Reconstruction of Glitch-affected Gravitational Wave data using Machine Learning SUMEET KULKARNI, MARCO CAVAGLIA, University of Mississippi — Real-time Gravitational Wave data streams at LIGO encounter numerous glitches arising from known and unknown sources of noise. In cases where they occur in conjunction with an incoming Gravitational Wave (GW) signal, they can seriously hinder signal detection and its consequent analysis. Current techniques to handle such scenarios include simply cutting the data segment which includes a glitch, and later carefully modelling the glitch to clean the data segment in question. Here, we explore the use of machine learning regression techniques to reconstruct the glitch-affected regions of a data stream whenever the glitch appears over a GW signal, using modelled waveforms from the adjacent parameter space. We present a proof of concept for a low-latency, glitch-independent method of cleaning and reconstructing glitch-affected data for a quick primary analysis of an incoming GW signal.

Sumeet Kulkarni
University of Mississippi