

## JOINT SEMINAR

Big Data Institute & Department of Computer Science and Engineering, HKUST

# Logic for Database Systems Implementation (or Life beyond Lite Logics and CQ/UCQ)

**Prof. David Toman**

Professor of David R. Cheriton School of Computer Science, University of Waterloo

**Date** : 22 Jul 2019 (Monday)

**Time** : 4:00 - 5:00pm

**Venue** : Chen Kuan Cheng Forum, LT-H, HKUST (near lift no.27/28)

### ***Abstract***

An important part of database technology is the requirement that only a logical appreciation of data is necessary on the part of application developers. This allows the formulating queries (and update requests) without information relating to concrete data sources and their low-level interfaces.

A fundamental problem---called query compilation---must therefore be addressed by such systems, the problem of translating user requests over purely conceptual and domain specific ways of understanding of data, commonly called logical designs, to efficient executable programs, called query plans, responsible for evaluating the requests by accessing various concrete data sources through their low-level often iterator-based interfaces. An appreciation of the concrete data sources, their interfaces, and how such capabilities relate to logical design is in turn called a physical design.

In the talk we explore how standard KR approaches, such as ODBA-style querying, relate to the above problem and how KR (and Logic at large) techniques can serve as a cornerstone to a comprehensive solution to the query compilation problem. We (briefly) discuss range of topics from adaptations of theorem-proving techniques to low-level query optimizations, commonly considered beyond the reach of logical approaches to query compilation, and conclude with a list of interesting research topics.

### ***About the speaker***

David Toman is a Professor in the David R. Cheriton School of Computer Science at the University of Waterloo. His research focuses on database theory and systems, query processing under constraints and query compilation, as well as temporal aspects of data management, and logic in Computer Science in general. Recently, he has been focusing on database schema languages based on Description Logic enriched with various forms of identification constraints. The languages investigated in this line of research are tailored to enabling compilation of queries formulated over a high-level conceptual schema to code that is executed over low-level physical layouts of data, such as records and pointer structures. He has published extensively in his research area including invited contributions to several reference collections, such as the Encyclopedia of Database Systems and the Handbook of Temporal Reasoning in Artificial Intelligence.

He has earned Bachelor's and Master's degrees from the Masaryk University in Czechoslovakia in 1992 and a PhD from Kansas State University in 1996, all in Computer Science. He has been awarded numerous research grants, including the NATO-NSERC Postdoctoral fellowship and the Ontario Premier's Research Excellence Award.