# Master Thesis Suggestion

- **Project Title:** Optimal Scheduling Policy Inference using Reinforcement Learning
- **Supervisor:** Anton Cervin
- **Co-Supervisor:** Nils Vreman and Albin Heimerson
- **Thesis Summary:** Robustness is an essential concern in the design of control systems. One of the fundamental strengths of robust control design methods comes from their inherent robustness to disturbances, unmodeled dynamics, and external noise. However, when implementing the control system on a real-time platform, additional issues are introduced in the form of computational constraints. For instance, constraints are put on the task governing the controller's execution to execute periodically, according to a given schedule. It is still possible – and quite frequent – that tasks do not complete within their execution period, causing what is called a *deadline miss*. The scheduling algorithm implemented on the real-time platform then needs to deal with the failed control computation. How this is done is governed by the *deadline handling strategy* of the scheduler, where three common choices are:

  (i) Kill

  (ii) Skip-Next

  (iii) Queue($\lambda$)

  Normally, one of these strategies is chosen and kept fixed for a control system's indefinite execution.

  In the suggested thesis, the student will analyse if the scheduler would benefit from adaptively choosing a deadline handling strategy, i.e., for each individual deadline miss a new deadline handling strategy is chosen according to some predetermined policy. The deadline handling strategy will be determined using reinforcement learning evaluated on the control performance of the system.

- **Goal:** Using reinforcement learning, find an optimal policy for choosing a deadline handling strategy.