GE HealthCare’s growing list of medical institutions conducting human subject research studies with its novel photon counting CTi technology further expands with the addition of Stanford Medicine

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- Unique from current CT technology, GE HealthCare’s proprietary photon counting CT design is engineered to leverage Deep Silicon detectors with the goal of capturing more patient data for clearer images and detailed information to help inform diagnoses across care areas
- Researchers at Stanford Medicine will collaborate with GE HealthCare for the intended future benefit of clinicians and patients – scanning human subjects on a prototype system as part of a research study to assess the developing technology and provide helpful insights for its evolution

WAUKESHA, Wis.--(BUSINESS WIRE)--Oct. 9, 2023-- As part of a research study, researchers at Stanford Medicine, Department of Radiology recently began scanning human subjects on GE HealthCare’s novel photon counting CT prototype designed with Deep Silicon detectors, [i,ii] which aims to greatly enhance imaging capabilities and provide clinicians the information and data they need to help enable improved patient outcomes across oncology, cardiology, neurology, and other clinical CT applications.

Photon counting CT technology has the potential to further improve the capabilities of traditional CT, including the visualization of minute details of organ structures, improved tissue characterization, more accurate material density measurement (or quantification), and lower radiation dose. Altogether, it has the promise to be a substantial step forward for CT imaging that can potentially benefit millions of patients worldwide.

“As a CT researcher, it is especially exciting to see this new advancement in CT technology,” shares David Larson, MD, MBA, Executive Vice Chair, Department of Radiology, Stanford Medicine.[iii] “Since its invention 50 years ago, CT has become a major workhorse in medical imaging across the world. Photon counting technology marks what is probably the most significant technological advancement in CT in more than a decade, and perhaps longer.”

Stanford Medicine researchers will facilitate human subject research and produce technical feedback to test and help advance GE HealthCare’s photon counting CT technology with Deep Silicon. The study will assess reconstruction methods, image presentation workflows, and clinical benefits for specific pathologies and disease types to help optimize GE HealthCare’s patented technology to enable better visualization and utilization.

Achieving greater depth with Deep Silicon technology

From the first x-ray machines to the first silicon-based photon counting prototype, GE HealthCare is committed to pioneering next generation imaging technology. GE[iv] researchers began studying photon counting CT in 1993 and developed the world’s first photon counting CT prototype using cadmium-based detectors in 2006.

After three decades of research and development, GE HealthCare has chosen Deep Silicon as the semiconductor material of choice for its photon counting CT detector due to its potential to deliver outstanding spatial resolution without compromising count rate or spectral resolution – all with the goal of helping clinicians’ realize the full potential of spectral CT.

As a semi-conductor material, silicon has a number of advantages including its purity, abundance, and broad manufacturing infrastructure. Historically, the main challenge with the use of silicon as a detector material is that it is too thin to stop and collect a sufficient number of x-ray photons. GE HealthCare has overcome this challenge with a patented, novel approach, positioning the silicon sensors ‘edge on’ so the detector is deep enough to absorb very high energy photons and fast enough to count and quantify the energies of hundreds of millions of x-ray photons per second. This way, the effective depth of the detector is determined not by the thickness of the silicon, but by its length – allowing the detector to have as long an absorption length as necessary. This is why it is called “Deep Silicon.”

“The installation of this GE HealthCare prototype marks our first photon counting CT scanner, and first whole-body scanner at the Stanford Research Park, where our research activities continue to grow,” explains Adam Wang, PhD, Assistant Professor, Department of Radiology and, by courtesy, Electrical Engineering, Stanford University.[iii]

The prototype installation at Stanford Medicine comes less than a year after GE HealthCare announced its first U.S. clinical evaluation site at the University of Wisconsin–Madison and two years after the establishment of its first global site with Karolinska Institutet and MedTechLabs in Sweden.

“The collaborative spirit shared by Stanford Medicine, UW—Madison,Karolinska Institutet, MedTechLabs, and our GE HealthCare team defines our institutions and is foundational to the success we are seeing with photon counting CT technology utilizing Deep Silicon detectors,” reflects Jean-Luc Procaccini, President and CEO, Molecular Imaging & Computed Tomography, GE HealthCare. “We are thrilled to work with Stanford Medicine’s team of seasoned researchers and clinicians as we continue to evolve this cutting-edge technology based on the valuable insights they and all our collaborators provide. Together, we are making giant leaps forward in what we expect will be a breakthrough in CT technology for the next several decades.”

For more information on GE HealthCare’s unique approach to photon counting CT with deep silicon detectors, visit gehealthcare.com.

[i] Technology in development that represents ongoing research and development efforts. These technologies are not products and may never become

products. Not for sale. Not cleared or approved by the U.S. FDA or any other global regulator for commercial availability. Not CE marked.

[ii] The study is being conducted with the approval of the Institutional Review Boards.

[iii] The statements by GE HealthCare's customers described here are based on their own opinions and on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist, i.e. hospital size, case mix, etc.. there can be no guarantee that other customers will achieve the same results.

[iv] A trademark of General Electric Corporation.

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