



# INFORMATICS COLLOQUIUM

**Speaker:**

**Dr. Renata Borovica-Gajic, University of Melbourne**

## **Fast-Tracking Data Insights with AI-powered Databases**

**Abstract:**

The volume of data generated annually is increasing exponentially, with estimates predicting it will exceed 150 zettabytes in 2024. While data is often termed the "oil" of the new millennium due to its potential to enhance business processes, lower production costs, and drive scientific discoveries, deriving insights from this data can be challenging and time-consuming, often demanding substantial expertise to optimize databases for such analysis.

Optimizing database performance is crucial for achieving prompt query responses, which is a key aspect of database management. In this talk, I will discuss a new generation of self-driving, AI-powered databases developed by my group. These databases utilize machine learning and artificial intelligence (AI) to automate the complex and labor-intensive tasks of database optimization. AI-powered databases streamline the transition from data availability to insight delivery by automatically adjusting to the type of analysis required, thereby optimizing performance. I will focus on three critical challenges in optimizing database performance: a) selecting appropriate physical design structures (e.g., indexes, materialized views) to accelerate data retrieval, b) determining the layout of these physical design structures, with an emphasis on learned indexes tailored for disk setups, and c) deciding which data to cache in advance through (semantics-driven) prefetching to further enhance data retrieval.

**Bio:**

Dr Renata Borovica-Gajic holds the position of Senior Lecturer in Data Analytics and is an ARC DECRA Fellow at the School of Computing and Information Systems (CIS) at the University of Melbourne. Additionally, she serves as the Associate Dean (Diversity and Inclusion) for the Faculty of Engineering and IT. Her research lies at the intersection of database systems, machine learning, artificial intelligence, and data-driven optimization and analytics. Her scholarly contributions are regularly featured in esteemed data management outlets such as SIGMOD, VLDB, and ICDE conferences, as well as in journals including VLDBJ, TKDE, and CSUR. She is a recipient of several notable recognitions for her research, including the esteemed L'Oréal-UNESCO For Women in Science Fellowship in 2023, the Test of Time Award at SIGMOD 2022, and the Google Award for Research Inclusion in 2021. She has also been honored with the University of Melbourne's Research Excellence Awards in 2022 and 2023, alongside Teaching Excellence Awards in 2018 and 2020.

*Date and time:* Tuesday, October 1<sup>st</sup>, 2024, 10.30 am  
*Location:* Pérolles 21, Living Space A201, Bd de Pérolles 90, Fribourg  
*Contact person:* Prof. Philippe Cudré-Mauroux

*The colloquium is free and open to the public.*