Apply Machine Learning to Identify Unique Patient Clusters and Associated Key Biomarkers in Rheumatoid Arthritis Developing a Point of Care Test with a Multi Biomarker Panel for RA Patient Classification and Disease Progression

Lui, Gabriella (School: Newport Senior High School)

I strongly believe that a cost-effective, highly sensitive, and easy-to-use Point of Care (POC) multi-biomarker diagnostic device has the potential to increase health equity, this is especially relevant after witnessing the disproportionate effect of COVID-19 on patients. For the past year, rheumatologists have not been able to acquire sufficient quantitative measurements to assess their RA patients' conditions due to travel restrictions. With a dipstick-type POC test that detects an optimal biomarker panel, patients could prick their fingers with a lancet and use a smartphone app to upload their instantaneous IL-6, IL-10, Resistin, ESR, and CRP levels to the cloud from the comfort of their own homes. Furthermore, rheumatologists could request that their patients ran tests whenever they felt significantly worse so they could gain better insight into their RA prognosis. Seeing this need inspired my vision of creating a POC dipstick type assay that tested for a panel of highly correlated biomarkers and inflammatory markers that would reveal a patient's instantaneous inflammatory state and disease activity.

Awards Won:
Fourth Award of $500