

## Project/Master Thesis

### Reinforcement Learning based Brake Controller

The Dynamics Group is happy to announce that we are currently looking for a highly motivated, independently working and ambitious student for a project/master thesis. Within a new research project we develop an AI-driven brake system control strategy for electrified vehicles. Using deep learning, we aim at predicting the friction sounds and brake particle emissions of real braking systems in collaboration with automotive manufacturers and suppliers, such as AUDI AG, VW AG and Hitachi Astemo.

This thesis encompasses the design and implementation of a reinforcement learning (RL) based controller, whose goal it is to reduce squeal- and particle-emissions while maximising the energy that is dissipated per brake event. The controller will be trained on a simulation model and in a second step deployed onto our experimental pin-on-disc equipment in Lille (France). The RL-based brake controller will be the first of its



kind and thus the ambitious goal of your work will be to produce highly relevant and state of the art results that will lead to a publication in a relevant journal.

#### Project milestones:

- Detailed literature survey on Reinforcement Learning
- Simulation of the pin-on-disc experiment
- Implementation of a Reinforcement Learning based controller in order to control the simulated pin-on-disc experiment and hyperparameter studies in order to find an optimal control policy
- Deployment of the controller onto the lab equipment in Lille, France
- Documentation, description and interpretation of the results, writing a thesis report

#### Your profile and skills:

- Demonstrated programming skills in Python, tensorflow, and related libraries
- Knowledge of control theory, non-linear dynamics, system identification
- Structured way of thinking, working, and communicating

Interested? Please contact: Nathanael Winter (Nathanael.winter@tuhh.de)