

Kris Thielemans

Short Biography:

Prof. Kris Thielemans is Professor in Medical Imaging Physics at the Institute of Nuclear Medicine (INM), University College London, UK. Prof. Thielemans worked in industry from 2001 to 2011. He led the international team in GE Research that developed Q.Freeze(tm), the first commercial solution for respiratory motion correction in PET/CT. Since joining UCL in 2013, his research covers PET-CT, PET-MR and SPECT, including motion detection and correction, quantitative image reconstruction and synergistic (joint) reconstruction of multi-modality data, with an aim towards translation to practice, as exemplified in various projects with industry. Dr. Thielemans is the lead designer and maintainer of the open source project Software for Tomographic Image Reconstruction (stir.sourceforge.net), which allows quantitative image reconstruction for PET and SPECT data, and the Synergistic Image Reconstruction Framework (SIRF) for PET, SPECT and MR data (www.ccpsynerbi.ac.uk). He now co-leads the Emission Tomography Standardization Initiative (ETSInitiative.org) which currently aims to develop standard for PET Raw data. Dr. Thielemans has 107 co-authored peer-reviewed publications, 250+ conference contributions and holds 17 patents (1 pending).

Abstract:

To be able to fully exploit the capabilities of Machine Learning and Artificial Intelligence, access to large data sets is essential. This implies standardised data. In current PET practice, raw acquisition data are recorded in an intermediate listmode format before vendors apply the necessary processing to deliver standard, sharable, PET DICOM images. However, all current vendor formats differ, to accommodate different architectures and processing strategies. The recently established Emission Tomography Standardization Initiative (ETSI) is working towards the definition of an open, extendable, standardised and vendor-agnostic description of PET listmode and associated data [1]. A novel feature of the proposal is the use of a meta-language called Yardl for defining data structure and protocols for accessing, transferring, and storing data [2]. All portions of the format, tools for accessing the data in the standardised format, and example data will be made open source and publicly available. In this talk we introduce the ETSI project and the current state of the standard. In addition, we will discuss how this could enable our community to develop more powerful and novel AI applications [3].

REFERENCES:

[1] K. Thielemans et al., 'The PET Raw Data Standardization Initiative', *Journal of Nuclear Medicine*, vol. 64, no. supplement 1, pp. P687–P687, Jun. 2023.

[2] <https://github.com/microsoft/yardl/>

[3] A. Sitek et al., 'Artificial Intelligence in PET: An Industry Perspective', *PET Clinics*, vol. 16, no. 4, pp. 483–492, Oct. 2021, doi: 10.1016/j.cpet.2021.06.006.