Seminar Announcement

Venue: **Indian Statistical Institute, Chennai Centre**

Date & Time: **Thursday, February 27, 2025, 02:30 PM**

Speaker: **Dr. Anantha Padmanabha, Department of Computer Science & Engineering, IIT Madras**

Title: **Consistent Query Answering under Primary Keys**

Abstract:

Primary key constraints in databases state there can be at most one tuple for every primary key in a given relation. However, these days it is common to have situations where this property cannot be maintained. Databases that violate constraints are called «inconsistent databases ». In particular, if a database violates primary key constraint, it will contain more than one tuple for the same primary key. In this setting, the notion of a repair is defined by picking exactly one tuple for each primary key (maximal consistent subset of the database). A Boolean conjunctive query q is certain for an inconsistent database D if q evaluates to true over all repairs of D. In this context, there is a dichotomy conjecture that states that for a fixed boolean conjunctive query q, testing whether q is certain for an input database D is either polynomial time or coNP-complete.

The conjecture is open in general and has been open for more than two decades. In this talk we will introduce two new algorithms that we have devised, one based on fix-point computation and the other based on bipartite matching. We will also see how these algorithms can be used to prove the dichotomy for the cases that were previously open.

These results were obtained in collaboration with Diego Figueira, Luc Segoufin and Cristina Sirangelo and combine the results that were presented at ICDT 2023 and PODS 2024.