



## Team Progress Updates

### SU2C Machine Learning for Cancer Convergence Research Team:

#### “Machine Learning for Cancer”



Recent successes in cancer immunotherapy have raised high hopes that an individual's immune system can be enlisted to fight cancer. These approaches can be expanded to more cancer types and to more patients. However, there are many challenges ahead that will require dramatically new approaches. For example, determining which patients are most likely to benefit from a particular immunotherapy may require integrating diverse types of data (such as lab values or observational data) that are captured in the text of patients' electronic medical records.

As there are no established methods for the complex challenge of mining these data, this SU2C Machine Learning for Immunotherapy Convergence Research Team is developing innovative solutions integrating deep multi-omic analysis, machine learning, and natural language processing. Current work in breast cancer using a large-scale database of pathology supports search and cohort selection according to patient histology and tissue analysis. Using raw image data for predicting disease progression and early detection, together with developing computational and experimental approaches, will enable scientists to search for new therapeutic strategies for diseases.

The team reported the following progress:

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- Using cellular and molecular assays, the team has gathered data from blood samples acquired from 900 individuals, some with cancer. Team members are analyzing these data to try to determine the state of an individual's immune system and his or her suitability for immunotherapy if cancer strikes.
- In a different cohort, the team has developed neural networks to read CT scans and predict whether a patient's disease will remain stable, progress, or respond to treatment. Using scans taken five years prior to diagnosis, researchers have been able to predict which subjects would develop breast cancer. This could become an exceptional new tool for the diagnosis and treatment of the disease.

