



 W.S.G. Isaac Newton

# Master internship lunch

2019

W.S.G. Isaac Newton  
4th of June

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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# TOC

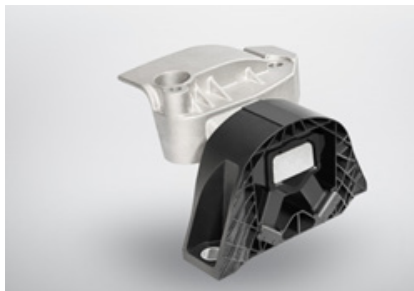
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## BOGE Rubber & Plastics

BOGE Rubber & Plastics produces plastic and rubber automotive parts, such as pedal boxes and bushings, which are rubber absorbers that link chassis, engine and transmission parts of the car.

BOGE Slovakia offered an internship in Rubber to Metal bonding inside Bentley bushings. The stay in Slovakia (Trnava) turned out to be great. A large part of the inhabitants are students and the city has many historical buildings. They have a football club "Spartac Trnava" and around their Arena a lot of activity takes place.



The working environment in BOGE is stimulating and open-minded staff is always available for helping you out. Inside BOGE you get a good look into the automotive parts industry and it has been a great learning experience.



# Fokker Landing Gear

An internship at Fokker Landing Gear (Helmond) is the opportunity to gain real experience in the field of engineering and the combination with business functions. The internships that are provided are real objectives ranging from engineering to manufacturing. Each intern is treated as a team member and may participate in any meeting or discussion. All employees are enthusiastic and will support you in any way to make sure you get the most out of your placement.



During the internship of Gijs, he evaluated the financial impact of implementation of monitoring techniques onto landing gear equipment. At first glance, it appeared that making a business case was not a task someone would expect from a Mechanical Engineer. However, as the project developed, the lack of linkage between engineers (technical aspects) and management (financial aspects) became a hurdle. Instead of focusing on the financial aspects only, a clear overview of the linkage between the financial and technical aspects was required. Gijs developed himself on this aspect and became a true technical project manager. His model is the basis of the development of a business case evaluated on different levels, both technical and financial.

# FOKKER

## LANDING GEAR



## NEDCON

NEDCON is a Dutch company headquartered in Doetinchem, Netherlands that has over 5 decades of experience in making storage solutions for a large number of clients all over Europe and North America. The company was acquired by the Austrian multi-billion dollar giant Voestalpine in 2004.

NEDCON develops efficient, innovative pallet racking, mezzanines, decking and several other storage solution products and have been a leading name in the field. The three month long internship focused on the development of an analytical model to predict the behavior of chipboard mezzanines in shear. The company fosters a healthy atmosphere of research and curiosity, and thus any questions during the course of the internship were duly encouraged and answered.



# NEDCON





# Callaghan Innovation

For this internship a device was developed, to help stroke survivors that have a partial paralysis in their upper lips recover, this device is called the Armskate. This internship was conducted at Callaghan Innovation in Christchurch, New Zealand. The company has a very good working culture and of course it is a beautiful country to travel around.

The Armskate moves on top of a table surface and has 3 modules, a hand open and closing module to train the hand of the patient, a vibration motor module and a joystick module. In the picture the hand open and closing



module is shown. Using the Joystick module, the patient can control the movements of the Armskate, the other modules use predefined patterns. This internship was mainly about redesigning the control system.

# CallaghanInnovation

New Zealand's Innovation Agency

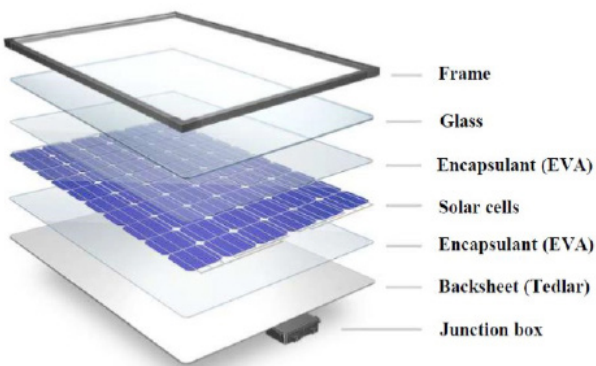


## ECN

The internship was executed at ECN in Petten, The Netherlands. ECN, a research institute has been working on developing various renewable energy sources such as Solar, Wind, Biomass. The institute aims on increasing solar panel yield and other new generation solar panels. I did my internship in PV Modules and Applications department and the work is focused to find different recycling methods for PV Modules through literature study.

A Photovoltaic module has the ability to convert the sunlight into electricity, known as solar energy. The module contains several layers in it and are shown in the figure.

It contains metals that are precious in the market. At the end lifetime of these modules, these panels cannot be thrown and has to be recycled to retrieve these precious metals (Silver, Copper). Therefore, the internship is carried out for finding efficient recycling methods to separate these layers in the module.





# Fast Forward Wheels

Fast Forward Wheels (FFWD) in Zwolle (The Netherlands) is designing and producing high quality carbon wheels. The Falcon project of FFWD is a project to develop the fastest wheel on earth. The front wheel in the figure is a prototype of the current design.

The Falcon has two carbon spokes with airfoil cross sections and a non-constant rim height in order to have the best balance between pressure and friction drag. The goal of the internship was to research the production quality, stiffness and aerodynamic characteristics of the Falcon using different testing methods.



**FFWD**

## Foseco

The Internship was conducted in the company Foseco based in Enschede, Netherlands. Part of my Internship was also carried out in the University Rapid Prototyping lab where some of the experiments were performed.

The Internship was about using company sand and binder to 3D print sand cores. It initially involved literature study, later several experiments were performed



in the company and finally 3D printing of sand blocks were performed in the University Rapid Prototyping lab.

The experience was amazing, since this was the first time I was doing an assignment with the company, I was able to get the insight of how the work culture is in Netherlands. The supervisors both from university and the company were very kind enough in sharing their knowledge and guiding me with the Internship.



## IMEC

The internship was executed at IMEC in Genk, Belgium. IMEC, research institute, has more than 30 years of experience in silicon solar cells and developing better PV modules to increase energy yield, regularly invites international scholars to work on ground breaking technologies. IMEC is located at 'EnergyVille Thor Park' in small, quiet, lovely city Genk, used to be known for coal mines, is 15 minutes away by bus from train station.

Internship task, was to optimize the Bifacial PV systems to achieve maximum energy generation which included mechanical designing, different programming, simulations, and optimization. The work done during an internship delivers a better understanding of the effects of various parameters on energy yield and definitive directions for developments during the installation of bifacial PV systems. The main achievement of the internship was the successful development of a proof of a concept that demonstrates the feasibility of algorithmic optimization of bifacial PV plants. It is expected that such techniques will shape the future of PV power plant development.

The IMEC logo is displayed in a large, bold, dark grey sans-serif font. To the left of the letters 'imec' is a small blue square. Below the letters 'imec' is a blue circle with a white center, resembling a stylized 'o' or a dot.

## Krone

Krone is one of the world's leading producers of agricultural harvesting machines. They are situated in Spelle, Germany, which is about a 45 minute drive from Enschede. This is their main site and contains everything from headquarters to production and engineering departments and a spare parts center. The assignment was part of the mechanical design section of the Self-propelled machines department.

The colleagues were willing to help with any questions, but all the communication is in German. They let you work out your own assignment and give feedback if necessary. Most of the work is carried out behind your desk but the prototype



workshop is close and can easily be visited. Prototypes are quite often manufactured, provided you have a good and functional design.



# Multi Tool Trac

The internship was carried out at Multi Tool Trac in Arnhem, the Netherlands. Multi Tool Trac designs and constructs specific tractors for arable farmers which implement Control Traffic Farming (CTF) to reduce production costs and increase crop yields while optimizing the soil. A unique feature of this tractor is that it is powered by a hybrid diesel-electric engine.

The purpose of the internship was to improve various components of the current Multi Tool Trac and new future developed electric tractor with the aim of reducing the weight of the tractor. The assignment consisted of a combination of analysing, (re)designing and optimization with MATLAB and finite element software.

The experience of working at a company was nice and interesting. At Multi Tool Trac, the colleagues are very friendly and open to new ideas.



**Multi Tool Trac**  
ELECTRIC POWER FOR SUSTAINABLE FARMING

## NLR

The internship project has been carried out at the Flight Physics and Loads Department of the Netherlands Aerospace Centre NLR in Amsterdam. The research at the department focusses in 'beyond state-of-the-art' aerospace applications. Theoretical and practical knowledge are applied together with cutting edge modelling of computational physics, which includes: computational fluid dynamics, computational aero-acoustics, computational electro magnetics, computational aero-elastics, aero-thermo dynamics and computational flight dynamics.

The internship assignment dealt with the aerodynamic optimization of the turbine blades and vane of a heavy duty gas turbine. It involved the use of sophisticated tools for the engine modelling, for which the student obtained two certificates.

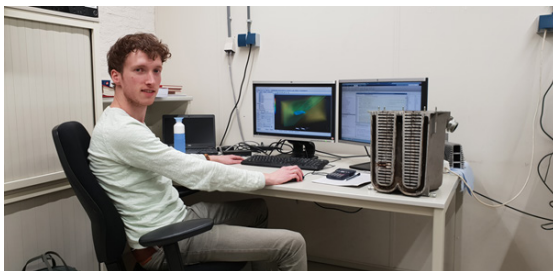




# Remeha

The internship within Remeha Apeldoorn consisted of two different assignments which made the internship a diversified experience. Part of the assignments consisted of computer simulations of heat exchanger designs, which can be seen in the picture. Working on the assignments resulted in an increased knowledge about various aspects of heat exchangers.

Especially the heat exchangers which are operating in harsh operating conditions such as the heat exchangers in gas boilers. Besides the experience of working on technical problems in real



cases, it was also a great experience to see how a great company such as Remeha is organized and how decision making and management plays a role on the work and projects of the R&D department.

# remeha

## Ricardo Rail

I came in contact with Ricardo Rail during the second semester of my first year at the UT regarding a course where they gave a guest lecture. At this moment I was already interested in the company. After further talks the company was also interested in an internship opportunity. The representatives of Ricardo were also curious about the specific master maintenance engineering and operations which is a unique MSc offered only in Twente.

The things I liked most in the company were the scale, the professionalism, the numerous experts in their respective fields and a consultancy culture where flexible working hours are maintained. I was given complete authority and freedom to finish my assignment however I felt best. The supervisors in the company and colleagues were also open and always ready to help when needed. The culture in the company was a formal one, but there always was time for a chat or a “bakkie” (cup of coffee). Part of my research was interviewing colleagues, and this was also done with a smile even with the busy schedules everyone had. There were also some other small things like fruit being available for free, more than often lunch would be provided via one or another way.

First, as an international student, this experience taught me a lot about the professional culture in the Netherlands. I got to improve my communication skills during the interviews and also ultimately got to apply theoretical knowledge from courses to a real-life problem. During the internship, I was working in the maintenance department which is also my study field. I can conclude that this was a successful internship on my part and was more than I expected from this experience.



# Stevens Ide Partners

Over the past decade aesthetics has been given more importance on par with the technical aspects of the machine in the industrial machineries. Eventually, this lead to isolating enclosures as a separate assembly similar to the human media interface due to the services it provides. To name a few, protection, accessibility, isolation of work environment, structural support for electronics, vents, ducts, warning lights, etc., But the real challenge is in bringing the developed sketching work into mechanical working toy. The assembly has to be easy to dismantle and mount, transport easily inside the buildings and in vehicles, user friendly procedure for putting together like the Lego works or Ikea's design. Some of the things that are given more importance nowadays, the ergonomics of the electronic or user interface points.

This is especially to reduce the human stress while working. Thanks to the evolving design, it forces to use the latest manufacturing techniques either to prototype or for mass production. So, as an engineering intern in a design company, it is a multidisciplinary role to manage 3d printing, pre engineering, sheet metal design, detailing and evaluation. And most importantly time management. Certain things look easy and working in the CAD tools, but unless it is prototyped, the real usage difficulties are unknown and this also applies with respect to the user. The one who is going to the machine at the end is a layman and not an engineer which makes designing a bit more important.

**ID**partners  
DESIGN FOR INDUSTRY



## UTSC

This internship was done at USTC in Hefei, China. In this Internship I joined the research department of the Fluid Mechanics department of the University. USTC is a quite well-known and prestigious(in China) university. It is not a technical university, so it offers a lot of different majors. In Dutch terms the university is huge (more than 5 campuses the size of UT), but for Chinese terms this is quite small.

The atmosphere at the university is very good. Most Chinese students there are very friendly and curious to meet you. Most of them are very serious and spent most of their time studying, but they are fun to hang out with. Hefei is a 2nd tier city, which means it 'small' to Beijing or Shanghai. But mostly that means in this case that it is not so internationalised and the people speak no to little English. However, the young people(like the students) do speak English quite well, which is quite important.

The internship itself was a research assignment on gaseous interfaces affected by reshock (Two shock waves). During the internship I performed numerical simulations on this problem, using a simulation tool called

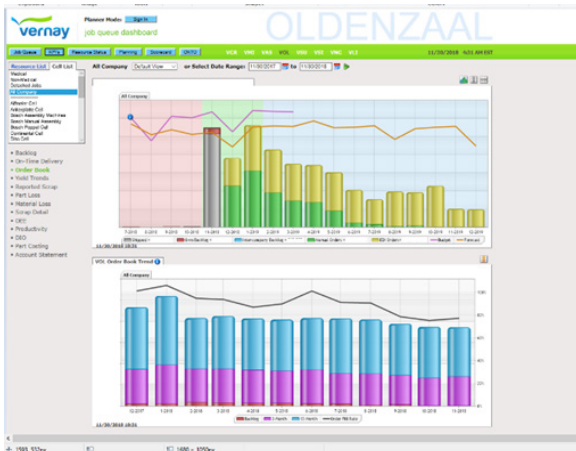


HOWD, developed by one of my supervisors at the university. The internship was mostly on the application of this tool and analysis of the results. It did not require my full understanding of CFD and the workings of the tool itself. The assignment was quite interesting, because it was a research into something that was not researched well until now.

# Vernay

The picture best describes the internship undertook at Vernay Europa, in Oldenzaal. The internship involved capacity management planning at the company. This meant looking at ways to help balance supply and demand at the company. The above picture shows the budget (purple line), forecast (orange line), and actual orders (green and yellow bars).

The bottom picture shows the order fill rate. Together they show the differences between supply and demand at Vernay. A main aim of the internship was therefore to create tools to help manage the supply and demand better. The tools provided assistance in checking the reliability of the forecast and order data, looking at and trying to level the differences between capacity and demand, and providing information on the most important parts to look at.



Vernay Europa B.V.



flow control solutions

## DEMCON

In dredging, mining or tunneling industries, density measurement of highly abrasive slurries is often very important. Alia Instruments, a company within the Demcon building, provides Non-Nuclear density meters. The Alia Density Meters (ADMs), use the dynamic response of a flexible tube, along with the slurry flowing through it, to estimate its mass. The ADM estimates this mass by excitation of the flexible measurement tube and measuring its response (accelerations). Because the system can be modeled as a simple mass-spring-damper system model, a second order model can be fitted to the measured dynamic response. The estimated parameters of this model give an estimation of the exited mass. A new measurement tube for this ADM sensor was designed. This new design got rid of the costly hydroformed steel bellows and casted polyurethane layer. Moreover, the measurement tube is half the length of a conventional tube, with even better dynamic behaviour. The improvements were achieved by more efficient use of space and flexure design.



The intern was really part of the team. The working sphere was informal. Support and feedback of the work was sincere. The assignment was well appreciated: A test setup will be build in the near future to further investigate the capability of the new tube





# Faurecia

This is a picture with my colleagues at Faurecia, taken during weekly Friday meeting. This meeting is meant to discuss anything other than work, like a leisure time with snacks and coffee. These meetings were fun and entertainment which helped me to know each other personally and exchange the culture and language. During my initial days it was very difficult to find a place and to get to know about city, they helped me to find things better in Germany. They belong to VW-AUDI team and are very experienced people. Interacting and communicating with each other during internship period helped me develop my soft skills.



Internship at Faurecia helped me in networking, direction towards career path, boost to my CV and exposure to real life working corporate environment, which helped me to prepare my mindset before I actually start a full-time job.

**■ faurecia**  
inspiring mobility



## Hankamp Rehab

Hankamp Rehab was founded in 2009, it is a spin off of Hankamp Gears and it is a product developer and distributor of patient revalidation devices. In order to obtain a functional product, a lot of scientific research has to be done. A part of this research is done in collaboration with the University of Twente and Roessingh RRD. The company Hankamp Gears, which is the "sister" company, offers the possibility of prototyping and production flexibility.



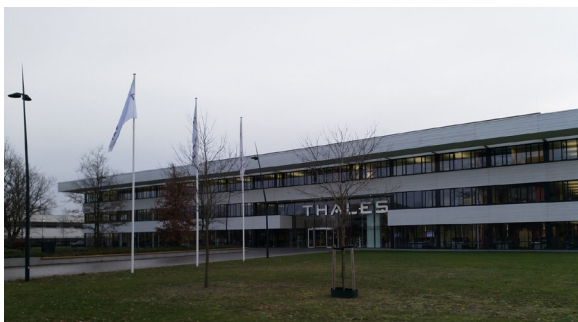
During the internship I have gained a lot of knowledge regarding the researched product. I had the opportunity to see how a company works in terms of product design, production and sales. The working environment was informal and the offices were shared. There has been the opportunity to have a complete tour of the Hankamp Gears and see all the steps, from sketch design received from a customer, to the production and final quality checks of the delivered product.



# Thales

Thales is a multinational company that is active in several different high-tech industries. Their establishment in Hengelo designs and produces radar systems for military applications. A big advantage of this company is that it is located rather close to the University of Twente.

The subject of this internship was to conduct research on condition monitoring of drive mechanisms that enable radar antennas to rotate, at the department of Mechanical and Electrical Engineering at Thales.



The atmosphere at the department is very relaxed and open-minded. The internship subject provided opportunity to conduct both theoretical research, as well as practical experiments, which made this internship rather diverse. Since Thales is a large company, there are always several interns, and they even have a dedicated association for interns that organizes several activities.

THALES

## Transfer Consultancy

From September to December 2018 this student was an intern at Transfer Consultancy, a consultancy firm in Barcelona with a focus on sustainable solutions. It is a small company in the centre of Barcelona. The most valuable experience for him was learning how to write a decent proposal to obtain subsidy of the European Union's Horizon 2020 project.



Barcelona is a great place to live as it has a lot to offer. Doing the internship in Barcelona means making a lot of new friends, doing the things you like and getting a whole new perspective on how one could live.



# NEDCON

The internship was carried out in the company NEDCON in Doetinchem, Netherlands. NEDCON develops efficient, innovative pallet racking, mezzanines, decking and several other storage solution products and have been a leading name in the field. The atmosphere in the company is very good and open minded. And colleagues are very friendly.



For international students, the only downside is that the company is a little far away from the university, but the company will have transportation subsidies which is very helpful.

The subject of internship focused on the development of an analytical model to predict the behaviour of chipboard mezzanines in shear. It proceeded into three phases: a detailed Finite Element Analysis of the mezzanine system, a series of simple experiments to measure the strength of a single fastener connection and finally an analytical model.



## NS

This internship project has been carried out for a period of 15 weeks at the Nederlandse Spoorwegen (NS), the main operator on the Dutch Railway network. I was part of the Maintenance Department which is under NS Techniek (NedTrain). NedTrain is responsible for maintaining and servicing, modernization, overhauling and cleaning of all rolling stock (trains) operated by among other the NS. From December 2018, a new train was introduced, the Sprinter New Generation (see figure). For this internship an analysis was carried to link an FTA with an FMEA regarding the door system, in which failures by human behavior are also considered.



For most of the time during the internship I was at the Maintenance Depot in Leidschendam, where all maintenance related activities are carried out regarding the SNG's. I have learned a lot here and have seen the work environment from different perspectives.





