

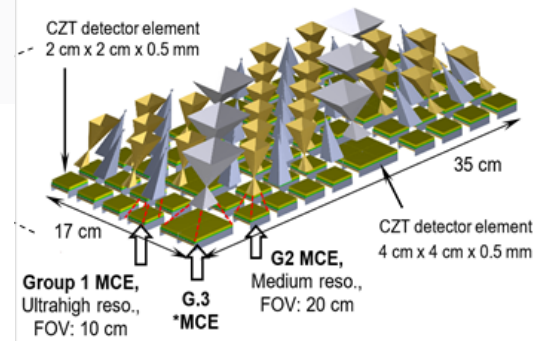
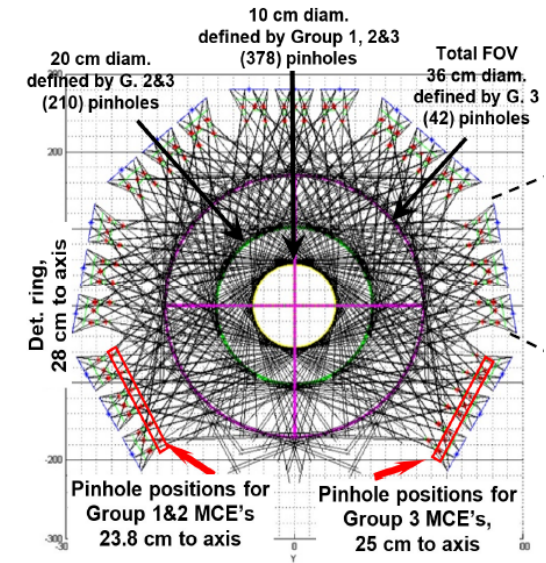
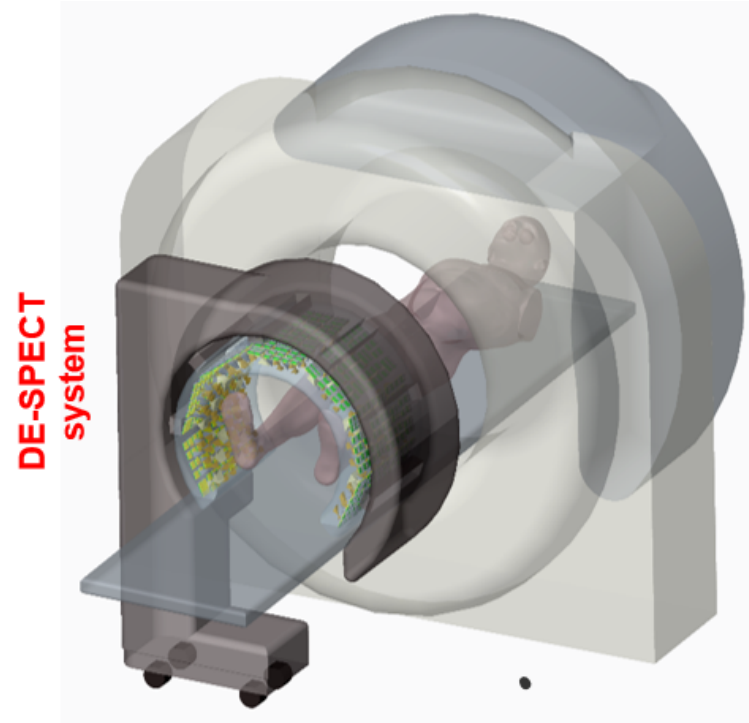
Project Goals

There is a critical need for a non-invasive imaging approach for the comprehensive assessment of molecular and physiological changes of the lower extremities in patients with peripheral vascular disease (PVD) in response to therapeutics.

We propose to develop a portable reconfigurable Dynamic Extremity SPECT (DE-SPECT) system that utilizes the 3-D HEXIETC CZT detector technology and a synthetic compound-eye (SCE) camera design for dynamic and multi-tracer SPECT imaging in PVD.

Resources Needed

- Machine shop for fabrication of phantoms
- Electronics Shop and Engineers
- Mechanical Engineers for optimization of design
- Access to advanced computing and high speed network
- Phantom and preclinical testing and validation of system to be performed in the Yale Translational Research Imaging Center



PI/Group

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Yale Translational Research Imaging Center (Y-TRIC)

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<https://medicine.yale.edu/intmed/cardio/ytric/>

Current Approach

This is a collaborative project between Faculty at the Yale University School of Medicine and engineers at Beckman Institute of the University of Illinois at Urbana-Champaign and at the University of Pennsylvania that is funded by a multi-PI NIH R01 grant.

Dr. Ling-Jian Meng (PI) from UIUC will be leading the hardware development efforts. **Dr. Scott Metzler (Co-PI)** from UPenn will be working on Monte Carlo modeling for optimizing the design of the DE-SPECT system and developing dedicated image reconstruction techniques. **Dr. Chi Liu (Co-PI)**, from the Yale will focus on tracer kinetic modeling approaches for dynamic SPECT imaging, and **Dr. Albert Sinusas (Co-PI)**, Director of Y-TRIC and Clinical Advanced Cardiovascular Imaging at Yale, will perform phantom, preclinical and clinical evaluation of the DE-SPECT system. **Dr. Matt Wilson** external consult will advise on the development of the HEXITEC ASIC. Redlen Technology of Canada will serve as a commercial partner to refine the design and fabrication process of the CZT detectors

Mechanical Parts:

- Mechanism to adjust height of imaging gantry and move detector modules to expand axial field of view

Control Electronics:

Electronic specialists in field of:

- Instrument communication and interface design
- Circuit design

Control Software:

- Software engineer for control design and interface with commercial SPECT scanner and rotate gantry