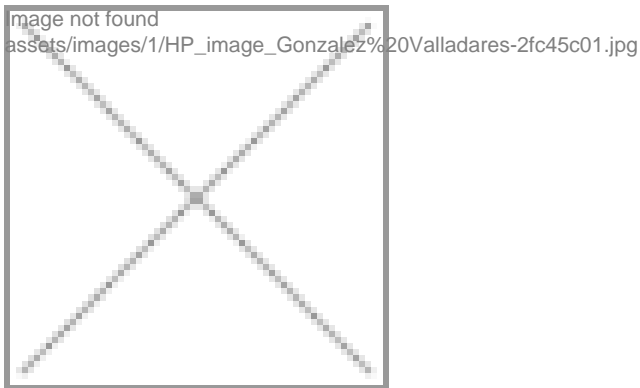


Standardized quality assurance protocols in multi-parametric imaging

HOST INSTITUTION. Medical University of Vienna (MUW)

The Medical University of Vienna was founded in 2006. With 8,000 students it is today the largest medical training facility in the German-speaking area. The MUW is organized into 27 university departments, 3 clinical institutes, 12 medical-theoretical centres and numerous highly-specialized laboratories. As such, it is also one of the most prominent research institutions in the field of biomedicine in Europe. Affiliation of the PhD candidate is with the Quantitative Imaging and Medical Physics (QIMP) group, which is part of the Center of Medical Physics and Biomedical Engineering (CMPBME) at the MUW. The CMPBME is a multi-disciplinary research centre with close collaborations with the medical and basic science faculties. The main objectives of the CMPBME include the development of applied physics methodology and biomedical engineering for clinical applications. The QIMP group brings together physicists, computer scientists and engineers in an effort to establish and validate clinical and research protocols using quantitative hybrid imaging technologies, such as PET/CT, PET/MRI and SPECT/CT.



DESCRIPTION OF THE PROJECT (ESR1 - Alejandra Valladares)

In this project, the ESR will design new quality-control (QC) concepts, including the development of digital- and physical phantoms for easy-to-use QC procedures for PET/MRI and multi parametric imaging (MPI). More specifically, this will include the development of digital phantoms to test site-specific implementations of algorithms for MPI across the HYBRID consortium sites. Additionally, dedicated cross-modality imaging phantoms will be designed and produced using 3D printing technology to address special needs of MPI. The phantoms will be tested in the on-site imaging systems, and their re-/usability in every day practice will be assessed. Within the course of this project, secondments to a clinical research organization in Dresden (Germany) and the University of Copenhagen (Denmark) are planned. Further, the project may include short-term visits to different HYBRID partners for phantom experiments.

Publications

Iommi D, Valladares A, Figl M, Grahovac M, Fichtinger G, and Hummel J (2021) 3D ultrasound guided navigation system with hybrid image fusion. *Sci Rep* 11, 8838. <https://doi.org/10.1038/s41598-021-86848-1>

Rausch I, Valladares A, Shiyam Sundar LK, Beyer T, Hacker M, Meyerspeer M, and Unger E (2021) Standard MRI-based attenuation correction for PET/MRI phantoms: a novel concept using MRI-visible polymer. *EJNMMI Phys* 8, 18 (2021). <https://doi.org/10.1186/s40658-021-00364-9>

Valladares A, Beyer T, and Rausch I (2020) Physical imaging phantoms for simulation of tumor heterogeneity in PET, CT, and MRI: An overview of existing designs. *Med. Phys.* 47(4), 2023-2037. <https://doi.org/10.1002/mp.14045>

Valladares A, Ahangari S, Beyer T, Boellaard R, Chalampalakis Z, Comtat C, DalToso L, Hansen AE, Koole M, Mackewn J, Marsden P, Nuyts J, Padormo F, Peeters R, Poth S, Solari E, and Rausch I (2019) Clinically Valuable Quality Control for PET/MRI Systems: Consensus Recommendation From the HYBRID Consortium. *Front. Phys.* 7, 136. doi: [10.3389/fphy.2019.00136](https://doi.org/10.3389/fphy.2019.00136)

You can find a summary of this publication [here](#).