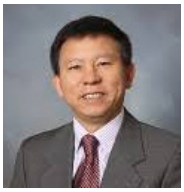

RECENT PROGRESSES ON DEEP-LEARNING ENABLED, DEEP-ULTRAVIOLETSCANNING MICROSCOPY FOR TUMOR MARGIN ASSESSMENT

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Cancer surgery remains the major treatment option for early-stage tumors and its goal is complete tumor removal. Patients with positive margins after cancer surgery are at increased risk of recurrence and are recommended to undergo additional surgery, or more toxic treatment (e.g., chemoradiation for oral cancers). Due to an inability to accurately determine margin status during surgery in a timely fashion, a substantial number of patients require additional surgery or treatment, which is associated with emotional, cosmetic, morbidity, and financial burdens. Current intraoperative pathological methods, such as frozen section and touch prep, are time- and labor- intensive and require pathology or cytopathology expertise, and thus are not routinely available or utilized, particularly in community hospitals settings. While 2D and 3D radiographic examination are available for intraoperative margin assessment, their accuracies and resolutions are low. Emerging technologies are either point (e.g., spectroscopy devices) or high resolution devices with a very small field-of-view (e.g., OCT and confocal microscopes) that require excessive time to scan a specimen, or wide-field devices (e.g., fluorescence and SFDI) with low resolution and poor sensitivity. None has demonstrated the capability of analyzing an entire tumor specimen with both adequate resolution and time efficiency in a clinical setting. At the 2023 LOPS, we reported a first generation (GEN-1) deep-learning enabled, deep ultraviolet scanning microscope (DDSM) as an intraoperative tool to evaluate the margins of freshly resected tumor specimens from breast cancer surgery at subcellular resolution. In this presentation, we report our new progresses on development of a GEN-2 DDSM system and new findings in imaging normal and malignant surgical tissues from multiple organ sites, including breast, oral cavity, lung, et

Biography

Dr. Bing Yu received his Ph.D. from Virginia Tech in 2005 and postdoctoral training from Duke University between 2005-08. Dr. Yu is currently an Associate