

## **TCS/24/09 - Predicting Response in Triple Negative Breast Cancer Using Machine Learning**

Triple-negative breast cancer (TNBC) is the most aggressive form of breast cancer which grows and spreads much faster than other breast cancer types. Is it also more difficult to treat because, unlike other types of breast cancer (such as ER-positive or HER2-positive) treatment is restricted to chemotherapy, which has unpleasant side effects. While chemotherapy can be effective for some patients, unfortunately the cancer quickly returns in about 40% of women, even after they have received treatment. When it does return, further treatments are limited, and so women frequently survive for less than one year. The aim of this project is to identify ways of being able to predict, at the point of diagnosis, which triple-negative cancers will return after chemotherapy. We will achieve this using a type of artificial intelligence called machine learning (ML). We have demonstrated that ML can extract meaningful information from sections of tissue taken from the woman's breast. These are commonly used for breast cancer diagnosis and are readily available. We have shown that tissue sections contain valuable information that may not otherwise be visible, and which is overlooked by conventional methods of analysis. We will use ML to analyse pre-existing tissue sections taken from TNBC patients to uncover information that may not be apparent through standard methods. By using ML, we aim to provide a more accurate and immediate assessment of TNBC aggressiveness. This will empower doctors to identify patients who require closer monitoring and who may benefit from earlier, potentially lifesaving, medical interventions.