Joint MSc thesis project with Center for Lightweight-Production-Technology (ZLP®) of the German Aerospace Center (DLR) in Stade

Thesis would focus on the development of custom thermoplastic tapes at [Delft Tapelab](https://www.tudelft.nl/lr/delft-tapelab) for the [CoRe HeaT](https://eur03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fevent.dlr.de%2Fen%2Fjec2019%2Fcore-heat%2F&data=05%7C02%7CASMstudentsociety-LR%40tudelft.nl%7C0791bac545034ecc1fec08dda5384efa%7C096e524d692940308cd38ab42de0887b%7C0%7C0%7C638848383631268128%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMiIsIkFOIjoiTWFpbCIsIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=LJBiuISelh2VQ97ssnjyS2gcBXha2IbQJcFlf%2F8xj0g%3D&reserved=0) technology and to investigate the influence of customized tapes in CoRe Heat process.

Brief description of the CoRe HeaT Technology:

The increasing demand for high-speed production of advanced carbon fibre reinforced plastics (cfrp) has driven the development of novel manufacturing techniques. One such approach is the Continuous Resistance Heating Technology (CoRe HeaT) process, which is being developed at the Center for Lightweight-Production-Technology (ZLP®) of the German Aerospace Center (DLR) in Stade, Germany. It aims to accelerate processes like filament winding and automated fibre placement (AFP) of composite materials. CoRe HeaT uses resistance heating to heat up carbon fibre (cf) tapes. Therefore, the surface of the cfrp tapes is electrically contacted by two electrodes. The Joule effect heats up the fibres volumetrically. Especially in the field of thermoplastic cfrp materials, which require a high energy input to exceed the melting temperature of the matrix, CoRe HeaT offers the possibility to increase the production speed with high energy efficiency. Furthermore, the investment costs are comparatively low and there is no need for costly safety enclosures as in established laser assisted fibre placement processes.

Possible modifications for the tape manufacturing process could be:

* Equal fiber distribution
* Raw fibers at the surface (no insulating matrix)
* Investigation if tortuosity is beneficial or not
* Matrix modification for less resistivity
* Surface roughness