Symbolic cryptographic protocol analysis is an important topic in cyber security, especially in the modern era. Recently we have seen many high profile security breaches in companies such as TARGET and SONY. Due to these and numerous other security exploitations, research in symbolic protocol analysis is emerging as a high priority.

In this work we will be studying problems relating to indistinguishability. The form of indistinguishability that we will be focusing on is static inclusion and its sub-case static equivalence. The main application of these is checking protocols for guessing attacks (e.g., when weak passwords or keys are used). Our main result is providing a co-saturation procedure for deciding whether a frame $A$ is statically included in a frame $B$ for $\Delta$-strong and $\omega^\square$-strong intruder theories, where a frame consists of hidden data and substitutions that represent knowledge that an intruder could have gained from eavesdropping on message exchanges by agents. We show soundness, completeness, and termination of our procedure for these classes of theories. We also outline future research directions.