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Title: *Boolean Networks for Modeling Biological Systems: From Theory to Therapeutic Applications*

When? *June 3rd, 2025 at 12:15*

Where? *Conference Room, Faculty of Mathematics and Computer Science*

Abstract:

Boolean networks are widely regarded as a gold standard framework for modeling biological systems due to their simplicity, interpretability, and well-defined formal foundation. In the context of precision medicine, these models offer a powerful approach for analyzing gene regulatory networks, facilitating a deeper understanding of the molecular mechanisms driving disease.

This presentation explores the application of Boolean formalisms to model network dynamics, with a focus on formal biological network modeling, automated network synthesis, and control strategy inference through abduction. Special emphasis will be placed on cancer biology, illustrating how Boolean networks can be leveraged to identify cancer-related mutations and guide the identification of therapeutic targets. Furthermore, we will introduce TaBooN, a novel method for synthesizing Boolean networks from omics data using tabu search, and BooN, an open-source software suite designed for the construction and analysis of Boolean models. These tools highlight the potential of Boolean networks to support personalized diagnostics and therapeutic decision-making.
