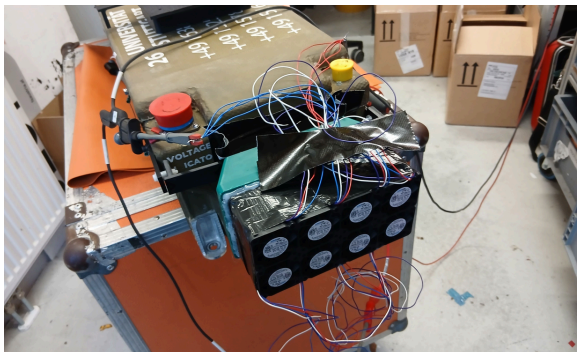



# SUGGESTED TOPIC FOR SCIENTIFIC WORK

## Development of a Water Cooling System for the HV Accumulator



The cooling system is critical to the performance of an electric Formula Student race car. Electrical losses during acceleration and regenerative braking generate heat that must be removed efficiently to ensure reliable performance. The objective is to develop and optimise a compact water-cooling system for the HV accumulator. Different cooling concepts and cooling plate geometries will be evaluated based on heat transfer, pressure loss, weight and manufacturability. Particular attention will be paid to achieving a uniform temperature distribution while minimising additional mass and energy consumption.
A suitable cooling concept will be designed, manufactured and tested to provide a lightweight, reliable solution for the next generation of the Formula Student accumulator.
The topic is merely a suggestion and must be finalised with the institute.

### Tasks:

- Define thermal and hydraulic requirements
- Compare water-cooling concepts and geometries
- Design coolant channels and hydraulic layout
- Manufacture and integrate a prototype
- Experimentally validate cooling performance

### Requirements:

- Basic knowledge of thermodynamics, heat transfer and fluid mechanics
- CAD and engineering design skills
- Interest in prototyping and experimental testing
- MATLAB/Python skills are a plus
- Willingness to join the Rennteam