

## TRA105 – TRACKS project: Advanced, 7.5 credits, Q1-Q2, 2021/22 Structural batteries – design, manufacture and characterisation

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We offer you a chance join our research activities to make car bodies and airframes into batteries. In this way, electrical energy can be stored in the structure of a satellite, in the body of a car or in the airframe of a drone or aircraft. Applications will not be sparse for a multifunctional material that offers mass-less energy storage across transport modes.

Scientists at Chalmers search for novel multifunctional lightweight composite materials. These exciting materials have an enormous potential to address some of the grand challenges facing us, particularly those associated with minimising environmental impact and maximise energy efficiency through reduced vehicle weight. Structural batteries can store electrical energy and simultaneously carry mechanical loads. While a liquid electrolyte is used in conventional batteries, structural batteries require a solid electrolyte to maintain rigidity and load-bearing capacity, and multifunctional carbon fibres are employed as electrodes. The potential offered for “mass-less” energy storage is very attractive for future transport solutions (see Figure 1).

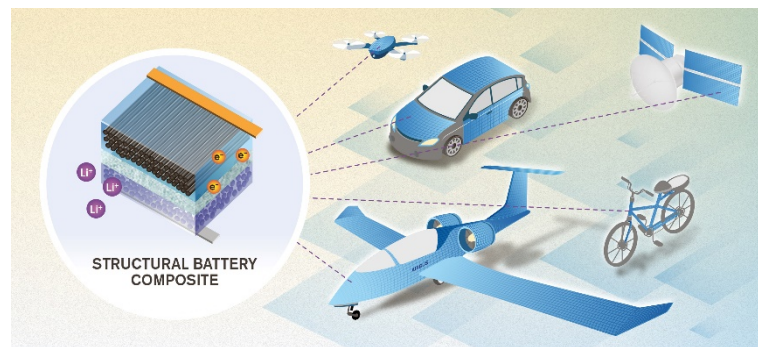


Figure 1. Structural batteries for energy efficient vehicle solutions across transportation modes.

We now invite students in Master’s programmes and research schools across Chalmers to contribute in the development of structural battery composites in this TRACKS<sup>1</sup> course within the theme Sustainable transportation. In an interdisciplinary team you get an opportunity to study the multifunctional performance of carbon fibres, make and characterise polymer electrolytes, design and manufacture structural battery composites and characterise their multifunctional performance.

We are looking for 8-12 motivated students across all of Chalmers’ Master programmes and research schools. The course does not belong to a specific Programme or Department. We need students with deep knowledge in: Physics; Chemistry; Applied Mechanics; Materials Science and Engineering; Electrical Engineering; Automotive Engineering and Sustainable Energy Systems. We aim to have the team in place by mid-April and to kick off the activities in late August 2021. The main body of the work will be carried out during September to December 2021. There are opportunities to form MSc thesis projects in the spring (2022) for further studies.

Apply by e-mail to Professor Leif Asp (leif.asp@chalmers.se) no later than April 10. Application should contain one-page cover letter explaining why you are applying and your background. It should contain your brief CV.

<sup>1</sup> <https://www.chalmers.se/en/about-chalmers/Chalmers-for-a-sustainable-future/initiative-for-learning-environment/Pages/default.aspx>