

**Project description (EFRO - Valorisatie)**

# Using vision to track the resin flow during the vacuum infusion process

Internship for: **WTB, TI, ET, LT** 3rd/4th year (2nd year intern in consideration)

Mike de Vogel, April 20, 2018

## Background

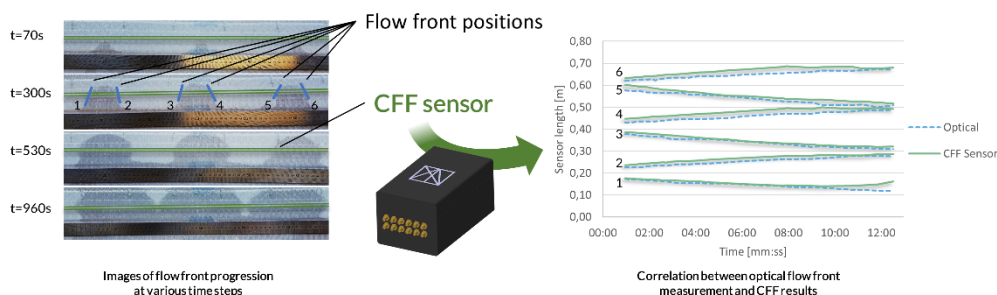
Manufacturing of composites can involve a lot of manual labour, which makes it more expensive and less consistent. In order to decrease the manual labour automation production technologies for composites require further development. Inholland Composites started a RAAK-MKB research project in September 2014, *Robocompo*, together with 10 SMEs with the aim to automate the vacuum infusion process. The project was a great success and the result can be seen in the Composite Labs in the form of a robot with several end-effectors.

One of the conclusions of the project was that almost the whole process can be automated, but the biggest challenge is controlling several steps in the vacuum infusion process. This subject resulted in a new EFRO project named: *EFRO - Valorisatie*. For this project the focus will be on improving the quality of the infusion in such a way that complex and one-off products can be infused in one try, instead of several tries that can be required. The plans to achieve this is using smart-moulds (with sensors and heating) to control the resin flow, vision systems to increase the quality of the build-up and advanced simulation models linked with real-time data and new disruptive concepts.

## Project description

To make a composite part you can use different kind of production methods. One of this methods is the VARTM (Vacuum Assisted Resin Transfer Molding) process. This process is done by a lot of manual labour. One of the steps is the infusion. As Inholland Composites we see a big opportunity to make the process more efficient.

The project will be a literature study and research to different kinds of ways and production methods to automate the infusion process. In the end the student needs to build a proof-of-concept setup in which it is possible to track the resin flow during the vacuum infusion process. This setup needs to contribute to the study done in the process. Are you a student that has a hands-on mentality, then this can be your project!



## Scope of work

During all projects at the EFRO-projects it is intended for the student to gain practical experience with composites. So, even if you're working on a 'theoretical' business-case, you will have to get your hands dirty in the lab. Thus, during design you will learn about manufacturing methods and materials. We are striving to create physical demonstrators in the design projects. Furthermore, a typical scope of work consists of these elements:

- Project plan, research questions, research method
- Literature study, research on tool design, etc.
- Functional analysis and concept study
- Gain expertise in composites
- Detailed design
- Demonstrator for manufacturing samples
- Testing of the demonstrator
- Analysis of test results
- Communication and interaction with stakeholders, companies and experts
- Technical report

## Company information

Inholland Composites, located at Inholland in Delft and Alkmaar, is a very well equipped, high-tech laboratory in the field of composite materials and structures. The focus is on fibre reinforced plastics which provide durable and lightweight solutions in a wide range of applications. Inholland Composites needs students from various technical departments and it's our mission to put theory into practice and provide students with up-to-date education which connects to today's business.

