MSc INTERNATIONAL HERITAGE VISUALISATION

The MSc International Heritage Visualisation will equip candidates with the knowledge and skill sets required to create digital records and visualisations of heritage sites and objects of local, national and international significance. This course offers a unique opportunity to combine architectural and heritage techniques with state of the art digital technologies, such as 3D laser scanning, digital reconstruction, real-time interaction and visualisation using state of the art virtual reality facilities. Candidates will become familiar with the range of skills needed for the meaningful 3D documentation of cultural sites and heritage assets, and the ability to present them effectively for use by the varied user groups and audiences engaged in cultural heritage management, conservation, academic research, tourism and art practice.

The course is structured using a combination of lectures, seminars and hands on recording and model development to enable students to understand the process of creating original 3D datasets from critical approaches and project planning through to technical execution and delivery. Utilising experienced professionals from the fields of heritage management, buildings recording and 3D modelling the candidates will benefit from the courses' novel approach to fostering multi-disciplinary study in computer science, heritage management, archaeological practice, architecture, the built environment, art and design and tourism.

Programme Structure

Stage 1

- Core Research Skills for Postgraduates
- 3D Modelling & Animation
- Digital Documentation of Cultural Heritage
- Interactive Heritage Visualisation

Stage 2

- Data Acquisition & Processing
- GSA Electives: choose two from
  - Mapping the City
  - Architectural Design & Design Theory
  - Environmental Design

Stage 3

- MSc Research Project (60 credits)
Digital Design Studio

The Digital Design Studio (DDS) is the largest postgraduate research centre of the GSA, with a complement of multidisciplinary Masters students, PhDs and an international multidisciplinary academic and research staff. Since its inception in 1997, it has experienced substantial growth and has now located to custom-built laboratories at Pacific Quay, Scotland’s Digital Media Quarter, Glasgow. Within this facility, Lab1 (the main teaching, research and educational laboratory) contains state of the art virtual reality, haptic and stereoscopic 3D projection facilities. The 3D projection facility in Lab1 is one of the largest in Europe. The DDS specialises in advanced 3D visualisation and interaction technologies. These technologies consist of 3D laser scanning, visualisation, 3D animation, 3D stereo displays, haptics, motion tracking, gesture based interaction, advanced interfaces, ambisonic sound, and machine vision. The primary focus of research and development is centred on user interaction with real-time digital data involving multidisciplinary skill sets. The DDS has built an international reputation in 3D visualisation and interaction research supported by new tools, techniques and methodologies.

The Master of Science (MSc) in Visualisation programme provides an academic framework for postgraduate students to engage with the application of 3D visualisation, computer graphics and games technologies across a variety of fields and in widely differentiated social, scientific, medical, technological and industrial contexts. The MSc programme creates a unique opportunity to combine architecture and heritage / human anatomy / serious games with state of the art digital technologies, including 3D laser scanning, digital reconstruction of historic sites, artefacts or human anatomy, interaction and visualisation using virtual reality facilities.

Programme Aims

While the rate of deterioration and disappearance of heritage sites has accelerated due to acceleration of human activities, major technological breakthroughs have occurred to enable high quality digital documentation, i.e. 3D digital capture has been developed allowing the creation of a high definition, high accuracy, and high productivity digital record. This technology has been adopted worldwide and over 3,000 international service providers are available to deploy this technology to facilitate the preservation of heritage sites. In addition, major innovations in digital image processing, 3D modelling software, broadband access, and computer hardware capabilities have allowed worldwide public access to voluminous data and information systems including 3D visualisation.

CyArk, a non-profit organisation with the mission of digitally preserving cultural heritage sites, has selected 500 of the world’s most significant and endangered sites (CyArk 500) to be surveyed and digitally preserved within a 5-year time period.

The International Heritage Visualisation is a specialist pathway in the realm of 3D visualisation at DDS. The MSc International Heritage Visualisation aims to develop the
knowledge and skill sets required to deliver and conduct digital documentation of world heritage sites and to create a unique opportunity to combine architecture and heritage with state of the art digital technologies, including 3D laser scanning, digital reconstruction of historic sites and artefacts, interaction and visualisation using virtual reality facilities. It allows an ideal opportunity for documentation, maintenance, and preservation of significant cultural sites and physical heritage assets, and to reconstruct them in a real-time 3D environment for use in tourism, art, education, entertainment and science.

This pathway enables students to understand the process of creating original 3D datasets of cultural objects and sites, to reconstruct and present immersive visualisation with interactive narratives, and provide a novel approach to foster multi-disciplinary study in computer science, history, geography, culture study, archaeology, architecture, the built environment, art and design, and tourist management, etc.

The MSc International Heritage Visualisation has emerged as a result of successful strategic research collaborations between the DDS and a number of partners in cultural heritage. DDS has various longterm partnerships with industry and governmental organisations and a world-leading portfolio of Page 4 of 20 work. DDS and Historic Scotland have formed the Centre for Digital Documentation and Visualisation (CDDV) which specialises in the precise documentation and 3D representation of heritage objects, architecture and environments using state of the art, high resolution laser scanning technology and 3D visualisation software. The CDDV promotes and celebrates Scotland’s cultural heritage at home and abroad and enhance Scotland’s reputation for developing world class and innovative research and development. It is delivering the digital documentation of the five Scottish UNESCO World Heritage Sites and five International Heritage Sites in a five-year project known as the Scottish Ten.

The MSc International Heritage Visualisation provides a higher level taught programme to those emerging from a wide range of disciplines. This places those graduates in a leading global competitive position to advance in research, academia, governmental and commercial organisations, gaining a greater understanding of techniques that may assist in digital heritage practices.

Facilities

Digital Design Studio is located within purpose built facilities at The Hub within the centre of Scotland’s new Digital Media Quarter at Pacific Quay, Glasgow. A range of research and teaching spaces fitted out with state of the art technology allows the DDS to progress within a truly world-class facility. Students have access to their own computer for the duration of the programme.
Lab1

Lab1 provides state of the art immersive Virtual Reality technology via a high-definition 13m x 8m stereo-projected display. The full body and object tracking facilities coupled with the latest in sound technology results in a multisensory VR experience. From a technical perspective, Lab1 is amongst the best in the world with the largest stereo projection space in Europe. The Virtual Reality facilities at the Digital Design Studio encompass a wide range of interaction devices such as vibro-tactile and grasp CyberTouch glove that tracks hand movement and provides vibro-tactile feedback to the fingertips and palm; desktop haptic probes which have been used to simulate a wide range of medical procedures, ranging from lumbar punctures to dental injections and nerve blocks; 3D laser scanner; full body motion tracking system; ambisonic sound lab; sound post-production studios; and video editing studio.