

## **University of Stuttgart**

Stuttgart Research Center Systems Biology





Systems Biology Seminar Talk

## Model-based trajectory optimization of treatment regimens in chronic diseases

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## **Abstract**:

Chronic diseases require long-term treatments that are continuously adapted to current physiological requirements. Often, a compromise must be found between desired treatment outcomes and side effects. For example, chemotherapies have to fulfill the subtle compromise between inducing cell death in tumor cells and potentially life-threatening hematotoxicity. To improve protocols for optimal interference with biomedical systems, my team and I have been working on methods for model-guided trajectory optimization using machine-learning techniques such as reinforcement learning. We hypothesize that current biochemical knowledge about the pathways affected by pharmacological treatments can be used for optimizing the administration dynamics to increase their therapeutic efficiency. will start with application examples in cellular systems that could be experimentally validated. Subsequently, I will present application examples chronic diseases. in



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## <u>CV:</u>

Dr. Dr. Stefan M. Kallenberger was educated as physician and physicist and works in the areas of systems medicine and systems biology. He heads the Systems Medicine team at the Health Data Science Unit of Heidelberg University and is working as physician at the National Center for Tumor Diseases (NCT) in Heidelberg. His scientific work covers applications of mathematical models for understanding biochemical pathways, characterizing pathomechanisms, and for improving the early detection of diseases.

