Three master thesis projects in learning-based control for cancer treatment

Background A new research project with funding from the European Research Council is about to start. The topic is learning-based control with applications in immunothearpy for cancer and this is a collaboration with Magnus Fontes at Institute Roche and Thoas Fioretos at the Department of Laboratory Medicine of Lund University.

MSc Projects Three MSc projects are planned for the spring 2026 in connection with the project:

1. Use single cell data from our partners to model cell population dynamics near the 24-hour periodic orbit driven by the circadian cycle. Models suggested in the literature will be applied to data from cancer patients. Both nonlinear and linearized models near the orbit are of interest.
2. Use single cell data from our partners to model the interaction between cell cycle, differentiation and cell functionality. Models suggested in the literature, for example based on optimal transport theory, will be applied to data from cancer patients.
3. Inspired by cancer growth models, this project will derive mathematical methods for data-driven stabilization of unstable control systems. The focus will be linear dynamics in high dimensions, where the unstable state needs to be estimated from data in order to be stabilized.

All three MSc projects will be carried out at the Department of Automatic Control with support from personnel at the Division of Clinical Genetics and from Institut Roche.

Interested students should contact Anders Rantzer, rantzer@control.lth.se

More information

https://www.lunduniversity.lu.se/article/three-researchers-receive-erc-advanced-grants-lund-universitys-most-successful-year-ever

https://www.clinicalgenetics.lu.se/division-clinical-genetics/fioretos-research-group

https://institut.roche.com/

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