

AbstractID: 14502 Title: Machine Learning as New Tool for Predicting Radiotherapy Response

Radiotherapy outcomes are determined by complex interactions between treatment techniques, cancer pathology, and patient-related physiological and biological factors. A common obstacle to building maximally predictive treatment outcome models for clinical practice in radiation oncology is the failure to capture this complexity of heterogeneous variable interactions and the ability to apply outcome models across different multi-institutional data. Methods based on machine learning can identify data patterns, variable interactions, and higher order relationships among prognostic variables. In addition, they have the ability to generalize to unseen data before. In this work, we will provide an overview of the current role of machine learning methods for predicting post-radiotherapy tumor control probability (TCP) and normal tissue toxicities (NTCP). We will discuss some of the current challenges in the field and highlight the potential opportunities of machine learning methods for future treatment outcomes research in radiation oncology.