A highly innovative system, called long axial field of view (LAFOV) PET/CT, has become available and is the ideal medical imaging modality to study diseases and molecular processes at the whole body/systems biology level with multiple radiotracers. Studying diseases and diagnosing patients using PET/CT imaging should use a whole body/systems biology approach, i.e., a comprehensive whole body characterisation of disease, and it should be longitudinal and should use multiple radiotracers. However, LAFOV PET/CT is so new that we lack the necessary tools, methodologies, imaging procedures and skilled scientists to effectively address key applications in patient care and research. With the **PREFERENCE** project we aim to develop innovative LAFOV PET/CT methodologies to perform and support ground-breaking new clinical research.

PREFERENCE will train the next generation of researchers specialized in LAFOV PET/CT who will capitalize on the new clinical and research opportunities of the LAFOV PET/CT system. By performing research in both academia and industrial groups, researchers within **PREFERENCE** receive training in a unique combination of (soft) skills across disciplines and sectors. **PREFERENCE** will develop new LAFOV PET/CT methodologies, and perform LAFOV PET/CT clinical studies across disease areas to obtain novel biological insights. This project was selected by the EU as worthy of funding under the HE Marie Sklodowska Curie Action. The consortium consists of 12 academic partners with a strong expertise in quantitative (LAFOV) PET/CT imaging as well as industrial partners developing imaging equipment or providing multi-center image analysis solutions and services.

PhD PROJECT. Machine learning-based kinetic analysis of LAFOV oncology PET/CT data

HOST INSTITUTION. German Cancer Research Center (Deutsches Krebsforschungszentrum DKFZ)

The German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) is Germany's largest biomedical research center, working towards a better understanding of fundamental processes in cancer and to develop innovative methods of cancer diagnostics and therapy. It is a member of the Helmholtz Association of German Research Centres. More than 1,300 scientists at the DKFZ investigate how cancer develops, identify cancer risk factors and search for new strategies to prevent people from developing cancer. To support "bench-to-bedside-and back" translational research, the DKFZ and the Medical Center of Heidelberg University founded the first "Comprehensive Cancer Center" in Germany (National Center for Tumour Diseases, NCT) together with the German Cancer Aid, providing an exceptional environment for translational biomedical research.

The DKFZ Clinical Cooperation Unit (CCU) Nuclear Medicine investigates the use of PET and PET/CT for diagnosis and therapy monitoring in cancer patients. Scientific work includes different tumour entities and radiopharmaceuticals like perfusion tracers, hypoxia markers, proliferation tracers, labelled amino acids, labelled cytostatic drugs, and novel radiolabelled peptides. Methodological aspects like pharmacokinetic modeling and parametric imaging as well as the relation between molecular imaging data and omics data is another field of the group´s research. Machine learning algorithms and AI are used for improvement of kinetic analysis and for image segmentation.

DESCRIPTION OF THE ADVERTISED POSITION (DC 6)

This is a 3-year, full-time position as a doctoral candidate under the auspices of the MSCA Doctoral Network programme. The successful candidate will be enrolled in the Heidelberg Graduate School for Physics. The project aims to develop and validate machine learning-based kinetic analysis methods for dynamic LAFOV PET data (MLKA-PET), as well as machine learning approaches for tissue and histological classification based on the original kinetic data.

The doctoral candidate will develop, implement and evaluate machine learning-based methods for the robust quantitative analysis of dynamic oncology PET/CT data. The work will include the comparison of approximately ten machine learning methods and their application to kinetic data for the differentiation of clinically relevant disease categories, including benign versus malignant lesions, histological cancer subtypes and different therapy-response patterns. The candidate will compare the developed approaches with established compartmental and non-compartmental kinetic modelling methods and assess their robustness, reproducibility and clinical applicability.

The expected results are: (1) improved kinetic analysis and parametric imaging of dynamic PET data acquired with a LAFOV PET/CT scanner; and (2) validated machine learning classification models that

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use kinetic PET data to distinguish disease categories, tumour histology and response patterns after different oncological treatments. DC6 will collaborate closely with DC1 and DC14 to extend and validate the methods for non-[^{18}F]FDG dynamic LAFOV and SAFOV PET/CT studies. The MLKA-PET methodology will also be evaluated using the [^{15}O]water perfusion studies performed by DC9 within WP2.

Planned secondments comprise a total of three months: at M19, an industrial secondment at CMINDS to contribute to the establishment of multicenter databases and analysis pipelines; at M25, a secondment at Aarhus University Hospital to apply MLKA-PET to oncology datasets and validate it against standard kinetic modelling approaches; and at M30, a secondment at the University of Turku to explore the feasibility of MLKA-PET for cardiac [^{15}O]water perfusion studies.

GENERAL ELIGIBILITY CRITERIA

Mobility Rule: The fellow may not have resided in the country where the research training activities take place for more than 12 months in the 3 years immediately prior to the recruitment date (and not have carried out their main activity (work, studies, etc.) in that country)

Doctoral candidate: The fellow must be — at the date of recruitment — a '**doctoral candidate**' (i.e. not have a doctoral degree).

Candidates from Russia, Belarus and occupied territories in Ukraine are also not eligible.

SPECIAL REQUIREMENTS

- A successfully completed MSc degree, or an equivalent university qualification, in Physics, Medical Physics, Biomedical Engineering, Computer Science or a closely related discipline.
- Demonstrated programming experience in at least one scientific programming language, preferably Java, C++ or Python.
- Experience in data analysis, numerical computation, algorithm development or scientific software development.
- A strong interest in quantitative medical imaging, dynamic PET, kinetic modelling, machine learning and oncology.
- Very good written and spoken English; knowledge of German would be advantageous but is not required.

The following qualifications will be considered advantageous:

- Previous programming experience in machine learning or artificial intelligence.
- Experience with machine learning libraries or frameworks such as PyTorch, TensorFlow, scikit-learn or comparable tools.
- Experience with medical imaging data, particularly PET, SPECT, MRI or CT.
- Knowledge of tracer kinetic modelling, compartmental modelling, time-series analysis, numerical optimisation or parameter estimation.
- Experience in medical image processing, image segmentation, radiomics or quantitative image analysis.

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RECRUITMENT PROCESS:

After assessing compliance with the mobility rule and eligibility for the position based on your CV and motivation letter you might be invited for several online or in-person interviews. Selection of the candidates and invitation for the interviews will be done by the local (host) supervisory team. These interviews will be performed by the local (host) supervisory team as well as an international scientific mentor from the network and, possibly, one of the scientific advisors. Information on your application will be shared with the coordinator of the consortium for centralized coordination and registration of the recruitment process. Information on the exact employment conditions will be provided by the host institution and can also be found on their job announcement board, information on salary (gross and net salary, social security benefits etc) will be communicated during the interview and upon appointment by

You will be appointed as fulltime PhD candidate for 3 years. Successful candidates will receive a salary in accordance with the Marie Skłodowska-Curie Actions, that includes a gross living allowance of €4,058/month (correction factor for Germany is already included), a monthly mobility allowance of €710 and depending on your family status, a family monthly allowance of €495. Please note that these amounts include taxes and compulsory employer contributions that will be deducted to make the net salary. The exact net salary will be confirmed upon appointment.

FURTHER INFORMATION:

PREFERENCE:	https://preference-consortium.eu/
DKFZ:	https://www.dkfz.de/
CCU-NM:	https://www.dkfz.de/en/nuclear-medicine

Full applications should include

- A motivation letter
- A Europass CV (https://europass.cedefop.europa.eu/documents/curriculum-vitae)
- Copies of your relevant certificates
- Contact details of two references

Applications should be submitted by email to: l.pan@dkfz.de by 1st November 2026. In case of any procedural questions, please contact: preference@amsterdamumc.nl

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