

## Master Thesis Proposal

### DEVELOPMENT OF BIO-REINFORCED COMPOSITE

#### Background

Short fiber reinforced composites (SFRCs) are being increasingly used due to their interesting mechanical properties and ease of processing. Despite very good performance of short fiber composites made from synthetic matrices and fibers, following from rising consciousness about environmental issues and the important need of sustainability, but also important emerging properties as light weight, considerable research is devoted to replacing man-made matrix material and fibers with materials obtained from natural resources.



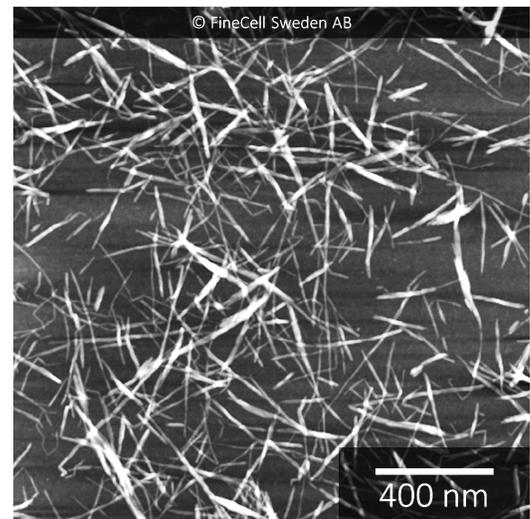
**Figure:** Components of an automobile made from biocomposites [Holbery and Houston (2006), JOM, 58 (11): 80-86]

#### Purpose

The purpose of this project is to (i): prepare bio-composite samples from recycled Polypropylene (PP) and micro-cellulose fibers, (ii): perform mechanical characterization of the composite, and (iii) characterization of the dispersion and micro-fibrillation of cellulose within the recycled PP

#### Project description

In the first phase of this project, bio-composite samples will be prepared using recycled PP as the matrix and micro-cellulose fibers as reinforcement agent, via melt processing. The impact of the formulation, cellulose properties and the extrusion conditions will be studied. In order to characterize the dispersion and micro-fibrillation of cellulose within the recycled PP, several microscopical and mechanical characterizations will be performed. According to the obtained results, the processing conditions of PP and micro-cellulose will be adjusted. An evaluation of the produced composite according to the automotive industry standards will be performed.



**Figure:** Cellulose micro-nanofibers produced by FineCell

#### Student background

This project is suitable for one or two master students who are interested in an interdisciplinary study merging characterization and composite materials. Background on Chemical engineering or Materials Engineering is highly valued. The internship will start at Chalmers university as soon as possible and expected to be from January to May 2022.

#### Contact

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