

## Michel Koole

### Short Biography:

Graduated as a master in physics and trained as a certified medical physicist, Michel Koole finished his PhD on quantitative SPECT imaging at the University of Ghent in 2002. After a FWO postdoctoral fellowship, he worked for a few years for private companies developing medical image analysis software. Beginning 2007, he joined the Nuclear Medicine and Molecular Imaging department of UZ Gasthuisberg Leuven as a medical physicist to cover the data analysis of contract research imaging studies. At a later stage, he was appointed as research expert in quantitative molecular imaging at the KU Leuven. Mid 2012, Michel Koole joined the medical physics team of the Nuclear Medicine and Molecular Imaging department of the University Medical Center Groningen, the Netherlands, to further extend research efforts on quantitative PET imaging. In Nov 2014 he rejoined the Nuclear Medicine and Molecular Imaging Department of KU Leuven as Associate Professor. Research interests are focused on quantitative SPECT and PET imaging, including PET kinetic modelling, univariate and multivariate data analysis, tumour lesion detection/segmentation and dosimetry. Michel Koole has published over 150 peer-reviewed articles (h-index 41 [GoogleScholar], 32 [Web of Science]) and is an associated editor of *Physica Medica*. He was elected as a board member of the European Association of Nuclear

Medicine (EANM) and is the scientific liaison officer for 2022-2024. Meanwhile, he gained support from the PRISMAP consortium to evaluate the feasibility of quantitative  $^{225}\text{Ac}$ -SPECT and is involved in setting up a European accreditation program for quantitative  $^{177}\text{Lu}$ -SPECT and defining European guidelines for dosimetry of alpha-emitting radiotherapeutics. He is currently (co)-supervising six Ph.D. students on topics related to image quantification while six of his Ph.D. students (four KU Leuven, one UGent-KU Leuven, and one UMCG) have successfully completed their Ph.D. He has also spent one month as a visiting professor at PUCRS, Porto Alegre, Brazil (Aug 2019) to support research efforts within the field of medical physics and to exchange expertise with Ph.D. students.

### Abstract:

This presentation will discuss the potential use of Support Vector Machines (SVM) to differentiate between neurological disorders using  $^{18}\text{F}$ -FDG brain PET. More specifically, we will focus on the differential diagnosis between patients with Amyotrophic Lateral Sclerosis (ALS) and patients mimicking ALS where we could improve the classification accuracy by including  $^{18}\text{F}$ -FDG PET imaging of the spinal cord. In addition, we will discuss the use of SVM to identify a suitable pseudo-reference region. Next, we will focus on deep learning for the segmentation of brain tumors where we will discuss cross modal knowledge and feature distillation to improve MR-based brain tumor segmentations in case of missing MRI sequences and where we will report on a multilabel deep learning approach to detect and segment brain tumors using  $^{18}\text{F}$ -FET PET scans.