

2025-2026 Seminar Series



REFLECTANCE CONFOCAL MICROSCOPY OF SKIN CANCERS: TECHNOLOGY, CLINICAL ADVANCES, EARLY IMPACT ON PATIENT CARE



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Gallogly Hall, Room 126



ABSTRACT

Visual examination and dermoscopy are routinely performed to examine skin lesions. Dermoscopy provides high sensitivity (~90%) but, in general, the specificity tends to be variable and lower (~30–50%), resulting in large number of false positives and biopsies of benign lesions. Reflectance confocal microscopy (RCM) images patterns of nuclear and cellular morphology in human skin in vivo and detects skin lesions and cancers with sensitivity of ~90% and specificity of ~60–70%. When dermoscopy is combined with RCM imaging to noninvasively guide the diagnosis of melanoma and basal cell carcinoma skin cancers, the specificity increases by ~2–3X and, consequently, the benign-to-malignant biopsy ratio decreases by ~50–70%, compared to that with dermoscopy alone. Following more than two decades of microscope device development and clinical studies, RCM imaging in combination with dermoscopy is now advancing into routine practice in clinical settings worldwide, to rule out malignancy and biopsy, sparing patients from biopsies of benign lesions. The success of RCM, notwithstanding, our past is prologue for what we have yet to accomplish (and still a lot remains to be accomplished). Yet to be solved problems – limited shallow depth, blind navigation, manual and qualitative image reading – are being addressed by combining RCM with optical coherence tomography (OCT), with widefield imaging and with machine learning. Emerging clinical advances are in combined RCM–OCT imaging to guide diagnosis–and–treatment and follow up management. In this seminar, we will look at the past, present and future state of the field.

BIO

Dr. Milind Rajadhyaksha develops and translates confocal microscopes for imaging-guided noninvasive diagnosis, treatment and management of skin and oral cancers. He is a member of the faculty in the Department of Medicine at Memorial Sloan Kettering Cancer Center and a Professor at Weill Cornell Medicine (New York, NY). His work spans the entire spectrum from bench to bedside: laboratory research through commercialization through clinical studies to clinical implementation, and he enjoys working in the “valley of death” – and living through frequent near-death experiences – between laboratory and clinic and between academia and industry. Two of his microscopes have been commercialized (VivaScopes, Caliber Imaging and Diagnostics, Rochester, NY), translated through clinical trials and are now in routine use at the bedside to noninvasively guide diagnosis, treatment and management of skin cancers. He wildly fantasizes about a future in which a multimodal optical imaging approach may routinely guide integrated diagnosis–and–treatment in a single patient visit – a “one stop shop” see–and–treat–and–manage patient care paradigm – in clinical settings.