

*Vienna, Austria*

Annual Congress of the  
European Association of Nuclear Medicine  
October 21 –25, 2017  
Vienna, Austria

## CME 1 (Physics)

Sunday, October 22, 08:00-09:30

### Session Details

#### Challenges and Solutions for MR-Based Attenuation Correction of PET

#### Chairs

Stefaan Vandenberghe (Ghent)

Stephan Nekolla (Munich)

#### Speakers

08:00 – 08:30 Live Eikenes (Trondheim): Introduction to MR-Based AC

08:30 – 09:00 Ninon Burgos (London): MR Based Attenuation Correction for Brain

09:00 – 09:30 Georg Schramm (Leuven): MR Based Attenuation Correction for the Body

#### Educational Objectives

1. Learn about the basic methodology of the generation of maps of linear attenuation coefficients (LAC, i.e.  $\mu$ -maps) using MR signals for attenuation corrections of the PET signal (i.e. 511keV gamma rays).
2. Gain insight in new developments and advancement of methods to improve attenuation correction using structural MRI data
3. Understand atlas based and neuronal network based generation of CT-like  $\mu$ -maps for attenuation correction in brain PET/MRI
4. Learn about new methods of hard and software implementation to generate whole  $\mu$ -maps for attenuation correction in PET/MRI

#### Summary

Other than using CT, MR structural imaging reveals a proton density of the imaged object. This is by no means representative for the attenuation of gamma rays traveling through the material and, hence, cannot be used to directly derive a map of the electron density or linear attenuation coefficients (LACs,  $\mu$ -maps). Beginning with very basic segmentation algorithms and the assignment of static LACs to classes of tissue, continuing with atlas based methods to derive more CT-like  $\mu$ -maps up to neuronal networks that are trained to derive continuous valued  $\mu$ -maps from structural MRI data and involving more sophisticated MR imaging sequences to better detect bone, this session gives an overview of the methodology either widely implemented or available for use in clinical and research settings. Methodology of MR based attenuation correction is – at least for the brain – no longer a challenge. The wide implementation and availability seems to remain the challenge.

#### Key Words

PET/MRI, MR-based attenuation correction, tissue class Segmentation,  $\mu$ -map