

Technology Opportunity, Ref. No. UB-23/394

## Revolutionizing PET Imaging: AI-Enhanced CT-Free Technology

The demand for ultra-low dose techniques for PET imaging is eminent. Our unique, groundbreaking approach integrates domain knowledge into AI development, enabling ultra-low dose PET imaging with unmatched robustness and transferability. This marks a significant leap in PET imaging technology, offering more accurate, efficient, and safer diagnostics.

**Keywords** Advanced AI Integration, CT-Free PET Imaging, Innovative Decomposition Technique

**Inventors** Song Xue, Kuangyu Shi, Axel Rominger

**Reference** Nature Comm.: "Using domain knowledge for robust and generalizable deep learning-based CT-free PET attenuation and scatter correction";  
<https://doi.org/10.1038/s41467-022-33562-9>

**Background** Traditional AI algorithms face a significant challenge in CT-free PET imaging - their applicability across different scanners and tracers. The rapid development of new tracers, each with unique distribution and textures, often renders conventional AI-based techniques ineffective for untrained tracers. This limitation has hindered the broader application of these technologies.

**Invention** Recognizing the inadequacies of traditional deep learning methods in substituting CT-based corrections in PET imaging, we've pioneered a novel approach. Our technique simplifies the integration of domain knowledge into deep learning for CT-free PET imaging. By distinctively decomposing low-frequency, anatomy-dependent information, and high-frequency texture details, we avoid unnecessary mathematical complexities. This method not only preserves texture fidelity but also significantly enhances accuracy and robustness, setting a new standard in PET imaging technology.

**Application** Implementation on PET scanners, reconstruction software, radiopharmaceutical development

**Patent Status** PCT Patent Application No. WO2023174789

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