

## WS1-1.5

# Application of Computational Phantoms and their 3D Print-outs for Educational Purposes

A. Marinov<sup>1</sup>, D. Ivanov<sup>1</sup>, Z. Bliznakov<sup>1</sup>, H. Bosman<sup>2</sup>, I. Buliev<sup>1</sup> and K. Bliznakova<sup>1</sup>

<sup>1</sup>*Department of electronics and microelectronics, Technical University of Varna, Varna, Bulgaria*

<sup>2</sup>*Department of Radiology, Katholieke Universiteit Leuven, Leuven, Belgium*

The paper presents an approach to be used in the face-to-face and the on-line phases of one of the chapters in module from the EUTEMPE-RX project. The module and the project are aimed at the training of medical physics experts in radiology. The approach consists of: (a) generation of computational anthropomorphic phantoms, (b) program scripts, specifically developed to convert computational phantoms to suitable formats used with 3D printing devices, and (c) 3D printing of software models. In this paper, the design and printing of a 3D breast glandular system has been demonstrated. Two small size breast phantoms differing in the complexity of their duct tree system were generated with a dedicated program. A set of image processing techniques were applied on the obtained breast phantoms to obtain an STereoLithography (STL) file format of the breast's duct tree that was imported within the software of the 3D printer used to print the sample breast tree.