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## ***"A New Look for Bladder Cancer Detection"***

### Abstract:

Bladder cancer (BC) — the 4th most common cancer in men and the most expensive cancer to treat over a patient's lifetime — is a lifelong burden to BC patients and a significant economic burden to the U.S. healthcare system. The high cost of BC stems largely from its high recurrence rate (>50%); hence, BC management involves frequent surveillance. Unfortunately, the current *in-office* standard-of-care tool for BC surveillance, white light cystoscopy (WLC), is limited by low sensitivity and specificity for carcinoma in situ (CIS), a high-grade carcinoma with high potential to metastasize. Early detection and complete eradication of CIS are critical to improve treatment outcomes and to minimize recurrence. The most promising macroscopic technique to improve sensitivity to CIS detection, blue light cystoscopy (BLC), is costly, time-intensive, has low availability and a high false-positive rate. Given the limitations of WLC, we aim to change the paradigm around how BC surveillance is performed by validating new tools with high sensitivity and specificity for CIS that are appropriate for *in-office* use. In this seminar, I discuss our innovative solutions to improve mapping the bladder for longitudinal tracking of suspicious lesions and to create miniature tools for optical detection based on optical coherence tomography (OCT). OCT and its functional variant, polarization-sensitive OCT (PS-OCT), can detect early-stage BC with better sensitivity and specificity than WLC. We discuss the critical technical innovations necessary to make OCT and PS-OCT a practical tool for in-office use, and new results from recent explorations of human bladder samples that speak to the promise of this approach to change the management of patient care.