



PL4: Dynamic Single Cell Analysis for Precision Management of Cancer

Pak Kin Wong
The Pennsylvania State University

Session Chair: Prof Chia-Hung Chen, City University of Hong Kong



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TIME
08:45–09:30



VENUE
LT-2, 4/F Yeung Kin Man Academic Building

ABSTRACT

Recent advances in molecular biology and imaging have revolutionized our ability to interrogate complex biological systems with unprecedented precision, throughput, and resolution. When integrated with cutting-edge engineering and data science, these innovations are reshaping the landscape of precision medicine. However, conventional biosensing approaches remain limited, as they often depend on cell isolation, fixation, and lysis—processes that strip away hierarchical organization, dynamic cellular states, and critical phenotypic behaviors such as invasiveness, drug resistance, and immunogenicity. To overcome this fundamental barrier, we are creating a personalized prognosis platform that unites dynamic single-cell biosensors, microengineered disease models, and AI-guided workflows to enable real-time, clinically actionable precision cancer management directly from patient-derived samples. In this presentation, I will discuss how these technologies are being deployed in bladder cancer, with particular emphasis on personalized prediction of chemo-induced invasion risk and tailored intravesical immunotherapy.

BIOGRAPHY

Pak Kin Wong is a Professor of Biomedical Engineering, Mechanical Engineering, and Surgery at the Pennsylvania State University. He earned his Ph.D. from the University of California, Los Angeles. His research focuses on novel biosensing techniques to investigate the regulatory mechanisms of cancer, screen novel therapeutics, and develop rapid diagnostic systems for infectious diseases. Dr. Wong has authored over 140 peer-reviewed journal articles and holds eleven patents. His work has been cited more than 13,000 times, with an H-index of 57, placing him among the top 2% of most-cited researchers globally. He serves as an editor for IEEE Transactions on Nanotechnology, Microfluidics and Nanofluidics, and SLAS Technology. Additionally, he is a steering committee member of IEEE NANOMED and has chaired or co-chaired several conferences, including IEEE NANOMED 2013, IEEE NEMS 2017, IEEE NANOMED 2018, and IEEE NANOMED 2023. Among his honors, Dr. Wong received the NIH Director's New Innovator Award, the Arizona Engineering Faculty Fellow Award, the AAFSAA Outstanding Faculty Award, the Distinguished Alumni Award from CUHK, and the SLAS Technology Ten – A Top 10 Breakthrough in Innovation. Dr. Wong is an elected academician of the European Academy of Sciences and Arts and a Fellow of AIMBE, ASME, RSC, and SLAS.