The hallmark of cancer is the invasive and metastatic nature of the disease. Cancer cell invasion and metastasis are partly regulated by altered cytoskeletal structures that result from the complex interplay of activation/inactivation of multiple signaling pathways regulating these cellular events, which can occur at either the genetic or epigenetic level. Thus, attempts to accurately assess these physiologically relevant mechanical properties of cancer cells using single, or even multiple marker profiles at the DNA, RNA, or protein level, may not be effective. Recently, we showed that cancer cell mechanical properties, or mechanotypic biomarkers, including cell elasticity and deformability can be directly and accurately measured by state of the art, label-free technologies at the single cell level. These mechanical properties of cells can be a marker for cancer cell behavior including invasion, metastasis and drug response. We developed an approach that uses mechanotypic profiling to complement morphological and molecular analyses, a process called “Nanocytology” which collectively enable robust and high throughput measurements and can potentially be implemented even in resources poor areas. The nanocytology approach combined with targeted delivery of nanoparticles with molecular-tailored anti-cancer agents may provide a more effective alternative for cancer detection and management.

Biography
JianYu Rao is an Professor of Pathology and epidemiology, Chief of Cytopathology and Director of Gynecological Pathology. He is a surgical pathologist and cytopathologist specialized in genitourinary tract and gynecological pathology. He is also a molecular epidemiologist and cancer cell biologist. He did his training of Anatomic and Clinical pathology as well as Cytopathology here at UCLA from 1994 to 1999. He became the faculty at Department of Pathology and Lab Med since 1999.

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