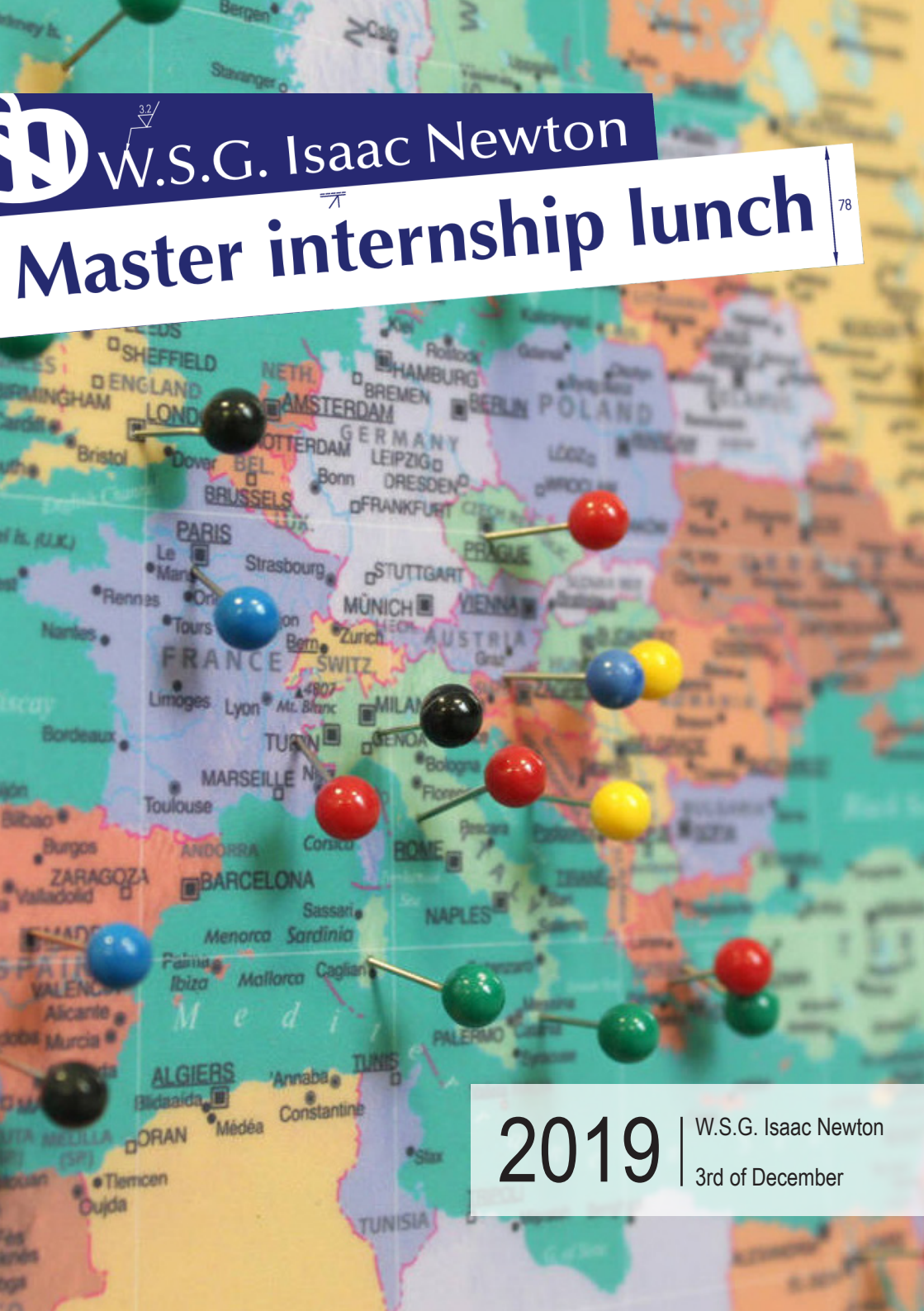
W.S.G. Isaac Newton

Master internship lunch



2019 | W.S.G. Isaac Newton
3rd of December

INTRODUCTION

Dear reader,

In your student life there eventually is a point that your study comes to an end. To prepare yourself for what comes next and to get already a taste of what it is like to be a "civilian", an internship is conducted. In a three to four month period you learn how it is to be working fulltime and to be a part of really awesome projects. This is a great opportunity to see what you like and to work at really cool companies. To make a wise decision, we have already gathered a lot of information specially for you! In this booklet, a great overview of experiences from students from different internship assignments at very diverse companies is presented. Well, what are you waiting for? Go and find your perfect internship!
But what if you want to know more companies after your internship? The study association has created the Shadowing Days project for this. During this day you can tag along with an alumnus Mechanical Engineering for a day to see what it is like to work in a certain kind of field! For more information of the shadowing days, ask the board.

Also see:
https://www.isaacnewton.utwente.nl/education/shadowing-day

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2nd edition

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2B Energy Holding B.V.

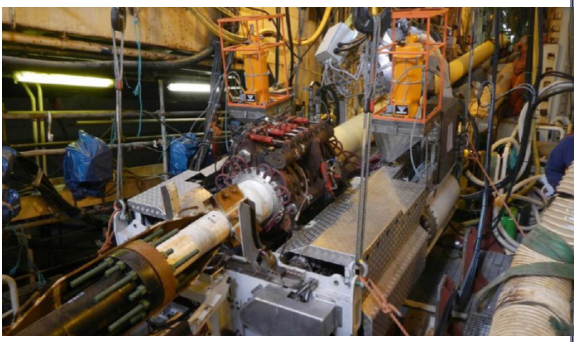
This is the 2B- Energy 6MW two bladed downwind turbine installed in Eemshaven, Netherlands. 2BEnergy Holding B.V. has its office located in Hengelo, NL. The internship assignment was about doing an aeroelastic simulation of this particular wind turbine in an open source software 'OpenFAST' developed by NREL (National Renewable Energy Laboratory) and validate the results. The aim of this assignment was to check the reliability and feasibility of this tool for the company to phase into.

The work experience in the company was great. The company has a small team of experts working on designing and developing two bladed wind turbines both onshore and offshore. Working with such expert individuals on interesting projects and having close interactions with them always helped me to learn a lot and get a much better insight on how things work in the wind industry.

2BENERGY

Allseas

Allseas is an offshore company specialised in pipe laying that is founded in 1985 by Edward Heerema. Allseas has over 4000 employees in offices all around the world and built the world's largest ship, named the Pioneering Spirit. The Pioneering spirit is a twin hulled vessel of 382m long and 124m wide, with a total installed power of 95.000kW and a lift capacity of 48.000t, capable of lifting entire oil and gas platforms.

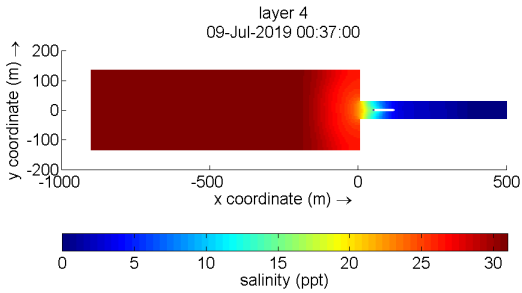


For some pipe laying projects, it is required that a pipe is thermally insulated. This is done by applying a thick layer of thermally insulating polypropylene around the pipe. These pipes come in 12m sections with the coating already applied, except for the location where the weld must be made. After the welding is done and the pipe is cleaned, an injection mould, as shown in the figure below, is placed around the pipe, and the cavity is filled with molten plastic. Since these pipes can have dimensions up to 24" and the coating thickness can be up to 100mm, the cooling time is very long. The internship assignment was to work out a method of reducing this cooling time. More in depth information could not be given due to confidentiality of this project.

Arcadis

Developing models for lock exchange gravity currents to obtain force from fluid acting on ship hulls. Used CFD program Delft3D and Matlab. Made ship by (moving) pressure field on water surface in Matlab. Delft3D uses that input to perform the mass and momentum equations to obtain pressure distribution of fluid. With a panel method, the pressure can be integrated over the surface to obtain forces.

Internship performed at Arcadis in the Netherlands, Zwolle. The attention given to students was good, colleagues are helpful and attentive and questions are readily answered. The overall mood of the office was diligent, but there is often time for discussion or some jokes.



BOND High Performance 3D

Bond is a 3D printing company specialised in printing high-performance polymers, such as PEEK. The assignment consisted of developing for 3D printers. The controller needed to minimize the tracking error caused by friction in the printers. The assignment required knowledge in control and precision mechanisms. A test setup was designed using the program solidworks and constructed it in the in-house workshop. Literature research was carried out and control simulations in a simulation program were conducted. The result looked promising.

BOND
HIGH PERFORMANCE 3D

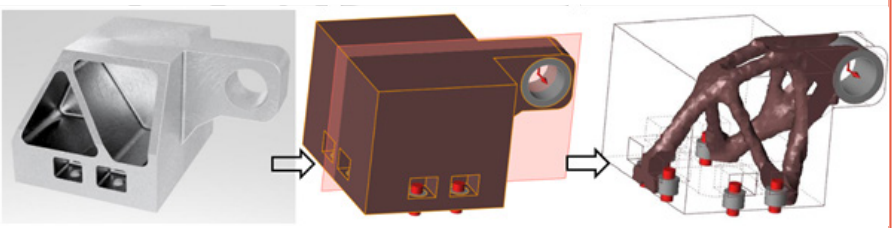
Bosch

Bosch cvt transmission has a plant just outside of Ho Chi Minh City (Saigon) in Vietnam. The plant produces pushbelts for continuously variable transmission, which is a complicated, high-tech product. The TEF2 department focusses on improving the production processes. The projects are diverse and every one requires knowledge from different specializations, which makes them fun to work on. Living in Vietnam is a big adventure as well. The culture is very different from the Netherlands.

Many different and very delicious meals can be bought on the street on the way to and home from work. Just outside the large city, the nature is incredible and every city from the south to the north is very different. Traveling through this country was a highlight of the internship.

MECAL

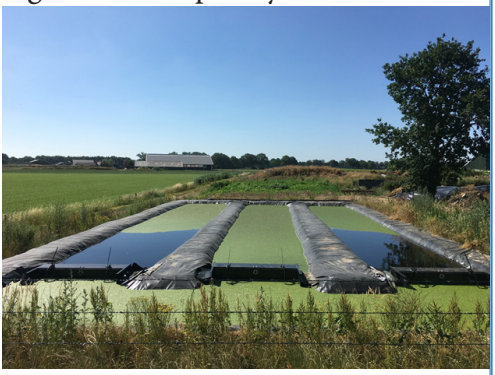
Internship was done at MECAL Semiconductor Product Development in Enschede. Work started out with doing a literature study into optimization with the available FEM software. Two different existing design projects were then given to show the usefulness of both optimization with FEM as well as the specific software SolidThinking Inspire. This determining the desired product properties and performance and filter out only the most important ones.



Multiple shape and plate thickness optimizations were then performed with Inspire and several concepts were created. These concepts were tested on their performance for mass, stresses, stiffness and production costs and compared to the original design.
From everything learned during the internship followed a recommendation to MECAL on training employees on the use of Inspire as well as optimization with FEM in general.

CCS Energie-Advies

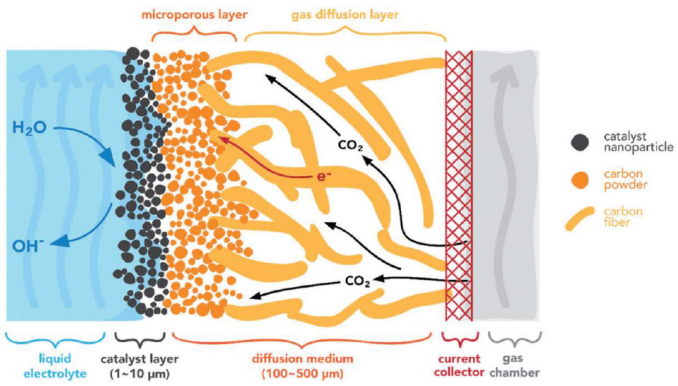
During my internship I had the opportunity to work with the company CCS Energie-Advies, here in Netherlands, in a project that was looking to optimize an automatic duckweed pond. The automation is made through a program designed for Raspberry Pi, with which all components such as valves, doors, motors and pump are controlled. Part of my project consisted in the improvement of an algorithm that was able to detect shades of green in an image, to perform the automatic analysis on the amount of plants that grow in the ponds, as well as a general revision of the algorithm to make sure it works accordingly.



Later on, I was able to install the components and make the necessary wiring for the pond operation. At the same time I also had the opportunity to test the components independently to verify their operation. Finally, some tests were carried out on the system to verify that everything was working as expected.

TU Delft

The storage of solar energy into chemical bonds by reducing C02 electrochemically to products such as CO, CH4, etc. has bred a great deal of interest in implementing solar-fuel generators. CO2 reduction in an electrochemical cell with planar electrodes is the common approach, however, mass transport across the hydrodynamic boundary layer is severely limited. This limitation can be minimized by use of vapor-fed, gas-diffusion electrodes (GDEs), enabling current densities increasing by several orders of magnitude, compared to the traditional system at the same applied cathode overpotential.



While there have been numerous experimental designs of GDEs, there have been only a limited number of efforts on the modeling of vapor-fed CO2R systems. The assignment during my internship at Process&Energy laboratory in the Delft University of Technology is on the topic of Modelling vapor-fed, gas diffusion electrode for CO2 reduction in an electrochemical cell.

TU Delft

DEMCON

DEMCON B.V. is a high-end technology developer and supplier with its head office in Enschede. The department of Production is busy with the industrialization of new products which can be internally or externally developed. The internship was based on this same procedure. In this case the product was an external design and DEMCON Production (DP) would be occupied with the assembly of the product.

The product was a finger-cuff for a blood pressure meter which required a lot of craftmanship to make. It was a fine experience to work in such an informal environment with besides the supervisor, also colleagues who were willing to help. Having close interactions with them definitely helped me in functioning in a full Dutch environment and in boosting my self-confidence.

DEMCON

Evonik

This internship was performed at Evonik in Wesseling (Köln/Cologne/Keulen). During this internship the extensional rheometry and shear flow behaviour under different conditions were tested for different kinds of elastomers. The data from these tests was analysed and conclusions were made.

Evonik in Wesseling is a quite big company with more than 1200 employees and 330.000 m2 area which is quite impressive. Even though the company is very big, it seemed small due to the nice atmosphere and the kindness of the people at the company. Also Cologne and Bonn are very nice cities. Cologne is a very big city with a lot of things to see and to do. There are nice restaurants and good parties.

EVONIK INDUSTRIES

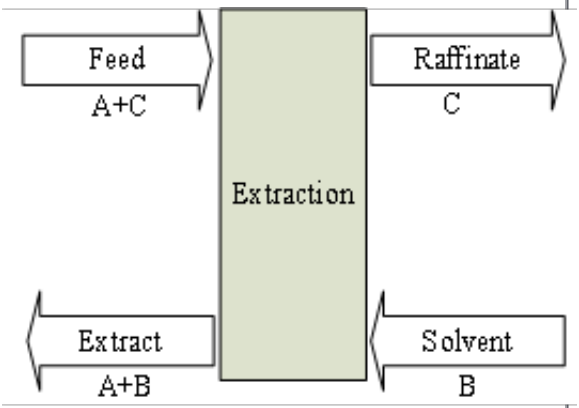
ExxonMobil

This internship took place at the refinery of ExxonMobil in Rotterdam, responsible for producing chemicals, lube oils and fuels. The organization can be characterized as hard working, enthusiastic with regards to their work and the people are very helpful. The assignment done was about equipment strategies for compressors.

Equipment strategies are basically policies of what needs to be done in order for the machines to run reliable and available. The strategies were outdated and not up to standards stated by the company and needed to be updated. The intern had a lot of freedom to choose how to tackle the assignment and could use his creativity. The results from the assignment will have direct impact on the business.

Graz University of Technology

This report summarizes the experiments carried by Robby Wijaya at the Graz University of Technology in Austria. The internship was conducted at the Institute of Chemical Engineering and Enviromental Technology as part of a larger study.



During the internship period, investigation of the isolation of lignosulfonates from model solutions using reactive liquid-liquid extraction was performed. The supervisor and the intern worked together in deciding the research method and overcoming any issue. As the assignment was a part of a bigger study, the result of the experiment will be used for future studies.

Graz University of Technology

IMS

Integrated Mechanization Solutions or IMS for short, develops high-end production systems for the global market. IMS' strength lies in distinctive production solutions, in which they offer their customers a sustainable advantage over their competitors. Currently they have delivered over 550 production lines worldwide and consist of approximately 100 employees.

The internship assignment revolved around the assembly principle of active alignment (AA), in which the optical system properties function as feedback for closed loop control. From the first day onwards, I felt really welcome to the R&D team and was frequently asked for my opinion in discussions, which really encouraged me to be at my best behavior. Occasionally there was room for a few off-topic discussions.

JAXA

The research performed during the internship was about the conceptual design of a helicopter that is capable of flying in the Mars atmosphere. The agency has the idea to fly into caves and pit craters present on Mars with this helicopter. The internship has been performed at the Japanese Aerospace Exploration Agency (JAXA). It is located in Tokyo, Japan.

It has been an incredible good learning experience both regarding research as well as collaboration with students from different disciplines and backgrounds. It was nice that the organization offered multiple interesting talks and presentations about their current projects during my stay. Besides working at JAXA, it was also a good experience staying in Japan. During the stay, several cities have been visited together with other (international) students working at JAXA.

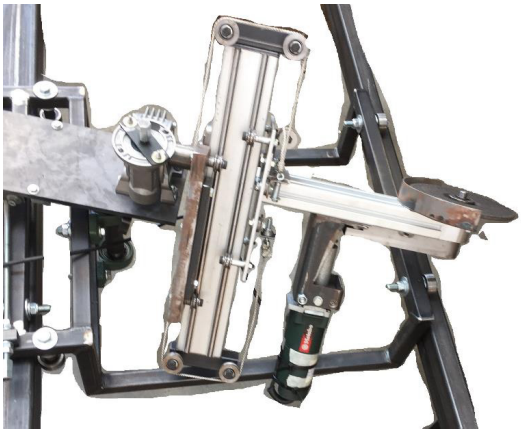
空へ挑み、宇宙を拓く

JAXA

宇宙航空研究開発機構

Lely Technologies

Wouter Bos' internship at Lely Technologies in Maassluis was about investigating whether a double action cutter bar that is currently sharpened outside of the machine, can be sharpened while still mounted on the machine. The internship was very hands-on and it was encouraged to quickly build & test prototypes in the workshop.



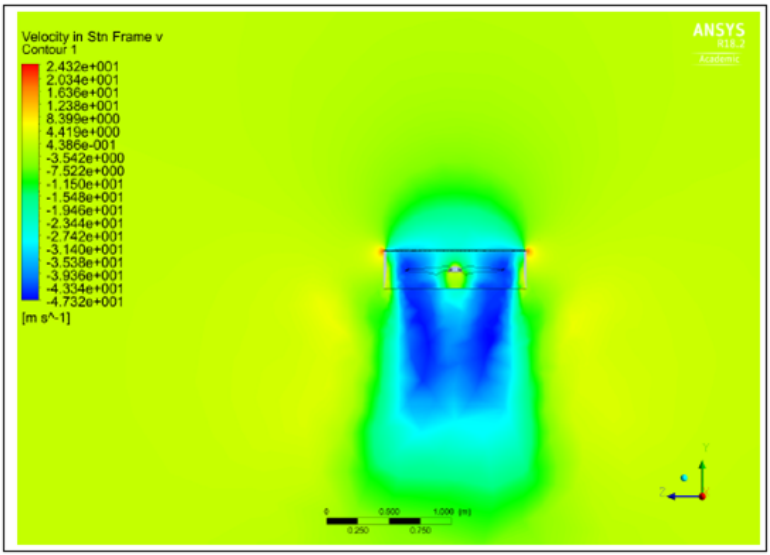
In the workshop, there was a lot of access to tools, welding equipment & steel to build those prototypes. The internship took place at Lely Technologies, which is dedicated to design & build new ideas for use in the dairy industry, which are later further developed for production. The internship location itself was a very informal workplace with very short lines between design and prototypes.

MECAL

Wind turbine towers are becoming thinner and taller, and a lifetime of 15 or more years is often desired. However, buckling is a very important aspect when considering the safety of wind turbine towers. At MECAL, Enschede, Netherlands, the Wind Turbine Design department works on modelling and performing analyses on several such towers. The purpose of this internship was to investigate this method and improve the accuracy of this method.

At MECAL, various archived projects are available to help understand the analysis method. The supervisors are highly proficient in modelling, simulations, and in the safety standards from the Eurocodes. They are also helpful and approachable, which made for a friendly environment to learn and apply relevant knowledge while experiencing the professionalism within the organisation.

RMIT



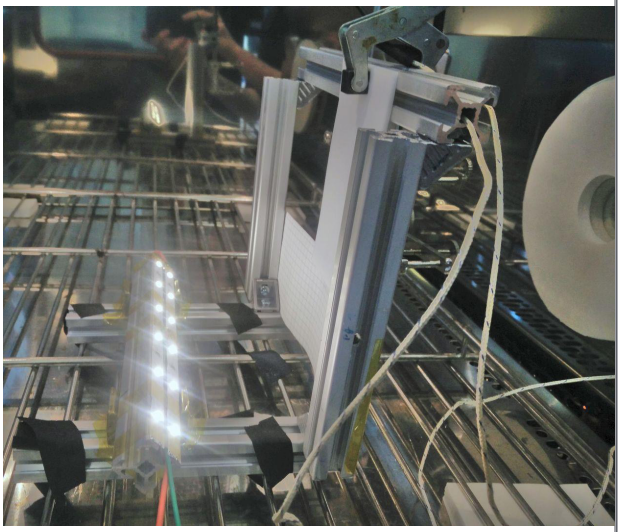
This figure above shows a 2D cross-section of a propeller simulation. The domain was split into tiny volumes and for every volume, a flow velocity was calculated, blue indicating downward velocity and red indicating upward velocity. This figure gives insight in how to air flows around a propeller inside a duct. The wake of the propeller is clearly visible in blue. The red 'dots' at the upper duct edges indicate a rapid change of air velocity in this region, as the air 'bends' around the duct to go trough to the propeller.

RMIT UNIVERSITY

Robert Bosch GmbH

During this internship at Robert Bosch GmbH in Renningen, Germany, a jig is designed to accurately and easily produce single lap joints to test the strength of an adhesive joint. These joints are tested in a testing machine to determine the strength of the bond. By testing different geometries of the joints, the data can be fitted to a model to determine the material properties of the adhesive. This has been done for an epoxy adhesive.

Besides this, two tests on the thermal contraction behaviour of silicone-based adhesive are explained. Also, the design of a Matlab tool to predict stresses inside an adhesive bond is elaborated.



BOSCH
Invented for life

Schrader T+A Fahrzeugbau

Schrader T+A Fahrzeugbau is situated in Beckum Germany. There are two facilities in Germany one specialised in stainless steel tanks for liquids and the other focussed on aluminium tanks for transport of mineral oils. As a project manager you manage different project related to simple projects where you have to lead a small team to re-structure working places to the redesign of a production process of the tank.

A lot of production is still done by hand and Schrader is known for having the best aluminium welders in the market. But there is a lot of room to automate the process and the company is also planning on fully automating certain production processes. The company mainly communicates in German so it helps learning a new language.

SCHRADER
T+A FAHRZEUGBAU

TATA Steel

This assignment is about the analysis of a vacuum tube which will be used for building the Hyperloop and was executed as part of a group project at Tata Steel IJmuiden. The project group consisted of international interns that all had their own individual assignment contributing to a group project. The project was managed using the scrum methodology in order to have short feedback loops between the project group and the management board that guided the project.

This assignment consisted of performing structural load case analyses on a vacuum tube by means of finite element analyses. During the internship a lot of opportunities were available to participate to workshops related to the project in order to meet companies and experts that were able assist in finalizing the assignment.

TATA STEEL

University of Queensland

The Centre for Hypersonics group at the University of Queensland conducts research in the area of high speed flow. They also developed their own Computational Fluid Dynamics program called Eilmer4. This program is continuously improved and the goal of this internship was to perform a three dimensional simulation in Eilmer4 and compare it with the results of an earlier study.

The internship was a great experience. Australia is a beautiful country and Brisbane is a wonderful city. The university has a very nice campus with good facilities and lots of nature. Australians are generally really chill and laidback people and the people from the Centre for Hypersonics group form no exception!

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

Vekoma

An internship was completed at the company Vekoma Rides Manufacturing B.V. at the Research & Development department. It is a very small department where about six people work with different nationalities, which made the communicating language primarily English. Vekoma Rides Manufacturing B.V. is located in the small village Vlodrop and is one of the largest manufactures of roller coasters in the world.

The assignment was related to the multi-body dynamics of roller coasters, using a multi-body software, and consisted mainly of modelling and trial-and-error research. Therefore a lot of time was spent behind a computer.
The assignment was interesting, but colleagues made the internship even better. They were very kind, helpful and sociable. Also the company organized something fun for Christmas and Sinterklaas.

VEKOMA

WiredWorkers

WiredWorkers has a young and enthusiastic team of coworkers who want to automate the boring labour by making robotics accessible. The company is based in Doetinchem, a city at 60 Km from the University of Twente. The student was responsible for the development of an application to reduce the changeover time of a robot between different tasks.

This was done by looking at current workflow of switching a robot between different tasks. After that the student came up with some concepts to automate this and eventually the student was programming an app that can be used to calibrate the location of a robot with the use of one of the concepts.

BTG

The internship was carried out in BTG biomass technology group situated in Enschede, Netherlands. BTG Biomass Technology group is an independent, private group of companies which specializes in the process of conversion of biomass into useful fuels and energy.

The objective of the internship was to develop a case study to analyze the technical and economic feasibility of Miscanthus x giganteus, an industrial crop, grown on marginal land in France for the pyrolysis process. The design of the pyrolysis plant was based on BTG's pyrolysis plant situated in Hengelo, Netherlands.

With the development of the case study, the relationship between the decisions taken in each stage of the supply chain of biomass with the capital cost (CAPEX) and operating cost (OPEX) of a pyrolysis plant was a good learning experience.

btg
biomass technology group

QConcepts

QConcepts is a young and dynamic company. It is situated in Doetinchem 60 Km southwest of Enschede. QConcepts uses a hands on approach to solve problems on the interface between composite materials, flow analyses and embedded systems. Next to the office, a workshop is located suitable of the production of composite products.

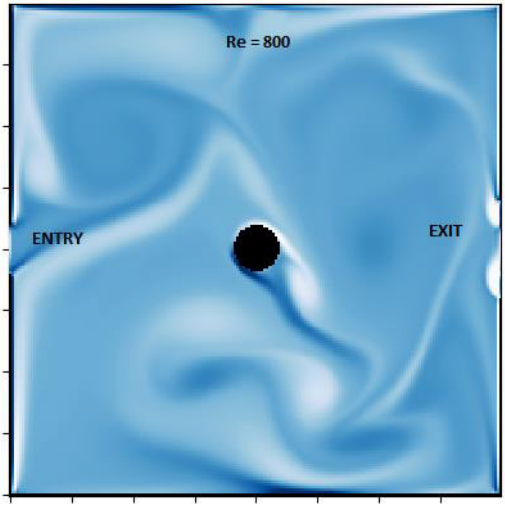
One of the projects at QConcepts is the build of a hydrofoiling sailboat, the Flo1. All steps between prototyping and production of the Flo1 foiling dingy have been tackled during the internship. This included material choice, optimization of parts for production and the establishment of the process.

QCONCEPTS
DESIGN & ENGINEERING

Thales

In this assignment, the case of optimization of the inner geometry of a flat plate heat exchanger was studied. The topological research regarded the introduction of solid objects inside the domain in order to create complex flow patterns that will reduce the maximum temperature of the cold plate.

The assignment was carried out as part of the internship project, in Thales Nederland B.V. in Hengelo. The progress of the project was tracked down through weekly meetings and guidance for the next steps. The overall impression from the working experience in the company was satisfying, as a lot of knowledge and skills were gained regarding real applications of conjugate heat transfer problem.



THALES

Transfer Consultancy

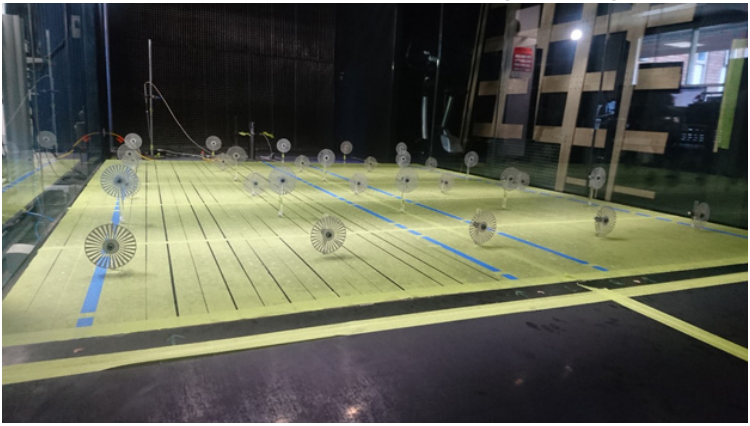
During his internship Maxim van Wieringen worked at Transfer Consultancy in Barcelona. This company helps their clients write project proposals for European funding programs, Horizon 2020 and LIFE. The internship was advertised through the internship Blackboard page. At the moment of writing 4 UT students have done an internship at Transfer.

For his assignment, Maxim wrote a Horizon 2020 project proposal regarding the Repurposing of end-of-life batteries from electric vehicles for the use as stationary storage. Barcelona is a great city to life in, although you should be careful when leaving your (3 bikes were stolen). To be allowed to work in Spain you need a NIE number. Getting this number yourself is possible, but help from your receiving institution can be useful, as Spanish bureaucracy is a nightmare.

TRANSFER
CONSULTANCY

University of Sydney

Mark did his internship in the School of Civil Engineering within the University of Sydney in Australia. He did multiple experiments regarding vertical staggering in wind farms in the Boundary Layer Wind Tunnel. Besides his research he was also tutoring a third year undergraduate Fluid Mechanics course to Civil Engineering Students.



Mark lived close to the city center, opposite of a relaxing park and swimming pool and about 15 minutes walking distance away from the university. Mark was working full-time at the university during the week, but in his weekends he explored places in and around the city.

THE UNIVERSITY OF SYDNEY