Institution: Bournemouth University

Unit of Assessment: UOA34

a. Context

Our work focuses on the technical development and applications of computer animation and digital media. We actively extend imaginative and technologically rich research in computer graphics, experimental media, arts practice and animation outside academia, addressing emerging and current challenges facing creative industries. Our research responds to demands for: (1) increased efficiency in terms of production time and data storage in the delivery of high quality animated products; and (2) improved standards for realism and verisimilitude, beyond those achieved by conventional animation techniques. This is well illustrated by our work on Motion Blur or our innovation around modelling skin deformation.

We provide solutions that impact on an array of public services, and educational and health issues, demonstrating the effective application of animation as a tool for sophisticated professional training, with high levels of efficacy and at reduced costs (e.g. Augury project). We contribute to enhanced understanding and practical validation of animation and virtual reality as tools in addressing complex societal problems, as illustrated by work on crowd control/social emergencies, delivering better understanding of human reaction and response, and in specialist education, demonstrating therapeutic benefits of virtual artefacts. This extends the sphere of application for animation and legitimates its applicability in those spheres (e.g. Bystander, Augury, SHIVA projects) to enhance the impact of the creative technologies on a range of health, heritage and public safety issues.

We enable artists to develop creativity by developing highly usable and inspiring creative tools. Our research in experimental media and creative arts contributes to the public understanding of changing digital cultures and the social management of information and knowledge. For example, Real Snail Mail captures complex ideas around contemporary communication processes. Work with Arts Catalyst has provided creative interventions in the public understanding of the social and spatial organisation of knowledge and secrets. Creative work within the unit provides collaborative and innovative forms of presentation, installation and participation to address new patterns of engagement with the arts, technology and science and contributes critical perspectives within a wider international conversation about contemporary cultures and experience. It is the innovative capacity to integrate art, technology and science in diverse spheres of application that supports our continuing ability to respond to societal needs. These capacities emerge from foundational principles of the NCCA (National Centre for Computer Animation) and its specialist groups, including EMERGE (Experimental Media Research Group).

b. Approach to impact

Our approaches to impact development links up three strategic priorities**:**

(1) The identification and engagement of interdisciplinary research partners and non-academic stakeholders, such as the games/animation/films industry, educators, hospitals and organisations concerned with cultural heritage.

(2) The strategic provision of seed funding for projects which demonstrate potential for impact generation. This is available through QR funds, the University Fusion Investment Fund (£3m per annum), or via the Centre for Digital Entertainment (CDE), which provides funding for industry-facing engagement and project development.

(3) Alignment of our research agenda with Bournemouth University's (BU) eight pan-institutional research themes. The themes focus ambition in shaping and addressing social agendas and public policy, to deploy our research into tackling research challenges identified at national, European and global levels. We have worked in projects supporting impacts in: the *digital economy*, as evidenced by research into animation techniques for creative and industrial applications; *culture and society* through projects which enrich cultural heritage in Europe, China and Africa (see below); *society* by way of projects which influence public policy and decision making in education, policing and the arts; and applications of animation to *health and well–being* through the development of surgical simulation platforms and experimental psychology in virtual environments.

The effectiveness of this approach to impact is demonstrated by the following projects which are cross-referenced to the points above:

- The **Centre for Digital Entertainment** jointly with the University of Bath (EPSRC Industrial Doctoral Training Centre, £6.3m, awarded 2009) currently supports 50 researchers embedded in industries as diverse as film visual effects, computer games, healthcare, cultural heritage and air traffic control. The deliberate decision to create an *Industrial Doctoral Training Centre* instead of a *Centre for Doctoral Training* (PhD centre) is evidence of our commitment to the establishment of industrial partnerships and actively transferring academic research to practical applications (Evidence of Point-1). A further EPSRC grant has been awarded (circa £5m, 2014 on a similar basis, to extend this work until 2022)
- The **Augury project** is a collaboration between the NCCA at BU and Bournemouth and Poole hospitals (Evidence of Point-1) to develop a medical simulation and training platform for colorectal surgery. In the UK nearly 40,000 bowel cancer cases are diagnosed every year. This project will provide a safe and cost-effective environment for training in this complex surgical procedure, reducing costs and saving lives (Evidence of Point-3). Higher Education Innovation Fund (HEIF) seed funding (£58k**;** Evidence of Point-2) has been secured for this project to develop the surgical simulation platform into a prototype commercial product.
- The **SHIVA project** (Sculpture for Health-care: Interaction and Virtual Art in 3D £219k, InterReg), develops virtual artefacts designed to support cognitive and motor rehabilitation for children recovering from trauma and disability (REF5). The research team meets with stakeholders, including the Victoria Education Centre (Poole) and the Hopale Foundation (France), at least twice annually (Evidence of Point-1). This innovative learning medium will revolutionise the teaching of concepts of shape and space to children with disabilities in a safe and fun environment (Evidence of Point-3).
- Throughout the **Bystander Project (EPSRC £290k, with UCL/Lancaster Universities)** our project group held annual meetings with stakeholders from the Ministry of Defence (MoD), the Jill Dando Institute and the Metropolitan Police to discuss applications of findings (Evidence of Point-1). Researchers from the Jill Dando Institute have used our experimental platform to evaluate violent offenders for release by assessing their responses to conflict scenarios. It is of interest to the MoD and police in diffusing conflict situations (Evidence of Point-3). Public engagement for this project was supported by BU's public relations officer leading to coverage by Reuters and the BBC.
- As part of the **Digital Beijing Opera** project (REF5) we are engaged with an international network of stakeholders, including performers and choreographers, Chinese folk art organisations and the Chinese Ministry of Culture (Evidence of Point-1). This demonstrates the application of our research-based technologies in a new method for cultural preservation, resulting in a unique archive of 1000 animated characters drawn from the Beijing opera repertoire. Future steps in this work will have wide–reaching impact on other forms of performance art and cultural heritage (Evidence of Point-3).
- Isley and Smith's **"Real Snail Mail"** installation, where live snails are used to convey messages across a physical and a virtual-digital space, has since 2008 seen 30,000 visits to exhibitions across Europe. In collaboration with LABoral (Industrial Centre for Art and Creation in Gijon, Spain) this was set within a school in Gijon (EEI Gloria Fuertes) (Evidence of Point-1). This innovative arts-based resource embedded in a practical setting enabled children to study the relationship between time and space, improving the teaching of these difficult concepts (Evidence of Point-3).

c. Strategy and plans

Our projected strategic focus is to consolidate and extend current strategic approaches to impact, further instituting impact priorities (Points 1-3 above) by embedding more formal mechanisms in the management, structure and delivery of our research across the unit. We will further integrate research with impact generation through institutional mechanisms, notably via interdisciplinary research themes set out across BU, further aligning our research agenda within BU's eight cross-institutional research themes. We will actively work to develop and trace commercialisation routes via a multi-faceted strategy of industry engagement, including funding incentives, archival distribution and curating of our work.

In May 2013 this unit formally adopted the recommendations of the DESCRIBE framework (http://www.exeter.ac.uk/research/inspiring/impact/), communicating the importance of impact by strategic managerial development. Impact forms a core consideration within research practice and development amongst researchers and our PGR/ECR communities, evidenced by support for the impact elements of Vitae framework via the Bournemouth Researcher and Academic Development (BRAD) programme. We will further drive impact-generating research, which links activities to institutional support structures by the development of local information gathering systems. Work load models will support staff to engage with dissemination of work outside the academic sphere, such as patent applications, source code distribution and public engagement. Impact plans, developed by individuals or groups, are assessed by a panel to consider significance, and 25% of QR funding will be ring-fenced for activities directly related to the generation of impact. The NCCA benefits from an environment where researchers come into regular contact with industry practitioners in computer animation and gaming. The HEIF funded *International VFX* Hub (£280k), the EPSRC-funded *Centre for Digital Entertainment (£6.3m in 2009 and £5.3m in 2013)*, the *Industrial Advisory Board* and *invited industry talks* (held weekly and featuring representatives of creative companies including Pixar and Industrial Light and Magic) put researchers in direct contact with industrial partners, underlining connections to current research needs within the sector.

Engagement and monitoring form contributory elements in the generation of research impacts within society and industry. We have identified digital dissemination and tracking as priorities and attached practical projects supporting impact in the 2014-20 period. This development is supported by £10k of seed QR funding as outlined in our 2012/13 Media School Delivery Plan. These projects will support technology that allows us to gather usage and credential information for the development of future impact and enable us to track more formally the uptake and usage of our research across the fields of practice, including the following:

- **Software Archive**: An archival system for the distribution of research software is in development, which is of particular interest to academics and industrial practitioners. By facilitating easy access to our results, we create opportunities for industrial and academic stakeholders to exploit our research while promoting our status as a hub for technical and academic excellence.
- **Creative Artefact Archive**: An on-going project within the NCCA is to develop accessible and meaningful repositories for creative artefacts to provide open access to work that is ephemeral or otherwise inaccessible. This goal corresponds to the AHRC priority of "Care for the Future", which encourages engaging with the problem of continuity and change in the context of cultural preservation, while making our work accessible to policy makers and the wider public.

d. Relationship to case studies

Case study 1: Through institutional support in the form of QR investment, Stephenson was encouraged to make deep connections with the film production industry (Evidence of Point-3) and was able to attend the SIGGRAPH conference from 2002-2006, enabling him to establish contacts with industry stakeholders and to facilitate the transfer of knowledge to practitioners (Evidence of Points-1 and -2). His motion blur camera is a product of the interdisciplinary nature of research within the NCCA as it combines theoretical principles from photography with the mathematics of Computer Science. This research environment provided Stephenson access to industry standard toolsets and expertise which were instrumental in the partnerships underpinning the impacts realised in this project.

Case study 2: White received institutional support in the form of teaching relief and in direct funding of international activities (Evidence of Point-2) for his research since his appointment in 2003. This enabled him to undertake research with Arts Catalyst and complete a series of visits to the Center for Land Use Interpretation in Utah, USA (Evidence of Point-3). This direct support, combined with media resources and extended remission to undertake fieldwork, has enabled him to create impact and gain further support from non–academic partners and funders (Evidence of Point-1), such as the Henry Moore Foundation and the Heritage Lottery Fund. This support has also enabled him to participate in public engagement activities, including international exhibitions and artist publications.