

INSTITUTSSEMINAR

On Tuesday, June 09, 2026, at 3:00 PM, in room Z 2073

Oliver Irwin

will give a talk on:

"Branching and Circuits: Algorithmic Techniques for Efficient Query Evaluation".

Abstract:

Efficiently evaluating and accessing the answers of queries over databases is a central problem in data management, particularly as data volumes continue to grow and queries become more complex. In the relational database model, query evaluation is complicated by the presence of joins, which may induce large intermediate results and lead to prohibitive computational costs.

This talk explores several aspects of query evaluation and their respective computational complexity. The first aspect we consider is that of worst-case optimal join algorithms. These algorithms aim to return the answer set of a query over a database, while providing strong guarantees ensuring that the evaluation runs in time proportional to the maximum possible output size. In this talk, we present a join algorithm that can be shown to be worst-case optimal in a simple and modular way. One of the advantages of our approach is the implicit data representation it induces.

By improving on this representation of the answers of a query, we are able to work on finer algorithmic problems, such as direct access. To this end, we exploit relational circuits to navigate the answer space efficiently and retrieve answers at arbitrary positions in a fixed order, extending existing approaches to broader



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classes of queries, including queries with negation. The aim is to build the answer set of queries incrementally. We also use the structure of relational circuits to improve on the complexity of these methods.

All interested parties are cordially invited.

Prof. Dr. Christoph Berkholz

Ilmenau, 05/12/2026