

OncoFreeze AI

# Deviceless motion management for PET imaging

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# OncoFreeze AI



All of the benefits of OncoFreeze™ together with intelligent imaging and a deviceless waveform solution, OncoFreeze AI offers motion-corrected PET images with a single click of a button.

## PET respiratory motion management

### Today's challenges

Oncology procedures account for over 90% of clinical PET studies performed today.<sup>1</sup> Whether diagnosing, staging, or monitoring disease, more than half of these exams are performed in areas of the body affected by respiratory motion.<sup>1</sup> The lungs and liver, making up about one third of PET oncology scans, are particularly impacted.<sup>1,2</sup>

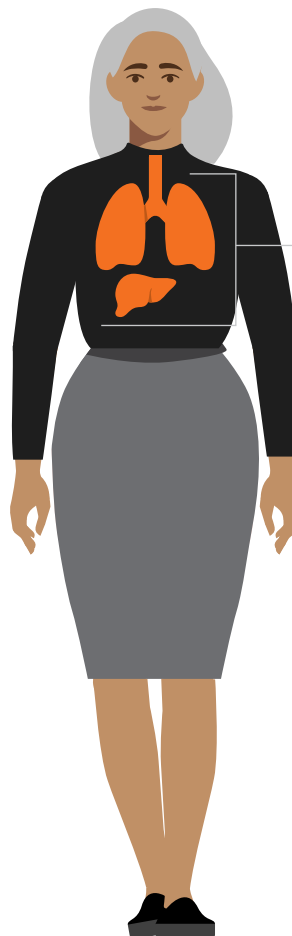
# 90%

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# 1/3

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Without correction, the effects of respiratory motion can result in misdiagnosis, as well as impair treatment planning, staging of disease before surgery, and therapy monitoring.<sup>3</sup> Small lesions may even remain completely undetected due to respiratory motion, increasing the likelihood of a diminished patient outcome.

Traditional approaches for PET respiratory motion correction rely on the use of an external device to generate the respiratory waveform, which can be uncomfortable and stressful for patients. These techniques also add roughly 10 steps to your patient setup, plus longer acquisition time<sup>4</sup> referred to as "schedule busters," they are not routinely used.

*“The beauty of OncoFreeze AI is that it really is for all patients, and you don’t need to choose in advance.”*

**John O. Prior, PhD, MD, FEBNM** | Professor and Head of Department of Nuclear Medicine and Molecular Imaging | Lausanne, Switzerland



## OncoFreeze AI

OncoFreeze AI solves today’s respiratory motion management challenges. Building on the benefits of OncoFreeze technology, OncoFreeze AI further integrates Siemens Healthineers’ proprietary deviceless waveform and anatomical algorithm technology to enable a motion management solution that can be performed with a simple click of a button.

By analyzing the raw PET list-mode data and applying OncoFreeze (an elastic motion-correction algorithm), OncoFreeze AI corrects for blurring caused by activity redistribution during respiration.

With OncoFreeze AI, your oncology patients can experience significantly shorter exams<sup>6</sup> that are free of cumbersome external devices and uncomfortable breath holds.

And with images that are virtually free of respiratory motion in the same amount of time as a conventional whole-body scan, PET motion correction is now a reality for every patient and every scan.



Free of external devices



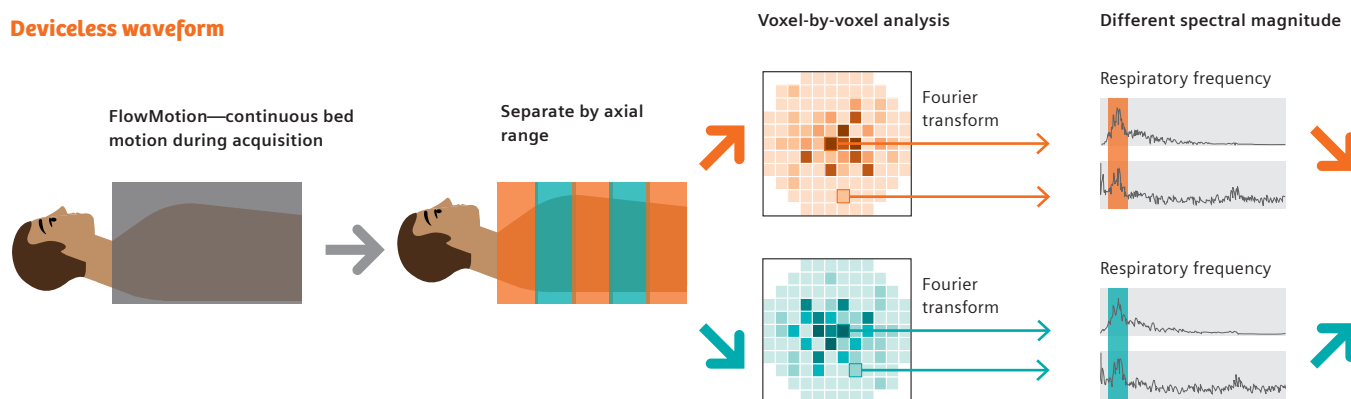
Faster, more comfortable exams



Extended FOV one-click motion correction

# OncoFreeze AI Technology highlights

## Deviceless waveform



## Deviceless waveform

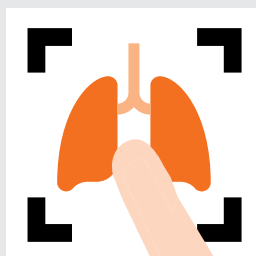
Siemens Healthineers' deviceless waveform is a respiratory signal derived directly from the acquired raw PET list-mode data.

The technique is based on spectral analysis and the principle that, over time, the sum of all pixel values inside a region of interest—defined over the edge of a moving object—

is proportional to the amplitude of the object's motion.<sup>5</sup>

The underlying algorithm automatically determines the regions of interest by defining a mask that includes only the pixels exhibiting a strong spectral magnitude and eliminates voxels not subject to respiratory motion.

To overcome the challenge of extracting a consistent respiratory signal from PET acquisitions that extend axially beyond one field of view, the deviceless waveform leverages Siemens Healthineers' FlowMotion™ (continuous bed motion) to determine the respiratory signal for axially extended PET acquisitions.



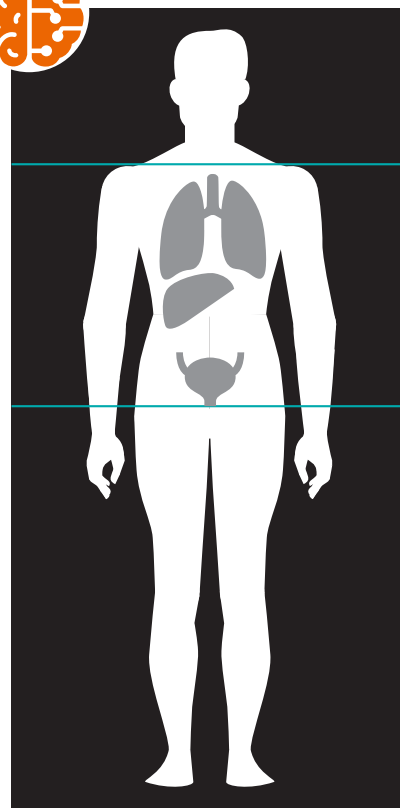
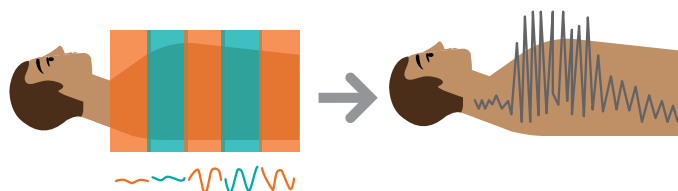
## Unique technology

**Breathe easy** with OncoFreeze AI: simple, one-button, deviceless correction that reduces scan time<sup>6</sup> and setup while enhancing patient comfort.

With OncoFreeze AI, you combine the power of deviceless waveform generation and ALPHA technology to seamlessly create images virtually free of respiratory motion.

For each axial range, temporal changes in activity distribution at each voxel are converted into the frequency domain

Combine overall respiratory signals into a single waveform



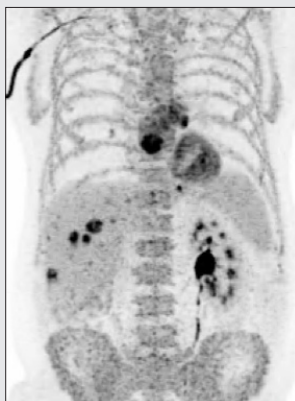
## ALPHA Technology

Automated Landmarking and Parsing of Human Anatomy (ALPHA) technology is a unique, deep-learning, artificial intelligence algorithm that detects specific anatomical landmarks. This allows for automatic identification of the zone to be corrected for respiratory motion. In the data-driven gating algorithm, a coronal CT topogram

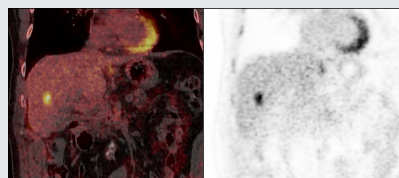
is analyzed to identify the clavicle and upper pubis, the region most impacted by respiratory motion.



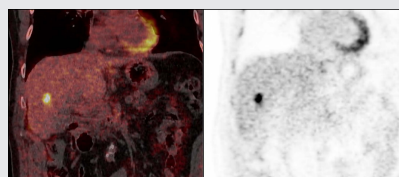
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OncoFreeze AI



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<sup>1</sup> IMV 2021 PET imaging market summary report. February 2021.

<sup>2</sup> Vella M et al. JAMA Netw Open. 2019;2(11):e1915828.

<sup>3</sup> Garcia Vicente AM, et al. *Ann Nucl Med*. 2010;24:207-14

<sup>4</sup> Disclaimer – data on file

<sup>5</sup> Schleyer P J, O'Doherty M J, Barrington S F, Marsden P K. Retrospective data-driven respiratory gating for PET/CT. *Phys Med Biol* 2009;54(7):1935–1950.

<sup>6</sup> Compared to conventional gated scan

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