

# Motion capture restoration

Jessica Hemmings speaks to Jane Harris for Future Materials about the challenges of digitally recreating Egyptian-era garments from fragments of fabric



**FM: You've recently finished a commission from the Whitworth Art Gallery in Manchester, UK, entitled 'Lady with Ankh Cross' that was part of the major exhibition of Egyptian dress, 'Clothing Culture'. How did this come about?**

JH: Jennifer Harris, the deputy director of the Whitworth Art Gallery in Manchester has watched my work evolve over the years. In particular, work I completed in 2003/4 that was supported by the AHRC (Arts and Humanities Research Council) Innovation Award. There were several computer graphic animation pieces as part of that research, one of which was a contemporary piece developed with fashion designer Shelley Fox, and the other was an eighteenth century Spitalfields Sack Back dress, from the Museum of London collection. Jennifer approached me towards the end of 2005 with the idea of linking this work to the Clothing Culture exhibition. It presented a good opportunity to achieve something that would not otherwise have been possible – the use of computer graphic animation in a context where you have

these incredibly fragile textile/garment pieces, fragmented, decaying, unusable, with no other way of presenting them in a wearable form.

I think it's quite easy for those with an interest in textiles and dress to examine such garments and imagine how they were worn, but for the general public, the life, and in particular the motion, of such garments is generally quite unimaginable.

**FM: How long does it take to typically prepare a piece such as 'Lady with Ankh Cross'?**

JH: December for May was the time frame for this piece, which is the shortest run-in we have ever contemplated. A lot has happened regarding the development of digital imaging software and hardware since I began exploring these tools. Even since working on the Spitalfields dress project two years ago with the Museum of London, the processing power required to render the computer graphic works we create has improved immensely, speeding up the whole process. The 4th century garment pieces from the Whitworth collection were composed of relatively



**Jane Harris is a leading artist, designer and theorist.**

basic forms, which simplifies the digital construction process. The tunic pieces consisted of about two layers of material. In comparison, the sack back dress consisted of about five layers, which was particularly challenging to digitally process. In computer graphic (CG) terms.

I have not yet seen an equivalent cloth

animation work of that complexity from commercial CG fields such as film and games. In the industry I think it is still a relatively uncharted field.

**FM: And how do you go about tackling a commission such as this one?**

JH: Every completed work is a sum of many parts and each component requires careful consideration so that the completed work is something visually 'natural' or believable and therefore quite unlike what may be perceived in the term 'computer graphic animation'. In this case the first port of call was a visit to the Whitworth to have a look at the collection with Mike Dawson, the 3D computer graphic operator I have worked with since 1999. Bearing in mind the relative simplicity of the garments and the digital tools to hand, we felt that the project was very do-able within the time scale. With this piece I was particularly interested in exploring the use of some kind of movement narrative to define the visualisation of the piece that was selected, a ladies tunic. This approach would expand upon interpretative methods I had begun to investigate in earlier works, directing the movement of the body, the key driver to the motion of the garment.

I use optical motion capture to digitise the movement of the body. This technology enables us to generate a computer graphic kind of 'pin man' skeleton form or mechanism that is installed within the CG garment form as a key driver of the garment, similar to the function of a human skeleton relative to skin, which is

essentially invisible. Motion capture is a unique and fascinating medium to work with in itself. As a tool it is more than just a means of 'recording' or representing fluid human or animal movement in a digitally modelled 'character'. (I have also used it to digitise the motion of other forms, although this is more unusual). Resulting data is so accurate that in this respect, motion capture lends itself to slightly left of field approaches to movement development, proffering beguiling forms of interchange in a computer graphic visual. Use of this technology requires much consideration to achieve something that looks effortless. It is not just a case of walking into a room putting on a body suit with sensors and presto you have a skeleton.

**FM: How advanced is motion capture technology?**

JH: In comparison to working with cloth simulation tooling, motion capture is very advanced. There has been much investment in the development of this hardware, particularly from the medical sector where it is used to measure the gate of the body. However I think the full potential of this technology has yet to be creatively realised. This is partly to do with the fact that it is not just like a pencil that anyone can pick up and use. As with most sophisticated digital media, there is a team of technical support required to facilitate its use and clean up the resulting data. Communication between technical and creative individuals can be quite challenging and a stumbling block to creative use of such tools.

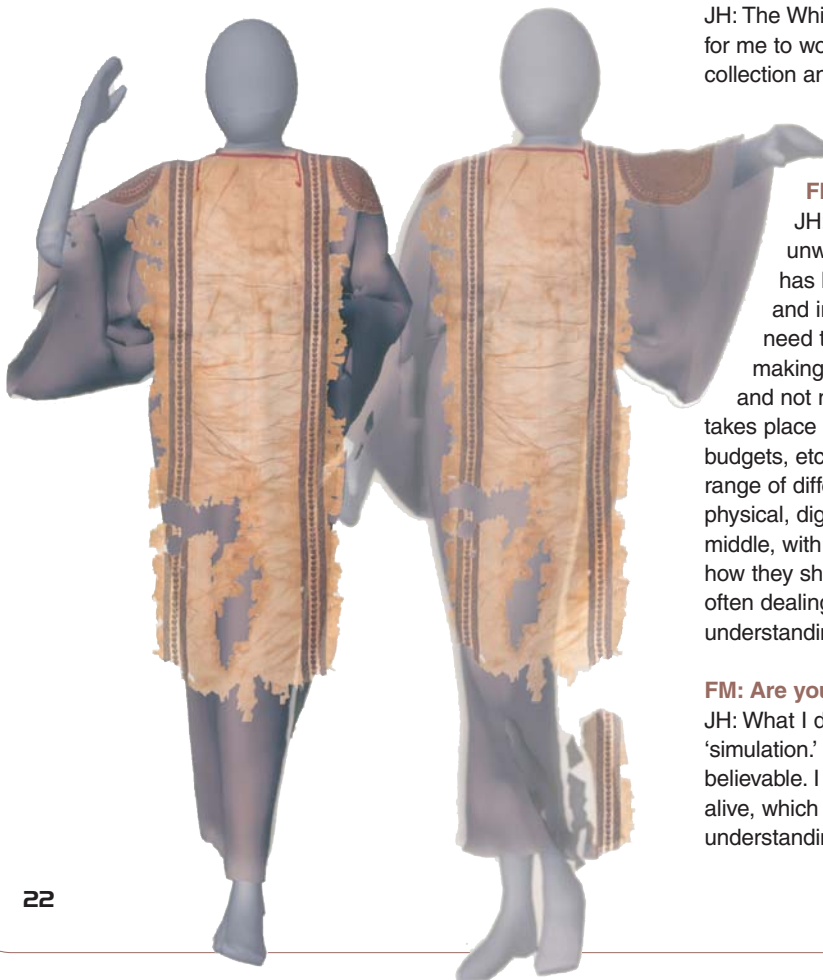
Mike is highly skilled in the use of 3D

software, however 'making' digital 'cloth' requires a range of textile knowledge and expertise in order for the characteristics of 'real' cloth to be communicated and portrayed. One of the key issues is that digital 'cloth' is in no way like physical or real cloth as it is basically an inert modelled form, with cloth-like characteristics defined by digitally-simulated gravity and wind. The result can all too often look quite plastic. The majority of CG operators understandably know little about textiles or cloth aesthetics, it is not their medium. So for obvious reasons believable CG cloth representation can be difficult to achieve in commercial sectors, and may look quite synthetic.

**FM: Will this be an ongoing aspect of your research or artwork?**

JH: Very much so. Funding I have received in the past prioritised the development of the use of the software that enables the construction of computer graphic 'cloth' and garment forms. Resulting examples or animated works may look like effortless fait accompli pieces but this is also very much due to the natural quality of the human movement driving the garment form. This movement has become a fundamental part of the whole. While the focus for the majority of the research enquiry has been defined, this hasn't precluded development of an interesting or challenging movement that literally drives the final garment work. However, I haven't really had a chance to explore the potential of this particular component or language that has become a key





element to the overall work and I think will become more so in the future, ultimately defining 'character/s' or 'characterisation' of the garment form.

Imagine using this visualisation process as a method of creating or presenting unique forms of character representation on a 'real' world stage, in an opera or dance for example. The potential for exploring the presence of individual characters in this way is untapped, the possibilities I now realise are endless but understanding of this potential has evolved through the research work, the tip of the iceberg.

At the end of the day it is really about bringing the 'human' into this work, something less associated with the term 'digital' or other realms of new technology for that matter. The palette I now have to work is potentially massive. This is not the way that the film industry tends to explore the use of visualisation technology because the industry usually seeks an overall generic cartoon-esque feel. Each company has a different style and synonymous with their product is the company brand, Disney, Pixar, DreamWorks to name but a few.

**FM: In other words, something similar to a house style in publishing?**

JH: Indeed it is a house style. And one that is very successful for those companies, commercially. But I think the potential of CG as a medium is far greater. My own approach has evolved through a 'crafting' process, experimentation combined with some lateral thinking, to achieve a quite different end. Generally speaking those that work in the computer graphics industry don't necessarily work this way if there is a particular aesthetic effect already in mind.

**FM: How did you select the piece of cloth you chose to bring to life? Did the curators offer suggestions of how to build that fragment into a garment from their historical knowledge of what the whole garment should look like, or was the visualisation also something you had to bring to the project?**

JH: The Whitworth had identified the fragment that they were keen for me to work from due to the fact that it is a key piece in their collection and particularly fragile. Otherwise the visualisation of the piece and the context that I chose to use was down to me.

**FM: Is the process intuitive?**

JH: It is both informed and intuitive, but overall surprisingly unwieldy as it involves so many different components. It has been suggested that my role is like that of a film director, and in some ways that may be true in that I imagine you need to maintain a clear focus to achieve the end goal when making a film whilst holding together 101 things in the process and not necessarily in an obvious or logical order. This often takes place over quite long periods of time, while juggling limited budgets, etc. What is interesting about this particular process, is the range of different languages involved, technical, textile, historical, physical, digital and so on. One person is required to be in the middle, with an appreciation of all these different languages and how they should visually connect in order to achieve the goal. I am often dealing with two parties for example, neither with understanding or interest in what the other does.

**FM: Are you, in a sense, rebuilding this garment for the public?**

JH: What I did not want to do was a 3D computer graphic 'simulation.' I don't think direct simulation works. It is rarely believable. I tend to think of these animation pieces as very much alive, which is why I think the narrative is so important – as is the understanding that the garment belonged to someone and was

Artist Jane Harris, Arts and Humanities Research Council (AHRC),  
3D CG Mike Dawson, Fashion design Shelley Fox



worn. While researching, I was given a book on portrait mummies and this took my thought process onto another level regarding this particular character. I had seen portrait mummies before, but I hadn't made the link. Somehow it brought to life the prospect of this piece proffering a more contemporary context or realm. The portrait images in the book and subsequently in reality were astoundingly vivid.

**FM: Something timeless about them?**

JH: Something timeless, but also quite powerful. From a distance they look incredibly detailed but when viewed closely you realise that the artist or image maker had only a few colours in their palette and quite crude materials, yet here was this incredibly powerful image. Then you consider that this is also a portrait of someone who is dead, whose life has gone many centuries ago, yet still this image is so vivid and alive. This helped me make the leap from the fragility displayed in related artefacts in the British Museum to thinking that the movement, for example, should be very relaxed and contemporary. That sounds like an incredibly simple thing to contemplate, but going back to the motion capture process, the capture of human movement is so accurate, that any overacting can look anything but natural. The 'actor' is guided by the information that I can impart; so I worked with the actor in the motion capture space as an invisible participant/director in creating an appropriate scene. The resulting skeleton provides the character to the overall form. It's a real challenge to achieve an effect that is believable.

**FM: I assume there are still elements of**

**the garment that are speculative, as you are dealing only with fragments now? Some of the details such as where a garment would fall at the wrist or on the leg must just be educated guesses?**

JH: Yes. Mainly because you do not have the correct height or shape of the person who would have worn the garment originally in order to define such scales. To that extent you are not necessarily able to correctly appropriate the motion capture data to the computer graphic skeleton placed inside the digitally generated cloth garment form. For the Whitworth piece I worked with actress Elli Garnett and I decided to work to her size and scale, which was not an unrealistic ratio to be honest.

**FM: Would garment shapes have been more androgynous then?**

JH: Yes to some extent. The level of embellishment is usually the deciding factor in terms of gender that in this case, later on, suggested the possibility of a male owner, perhaps in the army. However, a male at this level would have had a wife wearing similar dress and embellishment.

**FM: Did some of these questions become so much more vivid and necessary to address because the curators could see your animation? Possibly what may have been a rather loosely considered question before, all of a sudden becomes quite tangible when they can see what one version looks like?**

JH: The final animation I think did initiate consideration of these questions. I would like to think that was the case. Questions that arose with the modelling of the 18th

Century dress for example included the length and form of the undergarments. There were a number of different opinions. With CG you can generate several different visualisation options in order to explore such issues from a curatorial perspective for example. Using CG as a tool for analysis of period dress is another project being explored.

**FM: Are there other possibilities that computer graphics has yet to uncover with regards to museum textile collections?**

JH: Interestingly key collections have been discussing how favourite or important pieces will very soon be difficult to exhibit because they have reached a stage of vulnerability and are in risk of serious damage. As I understand it, there is an assessment process that any garment in a major collection has to go through before it goes on display or in exhibition pertaining to conservation and insurance issues. Recommendations are made as to the vulnerability and life expectancy of a piece. As you can imagine this is particularly pertinent to some of the incredibly heavy, eighteenth century dresses for example. Some museums are now facing the reality that they might not be able to exhibit a particularly key piece again.

As computer graphic use in this context evolves, the grandest or most important works could perhaps remain in exhibition in a virtual form and unusually in motion for example. I am very interested in marrying costume, body and motion with the entertainment sectors to achieve new scenarios of visual experience. While through research I think we have achieved a great deal in quite technically adverse conditions, I feel like I'm still at the tip of the iceberg.