Creating realistic replicas for museum tactile experiences

Steven Dey
ThinkSee3D Ltd

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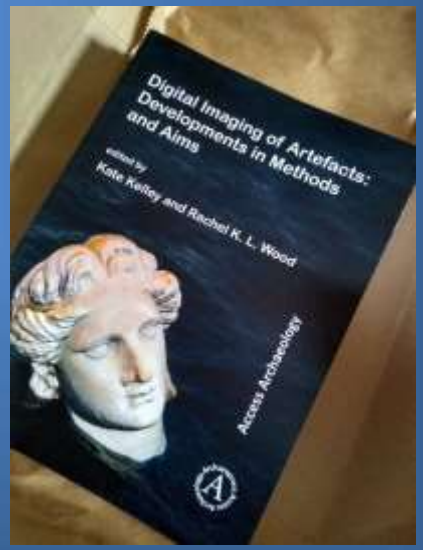
About ThinkSee3D

- 3D creative services for natural and cultural heritage, art, healthcare, education and research
- Over 150 projects completed in the last 3 years & ~ 600 digitally produced objects created for over 50 clients
- 3D innovators blending scanning, professional 3D printing, sculpting and traditional crafting and artistic skills
- Providers of applied and theoretical 3D content for academic journals and books
- Started in 2012, based in a studio just outside Oxford
- steven.dey@thinksee3d.com Twitter : @thinksee3d



Why create digitally produced replicas?

- Tactile engages!
- Impossible exhibition pieces
  - Reveal hidden, difficult to display or remote objects
- Restorations
  - Bones'R'Us
- Comparative studies
  - Cross museum collections
- Measurement in 3D
  - Easier in a digital model
- Proxy repatriations

Digital makes them…

- Affordable, high quality

ThinkSee3D – thoughts

- Digital replicas are highly effective props
  - improve access and engagement with museum collections
- Most effective if they are believable
  - no white plastic released from our workshop!
- Derived from real + believable copy = magic
- Provides unique opportunities for disabled people
- BUT replicating complex objects to the level of ‘believable’ needs budget, technology and multiple processes digital and physical production skills

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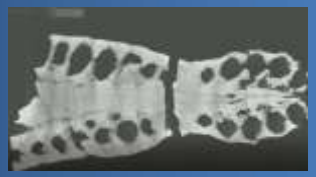
Quick thoughts on 3D technology

- Digital photogrammetry comes out of machine vision research
  - Part of AI research
- 3D printers are robots
- Do I feel worried? No
  - throughout the whole process from digital to physical humans make all the creative choices and everything is hand finished
- 3D Printers (robots) don’t need to sleep
  - They work throughout the night making items more affordable
  - The materials are pricey though

Stage 1 – Digital 3D Production



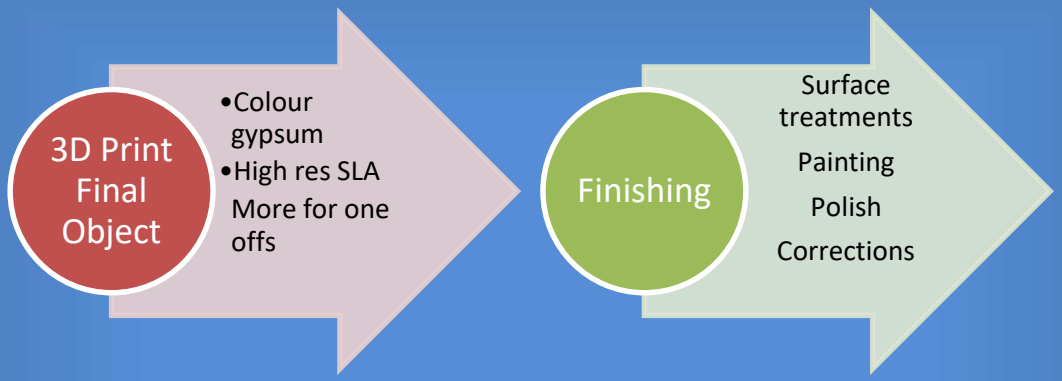
CT → Process scan segmentation → Prepare 3D printable digital models

Digital Sculpt → Sculpt from nothing or against references → Validate 3D printable models

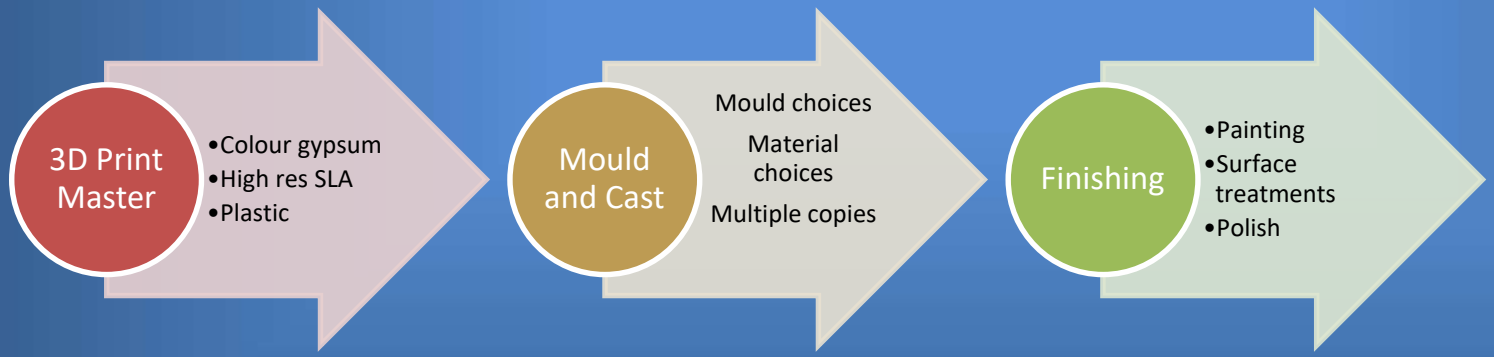
Photogrammetry → Take & process photos → Prepare 3D printable models

Multiple creative and technical choices are needed to get high quality digital models

Stage 2 - Digital to Physical Production



Multiple creative and technical choices are needed to get the best result



Case study: Igbo-Ukwu Bronzes

- Remarkable intricate bronzes found in a well in Igbo, Nigeria province in the 1930's, excavated in 1959
- Dated at 850AD so much earlier than the famous Benin bronzes
- 100's of intricate bronzes found
  - Most in Lagos but 5 pieces in the BM
- 2018 ThinkSee3D commissioned to make some replicas for BM education

The outcome

- A challenge to produce
  - Objects started with high resolution 3D print but all pieces required extensive hand finishing to get the desired quality and believability

- Copies proved highly popular with the Nigerian community in Britain
  - Chimamanda Ngozi Adichie, Nigerian Novelist , featured in Harpers Bizarre holding a copy

- Some TS3D replicas (below) to return to the Igbo-Ukwu village
  - People there who remember the archaeologists digging in the 50's/60's moved to tears as no material left in the area

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Conclusions

- Tactile replicas and derived works are more magical if believable
- Believability has a cost, can be demanding, requires multiple skills and multiple creative choices throughout, definitely not push a button and get a result
- Digitally produced replicas and derived works are creative works in themselves, sometimes weeks of effort goes into creating them
- Maybe the beginnings of a new creative medium/movement – digitally ‘assisted’ arts and crafts?

Steven Dey, ThinkSee3D

- Founder of ThinkSee3D in 2012
- University of Warwick – BSc Physics
  - Also a professional 2d artist in the summer holidays
- 20 plus years in creative software technology businesses
- Founded Commerce Decisions in 2001 & invented AWARD software
  - Procurement decision making software used by the 2012 Olympic Delivery Authority and since used in over £500bn of global public procurement
- Spent the last 9 years in 3D technology and heritage 3D printing
- *Passionate about the opportunities of 3D technology applied to culture, history, art , medicine and science to engage, inspire and educate*
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2D replica by S Dey