

# Design and validation of outrunner transmission



We are looking for two motivated master students Mechanical Engineering Technology

## Project description:

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Formula Electric Belgium (**FEB**) is a team of highly motivated engineering students that build an electric formula student race car. Just like Formula 1 the team builds a brand-new car each year to compete in multiple international competitions during the race season. Formula Student is the largest international engineering and design competition in the world. The competition is characterized by combustion vehicles, electric vehicles and since recently also autonomous vehicles. Formula Electric Belgium strives towards innovations and the raw performance of technologies. It is for this reason that the team will focus on the autonomous/electric race cars. Research and development applications will be made by postgraduate students in collaboration with thesis students from the KU Leuven and bachelor students from Thomas More.

## Thesis description:

For a couple of years we have used 4 electric motors to drive our electric race car. The gearboxes are mounted in an upright connecting the motor to the wheel. This setup is called an inwheel design. The gearbox itself is a 1.5 staged gearbox consisting of a stationary ring gear, 3 planet gears connected to a rotating hub and carrier and a sun gear connected to the motor. The goal of the thesis is to design a new inwheel assembly called the outrunner. In this design, The ring gear is rotating and the sun gear assembly is being held stationary. This has the following advantages; compact design, no need for a rim center and an easy assemblage. In the design stage harpoints, collisions, strength, overall dimensions and mass should be taken into account. Special care has to be taken to make the design and all its components producible and assemblable within the limits of the team.

## Thesis objective:

The goal of the thesis is to explore the outrunner and make a working design for the Formula Electric race car considering the hardpoints, collisions, mass and strength. This should result in a first design of the concept that can be finetuned and implemented in later years.

## Profile:

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- Interested in transmissions and drivetrains. Good knowledge of the course machine parts (machineonderdelen) and production technology (Productietechnologie)
- Knowledge and interest of Siemens Nx for design and simulations
- Fast learner of different simulation programs (Kissoft, Bearinx, ...)
- Make and follow a tight time schedule

## What do you gain?

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- A unique engineering- and team experience where hard work and team atmosphere are central.
- Work with innovative technologies in a realistic environment/application.
- Create added value for your curriculum and the team

Are you interested? Please send your resume with accompanying motivation to:

[recruitment@formulaelectric.be](mailto:recruitment@formulaelectric.be)

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