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My project involved developing a signal isolation test for gravitational wave (GW) data that discriminated between noise-induced and true GWs. The test was developed for the binary inspiral analysis pipeline using S4 data from H1:LSC-AS_Q. Environmental channels were not considered.

I initially inspected the signal-to-noise ratio (SNR) and χ^2 time series in the vicinity of S4 triggers, and compared them to hardware injections. I investigated the effect of template-mismatch on the filter output of hardware injections. A set of tests was then developed in FindChirpFilterOutputVeto.c. One test evaluated the average χ^2 value over an interval of a second, with a time offset excluding the intrinsic width of the event's signal. Another calculated the time above an SNR threshold in a similar interval but with the offset determined differently.

Using the CIT clusters, the tests were applied to periods of the S4 data with and without software injections. The parameters of the test were tuned, and then applied to the full S4 run. The effectiveness of each test was evaluated, and the results for different combinations investigated.