Currently, tumor staging and re-staging involves acquiring and repeating a series of diagnostic tests, which are time-consuming, cause direct and indirect accumulated expenses, accumulated radiation exposures, and in children, may require several or prolonged sedations. The ultimate goal of our research is to develop one single, non-invasive staging test, which could provide a sensitive detection of primary tumors and their metastases, a specific characterization of the cellular/molecular composition and aggressiveness of malignant lesions and quantitative assessment of response or failure to treatment. Towards this end, we are investigating novel, second-generation ultrasmall superparamagnetic iron oxide nanoparticles (USPIO; hydrodynamic diameter \(<50\) nm), which have recently entered clinical applications (e.g. ferumoxytol/Fe-raheme) or which are expected to enter the clinic very soon (P904, GEH121333). This presentation will discuss distinguishing physico-chemical, physiological and safety characteristics of these novel USPIO compared to first generation USPIO and SPIO (\(>50\) nm). Examples from our pre-clinical investigations and our ongoing clinical trial will demonstrate how these novel USPIO can be utilized to improve tumor staging with whole body MR Imaging, to detect tumor–associated inflammation, and to monitor therapy response. It is important to understand capabilities and limitations of these new nanoparticle–based imaging approaches, as they are being integrated into hybrid imaging techniques and expected to develop rapidly within the clinical realm. The close interaction of nanoparticle development and clinical advances in novel, cutting-edge imaging technologies will provide a unique platform to realize novel, non-invasive, more efficient, and more accurate approaches for “one-stop-shop” staging of cancer patients.

**Accreditation**
The Stanford University School of Medicine is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

**Credit Designation**
The Stanford University School of Medicine designates this live activity for a maximum of 1.00 AMA PRA Category 1 Credit(s)™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

**Cultural and Linguistic Competency**
California Assembly Bill 1195 requires continuing medical education activities with patient care components to include curriculum in the subjects of cultural and linguistic competency. The planners and speakers of this CME activity have been encouraged to address cultural issues relevant to their topic area. The Stanford University School of Medicine Multicultural Health Portal also contains many useful cultural and linguistic competency tools including culture guides, language access information and pertinent state and federal laws. You are encouraged to visit the portal: http://lane.stanford.edu/portals/cultural.html