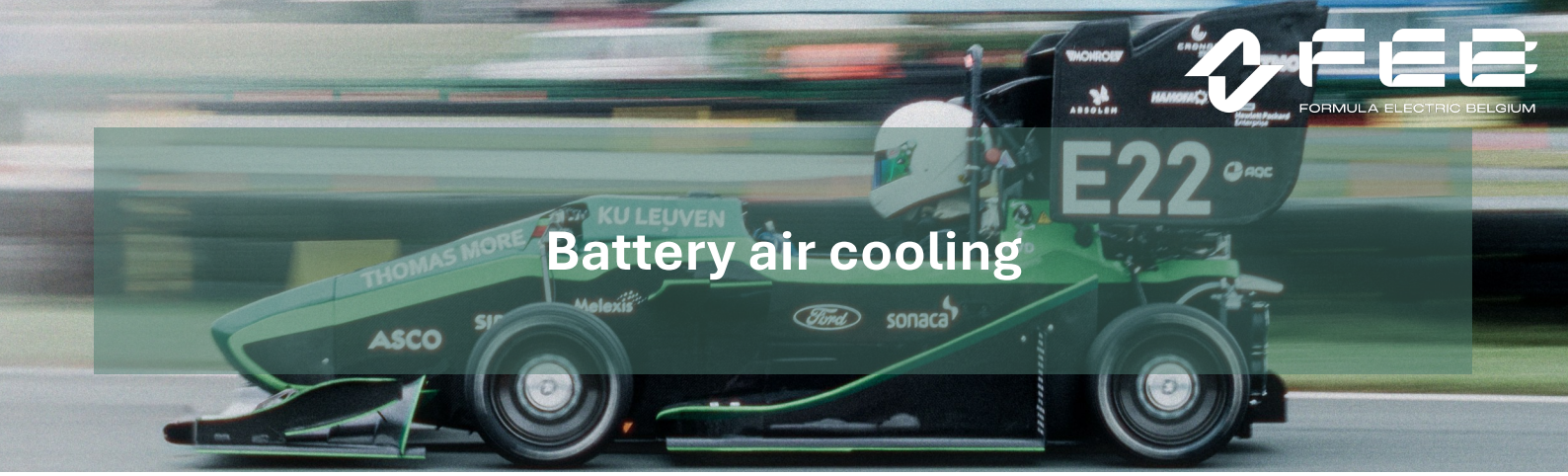

FORMULA ELECTRIC BELGIUM

Battery air cooling

OUR PROJECT

Formula Electric Belgium is a student-run electric race team which competes in Formula Student, the world's largest competition for engineering students. We aim to push the limits of performance, innovation and sustainability within electric racing every year, which is only possible with the help of our Thesis students. These pioneers are responsible for performance-defining innovations within the team, and we would love for you to join our team of highly ambitious and motivated engineers. As a Thesis student, you will research, design, prototype and test your innovations alongside the full-time members which make sure the team pushes itself and the car to new heights.

AIM AND OBJECTIVE

The aim of this master's thesis is to design and optimize an air-cooled thermal management system for the battery pack of a Formula Student electric race car, with a focus on numerical simulations using Computational Fluid Dynamics (CFD). The primary objective is to ensure safe and efficient battery operation by maintaining cell temperatures within acceptable limits under competition-relevant conditions.

The work focuses on the thermal and fluid-dynamic design of the battery enclosure and airflow architecture. CFD simulations will be used to evaluate airflow distribution, temperature uniformity, and heat transfer performance, enabling the identification of hot spots and areas of insufficient cooling.

Key challenges include achieving effective and uniform cooling using air while minimizing pressure losses, added mass, and system complexity. The design process will optimize duct geometry, inlet/outlet placement, fan configuration, and airflow rates. Where feasible, simulation results will be validated through experimental testing on a battery module or representative setup to confirm model accuracy and support implementation in the vehicle.

PROFILE

- Interest in **mechanical design and structural analysis**
- Interested in **CFD simulations**
- Has a background in **mechanical, electromechanical, or automotive engineering**
- Analytical mindset and pays attention to **model assumptions, boundary conditions, and validation**
- Interested in **material selection, lightweight design, and thermal behavior** of mechanical components

RETURNS

- Unique experience within a racing team
- Genuine work experience to carry with you into your career
- Exposure to cutting edge technology and software

INTERESTED?

Send us your contact details and field of interest to

recruitment@formulaelectric.be