Big Data Training for Cancer Research
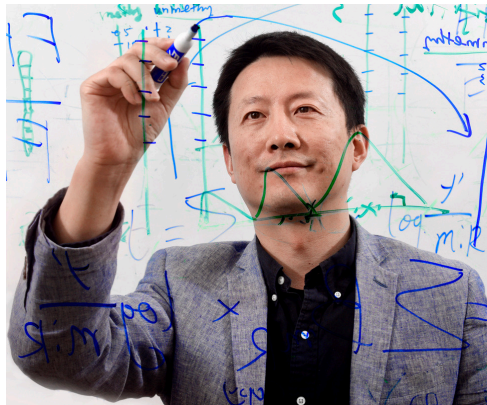
Special Lecture Series

Deciphering Human Disease through

Tandem Repeats and Epigenetics Liquid Biopsy

Dr. Wei Li

July 11, 2025, 1:00 – 2:15 PM (PDT)

Speaker Bio Dr. Wei Li is the Grace B. Bell Endowed Chair and Professor of Bioinformatics in the Division of Computational Biomedicine and the Department of Biological Chemistry in the UCI School of Medicine. His research bridges computational biology, epigenetics, RNA regulation, liquid biopsy, and human genetics, focusing on transforming genomics data into actionable medical insights. He has developed a series of widely used bioinformatics algorithms to harness the full power of population-scale genomics data. Research from his lab has led to exciting discoveries of novel epigenetic mechanisms, biomarkers, and therapeutic targets for various human diseases, including cancers, neurological disorders, and metabolic conditions.

Abstract: Tandem Repeat (TR) variations have long been overlooked in GWAS and medical diagnostics, despite their potential impact on human diseases. Our team recently developed the TR-Atlas (Cell, 2024), featuring ~1 million TRs across 340,000 individuals, and TR-xQTL (Nature Genetics, 2025), linking TR variations directly to gene regulation. Leveraging these resources, we are now uncovering novel TR genetic drivers across ~8,000 human rare and common diseases. Additionally, our advances in DNA methylation have led to patents and a liquid biopsy technique nearing FDA approval for the early detection of liver cancer. Together, this talk will highlight how these methodologies advance disease biology and precision medicine.