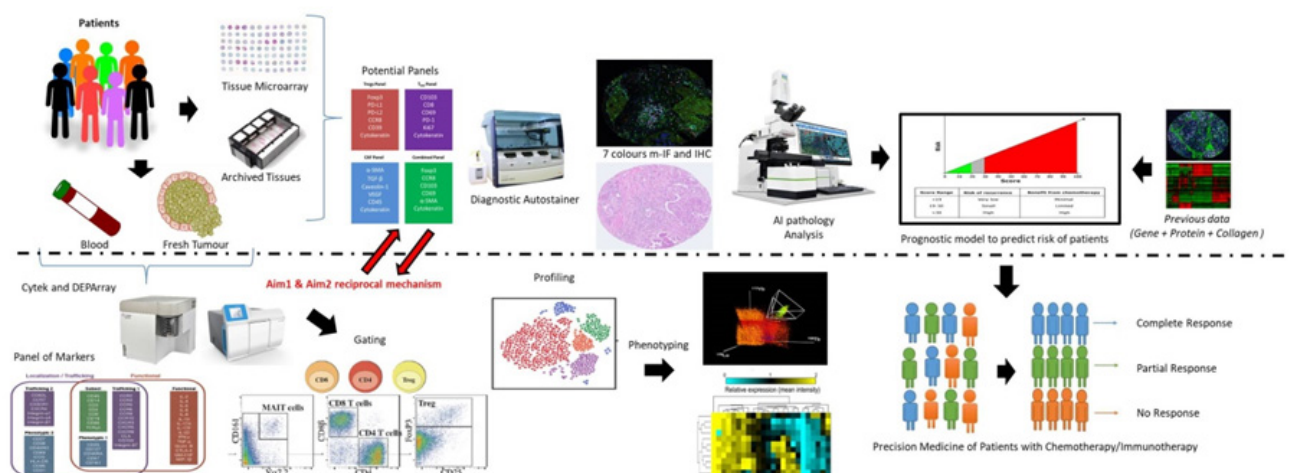


Research

Research Interests:

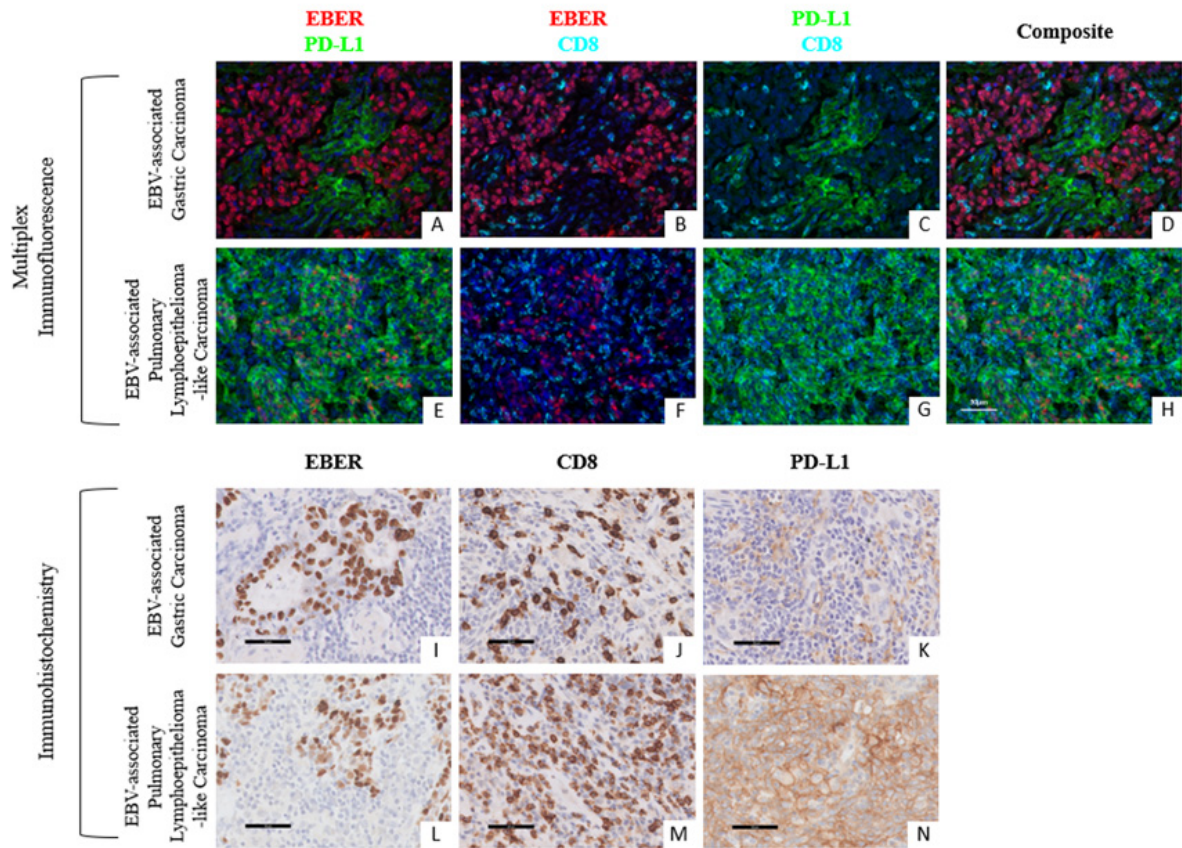
1. Tumour immunology - focusing on roles of tumour infiltrating leukocytes (TILs).
2. Tumour pathology - focusing on new biomarkers and technologies to improve current clinical diagnosis, and predict prognosis and treatment responsiveness of cancer.
3. Integrative translational research to combine tumour immunology and pathology (Immunopathology or Immuno-mapping) - focusing on application of immune markers in routine clinical practice for diagnosis and prognosis, with emphasis on cancer immunotherapy and precision medicine.
4. Others: Theranostics for immune-related disease such as liver fibrosis and infectious disease; natural compounds and its application in diseases and immune responses.

General Workflow for Research Project

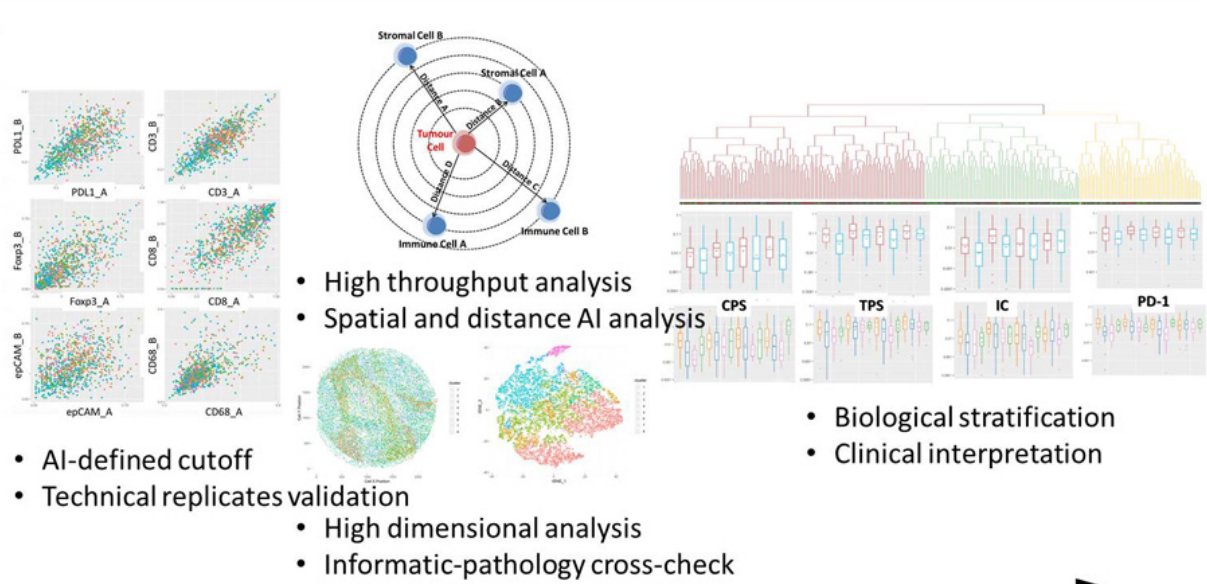


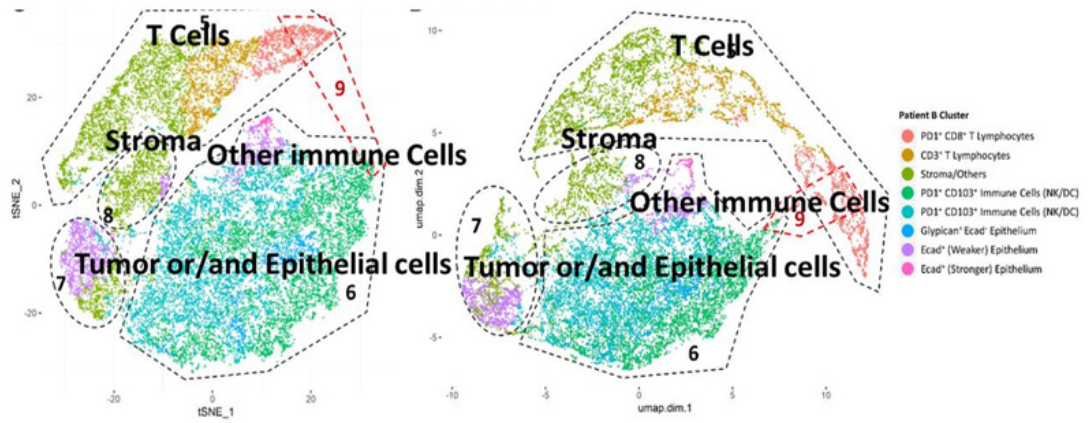
Automated quantitative Multiplex IHC/IF

Well-published methodology not only for multiplex IHC/IF detection but also FISH combination for RNA study. (Yeong et al. JITC 2019; Wu et al. BioRxiv 2019; Lim et al. Pathology 2018; Wee et al. Ann of Diagn Path 2018; Yeong et al. BCRT 2017; Garnelo et al. GUT 2017)

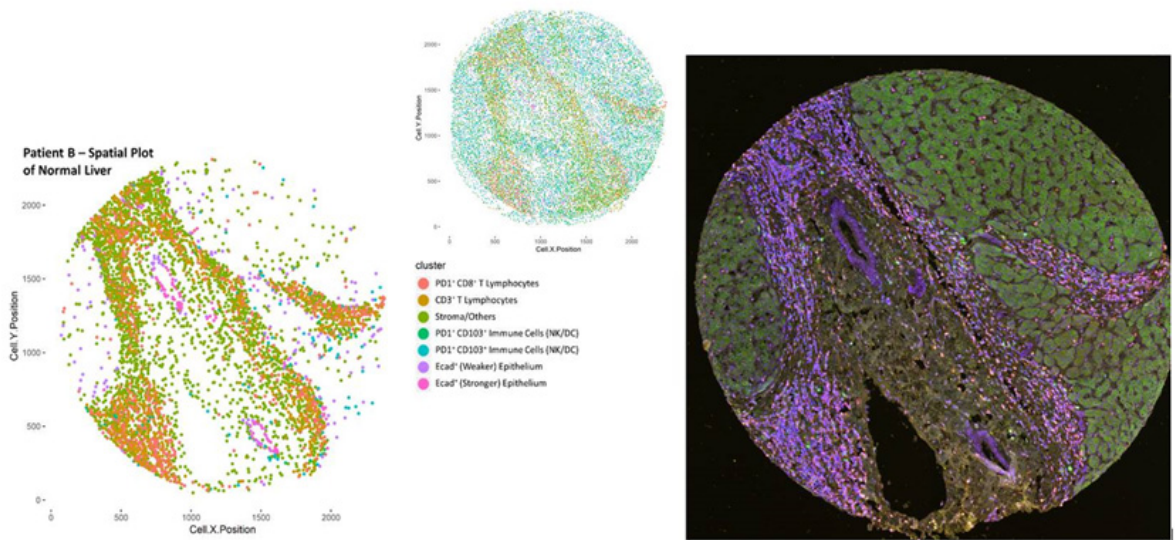


High-throughput, -dimensional analysis pipeline powered by AI-pathology





t-Distributed Stochastic Neighbor Embedding (**t-SNE**) Uniform Manifold Approximation and Projection (**UMAP**)

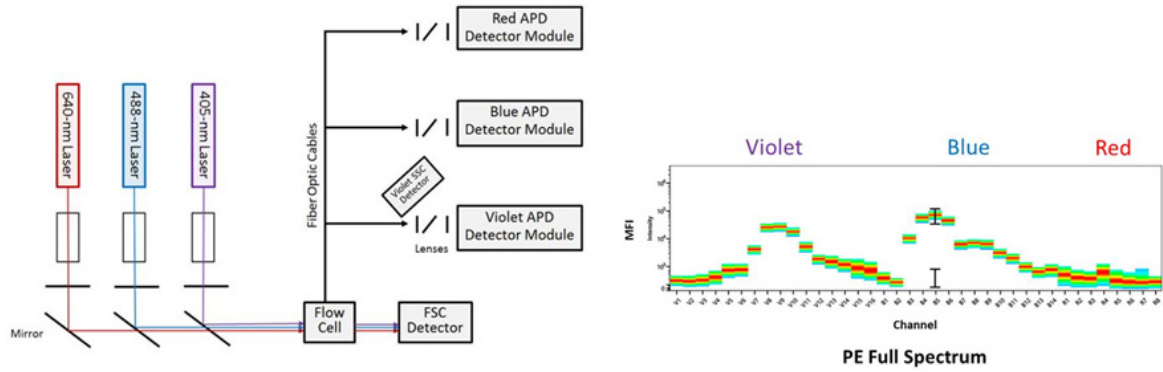


25+ markers multi-coloured Flow Cytometry powered by Cytek™ Aurora



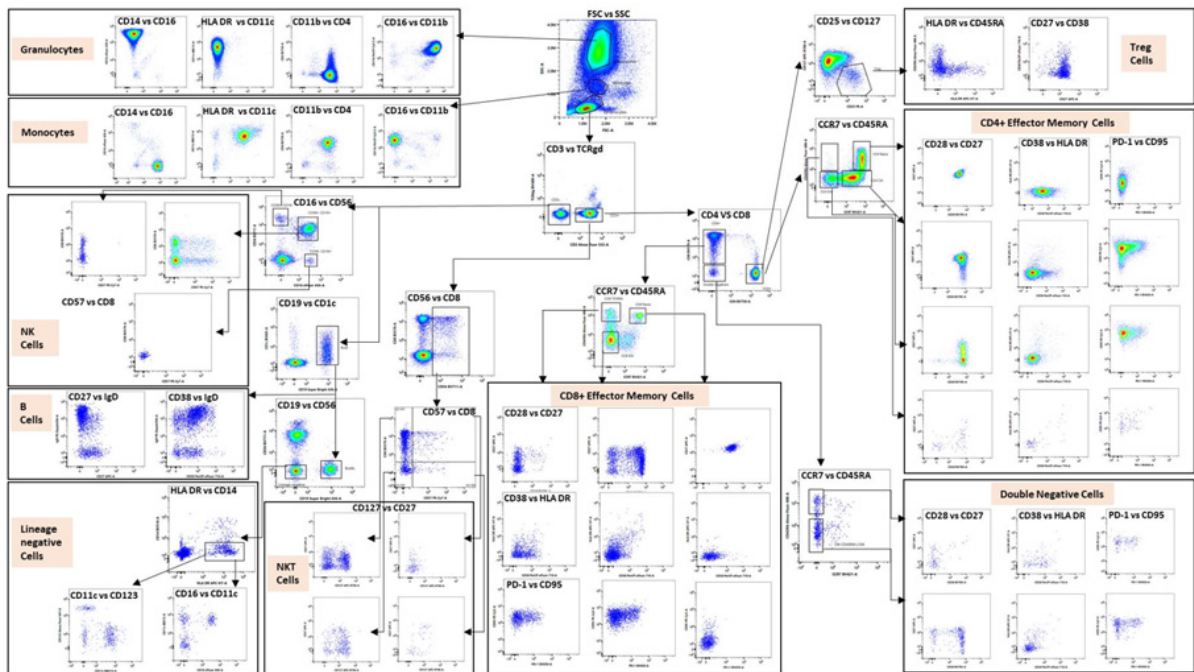
Our lab utilises the Cytek™ Aurora for multi-colour flow cytometry immune-profiling to complement our Multiplex IHC/IF immune-mapping expertise particularly for the matched patients' samples. Cytek™ Aurora is a newly build spectral analyser incorporating a unique combination of innovative technologies that is capable of discriminating fluorochromes with highly overlapping emission peaks, as it distinguishes their unique full spectrum signatures along a large range of continuous wavelengths.

The Aurora system is equipped with three lasers (405, 488 and 640nm), two scattering channels, and could detect up to 38 fluorescence channels. A paradigm shifting optical design which enables the use of a wide array of new fluorochrome combinations without reconfiguring your system for each application; where up to 24 colours have been demonstrated including fluorochromes with emission spectra in close proximity to each other.

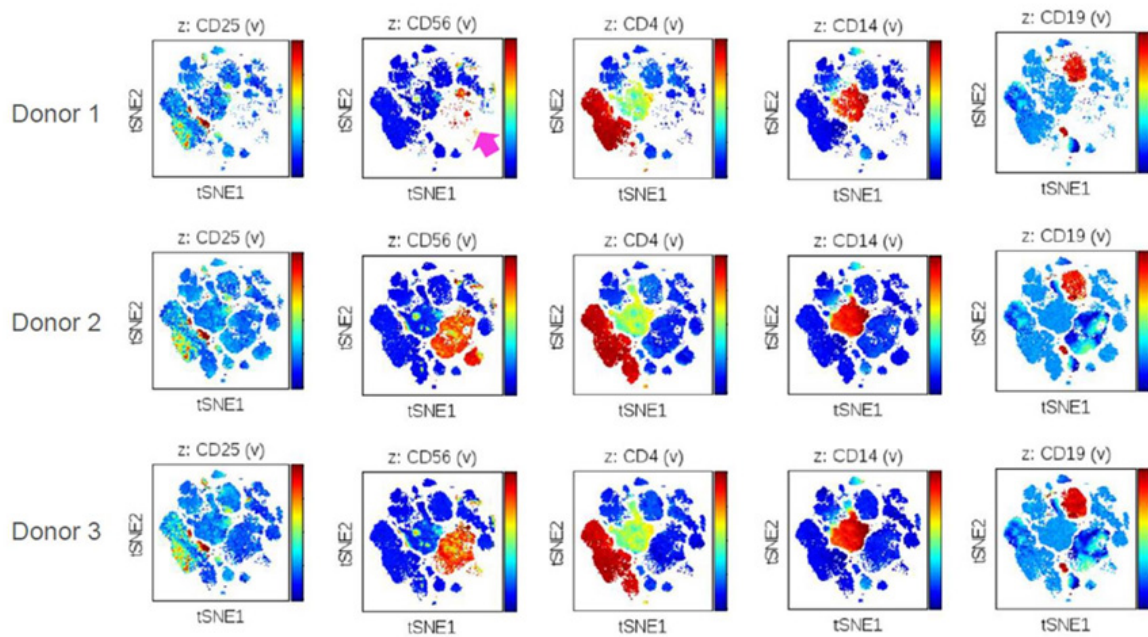


The SpectroFlo® Software with user-friendly interface offers an intuitive workflow from QC to data analysis with technology-enabling tools that simplify running any application. In spite of challenging applications involving highly auto-fluorescent particles, the auto-fluorescence extraction ability brings new levels of resolution.

24-colour gating strategy on the 3 lasers Aurora:



viSNE analysis of Aurora multiparametric 24-colour data with Cytobank (arrow points to the difference in CD56+ population across donors):



Other Collaborations

- University Malaya Medical Centre (UMMC) – Natural products for theranostics
- Malaysia Palm Oil Board (MPOB) – Natural products for theranostics
- QMIR (Queensland, Australia) – Translational tumor immunology with pre-clinical mouse model ([A/Prof. Michele Teng](#), who is also a visiting Senior Principal Investigator (PI) in IMCB)
- Cancer Research Malaysia – Asian Cancer
- NTU – Artificial Intelligence (AI)
- Singapore Institute of Technology (SIT) – AI

Industry collaborators

- Immunoscope
- Lucence Diagnostic
- Menarini Biomarkers
- MSD Singapore
- Diagnostics Development Hub (DxD)