

# Integrated Imaging from 1eV to 1MeV with Ultra-High Definition Optical Tomography, PET, SPECT, & X-ray CT

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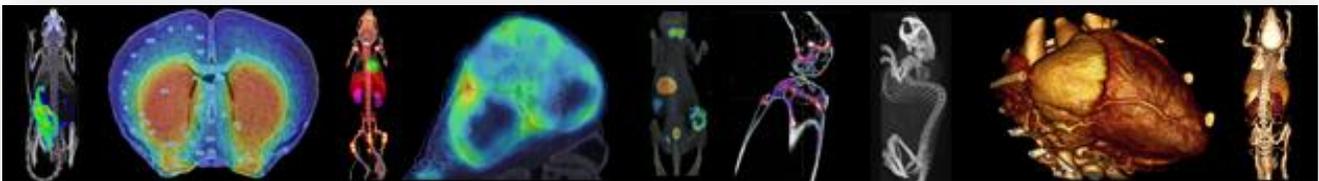
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## Abstract

In life science, we have dreamed about a 3D magnifying glass that would allow us to see a variety of tissue functions and structures in a single scan, and map integrated detailed dynamics for contrast agents, tracers, pharmaceuticals, receptors, and indicators of therapy response in organs and tumours. To meet these and many other imaging needs, we developed the user friendly fully integrated modular PET-SPECT-Optical-CT imaging platform (WMIC Innovation of the Year) comprising of 1) 0.12 mm SPECT & 0.6 mm PET resolution, PET with elimination of positron-range effects, concurrent sub-mm multi-tracer PET-PET and PET-SPECT, sub-second dynamic nuclear imaging capabilities, proprietary high energy SPECT enabling sub-mm resolution imaging of  $\alpha$  &  $\beta$ -emitters such as  $^{223}\text{Ra}$ ,  $^{213}\text{Bi}$ ,  $^{131}\text{I}$ ,  $^{209}\text{At}$ ,  $^{225}\text{Ac}$ , 2) ultra-high resolution and low dose X-ray CT, and 3) high throughput Fluorescence/Bioluminescence imaging including quantitative optical tomography. This platform has been designed such that any combination of modalities can be provided, and more modalities can be added as field upgrades. In this presentation, this adaptive and versatile molecular and structural imaging platform will be explained along with many scientific applications contributed by hundreds of world-wide users.



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## Speaker



Prof. Freek Beekman Ph.D. heads the section Biomedical Imaging at TU Delft. He is co-author on over 170 journal papers and the inventor on 17 life patent families. Dr Beekman has been honoured with many awards for his contributions to SPECT and PET technology and its application in biomedical research (several SNMMI and IEEE awards, the 2013 Dutch Physics Valorisation Prize, the 2015 & 2018 World Molecular Imaging Innovation of the Year, the 2017 Hoffman Memorial Award, and the 2021 Hasegawa Memorial Award). His present research interests include photonic imaging devices, image reconstruction, deep-learning and theranostics. Freek is founder of MILabs ([www.milabs.com](http://www.milabs.com)) that develops and markets high performance biomedical imaging systems.