

## Project Title: **Aerodynamics**

Supervisor: **TBC**

### Project details:

The new design direction of CUER's 2019 solar car provides a unique opportunity to have a significant contribution to the programme, pursuing aggressive high-efficiency aerodynamic design with a wide scope for creativity and innovation.

At cruising speed, the overwhelming majority of power losses are of aerodynamic origin. This highlights the importance of minimising our aerodynamic drag ( $C_dA$ ), while maintaining aerodynamic stability of the car, especially in cross-winds.

The design of the 2019 race vehicle's outer aero-shell will be constrained to a large extent by the choice of concept and key layout decisions made in light of the release of the regulations for the 2019 World Solar Challenge in June. These include restrictions on turning circle, steering, the maximum dimensions of the car in both driving and charging configurations and the internal space for the driver.

You will need to develop a full understanding of the trade-offs between aerodynamic efficiency of the aero-shell with other operational aspects of a solar car. The approach will be CFD-orientated, with as much validation as possible. Using industry standard software (ANSYS, Solidworks), this project will equip you with valuable skills for later employment in the Engineering sector.

Since the aero-shell will be manufactured by pre-preg carbon layup, any resultant design must be sufficiently simple to manufacture. As well as this, collaboration with the chassis project will be necessary to ensure the shell and chassis have a suitable attachment mechanism.

**Closely linked projects:** "Bodywork", "Chassis Structure", "Thermal Management & Battery Box Design" and "Steering, Brakes, Wheels & Tyres"

### Desired Skills and Experience:

*Note: These are not essential (unless listed in **bold**) and those who receive roles will be offered training to compensate for any gaps.*

- **Strong understanding of theory with good aerodynamic intuition**
- Completed at least Part IIA and 3A1
- Experience in designing with composites
- Proficiency in CAD with emphasis on surface modelling, particularly in Solidworks
- Proficiency in CFD, particularly ANSYS meshing and Fluent
- Good communicator of ideas
- Willing team player
- Prior interest/experience with solar cars/CUER
- Flexible and able to work to tight deadlines