Italy Chapter of the IEEE Sensors Council Lecture:

Nuclear Medicine Instrumentation: SPECT and PET technologies

Stratos David

Department of Biomedical Engineering, University of West Attica, Athens, Greece

May 7th 2018, 8.30 – 10.30

Faculty of Engineering, Università Politecnica delle Marche, Ancona

Room 155/d3

Abstract: Molecular imaging using high-resolution single-photon emission computed tomography (SPECT) and positron emission tomography (PET) scanners has advanced elegantly and has steadily gained importance in the clinical and research arenas. This lecture will briefly summarizes the state-of-the art developments in Nuclear Medicine instrumentation regarding the design of different geometries and various detector technologies of SPECT and PET scanners. Preclinical “low cost” imaging systems, very high-resolution research applications (including small-animal imaging), and combined systems such as SPECT/MR and whole body PET/MR scanners will also be discussed. Combining PET or SPECT with Magnetic Resonance Imaging (MRI) technology is scientifically more challenging owing to the strong magnetic fields. Options of new bright scintillators and photodetectors are discussed, including co-doped and mixed scintillators as well as discrete silicon photomultiplier arrays (SiPMs). Finally, it will be discussed how the crucial parameters (energy, spatial and timing resolution, sensitivity and injection dose) improved with whole body geometry, time of flight (ToF) and depth of interactions (DoI) techniques. Future prospects will also be discussed.

Short CV: Biography: Dr. Stratos David. Gender: male. He has a first degree in Biomedical Engineering as well as MSc and PhD degrees in Medical Physics from the University of Patras. He has participated in 12 Greek funded research projects as a researcher and in one FP7 EU project named NANOTHER. He was awarded with a Post-Doc scholarship programme from the action entitled ”Reinforcement of Postdoctoral Researchers”, Greek State Scholarships Foundation (I.K.Y.) for Academic Years 2017-2019. He works as Adjunct Laboratory Instructor and as Postdoc researcher of Laboratory of Radiation Physics, Materials Technology and Biomedical Imaging and of Nuclear Medical Imaging group of TEI of Athens (from 01/10/2009 up to now). He is active in the following research areas: experimental evaluation of absolute efficiency and decay time of scintillating screens for use in digital imaging systems, experimental evaluation of single-crystal scintillators, novel MR compatible small animal imaging detectors, instrumentation of dedicated nuclear imaging systems and spectroscopic radiation sensors for homeland security applications. He is reviewer in many scientific journals (Physics in Medicine and Biology, IEEE TNS, Physica Medica, NIMA, Radiation Measurements, JALCOM) and he has published 36 Peer-reviewed papers with impact factor (IF) and other 12 journals without IF, related with scintillator & phosphor materials. In addition, he has more than 43 proceedings in international scientific conferences with referees and more than 70 poster conference presentations. The number of citations given in his papers is up to 300 with h-index equal to 11 (excluding self-citations according to Scopus). Finally, he has been member of conference committees, session chairman and invited speaker in international conferences and medical equipment exhibitions.

Organizer:
Prof. Lorenzo Scalise, Measurement Group, DIISM
Università Politecnica delle Marche, Ancona, ITALY
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For information please contact: l.scalise@univpm.it