

VRGraphicsS

Virtual Reality, Computer Graphics and Simulation

Steve Maddock (head of group),
Paul Richmond, Daniela Romano



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Steve Maddock (SL, Head of Group)

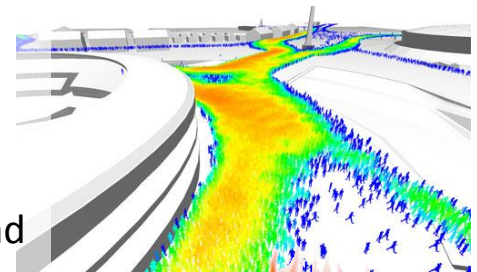
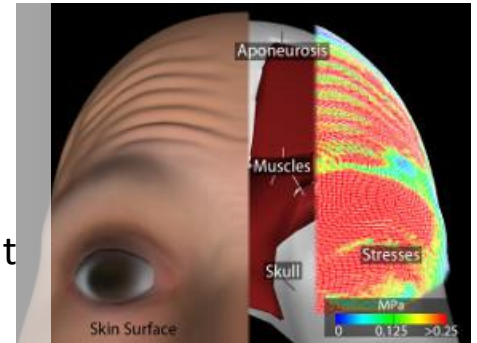
- **Facial modelling and animation; human figure animation:** entertainment, physical simulation, learning/rehabilitation
- **Meshes and deformation:** mesh comparison, sketching

Daniela Romano (SL)

- **3D real-time large scale simulation of complex systems:** agent based modelling on the GPU, pedestrian and traffic simulations, biological processes, organizational and corporate behavior
- **Virtual reality:** AI & games, serious games, brain-computer interface, virtual training

Paul Richmond (UoS VC fellow)

- **GPU-based solutions:** real time simulation and visualisation, languages for agent based simulation (FLAME GPU) of pedestrians and biological processes
- **Simulation using emerging computer architectures:** Computational neuroscience using the SpiNNaker neuromorphic hardware system



FLAME GPU

VRGraphicS – examples

- Visual speech in auditory training
 - Alghamdi (PhD), **Maddock**, Brown, Barker
 - Enhancing visual images
 - Face tracking: Faceware Analyzer, Image metrics



- Also: Producing 3D models of archaeological artefacts; Crichton-Turley (PhD), Willmott (Archaeology), **Maddock**; Museum of London



Crichton-Turley, 2015: Autodesk 123D catch, Samsung s5, 60 photos in natural lighting, 3264x1836, 58489 vertices. Kingly figurine, height: 137.14mm, Museum of London.

VRGraphics – examples

- PREMONITION

- **Romano** leads a joint project between Univ. Sheffield and Sheffield Hallam Univ., funded by **South Yorkshire Fire & Rescue Authority**
- **Agent based modelling of fire risk**
- Combining household level information and fire incident data with social network modelling
- Predicting areas of high risk, so SYFR can focus their resources



- *Also:* Real time large-scale social **pedestrian simulation** technology, part-time Industrial Secondment with **Costain** group, 2012-14

VRGraphics – examples

- **Richmond**, academic manager, Transport Innovation Centre Sheffield
 - part funded by the **Transport Systems Catapult**, UK's £150 million centre for integrated transport systems
- **Aim:** to promote **collaboration** with business and focus on the development of products and solutions in the field of **Intelligent Mobility**
- PhD Project: **micro-simulation of transport systems using GPUs**
- *Also:* **Richmond**, Nvidia CUDA research centre



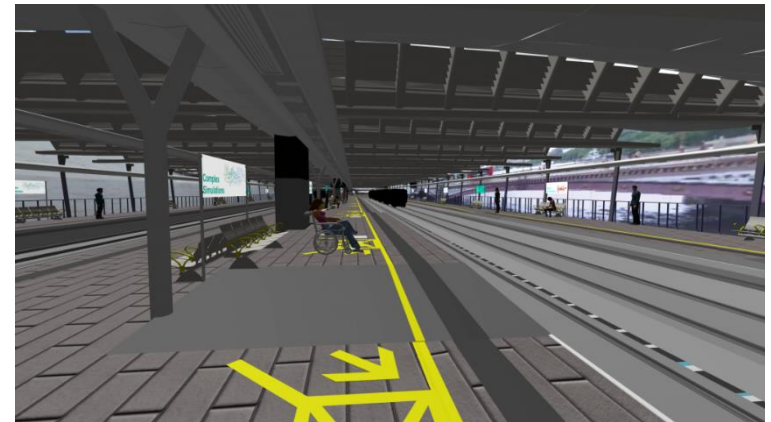
Transport Systems Catapult CEO Steve Yianni speaks at the first ever event in the 'Innovation Centre' in front of an interactive pedestrian dynamics technology demonstration provided by Dr Paul Richmond.

Other facilities: potential for collaboration

- **The Diamond**
 - VR suite, ART motion tracking, high-spec PCs with stereo monitors, Oculus Rift headsets, Leap Motion 3D controllers
- **Teaching links**
 - Undergraduate/MSc modules: 3D Computer Graphics, Virtual Environments and Computer Games Technology
 - Dissertation projects: u/g and MSc
- **Advanced Computing Research Centre (ACRC)**
 - Simulation, e.g. new ramp for wheelchair users at railway station



The Diamond



ACRC: 3D virtual environment of Blackfriars Station, Mark Burkitt. Client: Network Rail. <https://www.acrc.com/portfolio/3d-virtual-environment-of-blackfriars-station/>

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