

Analytical Seminar

Low-input, single-cell, and spatial epigenomic technologies for profiling diseases

Dr. Chang Lu

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Abstract:

Next generation sequencing ushered in the new “omics” era of unbiased genome-wide analyses for fresh insights into diseases and therapies. Epigenetics dictates switching on and off genes, forming another layer of regulation on top of gene sequence. Epigenomic dynamics are strongly affected by both genetic and environmental factors, thus have long been speculated to be the critical mediator in processes ranging from inflammation, cancer, to psychiatric disorders. In this talk, I will discuss the role of microfluidics in conducting low-input, single-cell, and spatial epigenomic assays using scarce tissue samples. I will then highlight several projects that produce cell-type specific epigenomic and multiomic profiles of tissue samples for insights into epigenomic regulatory mechanisms involved in cancer and brain disorders. We created comprehensive multimodal profiles on lung tumors that reveal coordination among various epigenomic marks involved in reprogramming. We discovered epigenomic changes in brain that underlie the long-term efficacy of psychedelics for treating depression and addiction.



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Chang Lu Bio

Dr. Chang Lu is the Fred W. Bull professor of chemical engineering at Virginia Tech. His lab develops low-input and single-cell microfluidic epigenomic technologies and applies them to multiomic and multimodal studies of neuroscience and cancer. Dr. Lu holds a PhD in chemical engineering from University of Illinois at Urbana-Champaign and conducted postdoctoral work in applied physics at Cornell. His scientific awards include Wallace Coulter Foundation Early Career Award, NSF CAREER Award, and Dean's award for research excellence. Dr. Lu is a fellow of American Institute for Medical and Biological Engineering (AIMBE). His research has been funded by various institutes of NIH including NCI, NIBIB, NIGMS, NHGRI, NINDS, and NIDA.



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