

ESOR TRAINING CENTRE ENROLMENT FORM

Name of Institution: Diagnostic and Interventional Radiology, Heidelberg

University Hospital

City and Country of Institution: Heidelberg, Germany

RESEARCH GROUP

Brief description of the research group and of its mission:

Our research group from the Diagnostic and Interventional Radiology is a dedicated team of clinical and multidisciplinary scientists. Our research areas cover a broad spectrum of advanced imaging modalities (such as modern CT, MRI and angiography) and various organs, spanning Lung and Cardiovascular Imaging, Abdominal and Interventional Imaging, Musculoskeletal Imaging, **Oncologic Imaging**, and Pediatric Imaging, with an additional focus in Computational Image Analysis and Medical Physics. We are aiming to translate research findings into clinical applications, contributing to improved patient care.

TITLE OF PROPOSED RESEARCH PROJECT

International Multicentre Validation & Continual-Learning Framework for Cardiovascular-Oncology

OBJECTIVES

- **Cross-site external testing** – The Chinese team evaluates its AI model for cardiovascular-oncology on independent oncology patients with cardiovascular involvement using cardiac imaging in Heidelberg.
- **Reverse validation** – Heidelberg deploys its cardio-oncology model on patient scans from a leading partner hospital in China.
- **Federated continual learning** – Only model parameters (not images) travel between sites, mitigating domain shift while remaining GDPR (General Data Protection Regulations, Europe) + PIPL (Personal Information Protection Law, China) compliant.
- **Scalable extension to additional indications** – Contingent on demonstrated success in pulmonary disease, extend the cross-site evaluation, reverse validation, and federated continual learning workflow to non-pulmonary radiology domains and modalities, using the same privacy-preserving framework.

APPLICANT'S DUTIES

- **Build a secure Europe–China pipeline** that enables Heidelberg and top Chinese hospitals to validate and continuously improve AI imaging models without transferring raw patient data.
- **Standardise data curation & annotation protocols** across both sites (DICOM de-identification, lesion labelling, ontology mapping) to ensure comparable ground-truth labels.
- **Design and orchestrate the federated training loop** (aggregation server, differential-privacy noise, convergence monitoring) and perform statistical significance testing of performance gains after each round.
- **Lead regulatory & ethical coordination**, drafting joint Data-Processing Agreements, security threat models, and Institutional Review Board submissions in both jurisdictions.
- **Disseminate results through interim dashboards**, stakeholder workshops, and open-source documentation, ensuring rapid adoption by additional EU–China clinical partners.

APPLICANT’S BENEFITS

- Training of clinical routine and data management from the host department
 - Validation report
 - Conference abstract
 - Journal manuscript
 - Open source federated-learning code
 - Template for GDPR + PIPL-compliant collaborations
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- Project Leader: Prof. med. Hans-Ulrich Kauczor
 - Members: Dr. sc. hum. Shengkai Zhao