HealthManagement
Promoting Management and Leadership

Volume 7 - Issue 1, 2007 - Interview

Blending Biomedical Imaging on Living Subjects with Fossil Imaging:The Dmanisi Projects

Interviewee

Prof. Dr Christoph P.E. Zollikofer

Anthropologisches Institut

Und Museum

Universitaet Zuerich-Irchel

Zurich, Switzerland

ZOLLI@AIM.UNIZH.CH

How did you come to be involved in the Dmanisi research project?

_ My original training is in neurobiology. During my postdoctoral studies in computer science, I got involved in paleoanthropology. My specific involvement in Dmanisi goes back to the late nineties, before the “big finds” were made. We were joking about the hominin fossils that might appear on the site, and asked David Lordkipanidze, the project leader in Georgia, to send us an email when they were located. This happened just one year later. Work in Dmanisi has now evolved into an international research project under the auspices of the Georgian Academy of Sciences, including colleagues from Germany, the US, France and Spain.

What are the origins of your project?

_ The original idea was to combine biomedical imaging and computer graphics to implement new tools to reconstruct fragmentary and distorted fossil hominins in virtual reality, to maximise relevant biological information with a minimum of invasiveness. We used these tools to reconstruct Neanderthal specimens from birth to adulthood and to compare their development with that of our own species.

For more than a decade, the team included just two researchers; my colleague Marcia Ponce de León, then a PhD student, and myself, then a postdoctorate. Our expertise was relatively broad (general biology, computer science), but it was a major challenge to bring together a diverse array of research approaches and technologies.

Who are the main supporters of the project?

_ Originally funded by the Swiss National Science Foundation, we received major support from Prof. Peter Stucki, former Director of the MultiMedia Lab at the Dept. of Computer Science, Univ. of Zurich. Interestingly, he was a former IBM manager, who went back to academia.

Which imaging technology was used to carry out your project?

_ We used computed tomography (CT), both medical and industrial.

How have international collaborations with other anthropologists helped your project?

_ We were quite alone regarding methodologies and technologies. Classical anthropology was rather sceptical about the use of computerised methods. However, the entire project would have been impossible without the collaboration and support of anthropologists in giving us access to the precious original specimens and permitting them to be CT-scanned.

How has modern imaging technology provided information on the specimens?

_ 3D reconstruction was a crucial step, particularly because it is non-invasive. Using CAD paradigms, it can be cast into a rigorous scientific framework, which can be tested and replicated by other scientists.

Imaging technology provides volume data from fossil specimens, in other words, it is possible to have a look inside the specimens without touching them. Applying image processing technology such as data segmentation and 3D reconstruction, permits inspection and interactive

manipulation of virtual fossils, as well as acquisition of quantitative data with complex virtual measurement tools.

Is imaging technology becoming more commonly used in paleoanthropology?

_ We now see a real ‘hype’ in applying imaging technology to fossil specimens. There was a switch of paradigms, so that it is now fashionable to scan almost everything. However, we need to keep in mind that imaging technology is a tool for scientists, like a Steinway piano is a tool for musicians. The piano itself does not produce high-quality music, we need a good score and, more importantly, skilled and knowledgeable musicians.

What is foreseen for the future of the project?

_ One especially interesting area of research is to blend clinical biomedical imaging on living subjects with fossil imaging, to learn more about how fossils were when they were living beings.

Published on : Thu, 1 Feb 2007