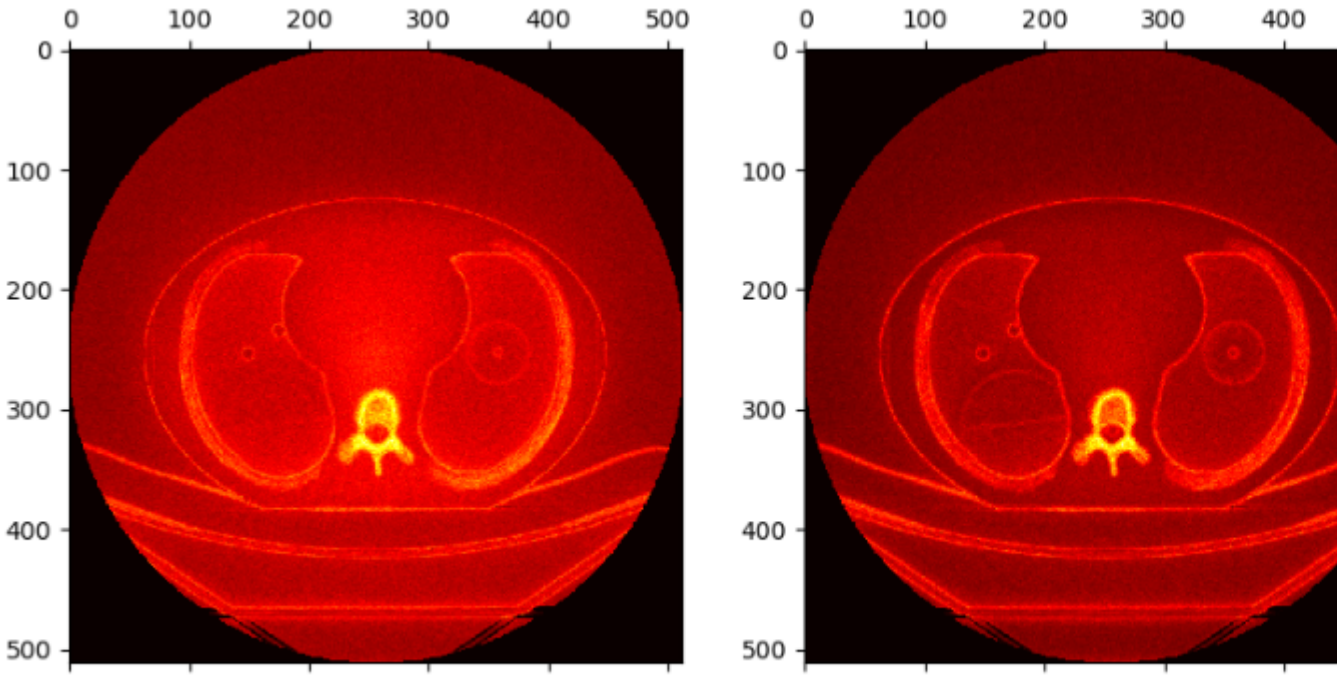
IMoST - Imaging biomarkers

Published on August 25, 2021 – Updated on August 25, 2021



X-ray computed tomography : Image quality (noise) assessment using an anthropomorphic phantom for different iterative algorithm level.

Functional imaging such as **positron-emission tomography** (PET) or **magnetic resonance imaging** (MRI) have demonstrated a high potential for assessment of therapeutic response or recurrence diagnosis.

In MRI, we have developed a reliable and reproducible method based on **dynamic T1-MRI relaxometry measurements** to accurately determine physiological tissue parameters (the vascular permeability (kep), the elimination rate constant (K) and the volume fraction (ve) of the extracellular extravascular space) which reflects the **tumour micro-vascularisation**.The predictive value for local brain metastasis control of a combined score of physiological tissue parameters measured with the developed dynamic T1 relaxometry MRI method already evaluated in different pathologies (breast, cervical tumor) will be evaluated on patients treated by preoperative stereotactic radiotherapy.

In radiology, new X-ray computed tomography (CT) allow, with the development of iterative reconstruction (IR) algorithms, to maintain image quality while significantly reducing patient radiation exposure and thus meet a major challenge of dose reduction while improving lesion detectability. However, safe optimization of CT protocols that use these IR algorithms requires some understanding of their implementation. In particular, in accordance with Report 54 of the International Commission on Radiation Units and

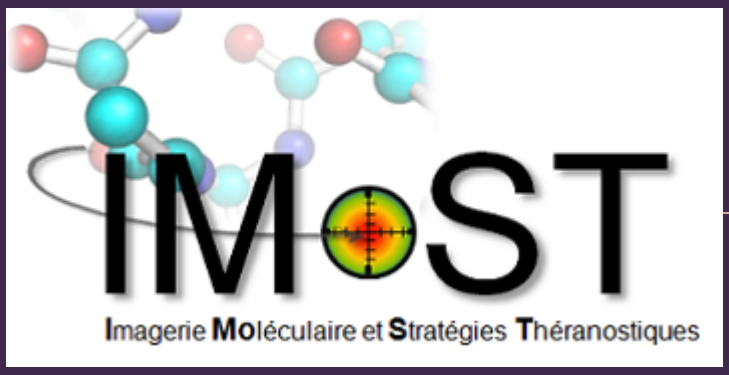
Measurements, image quality in CT should be objectively defined as the ability of an observer (human or mathematical) to extract the diagnostic information that gave rise to the image. In this context, we develop a **mathematical tool to define the acquisition and reconstruction** parameters to obtain the desired diagnostic information at the lowest dosimetric cost and thus improve the detectability of lesions. At the end the performance of our method will be compared with deep learning-based program and visual reading on own database of 211 patients harboring pulmonary nodules with systematic histology available.

OTHER GCCA PARTNERS

- Jean PERRIN Comprehensive Cancer Center - Imaging Department
- Jean PERRIN Comprehensive Cancer Center - Radiotherpay Department
- Jean PERRIN Comprehensive Cancer Center – Clinical Research Division(https://groupe-cancer.uca.fr/en/research/research-activites-by-tumor-site/central-nervous-system/jean-perrin-comprehensive-cancer-center-—-clinical-research-division)
- Clermont-Ferrand University Hospital - Radiology Department

(https://www.inserm.fr/en)

Lab



_(https://imost.uca.fr/english-version)

IMoST - Imagerie Moléculaire et Stratégies Théranostiques

Inserm UMR 1240

58 rue Montalembert

63000 CLERMONT-FERRAND

RoBust Team:

Group Leader : Florent CACHIN

Contact

Véronique DEDIEU(mailto:Veronique%252Ededieu%2540clermont%252Eunicancer%252Efr?Subject=&body=)

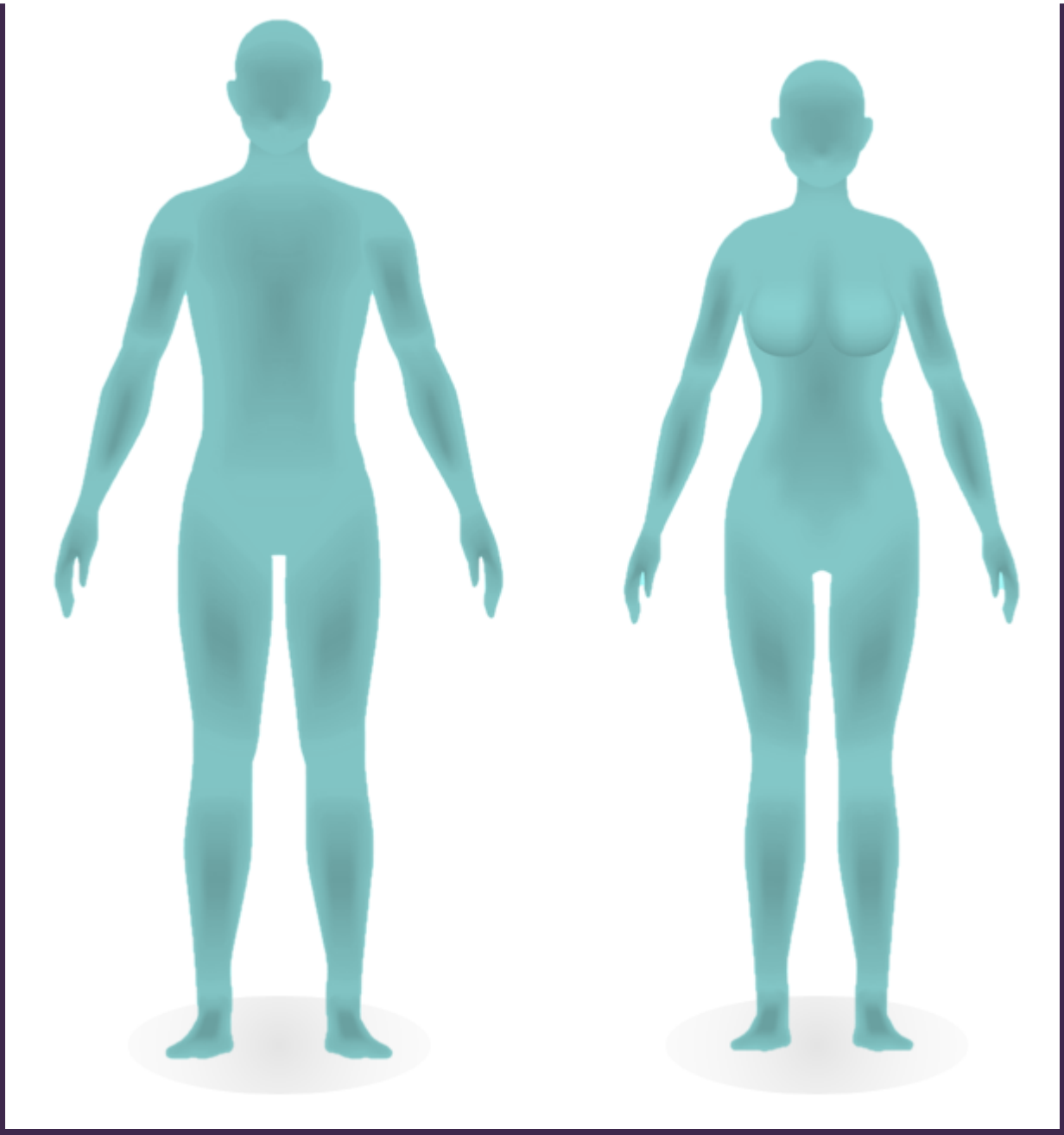
GCCA

Groupe Cancer Clermont Auvergne

IMoST

(https://groupe-cancer.uca.fr/en/research/research-activities-by-laboratory-department/imost-imagerie-moleculaire-et-strategies-theranostiques)

Tumor sites



(https://groupe-cancer.uca.fr/en/research/research-activites-by-tumor-site)

https://groupe-cancer.uca.fr/en/research/research-activites-by-tumor-site/central-nervous-system/imost-biomarqueurs-dimagerie(https://groupe-cancer.uca.fr/en/research/research-activites-by-tumor-site/central-nervous-system/imost-biomarqueurs-dimagerie)