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Keynote speaker

Using Multiplexed Multi-Omics to Study Spatial Heterogeneity in Ovarian Cancer

Why does spatial organization of cells matter? Can these data help us to better understand disease progression? We need to explore the niche or neighborhood in the multicellular system we want to study. Since proximity speaks to cellular activity, spatial organization of cells will certainly play a role in modulating clinical outcomes. However, most platforms used to reconstruct the tumor ecosystem (TE) fail to explore the spatial context in the three-dimensional (3D) space of a solid tumor with single-cell resolution, and thus lack information on cell-cell or cell-extracellular matrix interactions. Our study features a pipeline of integrated multiplex multi-omics 3D spatially resolved modalities using FFPE gynecological tumor samples. The multi-omics modalities include non-targeted Mass Spectrometry Imaging, Stereo-seq and targeted seqIF. These spatially resolved modalities identify analytes in voxels across serial tissue sections, which reveals an integrated 3D spatial map displaying cell identity, activation, and energized status. These methods will provide insights into the molecular basis of spatial cell heterogeneity.

Speaker Bio

Dr. Sammy Ferri-Borgogno is currently an Instructor in the Department of Gynecologic Oncology and Reproductive Medicine, where she is devoted to elucidating immune landscapes and crosstalk signaling networks that interplay in the ovarian tumor microenvironment to modulate clinical outcomes. During her doctoral training at the University of Turin, Dr. Ferri-Borgogno studied how cancer biology, -omics technologies and immunology might be integrated to understand host-tumor responses and identify new diagnostic markers and therapeutic targets for solid tumors. Dr. Ferri-Borgogno started her postdoctoral training in the laboratory of Dr. Anirban Maitra in the Department of Translational Molecular Pathology at MD Anderson, with the goal to develop and expand her passionate interest in cancer biology as well as explore a more translational research approach. Her willingness to explore new fields and to expand her research knowledge in cancer biology, made Dr. Ferri-Borgogno to join the laboratory of Dr. Samuel Mok. As a senior post-doctoral fellow and subsequently Instructor in the lab she had primary responsibility for all research initiatives and projects related to clarify the molecular/cellular interactions existing between stromal cells and cancer immunity to identify markers in the ovarian tumor microenvironment that can simultaneously normalize aberrant angiogenesis and increase tumor immune cell activation and infiltration, thus resulting in significant treatment outcomes. As an Assistant Professor, Dr. Ferri-Borgogno is currently applying cutting-edge technologies such as Spatial Transcriptomics (ST), Imaging Mass Cytometry (IMC), sequential immunofluorescence (seqIF) and Mass Spectrometry Imaging (MSI) to characterize the ovarian cancer tumor microenvironment with the final goal to identify spatial biomarkers associated with chemoresistance. More recently she applied multi-omics technologies to characterize the tumor immune microenvironment in 3D.