

**Texas Tech University**  
**Department of Chemical Engineering**  
**Seminar Series**



**Micro Nanotechnologies for the Clinical Applications of Circulating Tumor Cells: Implementing  
Liquid Biopsy**

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**Abstract**

Circulating tumor cells (CTCs) are shed from the primary tumor into the peripheral blood. CTCs are emerging as important biomarkers with high clinical relevance. Enumeration of CTCs may have several clinical uses, including determination of prognosis in patients with established malignancy, or even detection of previously undiagnosed cancer. However, due to the limitation of sensitivity and specificity of current technologies for CTC isolation, the full potential of CTCs has yet to be realized. Furthermore, emerging research show that a small number of cells have stem cell-like nature in various cancers and those are called cancer stem cells (CSC) which may arise from differentiated cancer cells through EMT and have the potential to self-renew and are pluripotent. Emerging microfluidic technologies are promising for isolating both CTCs and CSCs with a high yield and specificity. We present novel integrated nano microfluidic technologies that enable both functional and genomic assays beyond enumeration. The molecular and genetic profiling of CTCs is a viable alternative to painful, costly, and invasive biopsies. We demonstrate liquid biopsy using CTCs as a resource to identify genomic alterations in cancer and present the opportunities for diagnosis, therapy and surveillance.

**Friday, January 25**

**3:00 pm**

**Livermore 101**