Final Report of the Pump-prime Funding Scheme

1. Overall project results: Please write a brief overview of the work undertaken and results, highlighting innovative approaches to industry collaboration (max. 300 words)

(1) Trial new ways of collaborating with key actors in the digital and 3D heritage ecosystem,:

- We worked with ThinkSee3D, a leading high-quality 3D print company to display and research 3D models. We provided actionable data to ThinkSee3D and the heritage sector, using our unique position as researchers and the access we have to diverse museum audiences.
- Museum in a Box who have created a unique Raspberry Pi powered box upon which you can touch place objects with affixed NFC stickers that then 'speak' to you. We trialled the first use of the Box in healthcare settings at the Cambridge Dialysis unit (funded by Arts and Humanities Impact Fund, AHIF) and opened up new opportunities for partnerships as part of the University of Cambridge Museums (UCM)
- Soluis Heritage with whom we discussed potential collaboration around AR/VR making use of the assets which we created for this project
- Collaborated with Museum of Cambridge to display a ThinkSee3D print. Through our research, we provided a new way for their audiences to engage with them and key content for their newsletter. The Museum of Cambridge is delivering a HLF resilience grant, designed to support their future as a museum and UCMs are tasked with supporting this.

(2) Create a solid evidence base and basis for facilitating long-term collaborations and opening up new bidding opportunities:

- Received £201,558 from the AHRC's creative economies engagement scheme, and £5,000 from AHIF for work related to this project.

(3) Offer training to embed knowledge across the University and UCMs:

- Delivered 4 training sessions on 3D scanning and modelling to 36 people.
- Through a high-quality report produced by a PhD student working on tactile engagement in Museum collections, we have developed our understanding of tactile engagements in a museum setting, feeding back into ThinkSee3D and sector-wide museum practice.

(299 words)

2. Overall project outputs and outcomes: Please mention any success in facilitating new partnerships, interdisciplinary research, cross-sector and/or cross-company collaborations (max.300 words)

- We held a conference, *Do Not Touch? 3D in museums*, attended by over 90 people on 3 June. ThinkSee3D and Museum in a Box both spoke as our creative industry partners, alongside over 37 other presenters. Over 20 people wanted to collaborate with us as a result. We've been following up with the collaborators. Researchers came from a huge range of disciplines, including maths, physics, computer science, Egyptology, digital heritage, archaeology, education and English.
- We have started integrating partnerships from this work into wider museum activity. For instance, a Museum in a Box will appear in the major *Feast and Fast* exhibition opening in November 2019, which is expected to reach 90,000 people. Several prints are now on display in a case within the Antiquities gallery of the Fitzwilliam Museum.
- The other UCMs are also interested in investigating the uses of this technology. Further funding from AHIF and AHRC has supported this engagement work.
- Noting the amount of funding being linked to AR/VR applications, we started to look to the realm of AR/VR so met with Soluis Heritage to discuss future collaborations. Whilst this hasn't yet resulted in any collaborations, we expect that it will do.
- 3D modelling is embedded in the Fitzwilliam's activity with 70 models now freely available on Sketchfab and uploaded into the Museum's collections explorer to enhance open data in the longer term.

(227 words)

3. Impact: Please describe impact on partners and how this relates to the original challenge (max 300 words)

- Our industry collaboration work was chosen as one of the University of Cambridge case studies to be featured in the National Coordinating Centre for Universities and Businesses report.
- Further work with ThinkSee3D (funded by Arts & Humanities Impact Fund, Global Challenges Research Fund and Arts & Humanities Research Council) enabled us to work with them to innovate on the services they offer.
- We challenged them to create an animation of an incredibly complicated 3D scan, far beyond anything they had done before and unique in the field of Egyptology. This animation was used as part of the museum's pop up museums in Wisbech, in workshops with the Egyptian Museum in Cairo and was shown at Mozilla's Festival of the Open Web.
- Through understanding more about the Fitzwilliam's research on the construction of ancient Egyptian coffins, they are now considering how to improve their processes on joining together 3D prints to make larger objects based on innovations they noted in the joints used in Egyptian coffins.
- Through asking them to recreate a giant's boot from the Museum of Cambridge's collection, we also asked them to innovative their processes for non-rigid items. Whilst not entirely successful, it provided an essential learning opportunity for the Museum and ThinkSee3D.
- We are in discussions around using 3D models with History of Art.
- The central UCM team is interested in how the Museum in a Box collaboration could be rolled out via other UCMs (as a result of a workshop in September 2019); Museum in a Box is coming to visit again in December to discuss future collaborative possibilities.

At the conference we asked participants to put a green dot on the below chart when they arrived and a gold star at the end of the day, showing an increase in confidence:
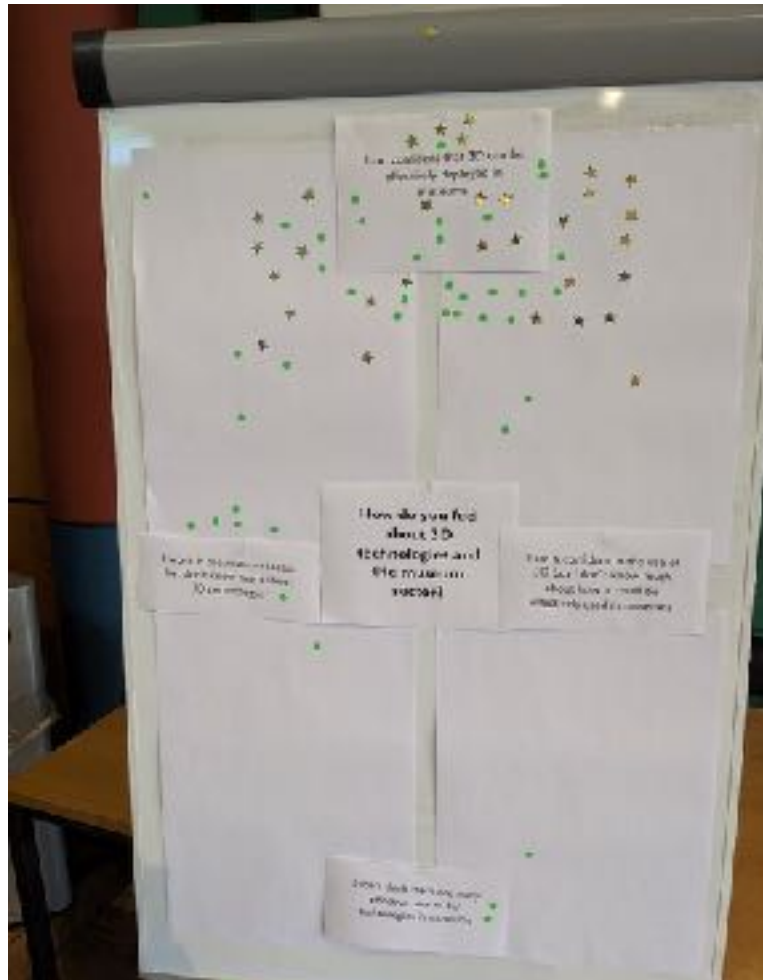
4. Use of funding: Please detail how funding has been used and whether there is unspent funding

No unspent funding

Item	Cost
Do Not Touch? 3D in Museums conference: speaker travel. We had 37 speakers and 5 panel members from universities, museums, other heritage sector organisations, creative industry companies and speakers included early career researchers, PhD students, as well as established scholars and professionals	£450.24
Payments to ThinkSee3D for production of 3D printed models and 3D scanned models. As a University Museum, the Fitzwilliam is ideally-placed to both be a location for displaying and testing innovations from the creative economy but also to provide high-quality research on how it is received by audiences	£6282
Raffaella Cecilia, a PhD student at UCL, was employed by us via TES to provide high-quality in-gallery audience research on the reception of the ThinkSee3D prints. She also worked with the Museum of Cambridge – as a different location – which was the recipient of a third 3D print so we could examine the reception of the 3D print in both a university museum context and in a mainly volunteer-led museum with very different collections from the Fitzwilliam's.	£2,719.70
Purchase of Ipads to be able to display 3D models created by ThinkSee3D and colleagues at the Fitzwilliam to audiences. These Ipads were also used by the ancient Egyptian coffins team when they displayed 3D models created by ThinkSee3D at their pop up Museums, held in both Wisbech and Cairo.	£698
Hardware – lightbox turntable. During this project – in collaboration with ThinkSee3D – our 3D scans, particularly for smaller objects, were not sufficiently high-quality for high-quality 3D prints to be created so we purchased a lightbox to enhance the quality.	£266
Interpretation and display purchases to enable 3D prints to be displayed	£511
Dr Abigail Glen – this grant enabled us to extend her contract by 1 month to enable her to visit Soluis Heritage (a Glasgow-based company) with which – inspired by this project and the recent research council interest in immersive experiences, we are in early-stage conservations with about potential AR/VR experiences and experiments in the Fitzwilliam.	£3,495.08
Visit to Soluis Heritage (Glasgow) – travel and accommodation expenses for multi-day trip that involved understanding much more about their processes and their current projects.	£596.54
Agisoft licenses – to enable processing of 3D scan data.	£2,386.44
Museum in a Box licenses	£432
Total	**£17,837**

5. Feedback: Please give feedback on the pump-priming scheme and how the scheme could be improved.

Having reporting template available from the start of the project so we knew what we were reporting against would have been helpful but we realise we were funded in the first round so this would have been difficult to pull together in time.

We're extremely grateful for all of Jingchen's advice and support through this process. We also really welcome the visibility that being part of this grant has given to our work in the Museum. This has been incredibly helpful at this point in time for us, as we are developing our research particularly around digital humanities.

6. Additional comments e.g. value for money achieved through the scheme, etc.