simulation and training
 - Emergency services, Defence
 - Education – Games based learning, immersive environments

Immersive Environments

- SnowWorld
- Physiotherapy and Rehab.
- Gesture interaction
- Motion tracking
- Pay back for motion
- Physiotherapy



SnowWorld

Controlled studies show an impressive 40-50% reduction in pain ratings when patients are immersed in SnowWorld.

According to Dr. Hoffman, “VR pain distraction results are encouraging and a growing number of burn centers around the world are now pioneering the use of SnowWorld with their patients.

University of Washington



MAPS

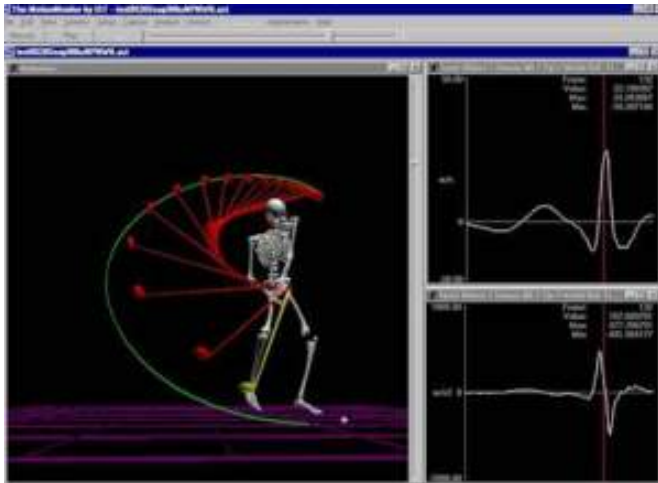
Motion Analysis Physiotherapy System

Games based semi-immersive environment incorporating motion tracking to provide feedback and motivation to patients with quantitative data gathering for assessment.

- **Joint Project**
- **Speckled Computing, DDS, SHIL (Yorkhill hospital)**
- **Domain experts**
- **Market analysis**
- **Technical Feasibility**

Immersive Environments

- **Sports Training**
- **Traditionally 2D images, discrete sensor input**
- **Future – Interactive 3D, linked sensor data**
- **Games based immersive environments**
- **Hit list of wants - SIS**



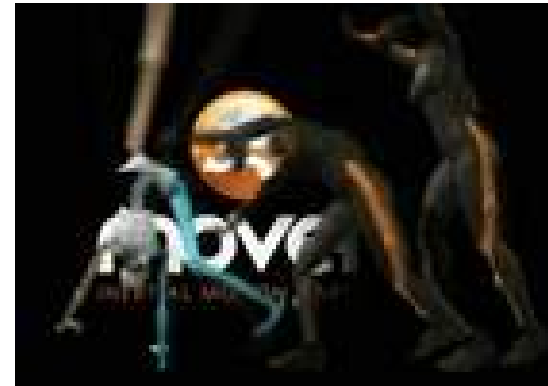
Immersive Environments

- **Life critical/High risk simulation and Training**
 - **Multi-limb single user**
 - **Multi-user**
 - **Fine motor skills**



Animation

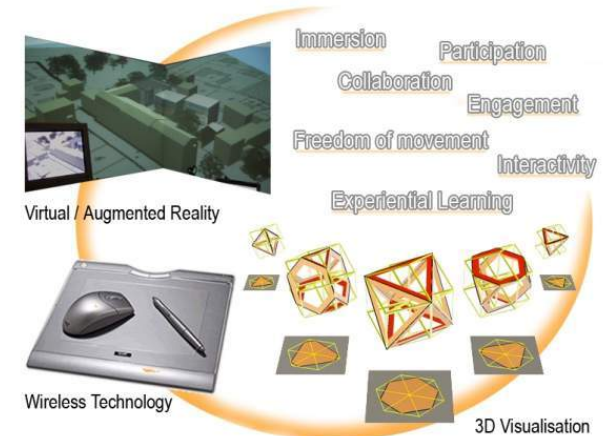
- Computer generated
- Motion capture of real life subject
- Motion capture – the potential
- Complex multi user interaction



Education

- Modern learner
- Immersive environments
- Early years – Focus
- New tools for interactivity

- Recent developments
 - Technology barriers
 - Cost
 - VR and human/computer interactivity moving from Sci Fi to reality



Discussion/questions?