

## INVITED SPEAKERS AND PAPERS



**Prof. Nicolas Pallikarakis**



**Dr. Kristina Bliznakova**

### **Simulation studies in medical x-ray tomographic imaging**

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**Abstract:** *Computer modeling and simulation tools greatly promote the development of new diagnostic procedures and their associated technology. They are a key technology in designing, testing and evaluating the performance of the new forthcoming imaging systems, prior to their realization and acceptance for clinical use. Advanced x-ray imaging techniques, especially those that provide three-dimensional images, are amongst those that benefit strongly from simulation studies. Such an example is Breast Tomosynthesis, a novel imaging technique that has the potential to extract additional diagnostic information in comparison to conventional mammographic images. However, there are questions on its clinical adoption at a wide range application. In this case, there is still no consensus whether routine breast tomosynthesis should be applied as a screening technique for early breast cancer detection, due to the increased incident exposure and glandular dose that may be reached in specific cases. Therefore, the absorbed breast dose must be reduced through optimization of x-ray beam, acquisition geometries, etc. This can be effectively studied using Modeling and Simulation. Similar situations appear in almost all cases of x-ray imaging. This keynote speech will address recent studies carried out in the Biomedical Technology Unit (BITU), University of Patras, Greece, in the field of x-ray tomographic imaging using modeling and simulation techniques. Examples of application of modeling and simulation include breast and brain x-ray tomography imaging.*

**Bio1: Prof. Nicolas Pallikarakis.** *Professor of Medical Physics, University of Patras, Greece. Studied Physics, Instrumentation, Biophysics and Medical Physics in Greece, United Kingdom and Belgium. He is currently Professor of Medical Physics, University of Patras, Chairman of the Board of the Institute of Biomedical Technology (INBIT) and Director of the European postgraduate course on Biomedical Engineering. He is author of more than 100 scientific papers, 3 books and 3 educational CD ROMs. For the last 30 years he has been actively engaged in the field of Medical Technology. Project coordinator of many national and European R&D projects such as: BEAM I and II, the EUROMEDIES and the Tempus CRH - BME “Curriculum Reform and Harmonisation of Biomedical Engineering education”. Former president of the Board of the Clinical Engineering Division (CED) of the IFMBE and recently elected member of the International Academy of Medical and Biological Engineering (IAMBE).*

**Bio2:** *Dr. Kristina Bliznakova received her degree in Electrical Engineering from the Technical University of Varna, Bulgaria in 1995, her MSc degree in Biomedical Engineering at the University of Patras, Greece in 1996 and her PhD degree in Biomedical Engineering at the University of Patras, Greece in 2003. Main field of interest is modelling and simulation of x-ray breast imaging techniques. She particularly developed three-dimensional breast models and simulation of novel x-ray breast imaging techniques and has strong background in implementing Monte Carlo methods for simulation of irradiation transport through designed systems for external exposures and dose calculation algorithms. She is also one of the developers of a novel model of carbon fiber reinforced polymers that can be used in a feasibility study of non-destructive x-ray based imaging techniques for inspection of aircraft structures built from these polymers for defects like porosity, delaminations and voids. Currently, she is a Marie Curie fellow at the Technical University of Varna, Bulgaria, carrying out the PHASETOMO project, which aims at the investigation of new technique, called phase contrast breast tomosynthesis.*