

## 3D Volumetric Tomography as an innovative bridge between medicine, diagnostics, scientific and industrial research

Luisa Leonardi<sup>1</sup>, Elios Sequi<sup>1</sup>, Cristian Mancini<sup>1</sup>, Maria Pia Morigi<sup>2</sup>, Fauzia Albertin<sup>3</sup>, Matteo Bettuzzi<sup>2</sup> and Rosa Brancaccio<sup>2</sup>

<sup>1</sup> Unibo, Dibinem, Bologna, Italia

<sup>2</sup> Unibo, Difa, Bologna, Italia

<sup>3</sup> Study and Research Center Enrico Fermi, Unibo Difa, Roma, Italia

3D X-ray volumetric tomography can be a bridge between scientific research, industrial research, medicine and diagnostics. Some innovative diagnostic techniques, developed by the researchers of the DIFA, the SMA and the Dibinem of the University of Bologna in collaboration with the Centro Studi e Ricerche Enrico Fermi of Roma and are illustrated in the images. To increase the effect of integrating the acquired scientific information, the 3D tomographic data, transformed and processed from raw images, are shown in 4D visualizations through innovative devices that generate virtual holograms. These devices are able to display, rotate, disintegrate and reassemble the 3D images produced by reproducing them in holographic-virtual films. The feasibility study (extensible to medical tomography images) was made on fine anatomical waxes made from Bolognese ceroplasts from the 18th and 19th centuries.

### References

- [1] Pedrazzini (A.A. 2012/2013) Sviluppo di un sistema tomografico con tubo a raggi X da 300 kV: progettazione e test preliminari, Tesi di Laurea in Fisica
- [2] Leonardi et al. (2015) Innovative anatomical representation through the use of x-ray tomography and holographic display emulator. Italian Journal of Anatomy and Embryology 69° Congress Ferrara
- [3] Mancini et al. (2014) Multy-layer spiral CT with 2D and 3D volume rendering electronic reconstructions of wax models presumably dating back to the 18th century and Bologna School Italian Journal of Anatomy and Embryology 68° Congress Ancona
- [4] Peccenini et al. (2015) A New Way to Enrich Museum Experience Through X-ray Tomography The Diagnostic Study of a Wax Anatomical Model of the 18th Century Made by Anna Morandi Manzolini Conference Paper
- [5] Leonardi et al. (2015) Multi-layer spiral CT with 2D, 3D and 4D volume rendered electronic reconstructions of wax models and natural bone made by Giuseppe Astorri kept at "Luigi Cattaneo" Museum in Bologna Italian Journal of Anatomy and Embryology
- [6] Leonardi et al. (2017) Alive ceroplastics - 4d representations Ceroplastics International Congress on Wax Modelling
- [7] Brancaccio et al. (2018) The 3D X-ray CT as new way of the Scientific Dissemination concerning Cultural Heritage SIAM Conference on Imagining.